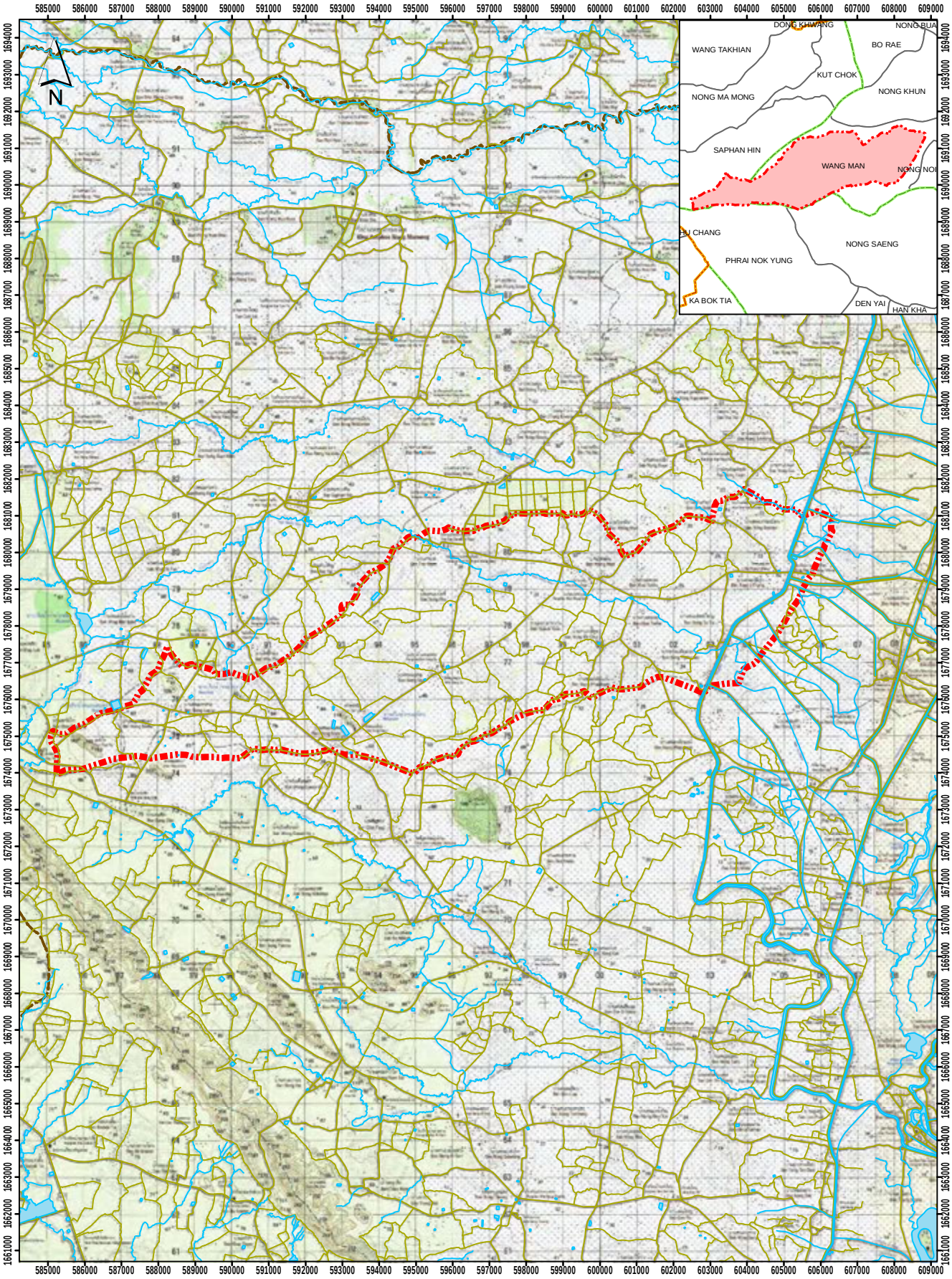
Community Case Study

Tambon Wang Man, Wat Sing District

Chainat Province

Content



Legend

- Provincial Boundary
- Tambon Wang Man
- Water body
- River
- Road

Note Data Source:
Tambon Boundary of Wang Man: TAO
Neibouring Tambon Boundary: GISTDA
Other data: RID

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

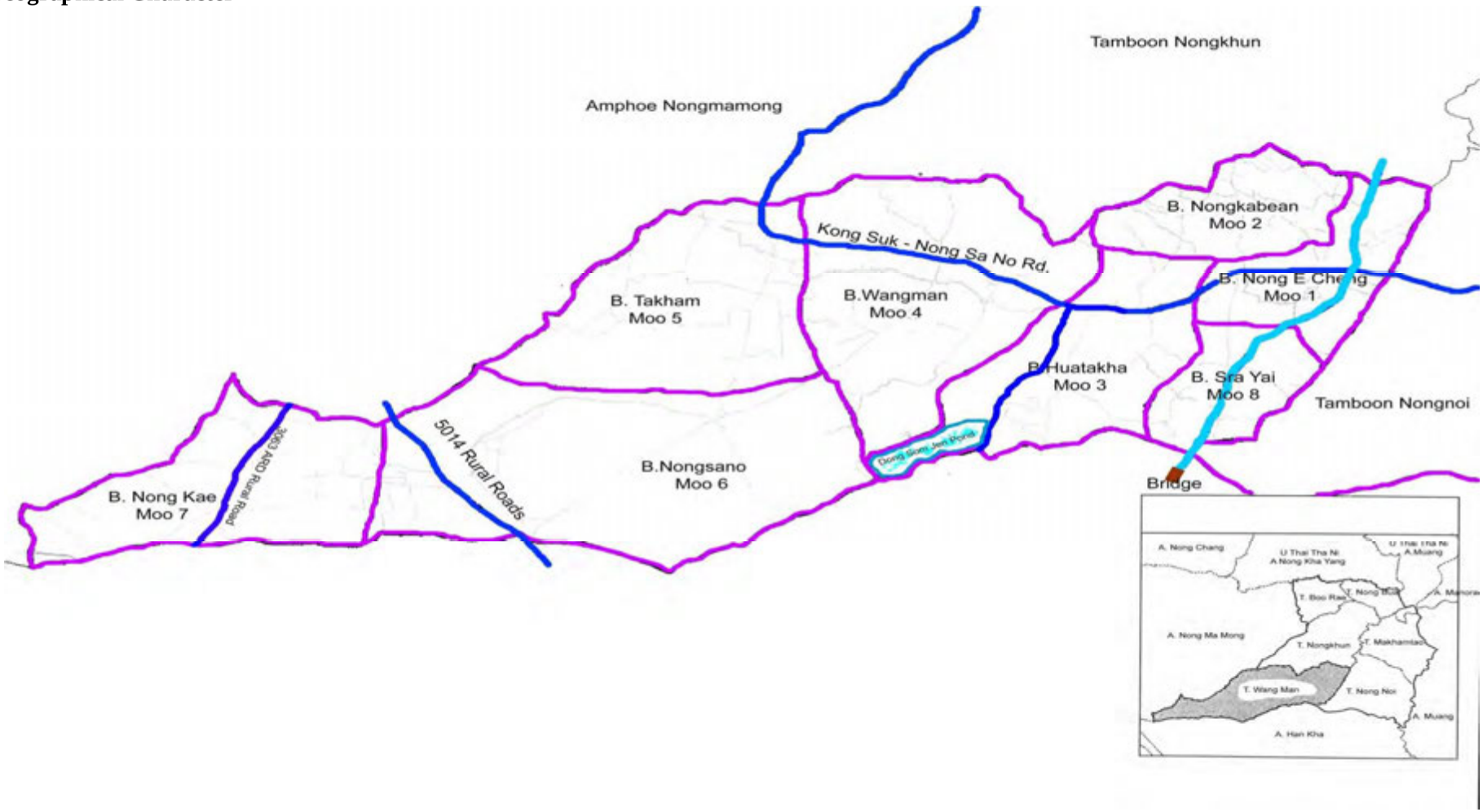
Date July 2013

Project for
Flood Countermeasures
for
Thailand Agricultural Sector

JICA

Topographic Map of Tambon Wang Man, Amphoe Wat Sing, Chainat Province

1. Geographical Character



Map 1 : Community Map

Tambon Wangman's geographical character is basins mixed with plateaus. In Moo 1, Moo 2, Moo 8 and some parts of Moo 3 and Moo 4, are the basins flooded in the rainy season, while Moo 4 - Moo 7, are plateaus with dry climate. In the highland areas, water for consumption and agriculture is not sufficient. Farmers can only plant rice once per year, because they must rely on rainfall. In addition, the farmers who cultivate sugar cane and cassava face the problem about the scarcity of water in dry season. Besides, in Tambon Wangman, there are 7 community forests accounting for 1,300 Rai, covering 4 Village, i.e. Moo 3 - Moo 7.

Tambon Wangman is one of 6 Tambon in Amphoe Wat Singh, Chainat Province. It is far from the center of Amphoe Watsingh around 18 km. Its area is approximately 78.72 km2 or 49,200 Rai. The northern border is connected to Tambon Nongkhun, and the southern and eastern border is connected to Tambon Nongnoi. The western border is connected to Tambon Saphanhin, Amphoe Nongmamong, Chainat Province.

There are three road routes for the main community and transportation. One is Kongsuk - Nongsoan, about 8 km, that runs from the police station at Tambon Nongnoi to the office of TAO Tambon Wangman. Another is Nongphaya - Tambon Wangman which runs from Tambon Nongphaya to the TAO. The last one is Rapid Rural Development Road.

There are 2 water sources which people use for household consumption and for agricultural purposes, as below.

1. The natural sources

There are 3 streams running through Tambon Wangman, namely Huay Tambon Wangman, Klong Nongkabiankland (Huay Land Development Department) and Huay Lam (Klong Nongkrabian)

2. The man-made sources

They are water sources built by government agencies, like Royal Irrigation Department and Land Development Department, in purposes of agriculture and consumption. Regarding the dug type of water resources, like pools or public wells, most of them are located near households in Ban Thakham, Ban Nongsoan and Ban Tambon Wangman. In Ban Nong E-cheng and Ban Srayai, some villagers can use water from MC Canal.

The housing character of Tambon Wangman is that people preferably build their houses close to water sources to easily utilize the canals for agricultural purposes. There are houses which are Central Thai type with elevated first floor, and the contemporary one without the elevated first-floor, caused by the lower cost in construction than the traditional ones.

2. Socio-Economic characteristic

Population

The population number of Tambon Wangmanis 4,446which make 1,421Households, in this number there are 2,234males and 2,212females. The most populated villages are Moo.4; 741people (16.7%). The least populated village is Moo.8,297people (6.7%).

Table1: The number of population divided by villages

Village	Population				Household
	Male	Female	Total	Percent	
Moo 1 Ban Non E-cheng	221	209	430	9.7	156
Moo 2 Ban Nongkrabian	182	199	381	8.6	123
Moo 3 Ban Huatakae	435	412	847	19	248
Moo 4 Ban Tambon Wangman	359	382	741	16.7	262
Moo 5 Ban Thakham	343	340	683	15.7	198
Moo 6 Ban Nongsoan	283	265	548	12.3	192
Moo 7 Ban Nongkae	259	261	520	11.7	149
Moo 8 Ban Srayai	152	144	297	6.7	93
Total	2,234	2,212	4,446	100	1,421

Income

The table below shows the income per household in Tambon Wangman. The average income per person per year is 67,877 baht or around 5,823 Baht per month the average cost per person peryear is 44,954 Baht or 3,746 Baht per month. The average debt is 228 Baht per person per year.

Table2 Average Income, Average Cost and Average Debt per person, per year, in 2011

Total households	Income/person/year	Cost/person/year	Debt/person/year
1,421	69,877	44,954	228

Saving

People in Tambon Wangman have an average saving in households around 2230.76 per person, per year.(Source: จปฐ, Tambon Wangman's Sub district Administration Organization)

Debt

The farmers in Tambon Wangman have faced the high debt ratio due to the price fall in agricultural products and the risks of natural disasters. So, the main purpose of loan is to invest in agricultural production, e.g. to repay for the fertilizers or insecticides, to pay for labor cost, household consumption etc. The important financial institutes in Tambon Wangman are Bank for Agriculture and Agricultural Cooperative (BAAC), Agricultural Cooperatives and local credit unions as well as informal loans with high interests.

Labor

Resident who age over 15 year old and finish compulsory education would tend to move to the industrial cities, such as Samut Prakarn. About the labor in agriculture sector and local small industry, most of the labor force is from the outer areas, such as the migrating labor from northeastern part of Thailand or undocumented migrant workers.

Occupations

According to the group discussion, the occupation in Tambon Wangman is divided to two categories; 1. occupation in agriculture sector and 2. occupation in non-agriculture sector.

The proportion of labor in agriculture is divided as rice farming 49.95% (653 households),crop plantation32.86% (467 households), livelihood 7.25% (103households) and others13.9% (198 households).

The people whose occupations are non-agriculture sector mostly migrate to industrial areas.

Sub-district Administration Organization

Tambon Wangmanis divided to 8 villages, with the administrative structure as shown below.

Table 3: The number of officers in TAO and executive board.

TAO's council member	Number	TAO's executive board	Number
1. Chairman of TAO council board	1	Chairman of TAO Executive board	1
2. Vice Chairman of TAO council board	1	Vice Chairman of the TAO	2
3. TAO council members		Secretary of the TAO	1
		Chief Administrator of the TAO	1
		Administrator of the TAO	4
		Finance Division	2
		Public Works Division	2

Table 4: Budget, Number of TAO's project from the 3 years development plan from 2011-2013

Strategy	2011 Budget		2012 Budget		2013 Budget		Total 3 year	
	No. Project	Amount (,000 Baht)	No. Project	Amount (,000 Baht)	No. Project	Amount (,000 Baht)	No. Project	Amount (,000 Baht)
1. Promotion of Value-added in Agricultural Products	62	163,190	114	618,710	63	191,700	239	973,600
2.Promotion of quality of life development	56	13,204	55	9,963	44	4,684	155	27,851
3.Promotion of good governance	35	10,490	25	15,991	21	8,541	81	35,022
4.Promotion of community development along with sufficiency economy	21	3,880	17	7,730	13	4,030	51	15,640
5.Promotion of tourism and natural resources and environment management	11	1,965	10	2,830	7	1,830	25	6,625
Total	185	192,729	221	655,224	148	210,785	551	1,058,738

Education

Tambon Wangman's Education Institutes consist of 5 primary schools, namely Wat Tambon Wangman School, Ban Sammakhithamviddhaya School, Huatakhae School, Ban Thakhamwangnam School and Samranrartbamrung School.

Table5: Education Level of Tambon Wangman's population

Education	Male	Female	Total
Uneducated	27	66	93
Below P.4	167	174	341
P.4-P.6	870	942	1,812
M.s. 1-3	7	3	10
M.1-M.3	267	177	444
M.s.4-5	0	1	1
M.4-M.6	89	92	181
Vocational Certificate	28	18	46
Vocational Diploma	31	37	68
Bachelor Degree	32	41	73
Master Degree	2	1	3
Doctor Degree	0	0	0
Others	26	32	58
Total	1,546	1,584	3,130

Table above shows that majority of population Tambon Wangman are P.4-p.6, accounting for 1,821 persons.

The proportion of teachers and pupils is 1:10 with the sufficiency in facilities and educational equipments. However, budget for education still is scarce as well as the parents are under poverty standard. The financial supports for education, consequently, remain near to the ground.

According to the information from interviews, people who finished their education in primary level are likely to work in agriculture sector, while people who finished above secondary level tend to pursue higher education in vocational schools, such as Chainat Vocational School, or universities.

Health Situation

Health stations in Tambon Wangman are located at Moo1 and 4 with public 155 health volunteers. The condition which people receive medication from the Health Stations the most are respiratory disease, malnutrition consecutively. And the chronicle patients who receive monthly medical prescription are those with diabetes and high blood pressure. The health station receives assistance from the health volunteer from each village who always keep records of chronicle, immobilized and patience.

In flooding period, the rate of illness of people in Tambon Wangman was not high, because many areas in Tambon Wangman are not located in basin areas. The flood problem mainly was flash flood, around 7 days. Most of disease in flooding period is Hongkong's foot and diarrhea. In case of emergency, villagers can inform to civil defense volunteers or TAO to pass to Watsingh Hospital.

Now, 50% of the farmers in Tambon Wangman have been examined and found the toxics in body over the acceptable standard. Therefore, the related organizations, health stations, initiated the education program to prevent the diseases from toxicity of chemical substances in agricultural activities.

Relationship of people in Tambon Wangman

Tambon Wangman people are agricultural based society. As a characteristic, there're deeply connected to nature. Almost all of the residents are Buddhists therefore the Buddhist rituals people have in common are; rite of passage involving ceremonies of birth, death, ordain; ceremonies related to nature such as the praying of the river and forest. Despite the modernization around the area, originally people consider kinship very seriously and the modern facilities don't cover all the area, therefore people are still socially oriented. It became apparent when the time of crisis, or some important public activities that the community leaders or authorities get full participation.

Land Use

The significant occupation of people in Tambon Wangman is farmers. The agricultural products are rice, sugarcane and cassava. Land use in Tambon Wangman is shown in the table below.

Table 6: Land Use in Tambon Wangman

Total Land	Residential area	Community Forest	Paddy land	Crop plantation	Government offices	Livelihood land	Factory	Water sources	Others
49,200	1,626	1,300	22607	16167	13	3,567	8	329	3,583

Sources: Land Development Department

Land Right

There are two types of land right; 1.owned by the owner the land by possessing the land deed, 2. rent to people for a curtain period of time.

Civil Defense Volunteers and One Tambon One Security team(OTOS)

The Civil Defense Volunteer are responsible for making sure of public peace that can varies from traffic work, security work emergency call and many others. It works under supervision of TAO. There are 92 Civil Defense Volunteers in Tambon Wangman, 10 of the number had participated in the OTOS training. The volunteers take turn to attend the revision training that held annually and taught by defense authorities.

Although the volunteers work under TAO, the supportive expense is given only partially such as some necessary equipment, and training allowance, that is to say, the volunteers use their own expense or donation support. At present, the tools and equipment which consist of 1 tank trucks, 4 life boat and 10 life vessels, are kept at the TAO office. In case of the Emergency Health Service, Volunteer would be given allowance by the count of patience they serviced.

Social Group

The social groups in Tambon Wangman are composed of chili paste housewives group (Moo4), broom group (Moo1) and weaved basket group (Moo8). Most of the members are housewives and the elder. The purpose of these groups is to earn extra-income for their family and to utilize free time. However, the market of local products from the group still remains for community consumption without marketing promotion to external markets and financial supports for investment.

Concerning agriculture, there are many agricultural groups in Tambon Wangman, e.g. chemical fertilizer group,organic fertilizer group, seed group, rice group, etc. The purpose is to be a learning center and to be a financial center for local farmers. Moreover, the farmers group can commercially produce organic insecticides and fertilizers.

The saving groups and village fund group are spread in every village. The village fund is managed by village fund committee elected by villagers according to the government regulation in purpose of being financial source for investment. The villagers can take a loan not over 20,00 baht per person. In case of loan over 20,000 baht, the committee shall consider the qualification and credibility of the burrower and approve.

Communication System

Communication in Tambon Wangman is used via community radio under responsibility of Tambon Wangman TAO.

Electricity

Electricity in Tambon Wangman is available in every village, but not every household.

Water supply system

About Water for consumption in Tambon Wangman, there are 2 systems; groundwater system and surface water system. The public wells are built in every village under the responsibility of TAO and private owners. The surface water system is found in Ban Nongkae, Ban Huatakhae and Ban Tambon Wangman of which capacity provide only 40-50 household consumption, but have to distribute to 100-200 households. Besides there is no water filter system equipped in the water system.

3. Agriculture Situation in Tambon Wang Man

Geographic and agricultural character

Total area of Tambon Wang Man is 49,283.22 Rais. The majority land is a flat basin. Land registering for agricultural purpose is49,200 Rais. Farmers receive water from rainfall and irrigation canals by pumping water into agricultural plots. Most farmers grow crop rice follow by agronomycrop and livestock.

Fig.1 – 3 Agricultural character

Table1 Agricultural area of TambonWang Man

No.	Area	Number of farmers (Household)	Number (Rai)
1.	Wet Season	698	23,729
2.	Dry Season	218	6,211
3.	Cassava	368	8,185
4.	Sugar cane	185	5,404
5.	Maize	7	153
6.	Fruit	57	96
7.	Vegetable	7	17
8.	Perennial plant	13	43
9.	Pasture grass	2	5
10.	Livestock	287	5,223
11.	Fishery	142	134
Total		**1,984**	**49,200**

Source: Department of Agriculture (2554)

Report from Agriculture Tambon Wang Man, General profile and information of agricultural at Tambon level Year 2554/2555, total population of 1,984 households and total agricultural land of 49,200 rai are categorized to land use as follows (Table 1);

: Wet Season rice : 698 households, total area: 23,729Rai.
: Dry Season rice : 218 households, total area: 6,211 Rai.
: Cassava : 368 households, total area: 8,185 Rai.
: Sugar cane : 185 households, total area: 5,404 Rai.
: Maize : 7 households, total area: 154 Rai.
: Fruit : 57 households, total area: 96 Rai. (Mango, Coconut,Pomelo, Guava., Banana,Sugar apple, Santol,Jackfruit and Pink.)
: Perennial plant : 13 households, total area 43 Rai. (Pinewood, Teak and Bamboo)
: Vegetables : 7 households, total area 17 Rai, Lamon, Manchuria wild rice,Green Bean,Leech lime,Beans and other
: Pasture grass: 2 households, total area 5 Rai.
: Livestock : 287 households, total area : 5,223Rai, Cattle, Chickens, Buffalo, Drug, and Pig.
: Fishery : 142 households, total area : 134Rai, Miscellaneous fish, Tilapia,Nile Tilapia, Pangasius Catfish andWhiteleg shrimp etc.

Contribution of Agricultural land use

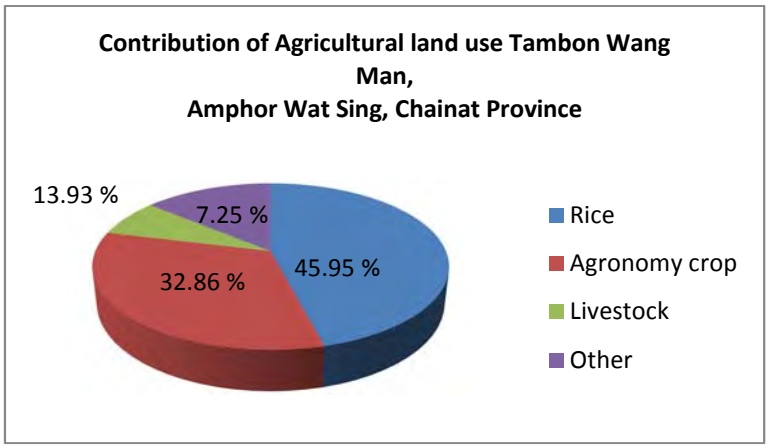


Fig. 4 Contribution of Agricultural land useof Tambon Wang Man

Source: Data of basic requirement , Tambon Wang Man

Land registering for agricultural use at Tambon Wang Man has total area of 49,200 Rai. (register to Department of Agricultural Extension). Significant economic crops are rice and agronomycrop. Figure 4 shows contribution of Agricultural land use that rice growing area is 45.95% of total agricultural area. Agronomycropis 32.86 %, Livestock area 7.25 % and other areas 13.93 %. Tambon Wang Man is a district which holds a traditional farming community. Most villagers continue occupation of agricultural farming.

Table 2 Land damaged by flooding at Tambon Wang Man

Moo	Farmer	Rice (Rai)	Agronomycrop (Rai)	Orchard and others (Rai)	Assistance in cash (Bath)
1	1	15	0	0	33,330
2	-	-	-	-	-
3	21	269	21	5	689,358
4	13	81	6	0	198,882
5	-	-	-	-	-
6	4	0	25	0	78,750
7	-	-	-	-	-
8	7	121	0	0	268,862
Total	**46**	**486**	**52**	**5**	**1,269,182**

Source : Department of Agricultural Extension (9 Sep 11-19 Oct 11)

Table 1 Shown agricultural lands which was damaged by flood. 46 farmers have been damaged. All the damaged area 543 Rai. Were as follows Rice production area 486 Rai Agronomy crops (Cassavaand sugar cane)52 Rai. Horticulture area and others (Tomato)5 Rai. Subsidy and support by government is estimated as 55 % of investment cost per Rai per year in 2554 BE. This subsidy is paid 100 % of actual damage area.

- Rice growing area subsidy for 2,222 Bht per Rai
- Agronomycrop area subsidy for3,150 Bht per Rai
- Orchard and others subsidy for 5,095 Bht per Rai

Government aid to farmers, Tambon Wang Man, sterile in cash 1,269,182baht.

Learning Center of Farmers at Tambon Wang Man

There are various learning centers in Tambon Wang Man., i.e., Agriculture Technology transfer Center. This center provides technology transfer i.e., Bio-fermented Juice making and Beauveria preparation.

Fig.5 – 6 Learning Center of Farmers at Tambon Wang Man

Supporting Organization

Subsidy and support by government is estimated as 55 % of investment cost per Rai per year in 2554 BE. This subsidy is paid 100 % of actual damage area.

- Rice growing area subsidy for 2,222 Bht per Rai
- Agronomycrop area subsidy for3,150 Bht per Rai
- Orchard and others subsidy for 5,098 Bht per Rai

Department of Livestock Development to support rice and vaccines for cattle and buffalo

Table 2 Shown the cropping season in the area of Tambon Wang Man. Dry season rice cropping begins from July to December, rice varieties are RD 15 and RD 105 with average yield 50 Tang/Rai while wet season rice in irrigation area (Moo 1, Moo 3 and Moo 8) will be cultivated 2 rounds, first round begins from January to April and second round begins from June to September. Rice cultivation in rain fed area will begin from June to September, rice varieties are RD 31, RD 41, RD 47 and Suphanburi 1 (Suphanburi 1 variety has dwarf phenotype, with average yield 80 Tang/Rai)

Cassava cultivations are carried two crops in one year. The first crop begins all year especially in dry season from January to December. The second crop begins in rainy season from May to April. Varieties are Lampang 11, K 200, 483, with average yield 2,000-3,000 Kg/Rai.

Sugar cane cultivations are carried for two crops in one year. The first crop begins all year especially in dry season from November to December. The second crop begins in rainy season from May to March. Varieties are Rayong 9,Rayong 5, KU 50 and Huay Bong with average yield 8,000-10,000 Kg/Rai. Maize crops begin from May to October. Varieties are 888 and KKK, with average yield 600 Kg/Rai.

Table 2 Crop Calendar

Crop season/type	Varieties	Month												Product(Kg./Rai)
		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	
Raining period						X	X	X	X	X	X			
Flooding period										X	X	X		
Drought period		X	X	X	X								X	
Wet season rice	RD 15, RD 105													500
Dry season rice	RD 31, RD41, RD47, Suphanburi 1													800
Cassava	Rayong 9, Rayong 5, KU 50, Huay Bong													2,000-3,000
Sugar cane	Lampang 11, K 200, 483													8,000-10,000
Maize	888, KKK													600

Table 3 Type of productand Number of Livestock at Tambon Wang Man

Moo	Type of product	Number of Livestock			
		Cattle	Buffalo	Pig	Chicken
1	Wet season rice, Dry season Rice	100	-	35	-
2	Wet season rice, Cassava and Sugar cane	10	8	20	-
3	Wet season rice, Dry season rice, Cassava and Sugar cane	450	-	During construction	-
4	Wet season rice, Cassava and Sugar cane	200	200	1,500	-
5	Wet season rice, Cassava and Sugar cane	200	100	-	2 Farm
6	Wet season rice, Cassava and Sugar cane	500	200	2,000	-
7	Wet season rice, Cassava, Sugar cane	100	20	-	-
8	Wet season rice, Dry season rice and Sugar cane	-	-	100	-
Total		**1,560**	**528**	**3,655**	**Unknown number**

Table 3 Shown type of produce and population of livestock in each village of Tambon Wang Man. Occupation in each village are wet season rice, dry season rice, cassava and sugarcane etc. As well as the population number of fed animals i.e., cattle, buffalo, pig and chicken. In case of cattle, buffaloes,

calf, female cattle and old buffalo are sold resulting no accumulation in population. Pig will be coming in 2 times and in one year there are numbers of pig ca. 7310 pig. Broiler will be feeding for 45 days in one time. The turnover of broiler in shed will be systematically fixed according to company procedure.

Table 4 Trend analysis of Crop/Livestock Farming

Type of Commodities	History	Present	Future
1. Wet seasonrice	Chainat and Suphuanburi 1	RD 15 and RD105	Certified seeds
2. Dry seasonrice	Chainat and Suphuanburi 1	RD 31,RD 41,RD47 andSuphuanburi 1	Certified seeds
3. Agronomycrop	Grass, Cassava and Sugar cane	Cassavaand Sugar cane	Cassavaand Sugar cane
4. Livestock	Cattle, Buffalo, Pig and Chicken	Cattle, Buffalo, Pig and Chicken	Cattle, Buffalo, Pig and Chicken

Source : PRA Tambon Wang Man

Table 4 Shown present and future trend of Tambon Wang man, farmers prefer wet season rice and dry season rice. Farmer prefer varieties and certified seeds from Department of Rice.

Agronomy crops are cassava and sugarcane in every village. Main produce of agronomy grown in Moo 7, follow by Moo 3, Moo 4, Moo 5 and Moo 6, respectively. According to the drought, those crops are economics crop in the village. However, farmers are not able to make production plan and reduce risk of damaged when flooding period occurs.

Livestock i.e., cattle, buffalo,pig and for meat while chicken and duck are farmed for household consumption as well as trade to market.

Table 5 Production cost of Wet season rice /Rai

No.	Items	Value (Bht)
1.	Land lease	500
2.	Soil preparation	450
3.	Rice seed including broadcasting	600
4.	Chemical fertilizer including application	520
5.	Herbicide including application	200
6.	Pesticide including application	120
7.	The bail and handle the conversion	500
8.	Harvesting including transportation	650
Total production cost		**3,540**
Yields (Tang/Rai)		50
Income in average (Bht)		6,500
Net income (Bht/Rai)		**2,960**

Table 5 Shown that production cost of Wet season in average per rai is 3,540 Bht at average yield 50 Tang/Rai. Farmers will receive net income 2,960 Bht/Rai. However, when flooding occurs, all produce will be damaged resulting income loss.

Table 6 Production cost of Dry season rice/Rai

No.	Items	Value (Bht)
1.	Land lease	1,000
2.	Soil preparation	500
3.	Rice seed including broadcasting	710
4.	Chemical fertilizer including application	1,950
5.	Herbicide including application	250
6.	Pesticide including application	1,060
7.	Water discharge and farm management	800
8.	Harvesting including transportation	600
Total production cost		**6,870**
Yields (Tang/Rai)		80
Income in average (Bht)		10,400
Net income (Bht/Rai)		**3,530**

Table 6 Shown that production cost of dry season in average per rai is 6,870 Bht with average yield 80 Tang/Rai. Farmers will receive net income 3,530 Bht/Rai. However, when flooding occurs, all produce will be damaged resulting income loss.

Table 7 Production cost of Cassava/Rai

No.	Items	Value (Bht)
1.	Land lease	500
2.	Soil preparation	450
3.	Cassavastocks	750
4.	Chemical fertilizer including application	344
5.	Herbicide including application	220
6.	Pesticide including application	100
7.	Hormone including application	450
8.	Crop Management	400
9.	Harvesting including transportation	1,165
Total production cost		**4,379**
Yields (Kg./Rai)		3,000
Income in average (Bht)		7,200
Net income (Bht/Rai)		**2,821**

Table 7 Shown that production cost of Cassava in average per rai is 4,379 Bht with average yield 3000 Kg/Rai. Farmers will receive net income 2,821 Bht/Rai. However, when flooding occurs, all produce will be damaged resulting income loss.

Table 8 Production cost of Sugar cane1st year /Rai

No.	Items	Value (Bht)
1.	Land lease	1,000
2.	Sugar cane stocks	5,000
3.	Chemical fertilizer including application	1,050
4.	Herbicide including application	880
5.	Pesticide including application	900
6.	Harvesting including transportation (1 Rai/10,000Kg.)	3,700
Total production cost		**12,530**
Yields (Kg./Rai)		10,000
Income in average (Bht)		10,000
Net income (Bht/Rai)		**-2,530**

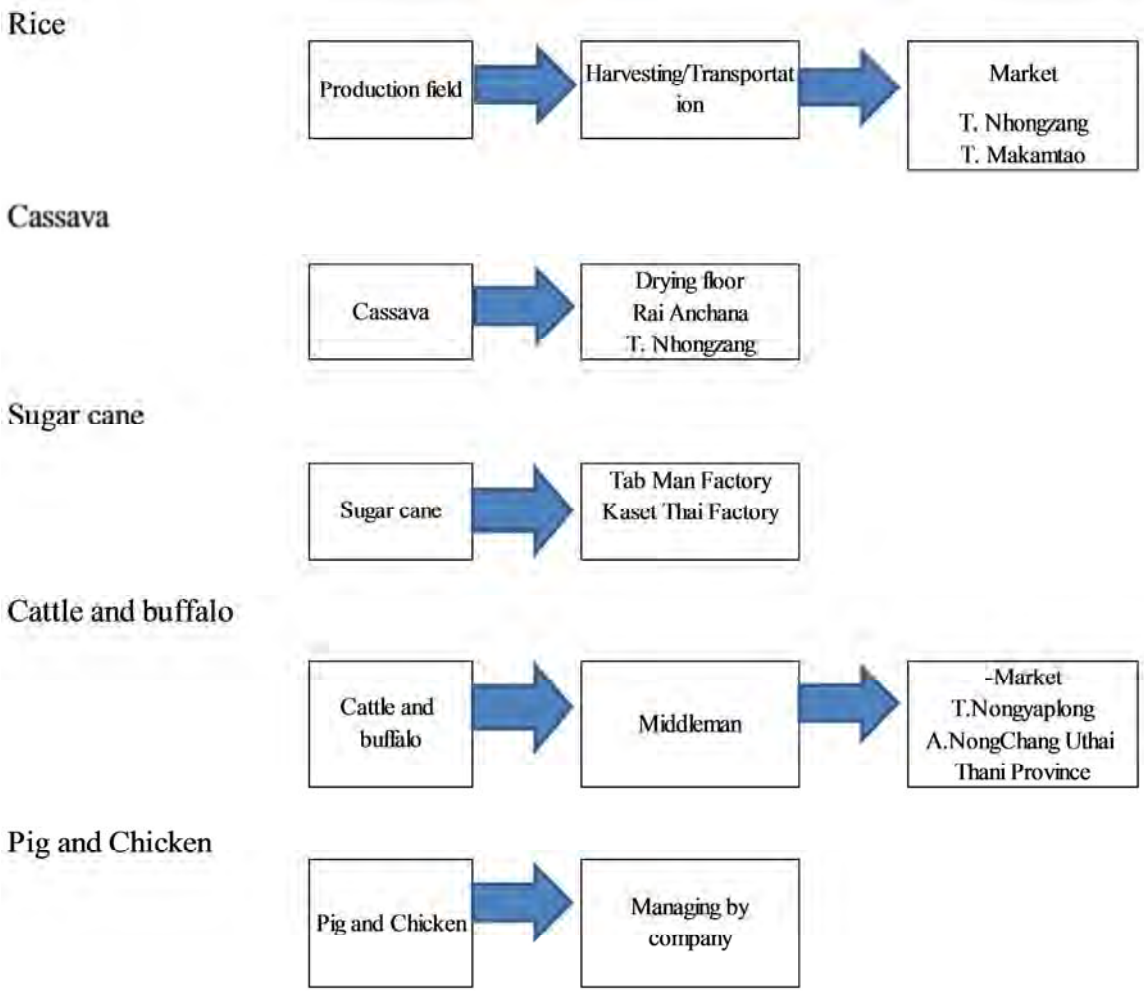
Table 8 Shows that production cost of Sugar cane in average per rai is 12,530Bht with average yield 10,000 Kg/Rai. Farmers will receive net income 2,530 Bht/Rai.

Table 9 Production cost of Sugar cane2nd-3rd year /Rai

No.	Items	Value (Bht)
1.	Land lease	1,000
2.	Cultivators	270
3.	Chemical fertilizer including application	1,050
4.	Herbicide including application	880
5.	Pesticide including application	900
6.	Harvesting including transportation (1 Rai/10,000Kg.)	3,700
Total production cost		**7,800**
Yield (kg./Rai)		10,000
Income in average (Bht)		10,000
Net income (Bht/Rai)		**2,200**

Table 9 Shown that production cost of sugar cane in second year and following in average per rai is 7,800Bht with average yield 10,000 Kg/Rai. Regards that no cost of stock, farmers will receive net income 2,200 Bht/Rai.

Transportation and Market



Constraints

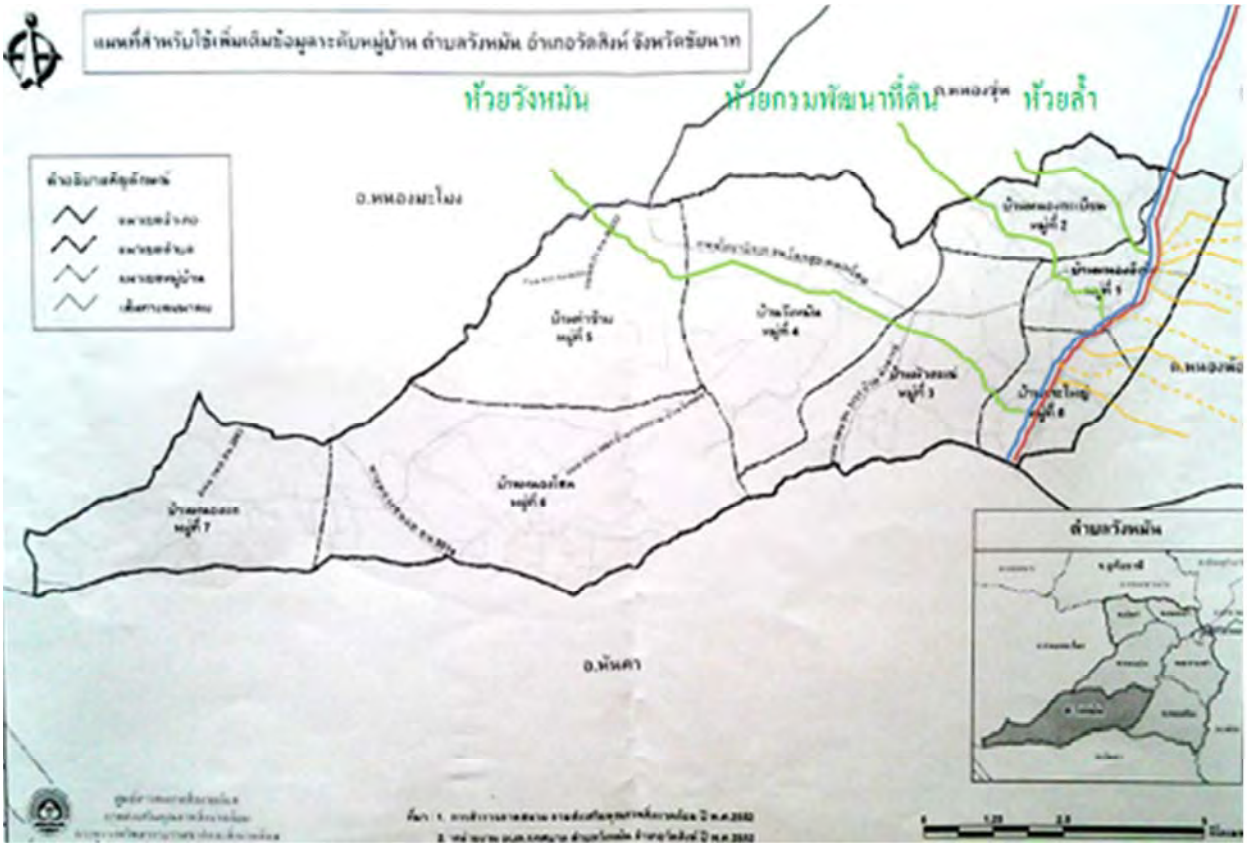
- Farmer members are not able to return seeds to seed bank according to flooding.
- Over use of chemical fertilizers.
- High production costs.
- Farmers have a lot of debt from the agricultural sector.
- Brown plant hopper outbreaks.
- Not enough water for farming.
- Low yield.
- Unsatisfied price of cassava. No power in price negotiation against middlemen.

Impact of flooding, Constraint and Solutions

Negative Impacts	Constraints	Community Solution during flooding	Community Solution after flooding	Response program and plan
1. Agricultural produce are totally damaged when flooding occur during September to November.	1. Water logging level is above crop level about 3 months, crops are rice, cassava and sugar cane.	-	-	1. Early cultivation is not possible due to water constraints, generally farmer rely on rain water. If irrigation department can supply water to rice field during May to August, harvesting can be finished before flooding time. This action will relief suffering and decrease risk of loss. 2. Using photosensitive varieties and certified seed for resistance to pest and high yield 3.Change type of crop i.e., cassava and sugar cane, should transform to rice farmingin case that irrigation supply is efficient.
2. Farmers who raise livestock confront increased investment.	1. Animals housing are flooded. 2. Lack of animal feed during flooding. 3.Price of animal feed are expensive during flooding. 3. Pasture of animal feed are damaged by flooded. 4. Occurrence of Foot and Mouth Disease.	1. Evacuate animals to higher ground. 2. Import and purchase animal feed (may be high price). 3. Prepare animal vaccine.	1. Move and return back animal to their own housing. 2. Import and purchase animal feed (may be high price).	1. Prepare animal feed in a sufficient quantity before flooding. 2. Prepare vaccine in a specific time for prevent animal disease.

Positive Impact	Promotion Factors	Promoting Future Plan for Community
Soil is more fertile by deposition of sediment and organic matter accumulation. There are also wash out agrochemical from soils and enhancing soil acidity. This results in decreasing fertilizer for plant growth.	-Soil properties is increasing - Soil Resting Naturally	Provide Training on soil improvement to farmers

4. Water Management Situation in Tambon Wang Man



Picture:Water Resources in Tambon Wangman

MC Canal

Grand Irrigation Canal

Lateral Canals

Water-distribution Canals

The Important Irrigation Sources

The surface water in Tambon Wangman is categorized to two types, i.e. natural sources and built sources.

1.The natural sources in Tambon Wangman comprise of 3 vital canals; Huay Tambon Wangman, Nong Kabian Klang Canal (Land Development Huay) and Huay Lam (Nong Krabian Canal)

2. The built sources are the irrigation infrastructures which were provided and equipped by several government agencies, such as Royal Irrigation Department and Land Development Department. The main objective is to apply and deliver water for agricultural activities. In Tambon Wangman, There are irrigation types, as follows.

Water Source	Amount	Details
Weirs	24	The purpose is to take form of a barrier to slow down the spate water and to pool the exceeding water in rainfall season for agriculture
Dug Canals	8	There are only 3 canals which the villagers can identify; i.e. Huay Kod Tambon Wangman, Nong Krabianklang Canal, Nong Krabian Canal and 4 canals mentioned in the meeting (or forum), i.e. MC Canal, Grand Irrigation Canal,

		6L-10L Sub-canal and 6L-10L Distribution Canal.
Pools	91	Large-size pools are the pool by Land Development Department located between Ban Thakham and Ban Nongsoan, Prapa Pongnok Pool and the 3 pools under construction, Wat Tambon Wangman Pool, Donggain Pool and Dongsomjean Pool, as large detention basins. Apart from those, the small-size pools can generally be found in the area, especially in the intense population areas like Ban Thakham, Ban Nongsoan, Ban Tambon Wangman. In some villages like Ban Nong E-cheng or Ban Srayai, some villagers can use the water from MC Canal.
Public shallow wells	19	Ban Nong E-cheng(1), Ban Nongkrabian(3),Ban Huatakhae(3),Ban Tambon Wangman(3 for consumption and 1 for other usages due to brackish water),Ban Thakham(3),Ban Nongsoan(2 but being not utilized now), Ban Nongkae(N/A), Ban Srayai(consuming water from irritation canal) Remarks: the number in blanket is the amount of the available shallow well at the present.
Private shallow wells	8	They are dug in order to village's consumption and other usages. The villagers can draw the underground water with some expenses for gas. The gas cost is 200 liters per 20 baht.
Dug wells	86	They are the dug wells which the villagers requested to water resource agency for consumption. The expense was around 2,500 bath per well. If the villagers dig a well on their own, the cost is around 40,000 - 80,000 baht for the well with the dept between 30 - 60 meter.
Surface Waterworks	14	Located at Ban Nongkae, Bange Huatakae and Ban Tambon Wangman, the surface water works are the small irritation systems with their capacity for the consumption around 40 - 50 households. In contrast to available facility, the water consumption in the surface waterworks area is around 100 - 200 households. Moreover, the water filter system has not been equipped, so the quality of water is poor, with the existence of sediments. The problem is found in 6 villages, i.e. Nong E-cheng, Ban Srayai, Ban Huatakae, Ban Tambon Wangman, Ban Nongkae and Ban Nongsoan, not including only Moo 8 Ban Srayai where the quality of water is higher without sediments
Water banks (F. 30)	6	Water Banks are 6 concrete cylinder tanks. Their diameter is 2 meters and their height is 6 meters. Owing to the fact that each tank was constructed in the someone's house area in the village, the villagers from other house hesitate to use it. Some of them are not applicable as the leak, no water spout system or the absence of the authority. In spite of having been provided by public health agency, the water banks have never been maintained.
Water Banks (F. 66)	3	They are 2 concrete cylinder tanks. Their diameter is 2 meters and their height is 4 meters.
Tank (F. 33)	10	They are 33 M^3 concrete cylinder tanks.
Tank (F. 99)	10	They are 99 M^3 concrete cylinder tanks.
20 M^3 Concrete Tanks	12	They are 20 M^3 concrete cylinder tanks.
2000-Liter Earthen Water Jars	2071	They are 2000 M^3 concrete cylinder tanks.

Pic: Water banks (F. 30)

Pic: Tanks (F. 33)

Pic: The surface waterworks with the below standard of water quality for consumption

Pic: Kanklong Road

Water Management for Agriculture

There are two parts of the water management for agriculture, as follows.

1. The water management in irrigation accessed areas

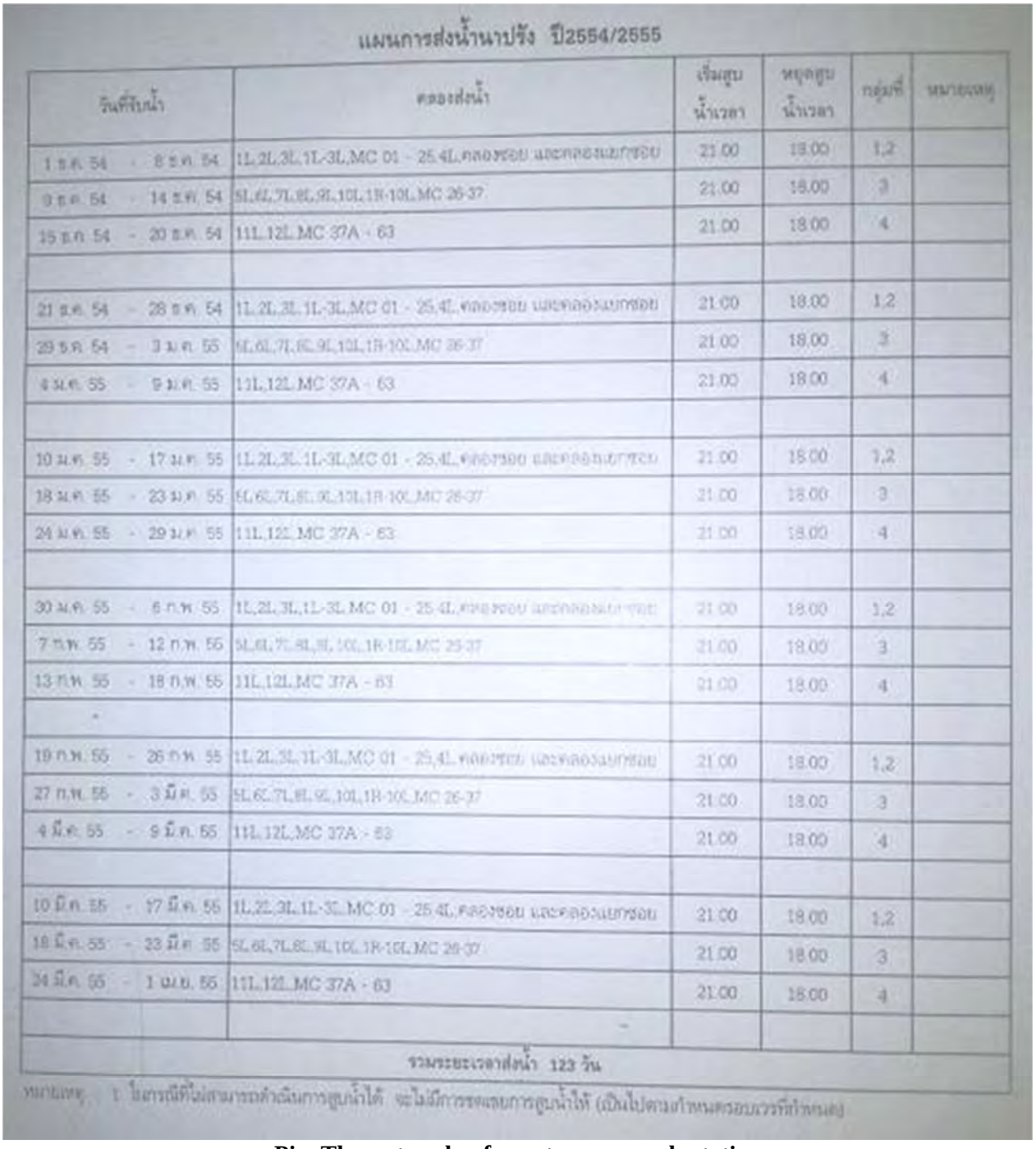
To begin with, the water is applied from the water source, Chao Phraya River, and advanced to Chak Canal, the dug canal, because the water level of the water sources is lower than MC Canal, the

delivery canal. Thus, It is necessary to employ water pumps to deliver water to Chak Canal. After that, water is advanced to the main canal, MC Canal, before passed to the water-distribution canals. This process is in charge by the irrigation officers in Chainat Province. The Mc Canal passes 2 villages in Tambon Wangman, i.e. Moo 1 Ban Nong E-cheng and Moo 8 Ban Srayai (6L-10L). When water comes to MC Canal, It is automatically distributed to agricultural areas due to the lower areas than the water-distribution canals. Having been sufficiently applied to agricultural fields, water will be released the exceeding to MC Canal. The amount of distributed water, now, are adequate for farmers in irrigation areas to plant rice 2 times per year.

Apart from the water-delivery operation, the irrigation officers initiated the program to ensemble the water users in the divided areas by water usage (L Canal). Each group takes responsibility of maintaining the canal and distributing water from the main canal to lateral canals by shift according to the agreement between the members in plantation periods. At the present, there are 22 groups and they are promoted to water management groups. The members in each group can elect the leader to join the meeting with Royal Irrigation Department.

Water Advance System from the River to the Water-distribution Canals

Pic: Water Management Process in Irrigation Areas



แผนการส่งน้ำนาปรัง ปี2554/2555

วันที่รับน้ำ	คลองส่งน้ำ	เริ่มสูบน้ำเวลา	หยุดสูบน้ำเวลา	กลุ่มที่	หมายเหตุ
1 ธ.ค. 54 - 8 ธ.ค. 54	1L,2L,3L,1L-3L,MC 01 - 25,4L,คลองซอย และคลองแยกซอย	21.00	18.00	1,2	
9 ธ.ค. 54 - 14 ธ.ค. 54	5L,6L,7L,8L,9L,10L,1R-10L,MC 26-37	21.00	18.00	3	
15 ธ.ค. 54 - 20 ธ.ค. 54	11L,12L,MC 37A - 63	21.00	18.00	4	
21 ธ.ค. 54 - 28 ธ.ค. 54	1L,2L,3L,1L-3L,MC 01 - 25,4L,คลองซอย และคลองแยกซอย	21.00	18.00	1,2	
29 ธ.ค. 54 - 3 ม.ค. 55	5L,6L,7L,8L,9L,10L,1R-10L,MC 26-37	21.00	18.00	3	
4 ม.ค. 55 - 9 ม.ค. 55	11L,12L,MC 37A - 63	21.00	18.00	4	
10 ม.ค. 55 - 17 ม.ค. 55	1L,2L,3L,1L-3L,MC 01 - 25,4L,คลองซอย และคลองแยกซอย	21.00	18.00	1,2	
18 ม.ค. 55 - 23 ม.ค. 55	5L,6L,7L,8L,9L,10L,1R-10L,MC 26-37	21.00	18.00	3	
24 ม.ค. 55 - 29 ม.ค. 55	11L,12L,MC 37A - 63	21.00	18.00	4	
30 ม.ค. 55 - 6 ก.พ. 55	1L,2L,3L,1L-3L,MC 01 - 25,4L,คลองซอย และคลองแยกซอย	21.00	18.00	1,2	
7 ก.พ. 55 - 12 ก.พ. 55	5L,6L,7L,8L,9L,10L,1R-10L,MC 26-37	21.00	18.00	3	
13 ก.พ. 55 - 18 ก.พ. 55	11L,12L,MC 37A - 63	21.00	18.00	4	
19 ก.พ. 55 - 26 ก.พ. 55	1L,2L,3L,1L-3L,MC 01 - 25,4L,คลองซอย และคลองแยกซอย	21.00	18.00	1,2	
27 ก.พ. 55 - 3 มี.ค. 55	5L,6L,7L,8L,9L,10L,1R-10L,MC 26-37	21.00	18.00	3	
4 มี.ค. 55 - 9 มี.ค. 55	11L,12L,MC 37A - 63	21.00	18.00	4	
10 มี.ค. 55 - 17 มี.ค. 55	1L,2L,3L,1L-3L,MC 01 - 25,4L,คลองซอย และคลองแยกซอย	21.00	18.00	1,2	
18 มี.ค. 55 - 23 มี.ค. 55	5L,6L,7L,8L,9L,10L,1R-10L,MC 26-37	21.00	18.00	3	
24 มี.ค. 55 - 1 เม.ย. 55	11L,12L,MC 37A - 63	21.00	18.00	4	
รวมระยะเวลาส่งน้ำ 123 วัน					

หมายเหตุ 1. ในกรณีที่ไม่สามารถกำหนดการสูบน้ำได้ จะไม่มีการหยุดการสูบน้ำให้ (เป็นไปตามกำหนดรอบเวรที่กำหนด)

Pic: The water plan for outer-season plantation

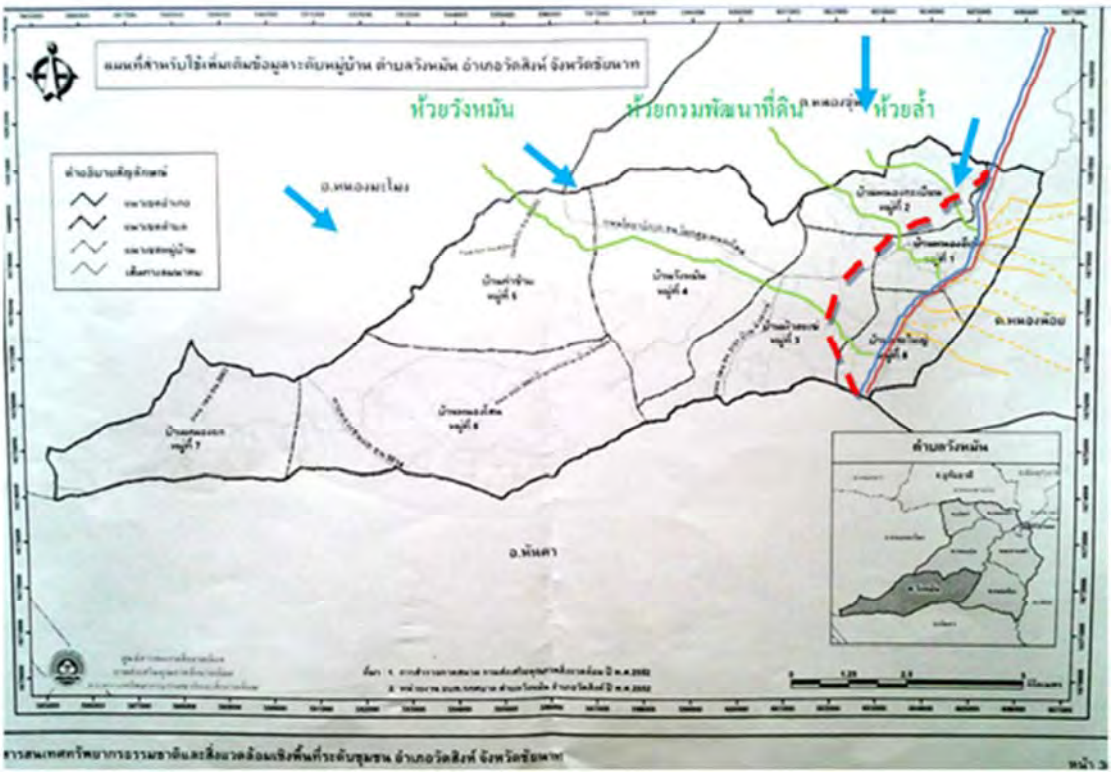
2. Water management in outer-irrigation areas

The plantation in outer-irrigation areas relies on rainfall. In Tambon Wangman, some part of Moo 1 and Moo 8 and entire Moo 2-7 are in this condition. The farmers in this area have water sources from 3 main natural streams,i.e. Huay Tambon Wangman, Huay Land Development Department and Huay Lam, and also the surface wells. They have to pump water to their own agricultural fields. The streams are under the Tambon Wangman's local government's management.

Pic: Water management in outer-irrigation areas

Normal Flood Situation

According to the geographical characteristics of Tambon Wangman, inclining from North towards South and from West towards East, in the monsoon season, from September to November, Flood from north, Tambon Nongkhun, and from West, Nong Mamong District, passes through Tambon Wangman's area along the Tambon Wangman Stream, land Development Stream and Huaylam Stream. The end of the three streams is the grand irrigation canal, paralleled to the MC Canal. Some parts of the grand irrigation canal, at Moo 8, are shallow due to the density of Mimosa. In addition, the Canal's capacity to deliver water was reduced by the 3 equipped 1 meter diameter tubes. In the flood duration, the canal, consequently, is incapable to release surplus water in time. The radius of flooded areas is around 1 kilometer from the irrigation canal and the flood level is between 1-2 meters. Flood remains around 2-3 months. The picture below shows the flooded areas in Tambon Wangman, Moo 1, Moo8 and some parts of Moo 3 and 4.



Pic: Direction of Flood

Direction of Flood

Flooded Areas

The Flood Situation in 2011

At the time of the flood disaster in 2011, Tambon Wangman's area was not affected by the exceeding water from Chao Phraya River. On the other hand, the flood which passed through Tambon Wangman last year was flash-flood, resulted from the rainfall accumulation. Normally, this type of flood occurs every year in the short period, 7-10 days. Only in the areas passed by irrigation canal, Moo 1, Moo 8 and some parts of Moo 3 and 4, the flood period is likely to be longer than other areas due to the problems described before.

The damages during the flood

Problems on Water Management

Geographical Factor

1. Tambon Wangman is a slope and high area, poor to alter or pass mass water. Most of the area, also, is used for crop plantation. So, in the monsoon season, the mass water travels from west to east rapidly and is stuck at MC canal. Moo 1, Moo 8, Moo 3 and some parts of Moo 4 become flooded longer time than other areas.

Construction Factor

Waterworks System

1. Waterwork system is utilized by areas where people faced the scarcity of water for consumption in the dry season.

2. The surface waterworks system provides poor quality of water for consumption, with sediments.
3. Water pump system is not sufficiently able to distribute water, compared to the demand from households.
4. Lack of supports and budget for surface waterworks system's development and expansion.

Wells

1. Insufficient quantity of water
2. The groundwater is not qualified enough for consumption.
3. The villagers have to pay some expense for gas to draw the ground water, around 200 liter per 20 Baht.

Pools

1. Pools are built at hills or areas where it is difficult to store water in dry season.
2. Pools are built too far from community or village.

Water Tanks

1. There are a large number of water tanks in the area, but still not provide adequate water.
2. Some tanks are infiltrative or lose some parts.

Drain tubes

1. Drain tubes at the south end of MC Canal are narrow and broken and obstruct water movement. Many parts of the canal are shallow and full of Mimosa.

Dry Season

Rainy Season

Management Factor

1. The irrigation officers do not coordinate to consider the overall flood problem in all areas.
2. There is no information integration concerning socio-economic, water management and agriculture in order to set a plan for preparation scarcity of water or flood.
3. There is a lack of maintenance of water facilities, because of the absence of responsible agencies or financial supports.

The damage value from the flood

Location: TAOTambon Wangman

Duration: Sep-Nov 2011

Moo (Village)	Rice plantation(households)	Crop plantation (households)	Others (households)
1	15	-	-
2	-	-	-
3	269	21	5
4	81	6	-
5	-	-	-
6	-	25	-
7	-	-	-
8	121	-	-
รวม	486	52	5

Solution for flood problem (From the villagers)

1. Changing the drain tubes of MC Canal to improve the flow.
2. Dredging canals
3. Eliminating mimosas and unwanted plants along canals
4. Building water tubes to connect other areas to irrigation canal.
5. Irrigation officers should coordinate with stakeholders to consider overall problem about the scarcity of water and cooperate with the people in the area to assess the water demands and actual problems in order to reduce the negative effects.

Changing the drain tubes of MC Canal to improve the flow.

Dredging canals

Eliminating mimosas and unwanted plants along canals

Report of the Preparation of the Strategic Planning for Flood Management
at Wang Man Sub-district
Project on Flood Countermeasures for Thai Agriculture Sector (JICA)
During 3-7 September 2012
At Somapa Pasak Resort, Pattana Nikom District, Lopburi Province

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Current Situation of Wang Man Sub-district

The terrains of Wang Man Sub-district lie in both lowlands and highlands sloping to from the west to the east. The area could be divided into two parts: the east side situated in villages Moo 1, 2, 8, 3 and 4. Some areas are the catchment areas for water flowing from Uthai Thani Province and nearby sub-districts flowing through Huay Kot-Wang Man Canal, Land Development Department Canal and Huay Lam Canal into the area and there is the irrigational canal as the barriers from water flowing from the east that caused flood in the areas of villages Moo 4, 5, 6 and 7. It is the highland area with dry weather. Most people of the community are farmers and plant rice during the wet season. Apart from that they will grow sugar canes, cassava and livestock raising.

The land right holding in Wang Man Sub-district can be divided into two main categories: lands with title deeds approximately 47,294 Rais and lands belong to the Agricultural Land Reform Office (ALRO) approximately 1,906 Rais. in which the ALRO has been providing for the farmers to rent only for agricultural purposes. After the payment term has been completely paid, farmer will be granted the right of that plot of land holding and can change the document type to the title deeds. Besides the community lands, Wang man Sub-district also has many public areas throughout the sub-district, mostly located in village moo 3. Some public areas are the public water reservoirs but been shallow and cannot store water no more. There is also the community forest in the west side of the community.

According to the gathering of the people in the community, people gathered together as the career groups and various community enterprises such as the Community Welfare Group, Saving Group, Chili Paste Group, Mackerel Basket Woven Group, Organic Rice Production Group and other agricultural OTOP products of Pitsanulok Province like Pomelo, Rice, Cucumber, Holland Papaya, etc. The model was the community is the Agricultural School that trains and educates people in the community and produces rice for selling in the community.

During the disaster happened in the community, there were local agencies that had contributed their cooperation and assistance for short term disaster management. However, they are in shortage of budgets to operate the disaster management in the long term. The disasters gave impacts to the community in terms of lacking of the incomes, unstable agricultural production and higher production costs and that resulted in debts at the end.

2. SWOT Analysis

Community's Goals

1. Having the water reservoirs for the use during the dry season
2. Having the water management in the areas in order to reduce the impacts from the flood

Internal – External Factor Analysis

Internal Factors

Strengths (S)	Weaknesses (W)
1.Community people, local leaders and the local agencies already have the readiness in cooperation to solve the flood and drought problems 2.Most of the local people own their agricultural lands 3. Having the public areas throughout the villages. Mostly lie in village moo 3 for the total number of 750 Rais 4. There are the gathering of the community organizations and enterprises such as the Community Welfare Group, Saving Group and Chili Paste Making Groups (Moo 4), Rice and Paddy Rice Group, Broom Making Group (Moo 5), Yarn Doll Making Group (Moo 7), Incense Stick Making Group and Mackerel Basket Making Group (Moo 8), Herbal Medicine Group (Moo 4), Thai Massage Group (Moo 2) and Bio-fertilizer Production Group 5. Having the Agricultural School Model (Moo 8) for educating and training about the agriculture and producing the rice seeds 6.Having their own 5-star-OTOP products registered as: Pomelo-Rice- Cucumber (Moo 5), Holland Papaya (Moo 5), Tub Tim Chan Rose Apple (Moo 8 and 1) and Sarjor caju mushroom (Moo 5) 7. Reliable Civil Volunteers for Disaster Prevention and mitigation for their contribution of helps to the community people, hosting the training for the community people and good task assignment 8. The community also has the Rice Booting	1.Terrain sloping from the west to the east so it lies on both highlands and lowlands, and there is no whole water management system for both terrains so that causes the water rapidly flows and resulting in flood and drought in the areas. It also damages the agricultural crops at the end. 2. Lack of the water reservoirs for the use in the drought and the existing swamp (Pa Prem Swamp) is shallow and cannot store water at the moment. 3. People gain more debts and it is one cause of losing the land right 4. High production cost spending on the pesticides, labor wages, fertilizers, harvest machine and truck, etc. 5. Mixed characteristics of soil texture so that cannot keep the water within. For instance, the sand, loam and clay are mixed in the same area 6. Inconsistent yields, some years the yields are adequate for consumption while shortage in some years. Mostly people have trouble with the high prices of meals 7. Farmers use lots of chemical substances in agriculture and that cause toxin to the health 8. Lack of the incomes during the flood period 9. Lack of the Community-based Disaster Management 10.Shortage of the animal feeds during the drought and animal feeds often difficult to find and cost more

2. SWOT Analysis

Strengths (S)	Weaknesses (W)
Welcoming Festival, Collecting Rice into the Barn Welcoming Festival and they also store some rice for their own consumption as well as the rice seeds. All rituals are still conserved as ancient ways of life 9. The community has tried to seek for the adaptation alternatives by planting other crops to reduce the impacts from the disaster, i.e. planting water melon and green beans 10. The community having raising the animals and having the proper pasture for types of animals especially the natural pasture after the flood 11. Having the organic rice cultivation group	expensive during the flood 11.Insufficient and dirty water supply 12.Lack of the communication devices to update the water situations 13. The local budgets allocated are not adequate to solve the flood problem in this area 14. People in the community still lack of the accurate knowledge and understanding about the organic (non-chemical) agriculture 15. The Seed Production Group still unable to do the complete cycle of this matter

External Factors

Opportunities (O)	Threats (T)
1. The agricultural Land Reform Office (ALRO) executed the land allocation for the local people 2. Wang Man Sub-district Administrative Organization (TAO) supports the water pumping 3. JICA conducts the community case study to find the solutions for flood and drought 4. Chainat Provincial Social Development and Human Security Office supports the professional training 5. Thai Health Promotion Foundation supports the promotion of hygiene 6.Chainat Provincial Administrative Organization contribute its well support on the provision of water pumps during the drought season in every year 7. The policy of Chainat Livestock Department supports the pasture restoration for animals 8. Private companies invest in pig raising in the area so it allows people to earn extra incomes and the pig manure can be used for the bio- production 9. Most people in these days turn to pay more attention	1. Lack of the community participation in water management. For instance, in the water management of the irrigational barrier canal and that caused flood 2.The community cannot control the irrigation of the canals receiving water from Uthai Thani Province 3.There is no inter-Tambon Water Management Plan with nearby sub-districts 4. The government's Career Building Policy lacks of the ongoing operation and no monitoring or assessment system. i.e. the Composting Production Project, etc. 5. Agencies in charge of the canals/ ditches still has not assigned the clear maintenance tasks to persons involved, so it has caused some control devices, for example the drainage gates damaged. 6. Private agencies or NGOs do not contribute their support for the area 7. The global warming affecting the disaster in the area

2. SWOT Analysis

Opportunities (O)	Threats (T)
to their health care such as healthy food, etc. 10.The ASEAN Economic Community (AEC) results in the wider area of healthy food 11. Most farmers in the central river basin like Khao Kaeo Sub-district and Singhanat Sub-district normally use the industrial method of rice plantation which contains high volume of chemical substances use. 12. Most people are interested in the eco-tourism 13. Having the Disaster Victim Networks all over the areas facilitates the cooperation in providing assistance 14. The CEO governor has been very supporting to the operations implemented in the local areas	8. The policy of the Agricultural Land Reform Office (ALRO) in land allocation still lacks of the promotion for the additional careers for the community 9. Swamps/ ponds built by the Land Development Department (LDD) are not related to the areas

2. SWOT Analysis

Proactive Strategy Analysis of Wang Man Sub-district

Proactive Strategies (S+O)		
Strengths (S)	**Opportunities (O)**	**Proactive Strategies (S+O)**
1.Community people, local leaders and the local agencies already have the readiness in cooperation to solve the flood and drought problems 2.Most of the local people own their agricultural lands 3. Having the public areas throughout the villages. Mostly lie in village moo 3 for the total number of 750 Rais 4. There are the gathering of the community organizations and enterprises such as the Community Welfare Group, Saving Group and Chili Paste Making Groups (Moo 4), Rice and Paddy Rice Group, Broom Making Group (Moo 5), Yarn Doll Making Group (Moo 7), Incense Stick Making Group and Mackerel Basket Making Group (Moo 8), Herbal Medicine Group (Moo 4), Thai Massage Group (Moo 2) and Bio-fertilizer Production Group 5. Having the Agricultural School Model (Moo 8) for educating and training about the agriculture and producing the rice seeds	1. The agricultural Land Reform Office (ALRO) executed the land allocation for the local people 2. Wang Man Sub-district Administrative Organization (TAO) supports the water pumping 3. JICA conducts the community case study to find the solutions for flood and drought 4. Chainat Provincial Social Development and Human Security Office supports the professional training 5. Thai Health Promotion Foundation supports the promotion of hygiene 6.Chainat Provincial Administrative Organization contribute its well support on the provision of water pumps during the drought season in every year 7. The policy of Chainat Livestock Department supports the pasture restoration for animals 8. Private companies invest in pig raising in the area so it allows people to earn extra incomes and the pig manure can be used for the bio- production 9. Most people in these days turn to pay more attention to their health care such as healthy food,	1. Promote the organic agriculture which is safe for both manufacturers and consumers 1.1 Establish/ expand the organic rice production groups 1.2 Attend the training, workshop on the safety/ organic rice production, safety vegetable, animal raising, etc. 2. Connect the Disaster Victim Networks in building the cooperation for the disaster victims and the consumer network in Thailand 2.1 Cooperate with all 8 Tambons, pilot study sites of JICA on the market channels of agricultural products such as rice and so on. 3. Prepare the Community-based Disaster Management Plan 3.1 Enhance the community potential to cope with the disasters - Develop the safety areas for sustainable sustenance with sources of food and other facilitating tools to be used during the disasters - organize the training on the disaster warning

2. SWOT Analysis

Proactive Strategies (S+O)		
Strengths (S)	**Opportunities (O)**	**Proactive Strategies (S+O)**
6.Having their own 5-star-OTOP products registered as: Pomelo-Rice- Cucumber (Moo 5), Holland Papaya (Moo 5), Tub Tim Chan Rose Apple (Moo 8 and 1) and Sarjor caju mushroom (Moo 5) 7. Reliable Civil Volunteers for Disaster Prevention and mitigation for their contribution of helps to the community people, hosting the training for the community people and good task assignment 8. The community also has the Rice Booting Welcoming Festival, Collecting Rice into the Barn Welcoming Festival and they also store some rice for their own consumption as well as the rice seeds. All rituals are still conserved as ancient ways of life 9. The community has tried to seek for the adaptation alternatives by planting other crops to reduce the impacts from the disaster, i.e. planting water melon and green beans 10. The community having raising the animals and having the proper pasture for types of animals	etc. 10.The ASEAN Economic Community (AEC) results in the wider area of healthy food 11. Most farmers in the central river basin like Khao Kaeo Sub-district and Singhanat Sub-district normally use the industrial method of rice plantation which contains high volume of chemical substances use. 12. Most people are interested in the eco-tourism 13. Having the Disaster Victim Networks all over the areas facilitates the cooperation in providing assistance 14. The CEO governor has been very supporting to the operations implemented in the local areas	- Organize the workshops - Prepare the Community-based Disaster Prevention Plan - Prepare the evacuation map and routes and signs of the dangerous areas - Prepare the rescue and resuscitating equipment. For example, boats, water buckets, toilets, etc. - Organize the training for the rescue and resuscitating teams - Organize the professional training for income generating during the flood - Organize the feed storage system like hay balers, feed storage and animal evacuation sites with dens for each type of animals - Host the campaign to educate about the disaster countermeasures, aids during the disaster, etc. 3.2 Develop the cooperation with the involved agencies/ associates working on the disaster management - Organize the meeting to prepare the Disaster Management Plan with the involved agencies - Design the Water Management Plan in

2. SWOT Analysis

Proactive Strategies (S+O)		
Strengths (S)	**Opportunities (O)**	**Proactive Strategies (S+O)**
especially the natural pasture after the flood 11. Having the organic rice cultivation group		cooperation with involved agencies - Cooperate with all involved agencies about the disaster countermeasures - prepare the Disaster Sensitivity Database - Host the training for the community electricity volunteers, 22 volunteers per village - Prepare the Cooperation Plan with the Provincial Administrative Organization, Provincial Disaster Prevention and Mitigation Department and Department of Public Health - Coordinate with the Livestock office for the use of the pasture during the disaster 4. Promote/ develop/ extend the standard animal raising that suits the community's lifestyles 4.1 Promote and develop the community potential as well as the interest group of animal raising - Developing the standards for animal raising such as breeds, etc. - Training 5. Seek the models for adaptation of the community to the drought and flood 5.1 Promote the development of the animal raising

2. SWOT Analysis

Proactive Strategies (S+O)		
Strengths (S)	**Opportunities (O)**	**Proactive Strategies (S+O)**
		methods - Pilot famer of the growing grass fed animals (cows) - (pilot farmer) promotes the animal production that suit with the areas. For example, goat, pig (household experiment) - Develop the experiment of Pangola grass planting 5.2 Promote the agricultural crop production - Strengthen the organic rice cultivation - Expand the areas of organic rice cultivation - Promote the mixed agricultural using less water model (Model 1 Rai 1 Million) - Promote the bio-fertilizer production 6. develop and upgrade the quality of the local products and safety standards as healthy and environmental friendly products 6.1 production and design of packaging products 6.2 Group management 6.3 Marketing/ making the unique trademark with the symbol of the Tambon 7. Connect with the manufacturer networks for

2. SWOT Analysis

Proactive Strategies (S+O)		
Strengths (S)	**Opportunities (O)**	**Proactive Strategies (S+O)**
		local products and flood/ drought management 7.1 Connect with the 8 sub-districts affecting by the flood (Inter-Tambon) 8. Build/ find the markets for the organic rice 8.1 Connect the manufacturer network in the province/ region 8.2 Organize the workshop for organic rice production group 8.3 Provide the experts/ coaches for the promotion of any activities 9. Expand the production areas for rice cultivation 10. Upgrade the ability of quality seed production - Organize workshops on the production/ techniques for group management - Organize the trainings for all topics of interest 11. Restore the production group and one stop service market of the community - Set up the rice production enterprise group of the community - Prepare the production and market plans - Enhance the ability of group management - Create the group trademark

2. SWOT Analysis

Development Strategy Analysis of Wang Man Sub-district

Development Strategies (O+W)		
Opportunities (O)	**Weaknesses (W)**	**Development Strategies (O+W)**
1. The agricultural Land Reform Office (ALRO) executed the land allocation for the local people 2. Wang Man Sub-district Administrative Organization (TAO) supports the water pumping 3. JICA conducts the community case study to find the solutions for flood and drought 4. Chainat Provincial Social Development and Human Security Office supports the professional training 5. Thai Health Promotion Foundation supports the promotion of hygiene 6.Chainat Provincial Administrative Organization contribute its well support on the provision of water pumps during the drought season in every year 7. The policy of Chainat Livestock Department supports the pasture restoration for animals 8. Private companies invest in pig raising in the area so it allows people to earn extra incomes and the pig manure can be used for the bio- production 9. Most people in these days turn to pay more	1.Terrain sloping from the west to the east so it lies on both highlands and lowlands, and there is no whole water management system for both terrains so that causes the water rapidly flows and resulting in flood and drought in the areas. It also damages the agricultural crops at the end. 2. Lack of the water reservoirs for the use in the drought and the existing swamp (Pa Prem Swamp) is shallow and cannot store water at the moment. 3. People gain more debts and it is one cause of losing the land right 4. High production cost spending on the pesticides, labor wages, fertilizers, harvest machine and truck, etc. 5. Mixed characteristics of soil texture so that cannot keep the water within. For instance, the sand, loam and clay are mixed in the same area 6. Inconsistent yields, some years the yields are adequate for consumption while shortage in some years. Mostly people have trouble with the high prices of meals	1.Provide and develop the water reservoirs for agricultural uses throughout the whole year 1.1 Dredge the public ponds 1.2 Increase the barrier weirs in the Huay Kot – Huay Wang Man Canal, LDD Canal and Huay Lam Canal 1.3 Develop the water resources for agriculture 1.4 Improve the existing water reservoirs 2. Manage the participatory cooperation of people in the community on the water management 2.1 Set up the sub-district Water Management Group 2.2 Prepare the Community Water Management Plan 3. Build the cooperation among people in the community and nearby communities especially those sub-districts situated in the west side 3.1 Study the problem solving styles of the flood caused by the Inter Canal 3.2 Host the meeting on the flood/ drought management in cooperation with the local

2. SWOT Analysis

Development Strategies (O+W)		
Opportunities (O)	**Weaknesses (W)**	**Development Strategies (O+W)**
attention to their health care such as healthy food, etc. 10.The ASEAN Economic Community (AEC) results in the wider area of healthy food 11. Most farmers in the central river basin like Khao Kaeo Sub-district and Singhanat Sub-district normally use the industrial method of rice plantation which contains high volume of chemical substances use. 12. Most people are interested in the eco-tourism 13. Having the Disaster Victim Networks all over the areas facilitates the cooperation in providing assistance 14. The CEO governor has been very supporting to the operations implemented in the local areas	7. Farmers use lots of chemical substances in agriculture and that cause toxin to the health 8. Lack of the incomes during the flood period 9. Lack of the Community-based Disaster Management 10.Shortage of the animal feeds during the drought and animal feeds often difficult to find and cost more expensive during the flood 11.Insufficient and dirty water supply 12.Lack of the communication devices to update the water situations 13. The local budgets allocated are not adequate to solve the flood problem in this area 14. People in the community still lack of the accurate knowledge and understanding about the organic (non-chemical) agriculture 15. The Seed Production Group still unable to do the complete cycle of this matter	agencies and people in the nearby areas of upstream/ middle/ end of stream 3.3. Prosecute at the Administrative court about the Inter Canals 3.4 Connect/ build the water management networks 4. Prepare the Strategic Plans for water management in order to find cooperation from the outsiders 5. Develop the quality and consuming/ drinking water management system in the community 5.1 TAO should provide the safety drinking water purifier system sufficiently for all areas 6. Revive the beautiful old traditions and culture of the community and promote the community of the community resource

2. SWOT Analysis

Preventive Strategy Analysis of Wang Man Sub-district

Preventive Strategies (S+T)		
Strengths (S)	**Threats (T)**	**Preventive Strategies (S+T)**
1.Community people, local leaders and the local agencies already have the readiness in cooperation to solve the flood and drought problems 2.Most of the local people own their agricultural lands 3. Having the public areas throughout the villages. Mostly lie in village moo 3 for the total number of 750 Rais 4. There are the gathering of the community organizations and enterprises such as the Community Welfare Group, Saving Group and Chili Paste Making Groups (Moo 4), Rice and Paddy Rice Group, Broom Making Group (Moo 5), Yarn Doll Making Group (Moo 7), Incense Stick Making Group and Mackerel Basket Making Group (Moo 8), Herbal Medicine Group (Moo 4), Thai Massage Group (Moo 2) and Bio-fertilizer Production Group 5. Having the Agricultural School Model (Moo 8) for educating and training about the agriculture and producing the rice seeds	1. Lack of the community participation in water management. For instance, in the water management of the irrigational barrier canal and that caused flood 2.The community cannot control the irrigation of the canals receiving water from Uthai Thani Province 3.There is no inter-Tambon Water Management Plan with nearby sub-districts 4. The government's Career Building Policy lacks of the ongoing operation and no monitoring or assessment system. i.e. the Composting Production Project, etc. 5. Agencies in charge of the canals/ ditches still has not assigned the clear maintenance tasks to persons involved, so it has caused some control devices, for example the drainage gates damaged. 6. Private agencies or NGOs do not contribute their support for the area 7. The global warming affecting the disaster in the area	1. Motivate the concerned agencies to conduct the study on the suitability of the areas before digging the swamps

2. SWOT Analysis

Preventive Strategies (S+T)		
Strengths (S)	**Threats (T)**	**Preventive Strategies (S+T)**
6.Having their own 5-star-OTOP products registered as: Pomelo-Rice- Cucumber (Moo 5), Holland Papaya (Moo 5), Tub Tim Chan Rose Apple (Moo 8 and 1) and Sarjor caju mushroom (Moo 5) 7. Reliable Civil Volunteers for Disaster Prevention and mitigation for their contribution of helps to the community people, hosting the training for the community people and good task assignment 8. The community also has the Rice Booting Welcoming Festival, Collecting Rice into the Barn Welcoming Festival and they also store some rice for their own consumption as well as the rice seeds. All rituals are still conserved as ancient ways of life 9. The community has tried to seek for the adaptation alternatives by planting other crops to reduce the impacts from the disaster, i.e. planting water melon and green beans 10. The community having raising the animals and having the proper pasture for types of animals	8. The policy of the Agricultural Land Reform Office (ALRO) in land allocation still lacks of the promotion for the additional careers for the community 9. Swamps/ ponds built by the Land Development Department (LDD) are not related to the areas	

2. SWOT Analysis

Preventive Strategies (S+T)		
Strengths (S)	**Threats (T)**	**Preventive Strategies (S+T)**
especially the natural pasture after the flood 11. Having the organic rice cultivation group		

Avoidance Strategy Analysis of Wang Man Sub-district

Avoidance Strategies (W+T)		
Weaknesses (W)	**Threats (T)**	**Avoidance Strategies (W+T)**
1.Terrain sloping from the west to the east so it lies on both highlands and lowlands, and there is no whole water management system for both terrains so that causes the water rapidly flows and resulting in flood and drought in the areas. It also damages the agricultural crops at the end. 2. Lack of the water reservoirs for the use in the drought and the existing swamp (Pa Prem Swamp) is shallow and cannot store water at the moment. 3. People gain more debts and it is one cause of losing the land right 4. High production cost spending on the pesticides, labor wages, fertilizers, harvest machine and truck, etc.	1. Lack of the community participation in water management. For instance, in the water management of the irrigational barrier canal and that caused flood 2.The community cannot control the irrigation of the canals receiving water from Uthai Thani Province 3.There is no inter-Tambon Water Management Plan with nearby sub-districts 4. The government's Career Building Policy lacks of the ongoing operation and no monitoring or assessment system. i.e. the Composting Production Project, etc. 5. Agencies in charge of the canals/ ditches still has not assigned the clear maintenance tasks to persons	1.Adjust the pattern, duration and methods of rice production to suit the environment, conditions and limitations of the area 2. Change types of crops. For example, from rice to grass or green beans 3. Promote the sufficient living for cost reduction and use the bio-fertilizer 4. Provide information about the use of chemical substances, toxin remaining in the body and prevention of toxin

2. SWOT Analysis

Avoidance Strategies (W+T)		
Weaknesses (W)	**Threats (T)**	**Avoidance Strategies (W+T)**
5. Mixed characteristics of soil texture so that cannot keep the water within. For instance, the sand, loam and clay are mixed in the same area 6. Inconsistent yields, some years the yields are adequate for consumption while shortage in some years. Mostly people have trouble with the high prices of meals 7. Farmers use lots of chemical substances in agriculture and that cause toxin to the health 8. Lack of the incomes during the flood period 9. Lack of the Community-based Disaster Management 10.Shortage of the animal feeds during the drought and animal feeds often difficult to find and cost more expensive during the flood 11.Insufficient and dirty water supply 12.Lack of the communication devices to update the water situations 13. The local budgets allocated are not adequate to solve the flood problem in this area 14. People in the community still lack of the accurate knowledge and understanding about the	involved, so it has caused some control devices, for example the drainage gates damaged. 6. Private agencies or NGOs do not contribute their support for the area 7. The global warming affecting the disaster in the area 8. The policy of the Agricultural Land Reform Office (ALRO) in land allocation still lacks of the promotion for the additional careers for the community 9. Swamps/ ponds built by the Land Development Department (LDD) are not related to the areas	

2. SWOT Analysis

Avoidance Strategies (W+T)		
Weaknesses (W)	**Threats (T)**	**Avoidance Strategies (W+T)**
organic (non-chemical) agriculture 15. The Seed Production Group still unable to do the complete cycle of this matter		

2. SWOT Analysis

Vision : "*Within 2016 Wang Man Sub-district has adjusted itself under the flood-drough conditions aimed at proucing quality rice, safety and standard animal raising and maintain the sufficient living under the good environment in accordance with the climate changes*"

Building the community participartion in the whole water management system			Community poteltial development for participatory flood countermeasures		Development of the patterns/ alternatives for community adaptation to the flood/ drought	promotion of the safety organic agriculture for consumers			Marketing promotion and upgrading the occupational groups of community products
Strategy 1: providing and development the water resources for agriculture, consumption and drinking	Strategy 2: building cooperation network in water management	strategy 3: Preparation of the community-based water management plan	Strategy1: Preparedness for disaster countermeasures	Strategy 2: cooperation with the partnerships in natural disaster management	Strategy1: change the production methods to suit and relate to the community terrains	Strategy1: development the groups/ networks potentials in conducting the organic agriculture	Strategy 2: Taking the organic agriculture of teh Tambon into action	Strategy 3: Development/ promotion/ restoring the agricultural products of teh community in the one stop market	Strategy 1: Development the quality for community products to be safe and standardized
Activity Plan1: Development the water resources for agriculture fields	Activity Plan 1: Setting the Water management Committee of T.Wang Man	Activity Plan 1: workshop at the model area of flood-drought management	Activity Plan1: providing equipment supporting the community disaster such as 12 pontoons toilets, 1,000 L drinking container, tents, ,picnic mattresses	Activity Plan1: Presenting and coordinating about the disaster management plan with involved agencies	Activity Plan 1: development of the pilot animal feed grass and feed storage	Activity Plan1: Establishing/ expanding the organic agricultural groups	Strategy 1: Expanding and promoting the organic rice production	Activity Plan 1: Setting the community enterprise group of organic rice production	Activity Plan 1: Training/ workshop on the development of the community products
Activity Plan 2: Water management by increasing dikes and improving thebarrier weirs	Activity Plan 2: providing the co-mechanisms for water management of the government and public in the upstream, middle and endstream areas	Activity Plan 2: preparation of the strategic plan on community-based water management	Activity Plan 2: Preparing the safe areas for (sustaining) community and animals during the disaster and development to be the Learning Center of the community	Activity Plan 2: Preparation of the community database for disaster countermeasures	Activity Plan 2: setting/ developing groups/ funds for animal raising farmer in the community	Activity Plan 2: Workshop/ training on organic agriculture/ development of rice varieties	Activity Plan2: Promoting the bio-fertilizer production	Activity Plan 2: Development the group potentials in production and marketing planning	Activity Plan 2: Designing unique products/ packages
Activity Plan3: dredging and development the natiral water resources in the community	Activity Plan 3: connecting and building networks/ artnerships of the whole water management system	Activity Plan 3: study models of flood solution caused by the Inter Canal	Activity 3: Preparation of the community-based disaster management plan	Activity Plan :3 Coordinating with the partnership fo the preparedness of the natural disaster countermeasures and resilient	Activity Plan3 :Extend and develop methods that use less water(Model 1 Rai 100,000 baht)	Activity Plan 3: Coordinating with the agencies/ experts in management/ processes/ knowledge to develop the group potential	Activity Plan 3: Development the pilot sites for organic agriculture of villages/ sub-districts to have food security	Activity Plan 3: Cooperating with the disaster victim networks in eight Tambons in selling organic rice and expanding to other areas	Activity Plan 3: Development the management skills for occupational groups and safety products
Activity Plan 4: development of the safety and sufficient drinking water supply			Activity Plan 4: Training, workshop on disaster management in the model areas		Activity4 : Support/ develop/ extend the animal raising to be standardized and related to the community ways of life		Activity Plan 4: Conservating, restoring natural resources in the community to creat sources of food and good hygiene for community people		Activity Plan 4: Connecting the manufacturer networks in the 8 victim areas and expanding to other areas
			Activity 5: Training Courses for electricity, warning, rescue, resusitating volunteers,						

2. SWOT Analysis

Pilot Project Plan of Wang Man sub-district, Wat Sing District, Chainat Province

Strategies	Reasons	Activities	Responsible Agencies/ individuals	Duration	Source of Budget		Issues to be discussed/ confirmed by the Community	Issues to be confirmed by the Experts	Remarks
					JICA	Thailand			
Building the community participation in the whole water management system	To operate the systematic disaster management requires, lessons exchange with other areas experiencing the same problems and with similar characteristics to facilitate the concept about the application of knowledge into practical	Workshop at the model site of the whole water management system			Finding the suitable locations for the workshop and supporting the budgets				
Development	Despite of the flood had	Provide		8 Sep. 2012	12-seat-				

2. SWOT Analysis

Strategies	Reasons	Activities	Responsible Agencies/ individuals	Duration	Source of Budget		Issues to be discussed/ confirmed by the Community	Issues to be confirmed by the Experts	Remarks
					JICA	Thailand			
the Potential of Community participatory disaster countermeasures	entered the area of Wang Man sub-district, from the problems found in the past years mostly about the limitations in assisting the victims. Partly caused from no pontoon, toilets, drinking water tanks so that the volunteers faced difficulty in helping them. The community faced the hardness in living their daily life.	equipment, tools in supporting the community disaster management such as the 12-seat-pontoon, toilet, 1,000litter water tank, tent and temporary sleeping mattress			pontoon with engine, toilet, 1,000 liter-water tank, tent and temporary sleeping mattress				

2. SWOT Analysis

Strategies	Reasons	Activities	Responsible Agencies/ individuals	Duration	Source of Budget		Issues to be discussed/ confirmed by the Community	Issues to be confirmed by the Experts	Remarks
					JICA	Thailand			
Development of the patterns/ alternatives for adaptation for the community during the flood	Most of the areas of Wang Man do not contain much water so it is suitable to grow grass as it needs little water and low investment. Also the community is in shortage of animal feeds so it is necessary to build the feed storage for the use in the flood season	Develop the pilot sites for planting animal fed grass and feed storage			Support the budget for building the feed storage and start up capital for growing animal fed grass	Provincial Livestock Office provides knowledge about growing grass			
Promote the organic agriculture which is safe for the consumers	The community has its own concepts about the organic agriculture and the agriculture school model to support the community but the community still lacks of the clear-cut operations in gathering together	Set up/ expand the organic agricultural group			Promote the establishment of the organic agricultural group and give knowledge				

2. SWOT Analysis

Strategies	Reasons	Activities	Responsible Agencies/ individuals	Duration	Source of Budget		Issues to be discussed/ confirmed by the Community	Issues to be confirmed by the Experts	Remarks
					JICA	Thailand			
					about such topic				
Promote the market and upgrade the professional groups and local products	ชุมชนมีการรวมกลุ่มอาชีพที่หลากหลาย แต่ขาดแนวคิดในการพัฒนาต่อยอดและ ะStandardize the products	Training/ workshop and development t of local products			Provide places for workshop, give knowledge about the developme nt of the local products				

2. SWOT Analysis

Proposed Activities but were not approved (Crossed out)

Activities	Reasons for crossing out	Remarks
1. Development of the water resources for agricultural uses at the farming fields		
2. Water management by increasing and improving the barrier weirs		
3. Dredging and developing water resources in the community		
4. Development the water supply management system to be cleaned and sufficient		
5.Establishment of the Wang Man Water Management Group		
6. Preparing the mechanisms of water management for the government and people in the areas of the upstream, middle and endstream		
7.Connecting and building the networks/ partnership of the whole water system management		
8. Preparation of the Strategic Plan of Community-based Water Management		
9. Study the solutions for flood caused by the Inter Canal		
10. Preparation of the safety (sustaining) areas for the community and animals during the disaster and development to be the Learning Center for Community Occupational Groups		
11. Preparation of the Participatory Community Disaster Management Plan		
12. Training and workshop on disaster management in the model areas		
13. Training course for electricity, rescue, resuscitating and warning volunteers of the disasters		
14. Presenting and preparation the disaster management plan together with the involved agencies		
15. Preparation of the community database in all aspects to be ready for the disaster countermeasures		
16. Coordinating with the agencies or partnership in preparing for the natural disaster countermeasures and restoration		
17. Establishment/ development of the animal raising groups in the community		
18. Promoting the sufficient economy that uses less water (Model 1 Rai 100,000 baht)		

2. SWOT Analysis

Activities	Reasons for crossing out	Remarks
19. Promoting/ development/ extending the animal raising to be standardized and related to the community's ways of life		
20. Workshop/ training on the organic agriculture/ development of the rice varieties		
21. Coordinating with the agencies/ experts in management/ processes/ knowledge body to develop the group potentials		
22. Expanding the areas and promoting the organic rice production		
23. Promotion for the bio-fertilizer production		
24. Development the model areas of organic agriculture of the village/ sub-district to have food security		
25. Conservation and restoring natural resources in the community to create sources of food and good hygiene for the community people		
26. Establishment of the community enterprise groups of organic rice production		
27. Development the group potentials in production and marketing planning		
28. Cooperating with 8 disaster victim Tambons in selling organic rice and expanding to other areas		
30. Designing the outstanding products/ packages		
31. Develop the management skills of the occupational group and safety products		
32. Connecting the manufacturer and consumer networks in 8 disaster victim Tambons and expanding to other areas		

3.Output Table of Tambon Wangman, Watsing District of Chainat Province

Strategy	Activity	Organization/ person in charge	Schedule time	Necessary		Issues to be further discussed/confirmed by the community	Issues to be confirmed with Japanese experts
				JICA	Thai		
1.Promote People Participation in Community Water Management							
	1.1 Develop Community Water Resource for Agriculture and Domestic Consumption						
	1.1.1 Construct Farm Pond						
	1.1.2 Construct Weirs						
	1.1.3 Improve existing community water resources						
	1.1.4 Improve and secure enough domestic water supply						
	1.2 Networking Water Management						
	1.2.1 Establish Tambon Wangman Water management Committee						
	1.2.2 Set up water Management System in cooperation with related government agencies						
	1.2.3 Networking with all related parties						
	1.3 Establish Water Management Plan						
	1.3.1 Study visit to model areas where flood and drought management is succesfully managed						
	1.3.2 Prepare Strategic Plan of Tambon on Water Management						
	1.3.3 Study on how to solve flood problem which occurs from the obstruction of irrigation canal						
2.Improve Tambon Capacity on Disaster Management							
	2.1 Disaster Prepareness						
	2.1.1 Secure necessary equipments such as 12 seated boat,toilet, water storage tank (1000 litres), tents and tempolary beds						
	2.1.2 Prepare evacuation center for community and animals and use as learning center during normal time						
	2.1.3 Prepare Community Based Disaster Management Plan						
	2.1.4 Training and Study visit to the model sites on disaster management						
	2.1.5 Training on electricity volunteer, early warning and first aid						
	2.2 Networking with related agencies on disaster management						
	2.1.1 Present and cooperate with related agencies in disaster management						
	2.2.2 Prepare community data base with all dimension to deal with disaster						
	2.2.3 Coordinate with all related parties to deal with disaster and to rehabilitate after flood						
3. Develop Alternative Activities for Community Adaptation in Flood and Drought tSituation							
	3.1 Modification of Cropping Pattern						
	3.1.1 Establish Pilot Pasture and Storage House						
	3.1.2 Establish Animal Raising Group						
	3.1.3Promote Integrated Farm under concept of "One Rai 100,000 Baht"						
	3.1.4 Promote Livestock Raising based on community resources						
4. Promote Safe Agricultural Products							
	4.1 Promote Organic Agricultural Group						
	4.1.1 Expand Organic Agricultural Group						
	4.1.2 Study visit to organic agriculture area and develop organic rice						
	4.1.3 Learn from government agencies, experts and others on group strengthening						
	4.2 Materialize organic agriculture of Tambon						
	4.2.1 Expand non chemical rice production area						
	4.2.2 Promotion of organic fertilizer production						
	4.2.3 Establish Model Area at Village and Tambon Level on organic food production						
	4.2.4 Rehabilitate Community Natural Resources to be food bank and good environment						
	4.3 Develop and promote community product and market						
	4.3.1 Establish community enterprise on organic rice						
	4.3.2 Capacity building on production and marketing						
	4.3.3 Networking with 8 Tambons for marketing of organic rice						
5.Promote community product and marketing							
	5.1 Develop High Quality Community Products						
	5.1.1 Training and study visit on community product development						
	5.1.2 Design Package						
	5.1.3 Capacity building of production group						
	5.1.4 Networking with other model Tmbons and other areas						

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

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 Wang Man TAO

Vision: *"Within 2016, Wang Man could adapt to drought and flood and produce good quality rice and animal under sufficiency economy"*. Community maintains this vision.

Strategies

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

a) Promote people participation in water management
b) Improve capacity of community to deal with disaster
c) Demonstrate adaptation activities on flood and drought
d) Promote organic agriculture
e) Promote income generation activities

The community maintain and follow these five strategies for flood and drought adaptation.

Activities

Activities are grouped into four after implementation of pilot activities namely

1) Pilot activities (green)
2) Short term activities (light green)
3) Follow up activities from pilot project (yellow)
4) Long term activity (blue)

WM-4-2

Vision : "*Within 2016 Wang Man Sub-district has adjusted itself under the flood-drough conditions aimed at proucing quality rice, safety and standard animal raising and maintain the sufficient living under the good environment in accordance with the climate changes"*

Building the community participartion in the whole water management system			Community poteltial development for participatory flood countermeasures		Development of the patterns/ alternatives for community adaptation to the flood/ drought	promotion of the safety organic agriculture for consumers			Marketing promotion and upgrading the occupational groups of community products
Strategy 1: providing and development the water resources for agriculture, consumption and drinking	Strategy 2: building cooperation network in water management	strategy 3: Preparation of the community-based water management plan	Strategy1: Preparedness for disaster countermeasures	Strategy 2: cooperation with the partnerships in natural disaster management	Strategy1: change the production methods to suit and relate to the community terrains	Strategy1: development the groups/ networks potentials in conducting the organic agriculture	Strategy 2: Taking the organic agriculture of teh Tambon into action	Strategy 3: Development/ promotion/ restoring the agricultural products of teh community in the one stop market	Strategy 1: Development the quality for community products to be safe and standardized
Activity Plan1: Development the water resources for agriculture fields	Activity Plan 1: Setting the Water management Committee of T.Wang Man	Activity Plan 1: workshop at the model area of flood-drought management	Activity Plan1: providing equipment supporting the community disaster such as 12 pontoons toilets, 1,000 L drinking container, tents, ,picnic mattresses	Activity Plan1: Presenting and coordinating about the disaster management plan with involved agencies	Activity Plan 1: development of the pilot animal feed grass and feed storage	Activity Plan1: Establishing/ expanding the organic agricultural groups	Strategy 1: Expanding and promoting the organic rice production	Activity Plan 1: Setting the community enterprise group of organic rice production	Activity Plan 1: Training/ workshop on the development of the community products
Activity Plan 2: Water management by increasing dikes and improving thebarrier weirs	Activity Plan 2: providing the co-mechanisms for water management of the government and public in the upstream, middle and endstream areas	Activity Plan 2: preparation of the strategic plan on community-based water management	Activity Plan 2: Preparing the safe areas for (sustaining) community and animals during the disaster and development to be the Learning Center of the community	Activity Plan 2: Preparation of the community database for disaster countermeasures	Activity Plan 2: setting/ developing groups/ funds for animal raising farmer in the community	Activity Plan 2: Workshop/ training on organic agriculture/ development of rice varieties	Activity Plan2: Promoting the bio-fertilizer production	Activity Plan 2: Development the group potentials in production and marketing planning	Activity Plan 2: Designing unique products/ packages
Activity Plan3: dredging and development the natiral water resources in the community	Activity Plan 3: connecting and building networks/ artnerships of the whole water management system	Activity Plan 3: study models of flood solution caused by the Inter Canal	Activity 3: Preparation of the community-based disaster management plan	Activity Plan :3 Coordinating with the partnership fo the preparedness of the natural disaster countermeasures and resilient	Activity Plan3 :Extend and develop methods that use less water(Model 1 Rai 100,000 baht)	Activity Plan 3: Coordinating with the agencies/ experts in management/ processes/ knowledge to develop the group potential	Activity Plan 3: Development the pilot sites for organic agriculture of villages/ sub-districts to have food security	Activity Plan 3: Cooperating with the disaster victim networks in eight Tambons in selling organic rice and expanding to other areas	Activity Plan 3: Development the management skills for occupational groups and safety products
Activity Plan 4: development of the safety and sufficient drinking water supply			Activity Plan 4: Training, workshop on disaster management in the model areas		Activity4 : Support/ develop/ extend the animal raising to be standardized and related to the community ways of life		Activity Plan 4: Conservating, restoring natural resources in the community to creat sources of food and good hygiene for community people		Activity Plan 4: Connecting the manufacturer networks in the 8 victim areas and expanding to other areas
			Activity 5: Training Courses for electricity, warning, rescue, resusitating volunteers,						

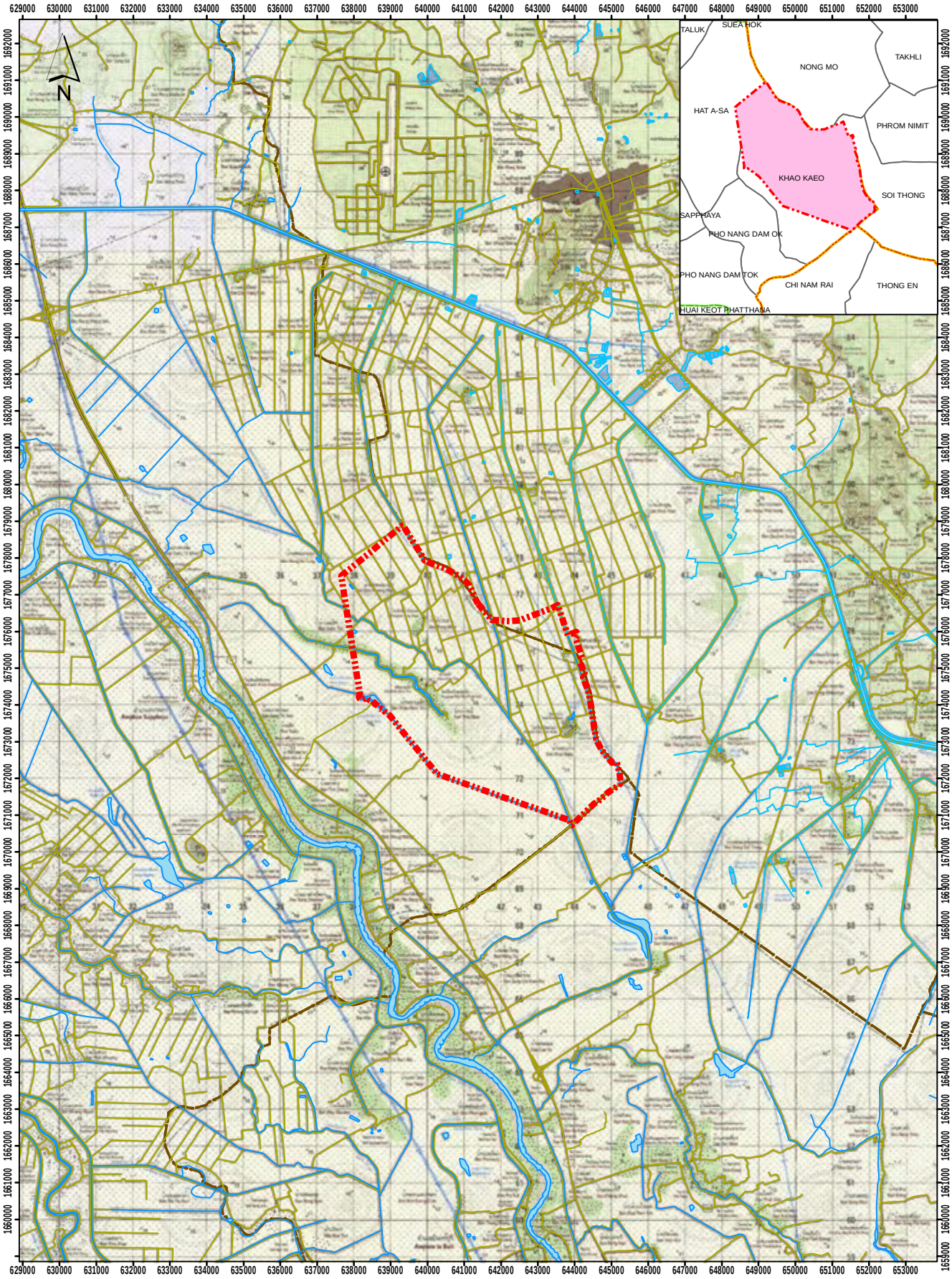
Remarks : Long-term plan; Completed activity; Urgent plan; Ongoing Plan

Community Case Study

Tambon Khao Kaeo, Sapphaya District

Chainat Province

Content



Legend

- Provincial Boundary
- Tambon Khao Kaeo
- Water body
- River
- Road

Note

Data Source:
Tambon Boundary of Khao Kaeo: 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 Khao Kaeo, Amphoe Sapphaya, Chainat Province

1. PRA Report

General information of KhaoKaeo Sub-district

History

Khao Kaeo Sub-district is a border sub-district of Sapphaya District. Primitively was the dry area. The location was far away from Chao Praya River and the civilization. It was only an agricultural land occupied by the farmers from nearby areas. Residents gathered in small groups along the hills and natural water streams. Later residents from other sub-districts began to migrate into this area. Some immigrated from Lopburi and Nakhon Sawan, for example, in order to seize the land for rice planting. Development of the villages, originally there were only three villages and then expanded to six villages in the present.

Khao Kaeo Sub-district is a significant agricultural area. The landscape is connected to the Main Road No.32 of Asia Highway, located in the east of Sapphaya District, and approximately 15 kilometers from the Office of Sapphaya District.

Boundaries

To the North	Nongmo Sub-district, Taklee District, Nakhon Sawan Province
To the South	Phonangdam Aok Sub-district, Sapphaya District, Chainat Province; and Chi Nam Rai Sub-district, Inburi District, Singburi Province
To the East	Soithong Sub-district, Taklee District, Nakhon Sawan Province
To the West	Hard Asa Sub-district and PhonangdamAok Sub-district, Sapphaya District, Chainat province.

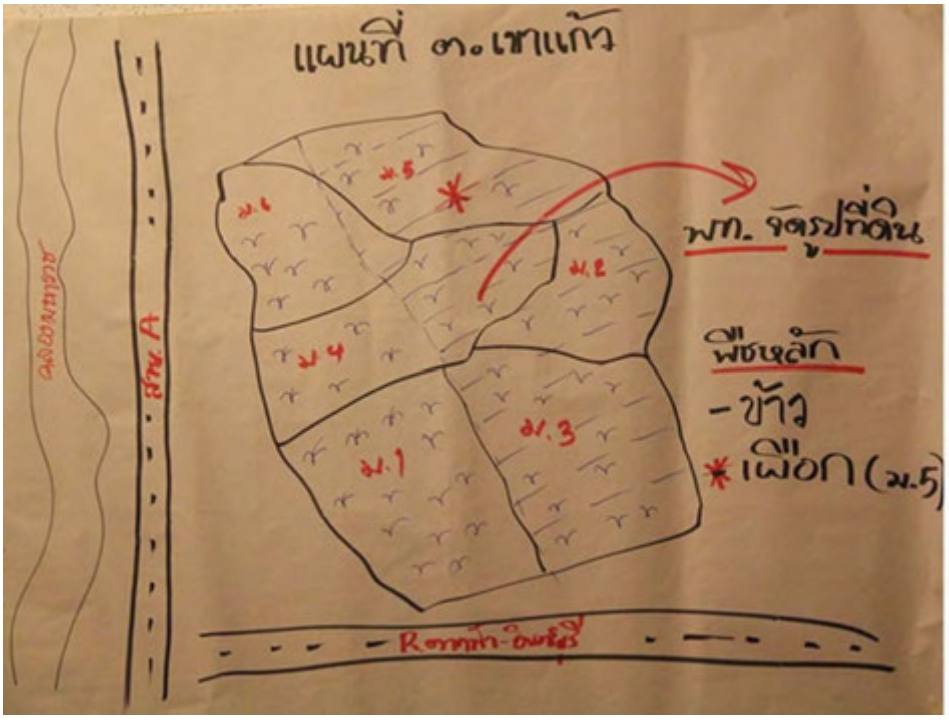


Figure 1: Map of KhaoKaeo Sub-district

Government Administration

The total number of villages in the Khao Kaeo Administrative Organization consists of 6 villages:

Moo 1 Ban Nomtho	with the area of 5.60 sq.kms. or 3,500 Rais
Moo 2 Ban Nongkoong	with the area of 4.80 sq.kms. or 3,000 Rais
Moo 3 Ban KhaoKaeo	with the area of 6.04 sq.kms. or 3,775 Rais
Moo 4 Ban Nomtho	with the area of 3.44 sq.kms. or 2,150 Rais
Moo 5 Ban Pong Kae	with the area of 5.77 sq.kms. or 3,600 Rais
Moo 6 Ban Nomtho	with the area of 2.40 sq.kms. or 1,500 Rais

Population

Table 1 Number of Population

Moo (Village No.)	Village/ Community	Households	Male	Female	Total
1	Ban Nomtho	237	342	400	742
2	Ban Nongkoong	105	162	170	332
3	Ban Khao Kaeo	190	277	282	559
4	Ban Nomtho	193	307	275	582
5	Ban Pong Kae	195	293	296	589
6	Ban Nomtho	122	172	159	331
TOTAL		**1,042**	**1,553**	**1,582**	**3,135**

Source : Office of the Registrar Sapphaya District, April 2012, the average intensity was 112 residents per sq.m.

Geography and Culture

A river basin with an important receiving device named Nomtho Canal. The terrain is suitable for agriculture particularly riceplanting. There are small water resources throughout the area such as Nong Lee and Sa Nomtho ponds. There is no jungle area.

The highland is the mountains lie in two areas: Nomtho Mountain and Khao Kaeo Mountain. The water management system is available in all levels such as in the household, reservoirs at rice fields, groundwater, small ditches and lateral canals throughout the area. The area occupies from the Southeast to the Northwest. It has been defined as the good class agricultural area by mean that the Office of the Land Readjustment has improved the irrigation and transportation systems. The geographical feature is the flood plains and various breeding habitat of fish are abundant.

Figure 2 Nomtho Canal

Religion and Belief

Belief is a spiritual bond. Nomtho Temple and KhaoKaeo Temple have a strong belief and pursue the customs and traditions.

Occupation

Residents in this area have agricultural occupation at most particularly the riceplanting fruit gardening, growing vegetables for household consumption. For other occupation such as employee in general are found in those farmers who do not possess any land property and generally are hired as the employees in the agricultural sector.

Outsource labor who do not possess land property especially Moo 5 Ban Pong Kae Village is a group which is risk on natural disaster and there is no life stability, occupation, agricultural land and housing. For cattle farming, it is not regarded as an occupation. There are little in number of cattle so that they can be raised around the canals.

Transportation

There are three main roads are asphalt named as following: 1) Hard Asa-Nong Namkeow-Khao Kaeo with 10.595 kms. in length, Ban Thasai-Ban Khao Kaeo with 8.396 kms. in length, Ban Lam Huay-Ban Pong Kae with 3.230 kms. and the gravel roads linking to the rice fields. Roads within the village are all ironic reinforced concrete.

Land Holding

Total land holding	17,531	Rais
Accommodation	696	Rais
Agriculture	16,609	Rais
Others	300	Rais

Table 2 Agricultural Areas

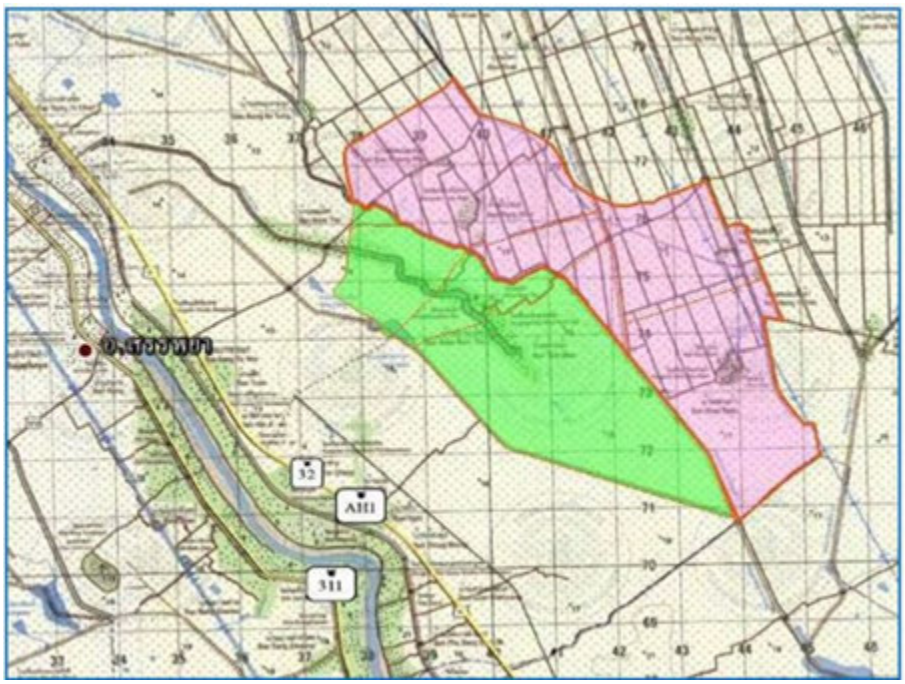
Villages	Ban Nomtho	Ban Nongkoong	Ban KhaoKaeo	Ban Nomtho	Ban Pong Kae	Ban Nomtho	Total
Number of village	1	2	3	4	5	6	6villages
Total area (Rais)	4,312.50	3,775	4,337.50	3,200	4,200	2,606.50	22,431.50
Agricultural Areas	3,372	2,994	3,769	2,009	3,524	1,440	17,110
Rice Fields	3,280	2,928	3,689	1,951	3,362	1,399	16,609
Gardening	62	51	60	40	47	32	300
Vegetable	15	10	5	5	110	5	150
Fish Ponds	15	5	15	13	5	4	57

2. Physical, Biological, Socio and Economy

Physical Feature

Khao Keao Sub-district is the lowlandwith two hills.The terrain is suitable for agriculture such as rice planting, growing vegetables, fruits and others. There is no forestry area. Half of the area is the good land readjustment of Sapphaya District. No rivers flow by except the three irrigation canals during the rice planting named as following:the lateral canal 5 Right, the lateral canal 6 Right receiving water from Chainat-Pa Sak Canal (Anusasanaanant Canal), lateral canal 2 Left receiving water from the Chainat-Ayutthaya Canal (Maharaj Canal), and various ditches within the land readjustment area. According to the irrigation canals, there are the tertiary Chainat-Pa Sak 2, Drainage Canal 3 Left, and the Drainage Canal 1 Left. According to the weather, it is generally hot with maximum degree of 37 C. and minimum degree of 21 C. The widespread thunderstorm is common during the rainy season. Average rain volume measuredaround 15-30 ml. Minimum annual rain volume around 920 ml., maximum is around 1,850 ml., and the average annual rain volume is around 1,200 ml.

Khao Kaeo Sub-district's most terrain is ratherlowland with the height of +12.000 - +17.000 m. (Mean Sea Level = MSL).



Map 1 Khao Kaeo Sub-district

The Irrigation System of Khao Kaeo Sub-district

The construction of the Chao Phraya Dam resulted in the capacity to control the level and volume of the water above the dam. In the past farmers' cultivation relied only on rain water. Thus, in B.E.2495 (1952) the Department of Irrigation operated the irrigation tertiary called Chainat-Pasak (Anusasananant Canal) above the left side of Chao Phraya Dam to PaSak River with the total length 133 kilometers approximately and the construction was completed in B.E.2505 (1962).

Figure 3 Chainat-Pa Sak Canal

Chainat-Pa Sak Canal (Anusasananant Canal) is the irrigation canal built with the purpose of changing the current from Chao Phraya River to Pasak River. It was built after the construction of Chao Phraya Dam completed in B.E.2500 (1957) to be a part of the Main Chao Phraya Project. In B.E.2495 (1952), the Royal Irrigation Department (RID) constructed the irrigation tertiary Chainat-Pa Sak Canal (Anusasananant Canal) and completed in B.E.2505 (1962).

It could irrigate water at the rate of 210 cubic meters per second maximum. Chainat-Pa Sak Canal (Anusasananant Canal) was divided from Chao Phraya River at Manorom Watergate in WatKok Sub-district, Manorom District, Chainat Province and later pass through Utapao Canal in Utapao Sub-district, Manorom District, then the temporary bridgein SuaHok Sub-district, Muang District before enter Taklee District, Nakhon Sawan Province, Ban Mi District, Kok Samrong District, Muang District of Lopburi Province, then Nong Done District, PraPuttabaht District, Ban Mo District, Saraburi Province and meet Pa Sak River at Taluang Sub-district, Tarua District, Ayutthaya Province, with the total length of 143 kilometers.

Chainat-Ayutthaya Canal (Maharaj Canal) is the irrigational canal in the Big Chao Phraya Project divided from Chao Phraya River at the area above the east side of Chao Phraya Dam in Sapphaya District, Chainat Province and flow in the parallel direction along with Chao Phraya River to Inburi District, Muang Singburi District, Phromburi District, Singburi Province, Chaiyo District, Muang Angthong District, Pa Mok District, Angthong Province, Bang Pahan District, ended at PhraNakhon Si Ayutthaya Province at the area of the Golden Mountain with the total area of 120.394 kilometers, irrigation capacity of 75 cubic meters per second maximum. The construction was completed in B.E.2509 (1966) under the responsibility of Maharaj Irrigation and Maintenance Project.

Khao Kaeo Sub-district is located in two irrigation projects as follows:

1. Manorom Irrigation and Maintenance Project, consists of: Lateral canal 5 Right, 8.3000 kilometers long, irrigation volume at 2.377 cubic meters persecond; Lateral canal 6 Right, 12.430 kilometers long, irrigation volume at 3.515 cubic meters per second; Drainage Canal 3 Left; the big Drainage Chainat-Pa Sak 2 Canal, with the Check Structure at the kilometer 14+600.

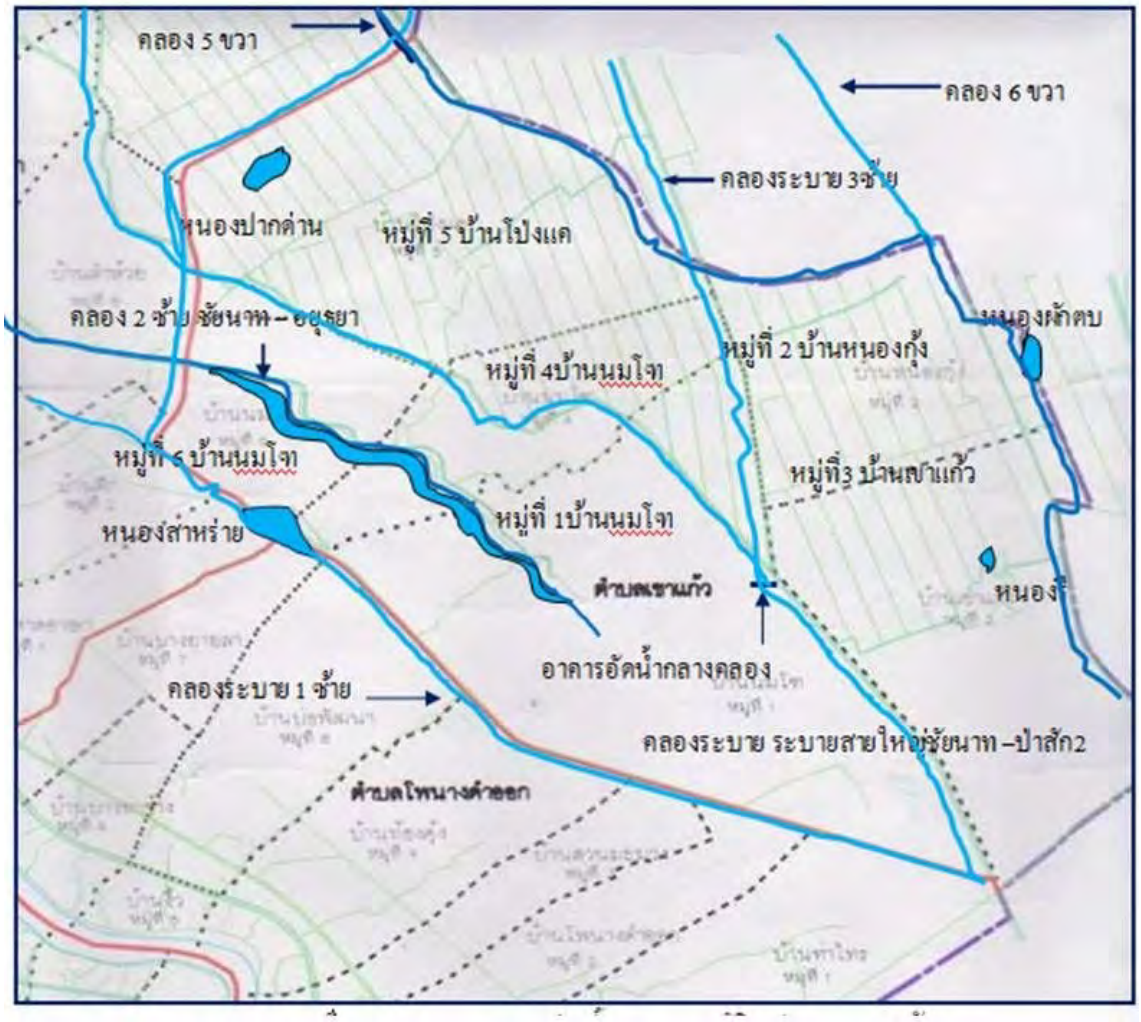
2. Maharaj Irrigation and Maintenance Project, consists of: lateral canal 2 Left and Drainage 1 Left.

Figure 4 Sub-canal 6 Right of Chainat-Pa Sak (left)

Figure 5 Drainage 2 Left of the Main Chainat-Pa Sak Canal (right)

Drainage

Chainat-Pa Sak 2 Canal occupies 27,810 kilometers started in Talook Sub-district, flows through Khao Kaeo Sub-district, Had Asa Sub-district, Ponangdam Aok Sub-district of Sapphaya District, Chainat Province. It also passes Chi Nam Rai Sub-district, Ta Ngam Sub-district of Inburi District, Singburi Province. The main Chainnat-Pa Sak 2 Canal is responsible for storing water in the planting season and draining water into Chao Phraya River in the harvest season using Bang Chom Sri Gate as a draining building. During the flood season, the water level in the Chao Phraya River normally is higher than in the canals. Hence, it is necessary to shut down the Bang Chom Sri Gate in order to prevent water from Chao Phraya River to cause flood in the irrigation area.



Map 2 Canals and Natural Water Resources in KhaoKaeo Sub-district

Natural Water Resources

Five natural water resources names as follows: Nong Pak Top located in village Moo 3, Nong Ree located in village Moo 3, Nong Pakdan located in village Moo 5, Nong Sarai in Moo 6, and Sa Nomtho in Moo 1, 4 and 6. These natural water resources hold an important role. Particularly, in the drought or in the period of rain delay that farmers still rely on water from these natural water resources but still insufficient.

Suggestions

Dredging the sediment or expanding these water resources should be applied in order to increase the storage capacity, establishment of the water user groups (WUGs), cultivation planning and water use planning.

Man-made Reservoirs

There are 15 shallow wells and 246 artesian wells/ hand pumps.

Figure 6 Shallow Well

Shallow wells: Generally refers to a well with less irrigation capacity and maximum depth is not over 15 meters. Construction method for shallow well could be various. For example,

Digging method: by hand, hoe or shovel, with not much depth, normally no more than 20 meters depending on the depth of the groundwater, diameter from 60 centimeters up to 2 meters. In other word, it is the well can be easily seen in general and people call it 'dug well'.

Dug well: at the top of the well is paneled with wood. Dug well could be in square by paneled with bricks, or in round shaped if paneled with cement pipes that are sold widely in the market. Extract the holes around the pipes at the level below the groundwater level to let the water flow in. Generally, the dug well yields the water volume less than 500 cubic meters per day.

The shallow well mostly is the well dug by manual labor, not too deep and set close to the households or community. Water from this well is good for general consumption. For drinking, it is necessary to bring this kind of water into the test for identifying the physical and chemical qualifications and as well as bacteria. If it meets the standards, then it is possible for drinking purpose but is recommended to boil first to kill germs before drinking.

The shallow wells in Thailand in many areas yield the clear and good to drink water. However, the clearness of the water does not imply to its cleanness and safety for drinking. It is recommended the test first. After the test if the Arsenic found at high level, it means that such water can cause the skin cancer. There is an advice from the Ministry of Public Health on digging the shallow well that should be at least 30 meters away from the toilet in preventing the contamination that may dribble from the toilet into the well. According to the water quality, normally the water gained could be either clear or turbid, whereas the taste could be insipid, sour and bitter and harsh to the taste depending on the mineral dissolution and any contaminants within the wells.

Figure 7 Artesian Well/ Hand Pump

Groundwater

Groundwater is a valuable resource and used widely in the present for consumption, industry and tourism. For the development of brining the groundwater to use, if the procedure is incorrect, then it will reduce the groundwater level and that reduction is not related to the increasing of the natural groundwater. Furthermore, it will bring many impacts after all. Therefore, we should have basic knowledge about the occurrence of the groundwater including the correct production to bring the groundwater to use, for a sustainable development.

Groundwater refers to water located beneath the earth's surface in the saturated zone, including the stream water beneath the earth. Basically, groundwater refers to all subsurface water except the water in the world and that located beneath the saturated zone (Dictionary of Geology, B.E. 2530).

In legal practice, groundwater, according to the definition of the Groundwater Act B.E.2520 (A.D.1977), refers to water that is in soil, gravel, sand or stone deep under the depth that the Minister specified in the Government Gazette not less than 10 meters.

Village Water Supply

Nowadays, Thailand's infrastructure has been developed to serve its citizens for a better living. The government therefore established the public service policy for mass transportation, postal, power supply, telephone, water supply and other services from the state. Despite of services for people in all

villages of Thailand, it is compulsory to provide the infrastructure for all especially the water supply which is the services on consumption. It is therefore required to build and develop the village water supply for household use.

This is different from the past that the households used water from the river, canal, well or natural water resources which was rather safe than in these days. In some rural areas, water supply is available for all households. In the villages, sub-districts and districts, everybody basically is in need of water supply rather than meals. And from the survey of the Department of Medical science, Ministry of Public Health, it was found that primitively the population in rural areas used rain water and water from well for their consumption and drinking.

But in the present, people in the rural areas all have water supply use in their households, in almost every village throughout Thailand. From the survey, it was found that the quality of the village water supply is not proper for drinking. Raw water pumped up from the underground for consumption and drinking, although clear, but heavy metal contamination found at high doses and did not meet the standard of drinkable water supply. The contamination contains heavy metals such as iron, zinc, chromium, copper, cadmium, barium, lead, nickel, manganese, mercury, etc.. If there are contaminants in the water we drink in the amount in excess of the standard, then it could affect to our health.

The heavy metals accumulate in the body can cause jaundice, pale, paresis, paralysis, and if a large number of collectors may have resulted in death. Although the collection is small and its dangers may not be seen by eyes, it will result in the growthof body suspension. Child should be tall, but in this case will be shorter than the standard, often has a slight illness and the brain retardation.If drinking water contaminated with heavy metals accumulated in a long period of time, intelligence or IQ will be dropped depending on the days of collecting contaminants.

Village Water Supply

Water supply is available for all eight villages, one per village except in village Moo 4 and Moo 5 with two water supply systems per each.

Figure 8 The Water Supply System of Village Moo 5 of Khao Kaeo Sub-district

Water Supply System of Village Moo 5, Khao Kaeo Sub-district

Description: A steel tower designed in golf ball shape, with small production capacity (30-120 households).

Source: Groundwater

Filtration: Similar to the filtration of the Department of Public Works and Town Planning, but with the contaminants filtration added into the system.

Strength: Finished tower chassis and with the good points of the filtration of the Department of Public Works and Town Planning implemented.

Improvement: Quality control for the contaminant filtration in which different from the past.

Figure 9 Water Supply of Village Moo 3, Khao Kaeo

Water Supply of Village Moo 3, Khoa Kaeo

Description : A concrete tower with medium production capacity (100-250 households)

Filtration: Has been standardized with rough and contaminant filtration, bleaching and the addition of the disinfectants.

Strength: It is the most standardized model.

Improvement: The budget used in construction should be provided, or combined with the other techniques of water supply in order to minimize the construction procedures. The village water supply is built in accordance with the standards of the Department of the Local Government and the Metropolitan Waterworks Authority. According to the use of the water supply in Khao Kaeo Sub-district, it is also used for drinking apart from general consumption. To make the water supply drinkable, it is necessary to have the filtration system first of all. Some households might not have the strainer but they can use the alum to swing in the water until the dirt settling, then it is good to drink.

Problems found in the water supply in Khao Kaeo Sub-district are: the rusty red sediments and the brownout that affects the motor pump not to work efficiently.

Suggestions

A water filtration should be efficient, or the sediment settling before distributing to the water supply system, or other water resources should be provided such as water from the pond surface. For the brownout, normally often happens in the morning and evening due to loadedvolume of electricity use. Should avoid this period of time for water supply production, or improve the power distribution system to be more efficient.

Power System

Khao Kaeo sub-district has the power supply provided for all villages, accounted for 99 percent of the sub-district population. Problem found is the brownout. Suggestion is that the power supply distribution should be improved.

Transportation

Asphalt Road: Hard Asa-Nong Namkhiang-Khao Kaeo Line, 10.595 kilometers

Ban Thasai-Khao Kaeo Line, 8.396 kilometers

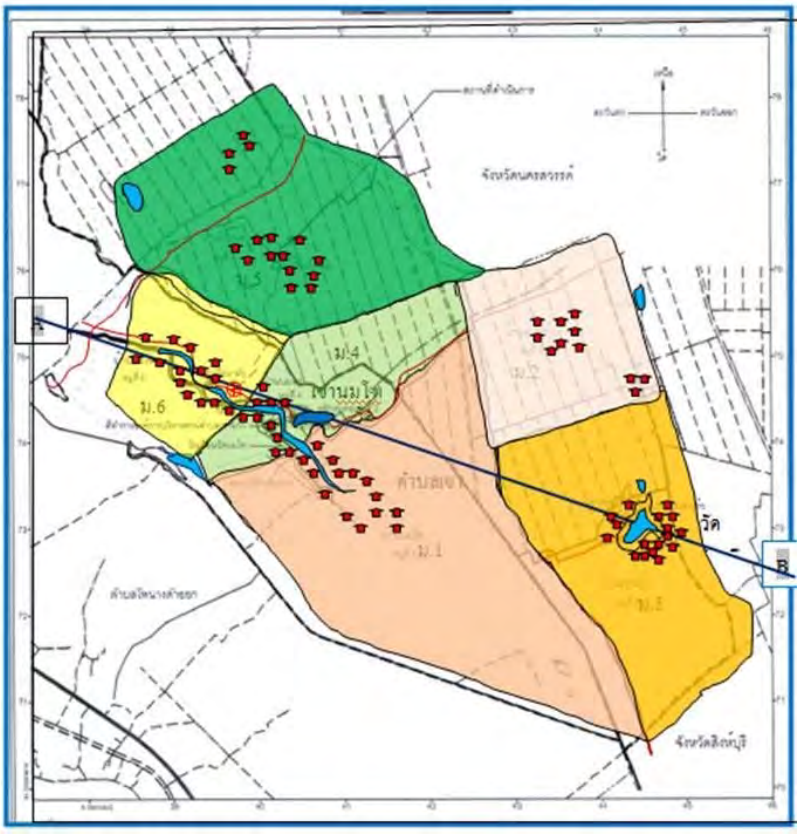
Ban Lamhuay-Ban Pong Kae, 3.3203 kilometers

Gravel Road: total distance within the sub-district accounted to 7.470 kilometers (along the canals, ditches or found as the entrance to the rice fields).

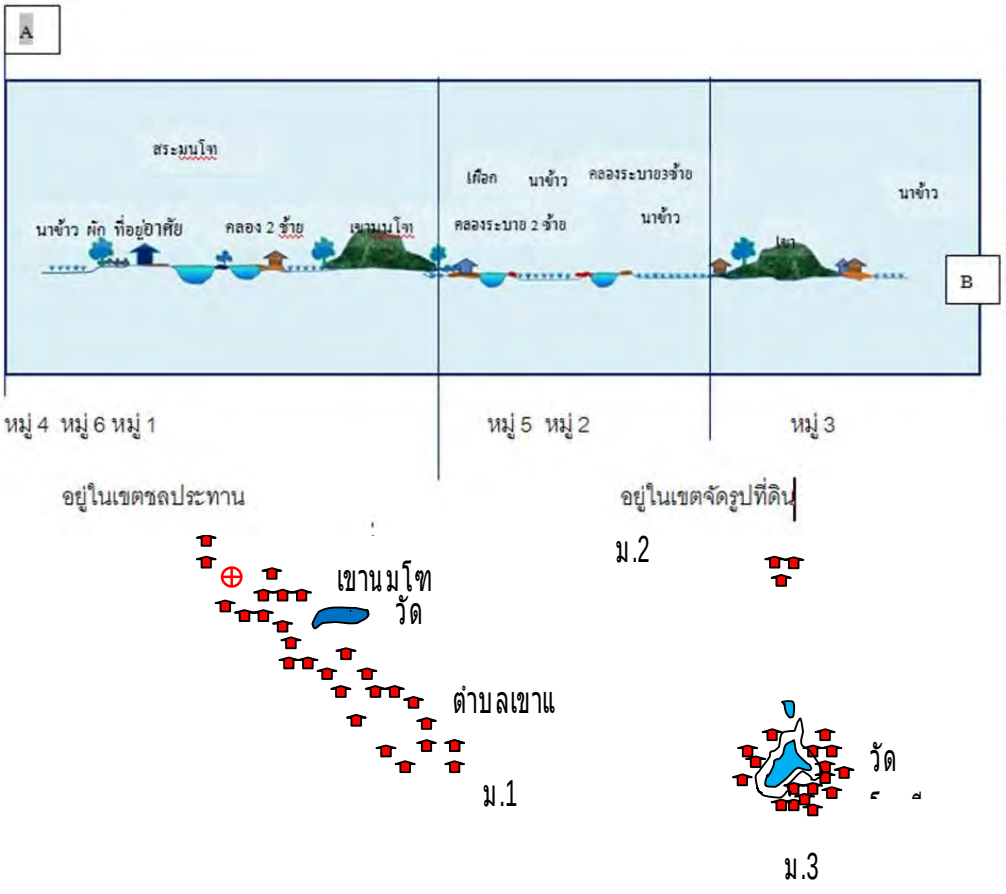
Concrete Road: total distance within the sub-district accounted to 6.20 kilometers, found as the connecting road within the villages.

Figure 10 the Asphalt Road, Ban Lam Huay – Ban Pong Kae Road (left)

Figure 11 the Gravel Road, a street at the canal or as the entrance to the rice fields (right)



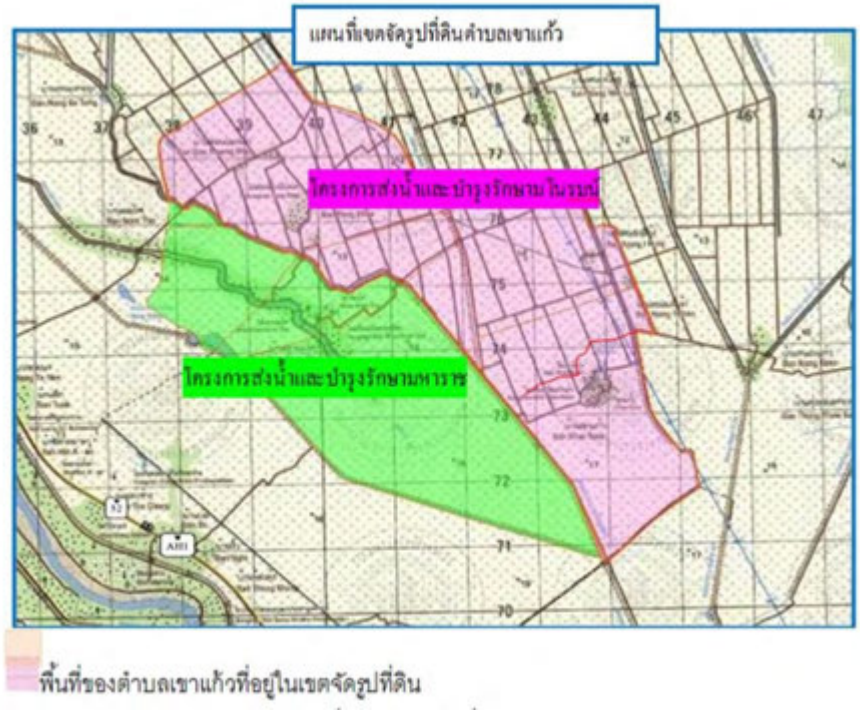
Map 3CommunitySettlement and the Cross-section



Map 4 Cross-section of the Sub-district

The household settlement, village Moo 1, 4 and 6 gather together as a community, normally along the Nomtho Pond and the street; whereas village Moo 3 resides around Khao Kaeo area, and village Moo 2 and 5 also gather as a community as well.

Land and Land Usage



Map 5 Land Readjustment Area of KhaoKaeo Sub-district

Areas of the water use in the land readjustment zones are as follows;

Village Moo 1 Ban Nomtho accounted to 769 Rais
Village Moo 2 Ban Nong Koong accounted to 2,031 Rais
Village Moo 3 Ban Khao Kaeo accounted to 4,711 Rais
Village Moo 4 Ban Pong Kae accounted to 207 Rais
Village Moo 5 Don Maeng Mao accounted to 5,229 Rais

Land Readjustment

Land readjustment refers to the operation the operation on land development for agriculture for all plots aimed at increasing the crops and reducing the capital, by collecting many plots in the same area into the land readjustment on land re-plotting, irrigation and drainage, road construction or transportation in the paddy fields, land leveling, land maintenance, planning, cultivation and agricultural crop selling, including exchange, transfer, transfer of land rights, the purchase of land and other affairs on land readjustment and land zoning for housing as well.

Agriculture

Agriculture refers to farming, animal husbandry, aquatic animal husbandry, bee farming, silkworm culture, lac culture, mushroom cultivation and other types of agriculture according to the declaration of the Minister of the Ministry of Agriculture and Cooperatives in the Government Gazette.

Land readjustment for Agriculture

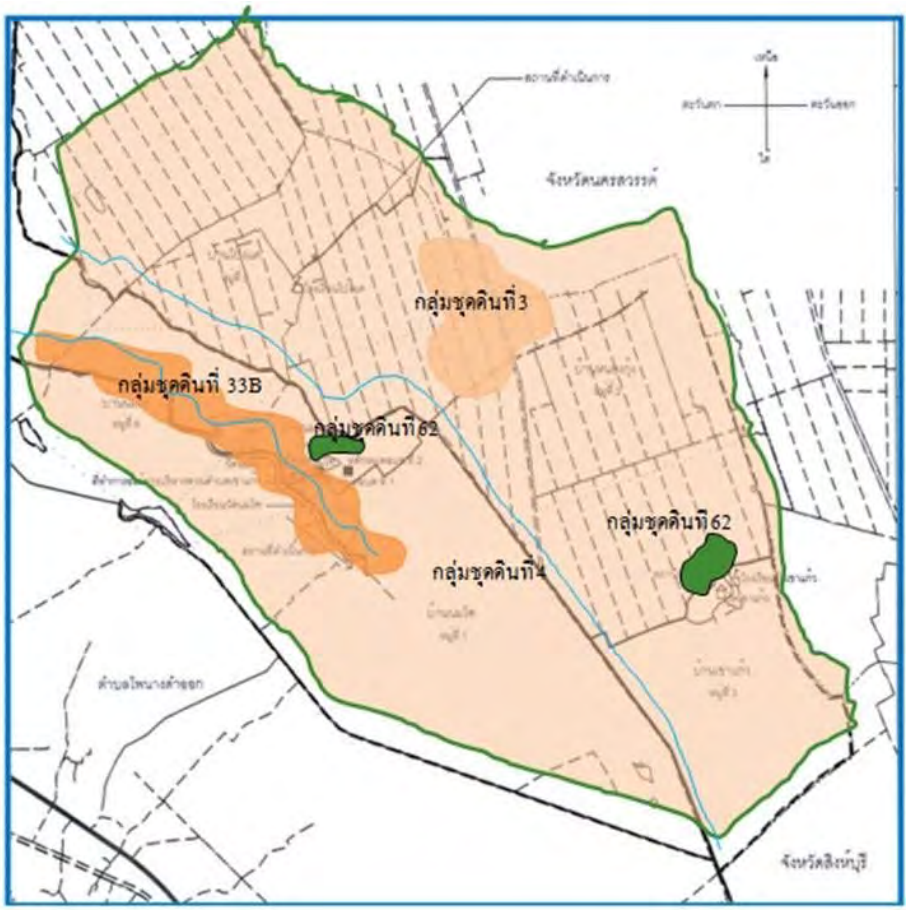
Land readjustment for agriculture refers to the land development for agriculture in the farming fields focusing on the water issue so that all plots can access to the irrigational water and accessible transporting paths or roads, land readjustment for cultivation for optimal advantages by reshaping or moving the cultivation plots in facilitating the cultivation. For example, converting the former distorted plot into rectangular, farmers who own many plots but separate and in the near areas would be reorganized into the same place, leveling the land in the high and low areas of cultivation, managing the irrigational system such as ditches, canals, road or transporting ways throughout all plots in the paddy fields. So, it makes the irrigation assessable for all plots and convenient transportation for crops from the fields or the main roads. Moreover, other development activities promoting the agriculture are also included. For example, the promotion of agriculture, the cooperative, etc. are also included in the land readjustment.

From the definitions mentioned above, it is seen that the reshaping or moving the cultivation plots is only a part of the land readjustment. But the main responsibility is about the provision for all facilitators into the farming fields such as the irrigational ditches, drainage canals, transporting roads or ways, irrigational building in the irrigational ditches, including the land readjustment in the cultivation areas. Such responsibility is aimed at facilitating all cultivation plots to be conveniently and thoroughly access to the irrigation, drainage and transportation. For the reason of moving or reshaping the land into straight line, that is, it is made for the convenience in the planning the irrigational ditches, drainage canals, roads or transportation ways for better efficient land use.

Figure 12 Plots in the Land Readjustment Area

Soil and Types of Soil

Soil for agriculture of KhaoKaeo sub-district is divided into 4 grous: Soil Series 3, Soil Series 33B, Soil Series 4 and Soil Series 62.



Map 6 Displays the Soil Series

Soil Series 3

Found in the area connecting villages Moo 1, Moo 2, Moo 4 and Moo 5.

General appearance: clay soil, top soil is dark gray and brown mixed with dark gray, low-lying soil is gray or light brown with dotted dark brown, brown mixed with yellow and red mixed with yellow. Mostly found at the lowlands or smooth surface. It is a deep soil with poor drainage. In the rainy season can hold 20-40 cm. deep flooding rain for 4-5 months. In the drought, soil is cracked with deep and wide cracks. If found at the seashore, often has the shells in the low-lying soil. Soil fertility is at moderate. Soil reaction is moderately acid to slightly acid, with the pH amounted to 5.5-6.5. For the low-lying soil, if mixed with shells then the reaction will be slightly alkaline or with the alkaline pH amounted to 7.5-8.0. This soil group consists of: Samut Prakarn, Bangkok, Chachoengsao, Pimai, Bang Pae and Singburi Soil Groups. At present, such area is mainly used for paddy farming or growing vegetables or fruits but rather seldom for the latter one.

For the problem found in the land use, flooding during the rainy season often happen in the very lowland.

The properness for planting, with the current situation, this area is capable for rice cultivation due to the terrain is flat to nearly flat, clay soil with poor drainage capacity. During the rainy season, the surface water will last for 4-5 months but can plant some certain fruits and vegetables. During the drought, after the harvest season it is not suitable to grow fruits and standing timber due to heavy flooding. However, the land can be switched from growing rice to other crops, fruits and vegetables only if having land development by making the earth ditches around the cultivating area to prevent the flooding and raising the furrows to help in better drainage.

Management for Soil Series 3

Rice cultivation. Increasing the soil fertility by plowing the stubble after the rice harvest, legumes growing after the rice harvest in rotation with other crops, and improving clay soil by adding the organic fertilizer prior to the rice planting at the rate of 1.5-2.0 ton/ Rai. Using the chemical fertilizer with photoperiod-sensitive and photoperiod-insensitive rice for the first round it is recommended the formula 16-20-0 or 18-22-0 at 25-35 km./Rai; second round use the Urea fertilizer at 10-15 km/ Rai or Ammonium Sulfate at 20-30 km/ Rai.

Growing dry crops. In case of growing dry crops during the drought or shifting the rice fields into permanent growing dry crops, then raise the planting beds and make the furrows around the planting plot for drainage, and use the organic fertilizer at 1.5-2.0 ton/ Rai.

Soil Series 33B

This soil seriesfound at the area surrounding SaNomtho Pond, along the length of the pond located in the area of village Moo 1, 4 and 6.

General appearance, soil texture is silt loam, brown or red-brown or dotted gray and brown in some areas, and Mica or limestone mixed. The origin of the soil is from the sediments at the river, found at the sand dune near the old river and the alluvial fan. The terrain is quite flat and wavy undulating with the slope approximately 2-12%, very deep soil, good to medium drainage capability, the depth of subsurface water is deeper than one meter all year long, naturally abundant at moderate level, upper soil has the pH about 6.5-7.5. Soil in this series consists of Dong Yang En, Kamphaengsaen, Kamphaengpetch and Lam Sonthi That Panon Soil Series.

Problem in soil use, it is found that it is risk for the shortage of water in some years.

The suitability for plantation, Soil Series 33B is potential for growing various types of crops such as dry crops, horticulture, fruits and rice planting. The usability of this soil is found in different regions

with this soil series. However, for more alternatives, farmers should utilize the soil in accordance with its potential.

Soil Series33 B Management

Rice planting. Problems found in the shortage or insufficientof nutrients, should add organic fertilizers such as manure or compost at the rate of 1.5-2.0 tons per Rai. Adding the fertilizer during the plowing to prepare the soil for planting rice, or planting legumes, Sunnhemp, Sesbania Rostrata, etc. to be green manure. Then sow the seeds 5 kilograms per Rai around 2-3 months before the planting season. According to applying the chemical fertilizer, it is recommended to add twice times; first round application should be done one day before transplanting the seedlings, or application on the date of transplanting the seedlings and then harrow using the fertilizer formula 16-20-0 or 20-20-0 at the rate of 20 kilograms per Rai for Photoperiod sensitivity varieties and at the rate of 35 kilograms per Rai for Photoperiod insensitivity varieties; second round should add fertilizer 30 days before the flowering stage of rice – after transplanting 30-45 days by sowing through the whole plot and cover by the Ammonium Sulfur at the rate of 15 kilograms per Rai or Urea at the rate of 6 kilograms per Raifor the Photoperiod sensitivity varieties and at the rate of 13 kilograms per Rai for Photoperiod insensitivity varieties.

Planting the dry crops, problems found in the drainage of bad soil and soil preparation for plantation. In case of dry crop planting during the drought or after the rice harvest, some suggestions are as follows: make the drainage ditch surround the plot and inside the plot in case of big plot about 15-20 meters apart, 40-50 centimeters wide and 20-30 centimeters deep. This will help in better draining the surface water and more convenient in irrigation and entering into the plot. For the problem of the lack of some certain nutrients and friability, in planting the legumes, soybeans, green beans and peanuts, sowing the organic fertilizers such as manure or compost at the rate of 1-2 tons per Rai onto the plot and then plowing 7-14 days before the plantation. Later adding the chemical fertilizer formula 0-20-0 at the rate of 30-40 kilograms per Rai, or other formulas with similar nutrients into the ditches or applying fertilizer at two sides of the planting plot before loosen the soil when the beans aged about 20-25 days.

Soil Series 4

Soil Series 4 will be found all around the sub-district.

For general characteristics, soil texture is clay, the surface soil is brown-gray or just brown, lower soil is brown-gray, or brown, or gray-olive green with dotted brown-yellow or dark brown. The lower soil sometimes mixed with small pieces of lime and chemicals accumulating Iron and Manganese. The drainage capacity is quite poor to poor. This Soil Series is usually found at the smooth plains or the lowlands between the ridge and the new river terrace. Water retention during the rainy season is about

30-50 centimeters for 4-5 months. Soil is naturally abundant at moderate level with the pH of 5.5-6.5. If the soil mixed with lime then the pH will be 7.0-8.0. This Soil Series is found at Chainat, Ratchaburi, Thaphon, Saraburi and Bang Moon Nak Soil Series. Those areas are now used for rice planting. Some places just raising beds to grow vegetables and fruits that will give the high yields.

Problem in the use of soil is that the water retention during the rainy season lasts about 4-5 months.

The suitability for plantation, the terrain is the lowlands with flat to almost flat characteristics. Soil drainage capacity is almost bad to bad. The surface water retention will last for 4-5 months. Soil texture is clay so that can hold the water well, so it is more suitable to plant rice rather than other crops. After the rice harvest or during the drought, this Soil Series can be used to grow dry crops or short-life cycle plants very well due to its moisture of content. This Soil Series is found at the areas close to natural water resources such as some main rivers that bring the water to use in plantation is possible. In addition, it is widely practiced in the central, north and northeast regions.

Soil Series 4 Management

Planting rice, increasing soil nutrients by stubble plowing after the rice harvest, growing legumes in rotation with other crops after the rice harvest.

Soil Series 62

Located in the area of Khao Montho and Khao Kaeo Mountains.

For general characteristics, this soil series contains the mountains with the slope more than 35%. Soilin these areas is deep and shallow soil.Soil textures and abundance are various depending on types of rock origins in the area. Usually, it is often found the rubble stone, stone or slabs scatted over the area. Mostly, this soil series is covered by various types of forests. For example, mixed forest, dry dipterocarp forest and tropical rain forest. There are mobile plantation without measures to conserve soil and water in many areas and that cause the erosion. In some areas there are only the slabs remaining. Soil in this series consists of Complex Soil Slope (Sc). This soil series is not suit for agriculture due to many problems that will have impacts for the ecology. It is to be reserved as the natural forest to maintain the headwaters.

Problems in soil use, it is found that in the mountain area with the slope more than 35% is easy to be eroded.

The suitability of the soil for planting, Soil Series 62 is not potential to use in plantation due to its shallow type.A rocky outcrop at the surface is mainly and the terrain is a steep mountain with the average slope exceeds 35% which is easy to be eroded. Thus, it is suit to be treated as a natural forest and to maintain the headwaters.

Soil Series 62 Management

Protects the forest.If the forests are attackedand destroyed, reforestation should be accelerated and maintenance of existing natural forests to be more complete. Steep and risk in erosion areas should be implemented the suitable measures in conserving soil and water for both agricultural and engineering measurements as similar to the Soil Series 61 stated above.

Suggestions for the soil use, as mentioned above that the Soil Series 62 is not suitable for cultivation or agricultural purposes. Mostly this soil series is located in the Watershed 1 zone. Thus, it should be treated as the natural forest for the headwaters or other conservative forests. Because this area has characteristics and features that easily affect the environment when there isa change on land use and give severe impacts. If that cannot be avoided, it should be used in the conservation or agroforestry.

Flood Situation in Khao Kaeo Sub-district

On 13 September, 2011, Chao Phraya Dam had drained the water at the rate of 3,200 cubic meters per second. That caused the water level in Chao Phraya River too high and eroded the right side of Chainat-Ayutthaya Canal which was the dike at the left side of Chao Phraya River around the bridge-neck of Bang Chom Sri Floodgate until it collapsed. Then water from Chao Phraya River flew into the flooded fields in the Tung Chiang Rak Irrigational area located in Sapphaya District. The causes of the massive flood in Khao Kaeo Sub-district was from water from various directions inundated into this area. For example, Talook Sub-district: due to Chainat-Ayutthaya Canal was eroded and water overflew across the bridge to Had Asa Sub-district; another direction was from Chainat-Taklee Route passed through the Siphon 35 and 39, Chainat-Pa Sak Canal. Moreover, water from Chao Phraya River also driven to the Bang Chom Sri Floodgate and the Inburi-Takfah Route was like a dike and that caused the inefficient drainage.

Suggestions from Farmers and Council of the Community Organizations

They are willing to allow Tung Chiang Rak Filed as the 'Monkey-Cheeks' in the Kaem Ling Project. However, the government has to define clearly about the timeframe of the irrigation so that farmers can be well prepared for the flood situation. The harvest season must be taken into consideration to have sufficient water for twice times of rice cultivation. Government has to provide the price guarantee for agricultural crops for both times. Inburi-Takfah Route should construct the drainage gate so that facilitates the water management in the field.

Inburi-Takfahh Road, should construct the Watergate to control the water management in the fields. For the Siphon 35 below Chainat-Pa Sak Canal, should construct the Watergate controlled by electricity, the gate must be closed during the high water level to prevent water not to enter the fields and to drain into Chainat-Pa Sak Canal instead.

According to the water management of the water user groups (WUG), there are WUGs in the area of the Manorom and Maharaj Projects. Due to the lack of the coordination between the RID officers and the WUGs, farmers do not follow the regulations of the WUGs and the farmers do not receive water on time as stated in the irrigation timetable, so it caused the weak water user groups. Therefore, all concerned must take these issues into consideration.

Figure 13 Road damaged by the Flood

Biological Feature

Economic Crops

The terrain of Khao Kaeo Sub-district, Saaphaya District, Chainat Province is the lowland. Soil texture is sandy loam, suitable for rice planting. Half of the area of Khao Kaeo Sub-district is the area of the land readjustment which is a good class rice field of Sapphaya District. The irrigation from the RID is available in the agricultural area of this sub-district with the irrigational and lateral canals, natural water resources all over the village that farmers can pump for their cultivation. Farmers in Khao Kaeo sub-district can plant rice both in the in-season rice and the double-crop fields. During the in-season rice field, farmers use water from the irrigational canals whereas during the double-crop field farmers use water from the artesian wells and by pumping water from the natural water resources into their plots during the drought - after the double-crop fields. Since the flood the RID had closed the canals to fix the damaged canals. For the fruit planting, farmers plant fruit trees at the farm forestand plant vegetables for household eating. Crops of Khao Kaeo Sub-district were damaged due to flooding for a long time. Farmers who plant rice during the flood had to switch their occupation to fishing and food processing for selling due to damaged crops and while in wait of the ebb tide. The cultivation round started in May to September for the in-season rice fields and December to April for the double-crop fields. Rice breeding are Suphan 1 and Chainat Kor Khor.41 because of their higher yields per Rai and plant disease resistance. Direct seeding used the average amount of grains about 25 kilograms per Rai

and the yields about 900 kilograms per Rai. Farmers sell their crops to the rice mills in Sapphaya District that joined the Thai Rice Mortgage Scheme of the government in the average price amounted to 12 baht per kilograms. For the rice price offering to the farmers will depend on the moisture of the grans and quality of the paddy rice. Farmers prefer to sell their rice to the rice mills immediately after the harvest without any management for value added.

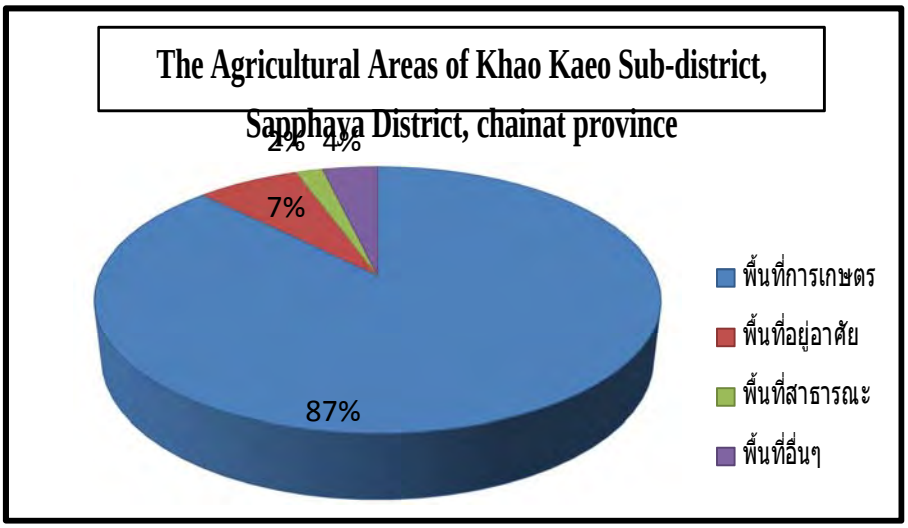
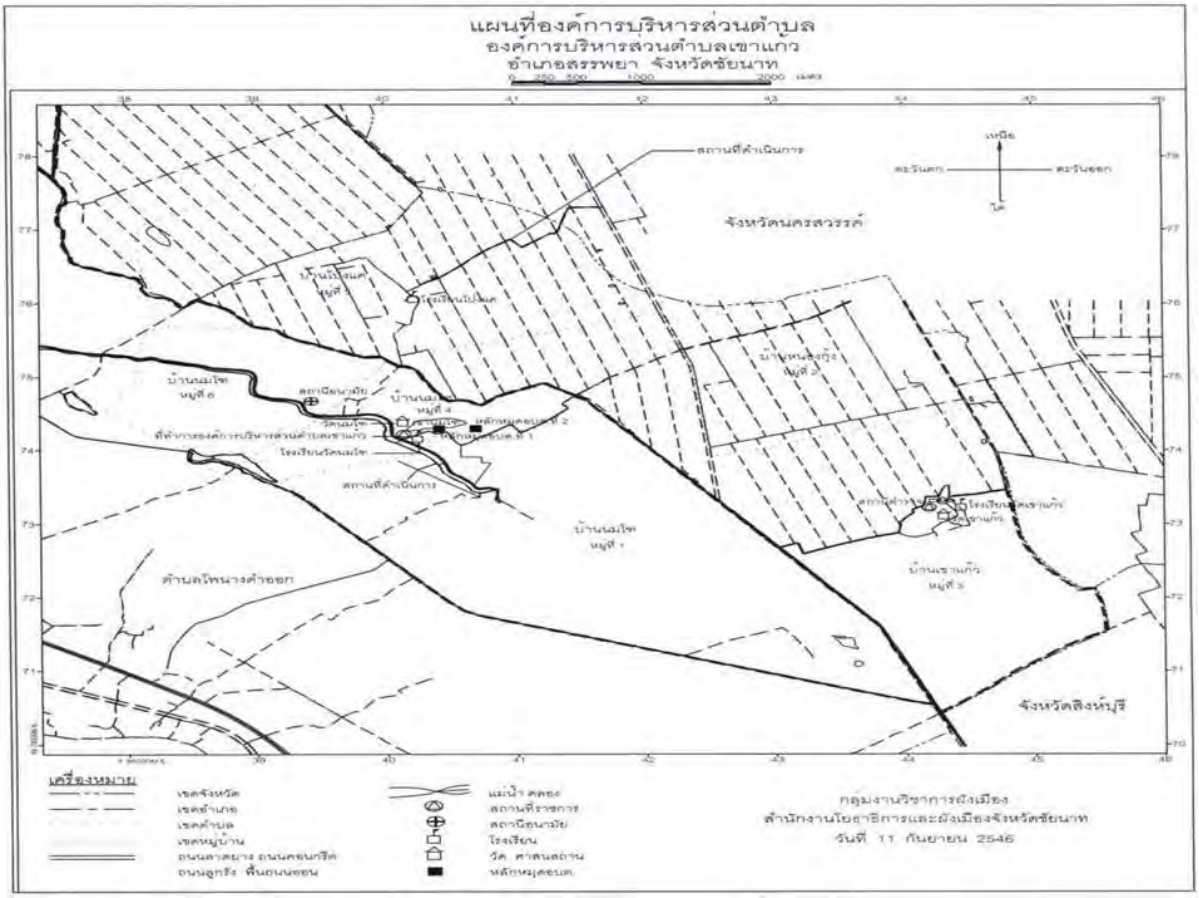


Chart 1 The Agricultural Areas of Khao Kaeo Sub-district, Sapphaya District, Chainat Province



Map 7 Khao Kaeo Sub-district

From the map of Khao Kaeo Sub-district, Sapphaya District, Chainat Province, it displays the whole area of the sub-district including the land use. Map also displays the land readjustment zones of Khao Kaeo Sub-district in villages Moo 2, 3 and 5. The land readjustment facilitates farmers to do more cultivation such as both the in-season rice and double-crop fields, including planting taro and onions in village Moo 5. In Khao Kaeo Sub-district also has natural water resources outside the land readjustment areas in villages Moo 1, 4 and 6. Farmers can use water from those natural water resources for their agricultural purposes. In overall, area of Khao Kaeo Sub-district is good for agriculture.

Figure 14 Rice Fields

Figure 15 The Irrigational Canals

Table 3 Calendar of Wet and Dry Cultivation at Khao Kaeo Sub-district, Sapphaya District, Chainat Province

Seasons	Rice Varieties	Months												Yields (per Rai)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wet	Suphan 1, Chainat, KorKhor 31, KorKhor 41								planting		FLOOD	harvest		90 buckets
Dry	Suphan 1, Chainat, KorKhor 31, Korkhor 41		planting			harvest								90 buckets

From the calendar of rice cultivation in Khao Kaeo Sub-district, Sapphaya District, Chainat Province, it was found that rice planting are operated in two seasons: wet and dry seasons. For wet season, farmers start the cultivation in August. They first will plow their plots to make the mire and prepare the rice seeds for sowing. During the wet season cultivation, farmers use the rice varieties of Suphan 1, Kor Khor 31, KorKhor 441 and Chainat and will harvest the yields in November. The yields of wet season in Khao Kaeo Sub-district amounted to 900 kilograms per Rai. For the dry season cultivation, farmers begin to sow in February. The period might be changeable depending on the terrain of the plots. For example, the sowing can be postponed in the flooded area and depending on the plot situation. Rice varieties used are Suphan 1, Korkhor 31, KorKhor 41 and Chainat and will be harvested in May, yields of 900 kilograms per Rai approximately.

Farmers in Khao Kaeo Sub-district proposed to shift the schedule for wet-dry season cultivation to avoid the flood. They also requested the RID to irrigate water into their plots for rice planting and to expand the period of Rice Mortgage Scheme to be in accordance with the planting and harvest seasons of Khao Kaeo Sub-district, that is, wet season rice planting begins in April and harvests in July, and dry season rice planting begins around the middle of December since sowing the seeds and harvests in March. Water is allowed to be leading into the rice fields after the completion of the wet season rice harvest and the information about the water volume must be acknowledged in advance.

Table 4 Rice Production Costs per Rai of Khao Kaeo Sub-district, Sapphaya District, Chainat Province

No.	Descriptions	Amount (baht)
1.	Seeds	600
2.	Plowing + Making Mire	480
3.	Sowing	50
4.	Fertilizer	1,400
5.	Weed killer/ Herbicide	200
6.	Insecticide	600
7.	Drain in-out	100
8.	Rent	1,500
9.	Harvest	500
10.	Transportation	120
	TOTAL	5,550
	Yields per Rai	
	900 kilograms × 12 baht	10,800
	10,800 baht - 5,550 baht	5,250

According to the rice production cost per Rai, the cost values about 5,500 baht per Rai. Cost maybe changeable depends on the production factors of each farmer on the use of the chemical weed killers and insecticide and the rent as well. Most of the farmers in Khao Kaeo Sub-district rent the land for planting rice. The rent costs about 1,500 baht per Rai so it affects the high production cost for farmers. Generally, the rice production of Khao Kaeo farmers will leave about 5,250 baht per Rai after deduction of the production costs. For farmers who have their own land might leave about 6,750 baht per Rai.

From the data of rice production in wet and dry seasons of Khao Kaeo farmers, it showed that farmers should have the production plan in order to gain the high income, including the promotion of the use of the organic fertilizer and effective microorganisms (EM) in the farming plots to reduce the use of chemicals and to prevent the soil degradation. Farmers should also form a group in purchasing all production materials to reduce the production cost. And farmers should have the management after the harvest for value added into the crops.

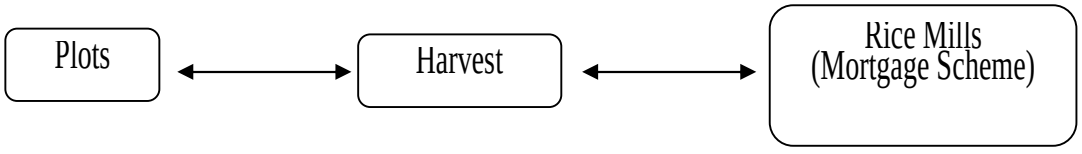


Chart 1 The Mechanisms of Rice Marketing of Khao Kaeo Sub-district, Sapphaya District, Chainat Province

According to the rice market mechanism of the local farmers, farmers sell paddy to the rice mills in Sapphaya District that join the Government's Rice Mortgage Scheme, no middlemandue to the rice buyers and mills are nearby. Farmers are well facilitated in transporting their crops to the rice mills. There are also rice buyers of the rice mills opened in Khao Kaeo. For problems farmers have found in the harvest areas are the high production cost and the crop prices affected by the paddy's moisture of content sold to the rice mills in the area. Farmers in Khao Kaeo Sub-district do not have the management after the harvest and that caused farmers to earn the lower prices, which affected by the rice moisture after immediate produced and sold.

Figure 16 Taro Plots for Ban Pong Kaeo

According to the taro planting of farmers in village Moo 5, first there are capitalists from Saraburi Province who promote the planting by giving the taro plants to farmers. During the harvest season, the capitalists send out the workers to help in harvesting the taro crops but farmers have to pay for the wages. Then the capitalists will be refunded for the taro plants after they finish the harvest. Many farmers were interested in taro planting at the beginning of the promotion. But they faced difficulty in

management and high invest capital. Farmers in this area do not have reserved funds in planting the taro and the flood problem, in addition. Due to farmers plants taro at high costs, so being in debts often followed the flood. Farmers try to avoid this risk by planting rice as before after the land readjustment due to the terrain is suit for planting rice and can plant rice both in the wet and dry seasons. However, some farmers still keep planting taro in village Moo 5 as per their remaining debts. Farmers who risk in planting taro due to it gives better income than planting rice. And also during the taro harvest season the capitalists will send the workers that the farmers have to hire at the rate of one baht per kilogram. The capitalists will buy taro from farmers at the price of 40 baht per kilograms. Taroplanting will take 4 months before farmers can cultivate. The capitalists who buy taro will then forward the products to Talad Tai Market, Farmhouse and general distributors.

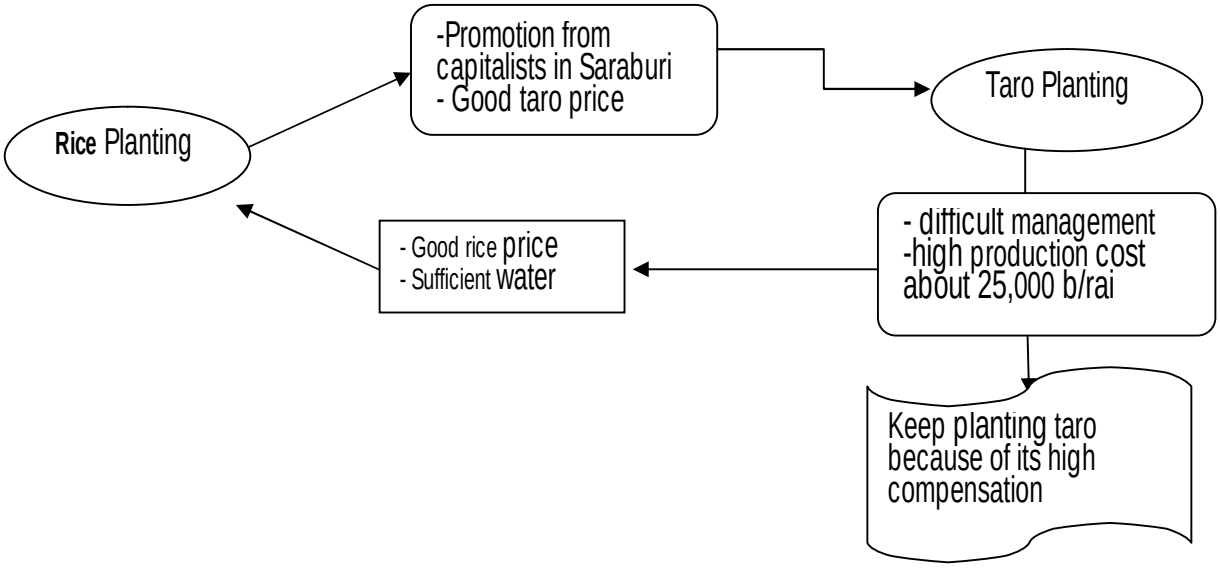


Chart 2 Development of the Agriculture of Farmers in Khao KaeoSub-district, Sapphaya District, Chainat Province

For the development of the crop planting in Khao Kaeo Sub-district, it can be seen that the factors influencing the crop planting of farmers in this area are as follows: market for crop distribution, prices and production capitals. These factors make farmers adjust their patterns of planting, both defensive and adjusting in order to reduce number of problems that might happen to either the farmers or crops. That is because doing agriculture in the present is required high investment and there are also many factors influencing changes. Moreover, the most important issue is the flood that causes massive damages to the crops. The flood remains in a long time so it affects the crops, particularly rice, which is the main crop grown in this sub-district damaged. However, farmers keep growing rice but with some adjustment for coping with the flood in the future.

Agricultural Problems in Khao Kaeo Sub-district

1. Flood
2. High production and labor costs

3. Outbreaks of disease and insect pests of rice
4. Shortage of the good rice varieties after the flood
5. Grain price slump due to the moisture content of the paddy
6. Personal problems of farmers in the rent farming fields
7. Problem of investment capitals for agriculture
8. Crops quality lower than the market standards

Suggestions for Agricultural Development

1. Establish the Good Rice variety Bank to be prepared and used in the flooded areas
2. Promote or train the farmers to know how to plan the production to avoid the flood
3. Promote farmers in the area to know how to improve the crop quality to meet with the market standards
4. Arrange the community stage for farmers to discuss on the management after the harvest and on the value added rice
5. Manage the discussion panel between villagers and the RID staff on the irrigation schedule and on the water use for agriculture in the areas

Economy, Society and Culture

Society, community and culture of Khao Kaeo Sub-district, Sapphaya District, Chainat Province, primitively was the ancient community in Chao Phraya River Basin, located in Tung Chiang Rak Field. Relocation was since a long period of time and nearly the timing of designating Sapphaya District by official announcement in B.E. 2440 (1897) in which named after the belief influenced by the Ramayana. At the beginning people called 'Khao Sapaya' but later became 'Khao Sapphaya'. Similarly to the name given to Khao Kaeo Sub-district in which named after the name of a mountain (Khao Kaeo Mountain) out of two mountains in this sub-district. Khao Kaeo Mountain is the location of Khao Kaeo Temple and the ancient Khao Kaeo Pagoda located in village Moo 3 and are respected by the locals since the past till nowadays. Another mountain was called Khao Nomtho where the Namtho Temple and the Luangpor ThamPra Norn (the Cave Reclining Buddha), the sacred Buddha image that people in Khao Kaeo Sub-district respect and come to pay homage to.

The community was settled in the early stage along with the former Lam Nomtho that is the Sa Nomtho (Nomtho Pond) in the present. The community first seized the land for rice planting and doing agriculture. They immigrated and settled in Khao Kaeo Sub-district around B.E.2400-2440 (1857-1897) to plant rice since the beginning and later spreading out the community into the rice farming areas. Immigrants were from Lopburi Province and partially from Had Asa Sub-district, Sapphaya District, Chainat Province and Taklee District, Nakhon Sawan Province.

For the occupation in the first phrase was rice planting using human and animal labors. Rice planting was only for household consumption and the rest was for selling to earn some livings. People planted rice only once a year and mainly relied on the rain water. Due to the reliance on the animal labor in planting rice, it therefore numbers of livestock were raised, particularly cows and buffaloes for rice planting as the main purpose and for selling as for additional income. The livestock farming was simple by letting them five grasses around the fields. There were plenty of empty fields for the livestock feeding as a result of one time per year rice planting. When there was flood in Khao Kaeo Sub-district during the flood season, villagers would gather together to herd their cattle to the high lands in Taklee District, Nakhon Sawan Province due to insufficient grasses. They had to do in group for camping and keep security for their cattle. When the water level reduced, they later herd the cattle back to the areas for rice planting and freed them.

From the land readjustment in B.E.2518 (1975), it resulted in the complete water management system for agriculture, including the development of more agricultural technology. The community began to adjust their ways of rice planting, from once a year to twice or three times a year. The effect of planting rice many cycles a year now resulted on the shortage of cattle. So, farmers turned to use the machinery and equipment instead. It has been the beginning of the commercial rice planting rather than household living since then. And from the rice production rounds became more frequent, it also affects the soil nutrients and that resulted in the reduced productivity. Framers therefore had to rely more on the chemical substances until it became the whole chemical use in rice production in these days. And from the addition of the rice planting cycle, the pasture is less and animals are not used in farming anymore. The animal raising in Khao Kaeo Sub-district has been decreased. Nowadays, farmers are still raising the cattle and goats but for earning some extra moneyonly.

From the story told by people in the community, it is said that around the year B.E.2514 (1971) before the land readjustment, the land price in Khao Kaeo Sub-district was still not too high, it was at 2,500-3,500 baht per Rai. But after the land readjustment, there are more needs from both the locals and outsiders. This increases more land property selling-buying particularly after the land readjustment and the land prices become doubled as a minimum. Land prices keep increasing since then. And from being the potential farming area with high yields capability and sufficient water availability, it is also a main factor to the more needs in land property of Khao Kaeo Sub-district for agriculture, speculation and rent. It is the beginning of the changes of the tenure of land in Khao Kaeo community after all.

Educational System

Khao Kaeo sub-district has managed the proportion of the educational groups as: Grade 3 – Grade 4 as the major group and the upper secondary, diploma and bachelor's degrees respectively. The community has two educational institutes under the supervision of Khao Kaeo Sub-district Administrative Organization.

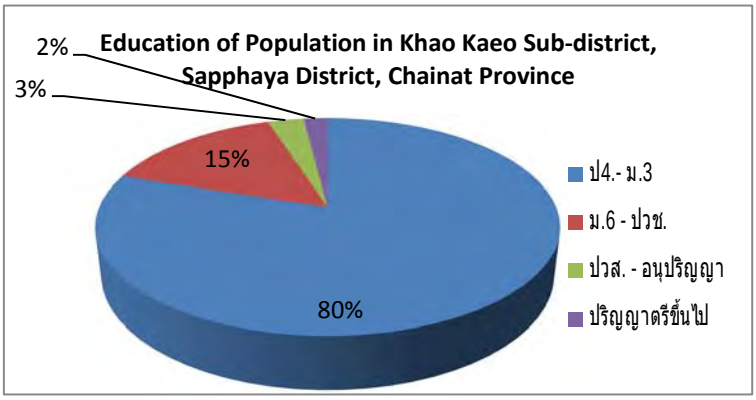


Chart 2 Proportion of theEducational Levels of Population in Khao Kaeo Sub-district

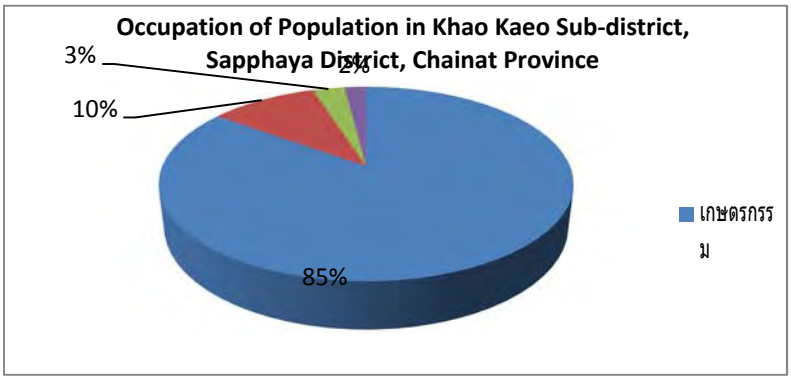


Chart 3 ProportionofOccupations of Population in Khao Kaeo Sub-district

The occupation of people in Khao Kaeo Sub-district mainly is rice planting. The minor occupation is the employment in agricultural sector such as sowing, pesticide injection, weed removal and so on. The employment takes place within the Khao Kaeo Sub-district and nearby areas. And others are in the employment in industry sector such as SCS, PAN, or working at the industrial estates and partially working in Bangkok.

The incomes of people in Khao Kaeo Sub-district are: 85 percent of population from the agricultural sector, about 2-3 times a year depending on the rice planting cycles. The rest are from extra jobs such as making water hyacinth-rope, trading, family support, etc.

Rice planting basically operates in two cycles per year. Rice varieties most planted are: KorKhor 31, KorKhor 41, KorKhor 47 and Suphan 1. The main purpose of rice planting is for selling all rice to the local ท่าข้าว (Ta Khao) (buyer with rice yard, as the middleman) and rice mills without leaving any for household consumption. Rice prices ranged between 10,000-13,000 baht depending on the rice quality and the moisture content and the government's policy at that time. Normally, the rice price sold to the rice mills is cut due to the moisture of content as farmers do not have the storage or yard to dry rice.

Rice is immediately transported to sell at the local rice mills right away and that causes high moisture of content and results in lower rice price when compared with drying rice prior selling or mortgage.

For debts and main loan sources are the Bank of Agriculture and Agricultural Cooperatives (BAAC), the Agricultural Cooperatives and village loan sources. Some groups get the loans from the Village Loan Funds. The loan is granted for the agricultural purpose in which for rice planting as a major. The potential the debts financing depends on the yields in each planting cycle and the rice price during that time. It also depends on the government's policy as well. In B.E.2555 (2012), rice prices ranged between 10,000-13,000 baht out of the production cost of 6,000-6,500 per Rai under the general conditions of planting and harvest.

However, the incomes and the production costs are vary between farmers who owe the land and farmers who rent the land for rice planting. As renting the land for rice planting will increase the production cost after all.

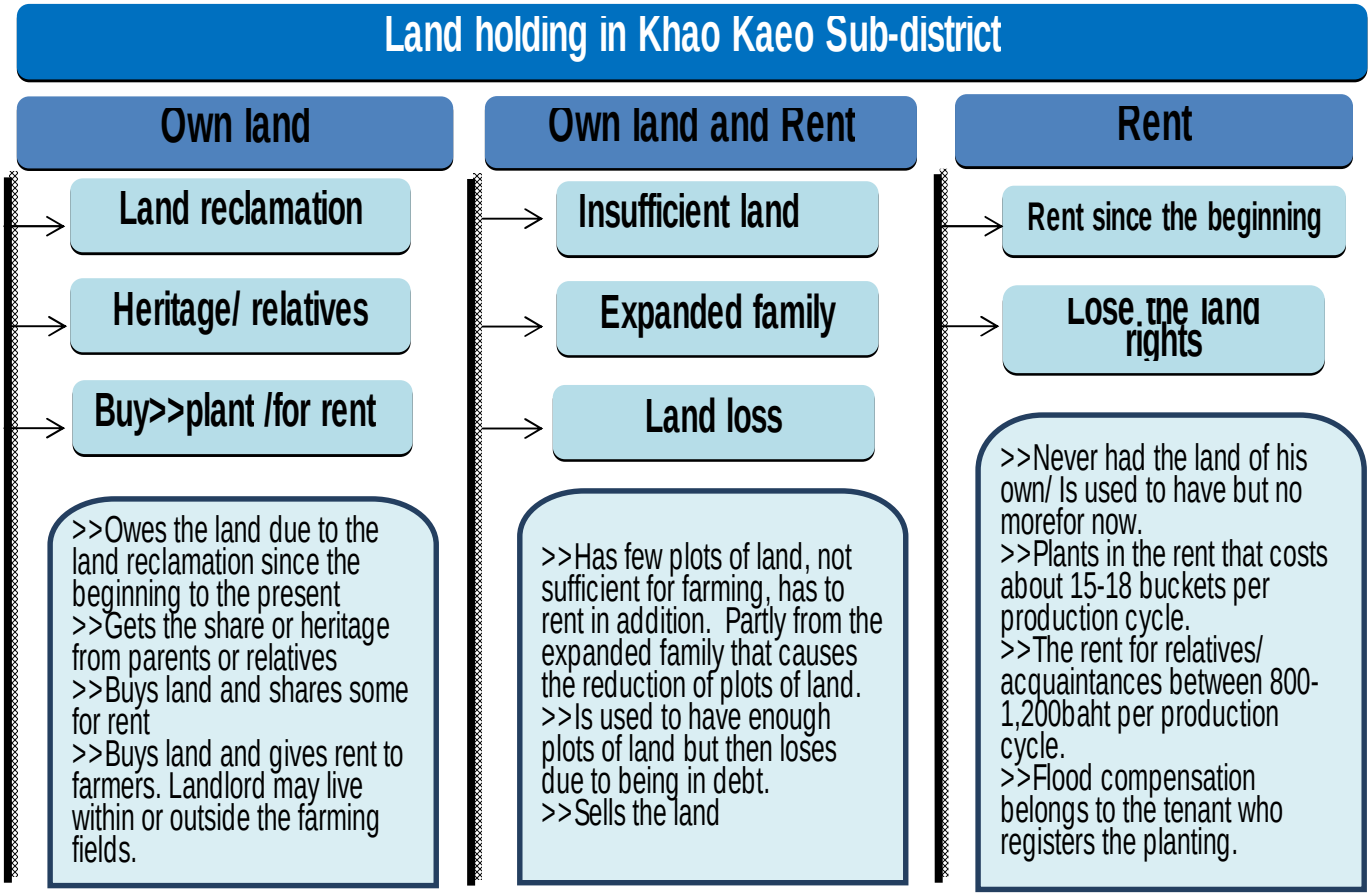


Chart 3 The Overall Picture of the Land Holding of Farmers in Khao Kaeo Sub-district

Regarding the fact that farmers in Khao Kaeo Sub-district do not possess the land and have to rent, it causes the additional rental cost into the production costs. The rate of the rent depends on the agreement between the farmers and the landlords. The rent clings to the current rice price, basically is about 15-18 buckets per Rai per a production cycle, or equivalent to 1,500-2,000 baht. If the rent is in

the relative or acquaintance system, then the rental cost is less expensive than the regular, that is, between 800-1,200 baht upon the agreement of both parties.

The risks in rice planting often affects to the community incomes. Suppose the community agricultural operation relies on the machinery, employment and chemical use for the whole system, this will result in high production cost. Cost may be increased due to various factors such as the chemical substance cost, insect pest outbreaks (i.e. aphis), the outbreak of weedy rice, rice weeds, etc. These factors cause additional wage of weed removal. It also affects the yields in which important to the income earning of farmers. For the drought, it also happens although most of the areas of Khao Kaeo Sub-district located in the land readjustment zone and with the irrigational system, sometimes or in some areas are in shortage of water for their rice planting. Farmers solve this problem by digging the shallow wells to bring the subsurface water for rice planting and that causes the other additional expenses in fuel charge.

Flood is also a factor affecting the income and debt for the community. If the flood occurs in the area, it will bring damages to the rice fields and problems to the farmers such as the loss from getting the loan in production, but no yields to sell to gain income. Damages depend on duration of flood. If the flood occurs nearly the harvest season, then the damages will be most severe as farmers have invested in all production phases but could not harvest the crops. So, it has impacts on the income and the ability to pay the debts. It is a major part of the increasing debts that leads to the loss of the land – the most important production factor that can be used as the guarantee to the bank to get the loans. Farmers cannot only pay for the outstanding debts but also have to get the loans from other loan sources for the next production round.

The long history of being the community benefits in strong and close relationships among people in the community and people can rely on others since the past to the present. To pay the debts, sometimes people can simply borrow money from their relatives in short-term with free of interest. After selling the crops, they will return money to their relatives without any interest added. It is regarded as a debt rotation using the social relationship. For farmers whose relatives could not provide the loan but their crops are damaged and still do not have enough income to pay the debt on the regular schedule, they have to get the loan from other sources. Loan with guarantee properties or items will be offered with 2-3 percent interest rate per month, whereas loan with no guarantee will be offered with 5-20 percent interest rate per month.

The Bank of Agriculture and Agricultural Cooperatives (BAAC) is the main loan provider for the community. Although there are the loan agreement and the clear interest rate, the crops are damaged continually and could not pay for the installment loan debts. Then farmers will lose their guarantee properties or it is a must to be sold at the auction to pay the debts. As a result, some farmers' status changed from being the farmer who plants rice in his own plots of land to the one who rents.

The fluctuation of the yields and income affect the risk of loss and transfer the land. Another form of loan that farmers use the land as the loan guarantee or as the buying guarantee for agricultural materials such as seeds, chemical pesticides, production tools, etc. If not capable to pay the installment loan debt, it will cause the accumulative of loan principal and interest until farmers could not pay. Creditors are allowed to seize or to buy the land.

On the other side, farmers use the land as the loan guarantee with the private sectors to get the production materials in advance. The payment will be made after the harvest completion. Some loan agreements do not specify the amount of the loan granted, just the signature of the borrower. It is called "สัญญาลอย" (SanyaLoi Agreement / Abstract Real Agreement) which is unfavorable to farmers who get the loan since the beginning and the payment is difficult if with land property as the loan guarantee. It is risk for the farmers in the community to lose their plan. This case has been since a long history and still can be seen in these days.

Expenses

The expenses of Khao Kaeo Sub-district are divided into four types as follows: 1.Investment in production materials such as seeds, chemical pesticides, wages, fuel, etc., 2. Household consumption, 3. Education and 4. Other expenses related to the rice planting. The household expense is directly proportional to the production cost in each production season. Basically, farmers have debts approximately 400,000-500,000 baht per household. Debts caused from the investment in rice planting and the rent. Recently, the additional expenses partly are from the children's tuition. New generations (aged less than 30 years) mostly will have occupations along with their career paths and less of them have entered the rice planting as occupation, and tends to not to do rice planting in the future. One factor is there are more people entering the educational sector due to the reduced number of household rice farming fields. The rice planting in these days also relies on technology that eases out the human labor. Only the employment and production control in which seniors still capable to do. In addition, the more convenient transportation makes the areas connected and easy to travel and that allows more children to attend schools out of the area.

Table 5 Relation of the Income, Debt, Production Cycle and Disaster

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Production cycle (Agricultural Calendar)												
Production cycle (community proposal based on the flood time)												
Disaster												
Duration that the community has been waterlogging												
Gov. Mortgage Schemes												
Main Income												
Annual Debt Payment (BAAC)												

Source: from the interview

Farmers in Khao Kaeo Sub-district have been learning from the experiences of rice planting in the flooded areas on a continual basis. Farmers in this area learn how to adjust their ways of production to suit the seasons aimed at reducing risks that might happen to the crops. Some areas adjusted their production cycles from three to two per year due to less production costs and risks but better yields. For the regular two cycles of rice planting in the flooded areas naturally urge farmers to plan their production well and to complete the harvest before the common flooded season.

Suggestion from the community is the adjustment of the production cycle of the community to reduce the impacts from the disaster in order to suit with the common production season and be able to complete the harvest prior the flood. The first rice planting cycle will operate after the flood reduce to the common level or not later than December 15th, and harvest around the middle of April. For the second cycle, it will be around the middle of April and harvest in August, prior to the flood that happens during September to November. The flood will last for three months approximately. This is to be pursued as the contingent plan to reduce the damages to the rice fields caused from the flood. One

of the issues proposed at the meeting to be taken into the Department of Policy and Planning for consideration, that is, the adjustment of the duration of the Government's Mortgage Scheme to be in accordance with the production cycle to reduce impacts from the disaster that might happen to the community.

From the government's policy declared in the Disaster Prevention Plan, one of the tasks is to find the catchment areas of 2 million Rais in total in the area of Chao Phraya River Basin to be the waterlogging during the flooded season. Khao Kaeo Community is designated as the waterlogging drainage area. Khao Kaeo Community had discussion and conclusion that the community is willing to be the waterlogging drainage area but based on the community's suggestions as follows:

- Specify the clear duration of the time leading to flooding the community. It is a must to be after the harvest season. The drainage area could be only the rice fields and the water level in the community must not be too high to ruin the households and transportation in the community. According to the flood compensation, if there is the provision on this issue then it will be benefit for the community. Suppose the compensation is not provided, the water management must be assured to provide sufficient water for two production cycles per year.
- During the time of being the drainage area or leading to flooding the community, it must not affect to the next rice production cycle after the low tide. The systemic water removal from the area must be guided. The community suggested that water should be kept outof the area despite of the production cycle in that will begin around the end of November or not before December 15th.
- The community presented the water management plan and to be the drainage area according to the terrain by managing Tung Chiang Rak Field and other drainage areas with similar physical features. Because the management solely in Khao Kaeo Community might not be potential to solve the problem efficiently but the nearby area management is to be included.
- In case that Khao Kaeo Community is officially declared to be the drainage area, and during the rice fields are rich in water, the community would like to call for assistance from all concerned units to promote careers that can earn extra income during the three month period of no rice planting and employment in the agricultural sector.
- The community proposed about the value added crops from rice planting such as the rice drying yard or community rice mills in order to manage the whole rice system instead of selling rice to the private mills or merely mortgage as seen in the present. It is called for the brainstorming and preparation of the management that allow people in the community participation in thinking and administrating the groups of value added rice of KhaoKaeo Community.

3. Phenomenon, Impacts and Natural Disaster Management

The terrain is a drainage basin with numbers of ditches and canals and water barriers. It is a drainage basin for Chiangrak which is a part of the Chao Phraya River Basin, where various rivers flow rejoin.

The natural disaster, flood at Khao Kaeo Sub-district caused from the water level at Chao Phraya River was too high. Then the landslides at Chainat-Ayutthaya Canal in the right side around the bridge-neck to cross Bang Chom Sri Gate, the gate was damage and caused severe flooding. The water flooded at Talook Sub-district, Had Asa Sub-district, Chainat-Taklee Road and the water barriers at Inburi-Takfah. The flood lasted for a long period of time. The residents had to evacuate from the area. Water entered by two main ways: Chao Phraya River and the water from Nakhon Sawan joined. The full flood started from 18 September to 29 November, 2011. The water started flowing into the field since 16 August, 2011.

Figure 17 Flood over Houses, Gardens and Paddy Fields

Impacts and Damages

The area of Khao Kaeo Sub-district, Sapphaya District, Chainat Province was affected by the flood since 16 August, 2011 and the water continued to flow into the flooded area until it became the full flood on 29 November, 2011 and remained for 41 days. The flood caused numbers of impacts and damages to the area. The massive floods happened in Khao Kaeo Sub-district in the past were in B.E.2523 (1980), B.E.2538 (1995) and B.E. 2540 (1997) had similar causes with the flood in B.E.2554 (2011),that was, the damages of the dykes, floodgate, high volume of water and drainage delay. So, it caused massive damages to the community.

The rice field is the source of the main income of people in Khao Kaeo Sub-district as the result from the promotion from the government in land readjustment for first class agriculture. They operate both the in-season rice field and the double-crop field. The total area of rice fields amounted to 16,609 Rais.

The flood caused damages to the rice fields in total number of 7,765 Rais. The value of damage compensation by the government was in the amount of 2,222 baht per Rai, in the total amount of 17,253,830 baht. It affected too the next cultivation season in terms of investment capital, debts, rice varieties, and the most important thing, round of production that was changed by the flood including the modification of strains of rice to meet the climate variability as well. Crops were damaged in 26 Rais with the value of damage compensation by the government was in the amount of 3,150 baht, in the total amount of 81,900 baht. There were also other crops damaged in 57 Rais.

According to the cattle, fourteen cows raised in the community were affected with the value of damage compensation by the government was in the amount of 3,600-15,800 baht per each, in the total amount of 50,400-221,200 baht. Four Pigs were affected with the value of damage compensation by the government was in the amount of 12,000-25,000 baht, in the total amount of 48,000-100,000 baht. Poultries in the amount of 8,294 were damaged. And for the fishery, thirty fish ponds were damaged.

In addition, agricultural tools were also damaged greatly. For example, 257 electrical appliances, 10 cars, 79 motorcycles and 192 engines were damaged.

The infrastructure such as the water supply and the transportation during the flood was impaired. Fifty six gravel, three asphalt, eight concrete roads, six bridges, fifty drainage pipes and twenty exercising equipment were included.

The majority of the houses were built as two-story house. When the flood attacked, they were only partially damaged. From the survey of damage, it was found that there were 689 households with partial damage with the value of damage compensation by the government in the amount of 5,000 baht per households, in the total amount of 3,445,000 baht.

Lessons from the Disaster Management

Although the terrain of Khao Kaeo sub-district is the plain, their experiences in disaster management are still limited when considered from the past. It has been only adjustment in the urgent cases, provision for immediate assistance, cooperation only in the local and local leaders, and the communication.

- In the household level: storing their belongings in the high places, evacuation of the family to the high places and the acceleration to harvest while rice still green, not yet ripe.
- In the community level: the communication is processed via the village broadcast tower, blocking the dikes and the water level survey of the leaders.
- The community mechanism: particularly the local administrative organizations, the establishment of the evacuation center, cooperation with the outsources, aids provision and assignment to the military.

Lessons from the Flood

- Adjustment of the cultivation season in accordance with the flood in the long run
- Awareness, helping mechanism and development of the operational plans on evacuation routes, evacuation centers, etc.
- Lifestyle adjustment in accordance with the flooding context, fishing, agricultural development based on the benefits gained from fishes.
- Social mechanism: included family relationship, village and outside social networks

4. Recommendations

According to the mechanism in disaster management, Khao Kaeo Sub-district Administrative Organization was the center for working with both internal and external parts, government, private and non-government organizations. Apart from that, the communication with the community to be well prepared, preparation of flood supplies, sand bags, Backhoe to make dikes, larger pumps, fuels, barges and establishment of the coordinating center.

The emergency correspondence, meal box catering, survival kits, floating toilets, drinking water, helping centers, Department of Disaster Prevention and Mitigation, politicians, Provincial Red Cross, Non-government development organizations. Khao Kaew Sub-district Administrative Organization initiates to build the housing for flood victims in Khao Kaeo Sub-district.

Recommendations

Due to the terrain of Khao Kaeo Sub-district is the plain so that residents can plant rice and the abundance of the species and quantity of fish, including those who are employed in the agricultural sector but no holding of any rights in housing and farming lands. Recommendations for the development of approaches on coping and adjusting for living with the natural disaster are as follows:

1. Flood management is required to be aware of the related ecology, be aware of Chiang RakNoi Drainage Basin which covers three provinces: Singburi, Chainat and Nakhon Sawan. The water management must be related to the agricultural system.
2. The local water resources development particularly the digging of sediments, expansion of the public swamps, development of the mechanisms for the water users to participate in cultivation planning, and the drinking water quality improvement such as finding the potential water resources and the water filtration.
3. Inappropriate land development for agriculture. For example, the community conservation areas.
4. The agricultural system, establishment of the Rice Varieties Bank (Fund) to be used upon the disaster encounter, adjustment of the cultivation period to be related with the water management.

5. Quality improvement for crops particularly rice fields, can be processed by developing the mechanisms for crops management after the harvest season, marketing, storage, drying yard, โรงอบ for value added into the crops.
6. Groups of people who get fewer opportunities in the community, ones who do not own farming lands and housing place, employees in the agricultural sector, risk groups, the brainstorming, monitoring, finding the solutions and the security in their living places.
7. Development of value out of the things caused by the disaster such as development of the new techniques in fishing, fish processing, and value added by food preservation.
8. Cooperation in planning for the water management between the Department of the Irrigation and local people to promote the census on water management system.

To solve the problems caused by disaster, it is recommended to be based on the “adjustment” in order to promote the efficient disaster management in accordance with lifestyles and to shift from the disaster management to self-adjustment of the locals.

Report of the Preparation of the Strategic Planning for Flood Management at Tambon Level No.2 In Cooperation with Khlong Ha Sub-district of Pathumthani Province and Gop Chao Sub-district of Ayutthaya Province and Khao Kaeo and Wang Man Sub-districts of Chainat Province
During 3-7 September 2012
Project on Flood Countermeasures for Thai Agriculture Sector (JICA)
Hosted by JICA and Ministry of Agriculture and Cooperatives

1. Opening Ceremony

Report addressed by Mr.Nakorn Najaroon

Respectfully Chairman and distinguish attendees, today we all attend the meeting on Flood Management at Tambon level. Representatives are from Khlong Ha Sub-district, Pathumthani, Gop Chao Sub-district, Ayutthaya, Khao Kaeo and Wang Man Sub-districts from Chainat Province, in total number of 80 attendees. There are also relevant government agencies such as the Office of the Royal Irrigation Department, Livestock Office and Provincial Agricultural Extension Office. The purpose of the meeting is to prepare the strategic plan. We will work on it until September 7th, includes pilot plans. There are also experts from JICA experts to work along with us. The process is about brainstorming of ideas in the defining the development strategies. And the study tour to Saraburi is also arranged.

Opening speech by Mr.Apichart Sutika, representative from Ayutthaya Agriculture and Cooperatives

First I have to convey my appreciation to the JICA, our best friend who always contributes the helps every time Thailand facing the disasters, same as the flood in 2011. The whole week of the meeting we do need you all's knowledge exchange. The most important thing is that you are the representatives of the communities and are close to them. The results of the study include the aquatic adaptation (adaptation to live with flood). Findings will be summarized and presented to the government, and to be lessons for other areas that JICA has contributed its helps under the project called "Flood Countermeasures for Thailand agricultural Sector".

For the government sector, as I am a committee of the Kor,Bor.Jor. board and responsible for the budget allocation for disaster mitigation. Honestly, I am quite uncomfortable that many agencies requesting for the budgets but those are not in accordance with the government policies. Nowadays, the government already cancelled that regulation. Do you what, according to the meal boxes distributed for those disaster victims, normally cannot do that, only allow for those who come help the government. To build the walking streets or earthen dikes before the disaster are also impossible due to the regulations. There is no budget allocated for the disaster prevention policies at all.

I would leave this topic to you whether it is possible to amend the regulations for the optimal benefits of the country. Also during September to October every year is the closing period of the fiscal year and the same time the flood arriving into the community. Normally, there are budgets from the governor that can be used for disaster mitigation. Suppose there is also the disaster management fund would be great too. Then, we do not need to worry about the fiscal year. I would like to propose for the fiscal year closing period should be in April so that we can do many projects. Please kindly consider this.

For other water management projects presented in Bangkok, please visit the website URL: www.waterforthai.go.th, or visit the Facebook of the สำนักงานนโยบายและบริหารจัดการน้ำและอุทกภัยแห่งชาติ (Office of the National Water and Flood Management Policy). There will be plenty information about the water situation, CCTV from the gates, etc. If you search for the word "Safety Food and Agricultural Products from Ayutthaya", information about the "Sky Plant" will show up. This is an alternative of the adaptation to live with flood, as well as fish farming, banana raft planting vegetables, soiless culture, etc. from Hor Mok Sub-District, Bang Sai District which is the land reformed area for agriculture. We can have a visit there to learn about the project. It is an integrated agriculture on the areas of 21 Rais. Then you may have the ideas of how to live with flood. Thank you for your cooperation and joining the meeting today. May the meeting achieve the predefined objectives. Thank you.

Cooperation between the Japan and Thailand Governments by Mr.Michio Goto

Thai people can address such beautiful speech, but not a as Japanese like me. I would like to explain a little about the project called "Flood Countermeasures for Thailand Agricultural Sector" set with three components: 1) the restoration of pasture and feed storage, 2) study and guidelines for the improvement of the irrigation system and 3) the study of approaches and measures for the community to handle the flood effectively. This Project has been operating since March 2012 and will be complete in April 2013. The cooperation comes from the local agencies and communities. We had hosted the meeting like this first among three Tambons last week and now is the second meeting. Everybody is invited to brainstorm your ideas and exchange strategies that you may come up with already.

2. Background of the Projects by Mr.Tetsuro Oda

If the earthquake happens today, at this moment, what are you going to do? Some people may run away to the doors. In Japan we will protect our heads first by hiding under the tables and then we will know spontaneously what to do next. When the earthquake happens, objects always fall from the high places.

The past worst earthquake happened in Tokyo 1 September around noon while people were cooking. All buildings caught the fire. This happened eight years ago but we all cannot forget about it. So many organizations would set the earthquake evacuation drills as the priority. The latest earthquake happened in March and shortly the Tsunami followed. Thousands of people were killed. Houses were destroyed. Communities near the nuclear plant cannot live in their houses anymore due to the plant might blast anytime. In some areas with 3-4 storey buildings even collapsed under water. Some communities were attacked by the gigantic waves but no one was killed as they could run and escaped in time to the high mountains. Communities close to water resources built the protective walls against Tsunami and people ran to the top of the walls just to see the Tsunami. Unfortunately, around 5,000 people were feld down and killed as the unexpectedly high tide. Some people had moved to live on the mountains. Some had aids from both inside and outside the country whereas some did not even know what to do.

We can see that the disaster can happen at all time and hard to predict and unavoidable. But the most interesting things is that some communities were collapsed and could not restored while others could recover from the disaster very rapidly. In English we use the word “Resilient” which has no translation in Japanese yet. But it refers to the approach to make the community recover as fast as possible from the disaster. Many things may be permanently lost, but many others can be restored again. Japan is now learning from the most violent Tsunami about what factors that can make the community can recover rapidly. Who can run fast will not be killed.

From the study, it is found that the story of running to the high places escaping the Tsunami has been told since 200 years back. For this time, the community try to learn and realize about the water level. They grew the Sakura trees as the remarkable signs for the water levels and people can notice from that.

Therefore, we should learn from the past disasters and transfer the knowledge and precautions to our clans as reminding. In some strong communities they learn to uplift their houses. To have the strong community is the key for rapid community resiliency.

Besides the communities, the local organizations were also had uncountable costs of damages to staff and equipment, etc. But these organizations had the cooperation network so that they could come to help in the areas affected by Tsunami in return. In today preparation of the strategic plans is a good opportunity for us to create the cooperation networks. Last year we faced the big flood and Khao Kaeo had been suffering by the flood for three months. Tao and other networks outside the community also came to help.

Last week we had been working on the strategic planning and it was found out that the flood is not a major problem now as the community has been adjusting itself to live with the flood. Flood occurs usually every year in this area, so it is not regarded as a disaster now but a nature that humans can adapt to it. But the big flood 2011 was too big than the expectation and caused big damages. Farmers lost their farms as the flood entered into the area one month earlier than the usual schedule.

However, such big flood normally does not happen frequently. Big flood may happen in the thirty years or fifty years in a round. It might happen again one more time in the future or maybe in the near future. Therefore we should find the preventions to handle this situation.

For the meeting, all Tambons related are going to brainstorm opinions and activities that are considered to be beneficial to the communities. Tomorrow the Japanese experts will present the interesting activities for the implementation. Please consider if there are some activities that might be suitable for your communities as you know the best about your own communities. JICA Study Team had complied all of the communities from the north, northeast and central regions of Thailand that are successful in the flood management as posture presentation. If you are interested in any sites we can then organize the study tour. In the next two days we are going to visit the water management in Saraburi. And in the last day of this meeting we will summarize the planning as the vision, strategies and primed activities that the communities want to operate urgently. The Project can provide support in terms of knowledge and some budgets. If there are any activities that we could not provide our full supports, then we are pleased to search for the contribution from other government and local agencies in your areas. This project is supposed to end in March 2013, it is about to complete soon. If our activities are satisfactorily completed, we later will publicize about the projects in many channels available in Thailand.

This meeting is a part of the project initiation. We emphasize on the participation approach. After the opening ceremony, there will be the speakers to help motivate us on finding the procedures and approaches. You may have heard about the government's projects which mostly are big scaled construction projects. But when it comes to the community level, we have to consider about ways to live with flood. For example, in the areas of the catchment area of the Monkey Cheek in Khao Kaeo or Gop Chao areas, etc. If the inundated period lasts too long then we have to think what shall we cope with it again. In Japan we worked together on how we should do at the household level, what students should do, what the working people should do and what villagers should do, etc. People in all levels, from individuals to national level must participate in finding the solutions. Please everybody contribute your shared opinions, alliances and networks of cooperation. I wish all are happy joining this seminar. Thank you.

3. Greetings and Introducing the Attendees

3.1 Target Groups

3.1.1 Khlong Ha Sub-district: Deputy Chief Executive of TAO, secretary of TAO, representatives of the Water User Groups (WUGs), Disaster Prevention and Mitigation Department, TAO, representatives from villages, Tao members and representatives from educational institutes.

3.1.2 Wang Man Sub-district: Educators, TAO, Deputy chairman of TAO, Tao members, Secretary General of TAO, representatives from villages and community leaders.

3.1.3 Khao Kaeo Sub-district: Chief Executive of TAO, village headmen, Khao Kaeo Subdistrict headman, two representatives from, representatives from TAO village Moo 1, Moo 2, Moo 4, Moo 5 and Moo 6, village headmen of Moo 1, Moo 4 and Moo 5, and assistant village headman of village Moo 6.

3.1.4 Gop Chao Sub-district : Deputy Chief Executive of TAO, village headman of Moo 9, Occupation Group, TAO Village Moo 1, village headman of Moo 3, a physician and 2 medical officers at the Tambon Health Promotion Hospital, village headman Moo 8, , representatives from villages and Disaster Prevention and Mitigation Department.

3.1.5. Government Agencies: Provincial Agriculture and Cooperative Offices, Chainat Land Reform officers, Director of Chainat Rice Research Center, 2 officers from Sapphaya District Agricultural Extension Office, Chainat Livestock Office, Animal Husbandman from Chainat Livestock Office, Bang Ban Irrigation and Maintenance Project, Khlong Luang Rice Research Center of Pathum Thani Province, Agricultural Technical Officer from Khlong Luang Rice Research Center, Ayutthaya Agricultural Extension Office, North Rangsit Irrigation and Maintenance Project.

3.2 Guest Speakers

Gop Chao

- Ms. Thita Aon-in
- Mr.Sukan Sangwanna
- Mr.Sarawut Chuanchaiyaphum

Khlong Ha

- Mr.Damrongpon Saengmanee
- Ms.Klairung Song-ngam
- Ms.Bubpachart Pongtheerasart

Wang Man

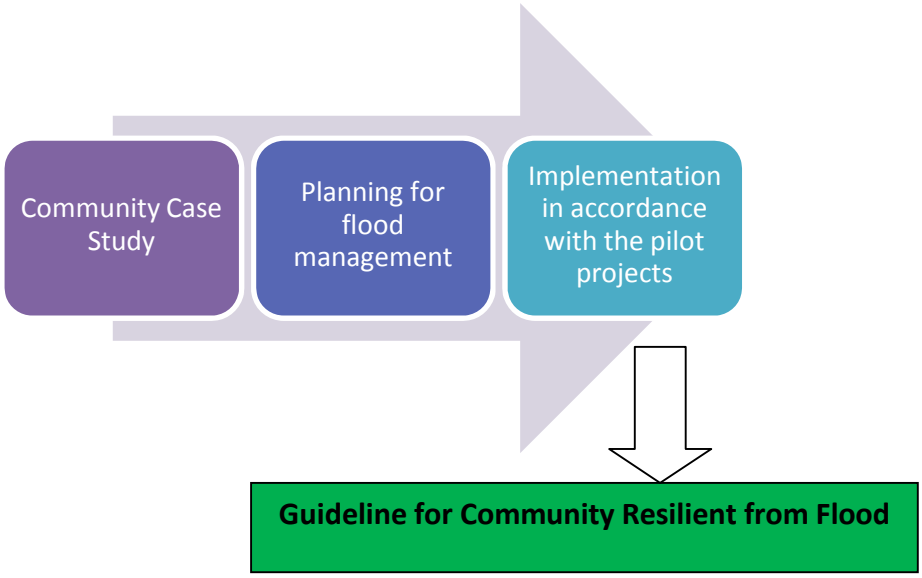
- Mr.Nattawut Uppa
- Mr.Ronnachai Chainiwattana
- Ms.Kanueng Wanwiset

Khao Kaeo

- Mr.Sanya Soisena
- Mr.krittikorn Noipin
- Ms.Sirirasda Thammarasdikul

Review of the work procedures of the Project

1. Conduct the community case study in the pilot locations to plan for the flood countermeasures. The study team will survey the sites for data collection on flood situations
2. Implementation in accordance with the pilot projects
3. Guideline for Community Resilient from Flood



The learning activity “What is it?”. Draw a picture as the dictation and present to the meeting.

- A monster, because it has the radar on its head
- A cartoon character, can’t be other thing else
- A mosquito, because it has a long stink
- An anteater because of its long-beaked echidna
- A monkey
- A unicorn
- An Negrito alien as it looks like a negrito and also has eyes
- A dog tick because it has round shape

What do you think of this picture?

Participants showed their opinions differently although they had listened to the same story, but had drawn different pictures then. Why?

Participants gave these reasons:

- Different ideas
- Different experiences
- Different opinions
- Different imaginations
- Different ability of perceptions

The speaker asked what causes were like that influencing people to have different ideas as we had different knowledge background. We learned from both educational institution directly and environment indirectly. And each individual's environment was different. So, we could not force others to think the same like us. But we could utilize those diversifications as a power of the teamwork. Some people may have lots of experience as they are residing in the local areas although never studied water management. Therefore, to learn together is to decorate a vase with different colors of flowers.

The fiercest animal on earth is the human-being. Humans have front teeth for biting, fangs for tearing, molars from grounding and humans can eat both vegetables and meat. If we want to live with this kind of animal, we have to reconsider about these following issues:

1. We should respect the honor of a man
2. Humans all have ability to work and should let each individual work at his best when working together in groups
3. Humans can change upon time and opportunity. Do not expect over-realistic. We had hosted the meeting in days as because we wanted us to exchange our knowledge, ideas and experiences with other sub-districts.

4. What were you expectations from joining this seminar?

4.1 Khao Kaeo Sub-district, Sapphaya District, Chainat Province

- Flood Management Plan
- The JICA would contribute assistance on flood problems
- Possibility to generate income during the flood
- Financial support for the community disaster funds
- Knowledge to solve the flood problems
- Dikes to prevent flood surrounding the whole Tambon areas
- Cooperation from the government agencies in flood countermeasures
- Guidelines for the management of a happy living with flood
- Budget for flood countermeasure planning
- Roads for convenient traveling around the villages
- Knowledge about disaster prevention
- Value added into agricultural products

4.2 Gop Chao Sub-district, Bang Ban District, Ayutthaya Province

- Knowledge and understanding about flood prevention plans provided by JICA. Local people have experience but lack of budget
- Lack of communication tools, broadcasting center, etc. that will be useful once seniors are sick and helps can be contacted easily, for example.

- Boats for easier transportation
- It is the riverbank area that water can flow into the paddy fields. The community had asked the government for the budget allocation, but still no answer yet. What we could do is only building the earthen dikes which are easily wiped by the flood.
- Requires to embank the roads up to the height of one meter (1,200 meters in length) surround the village
- Requires for the income generating activities during the flooding period. Because people cannot work as the factories close, they only wait for the outside distribution of helps and food and find own food along the fields.
- Budgets exclusively for the community

4.3 Wang Man sub-district, Wat Sing District, Chainat Province

- The community always affected by the flood and drought. In the past it was never be the flooded area but since the construction of the Tung Wat Sing Irrigation Canal, flood occurs every year. Tambon can benefit only 10 percent from that project. So the community is in need of the budget to build the dike and the cost estimation is approximately 5 million baht for five kilometers of dike.
- Looking for the aids from the government agencies as its too dry until the trees die in the dry season. In the rainy season, water from the north direction, Uthai Thani Province flood over Wang Man, no drainage canals and sometimes it has been inundated for months.
- Knowledge about flood management and capability to help people
- The Community is in need of the new dikes, but what they had provided is only dredging the canals. That does not meet the community demand and cannot solve the problem suitably
- RID never enter the community, to learn and solve the problems of the community

4.4 Khlong Ha Sub-district, Khlong Luang District, Pathum Thani Province

1. New approaches for water management, integration methods provided by JICA, surface groundwater supply and the water management at Tambon level.
2. Knowledge exchange and network initiating, experiences from solving flood problems from other Tambons and having the flood management networks.
3. Flood Resilient Plans and lessons learned from JICA that can be taken for teaching students, and establishment of the Tambon Disaster Fund.
4. Information management, want to learn how to organize the information and how to use the information from the government agencies
5. Budget supported by JICA

6. Development of the careers during the flood, assistive innovations for flood, research and development of the products, more information obtained about the rice as Pathum Thani is well known for its good rice, then can take this into the topic of interest for further research.

Summary of the Expectations

1. Knowledge about flood/ drought management
2. Flood/ drought management plan
    - Aquatic adaptation
    - Development of natural water resources for agriculture
    - Health care for community people during the flood period
    - Drinking and consuming water management at Tambon level
    - Secured incomes during the flood
    - Extra careers during the flood or drought
    - Public disaster prevention and mitigation during the flood or drought
    - Value added to the rice production
    - Research on the rice varieties suitable and endurable for the flood or drought
    - Establishment of the disaster management fund at Tambon level
3. *Building the cooperation networks*
    - Knowledge exchange among the Tambon networks
4. *Budgets*
    - Roles of JICA in solving the flood/ drought problems
    - Lessons learned from Japan's disaster management
    - Coordination with the government agencies in solving the flood/ drought problems
    - Financial aids to establish the Flood/ Drought Disaster Fund

4. Objectives

1. To review and analyze the current situations of the flood crisis of each Tambon
2. To determine the strategic plans to reduce impacts from flood and the aquatic adaptation of the community
3. To set the activities and operational plans for the pilot projects with the cooperation of the community and the Project
4. To create good understanding about the Project and to set the practices for the community and the Project

5. Meeting Agenda for 3-7 September, 2012

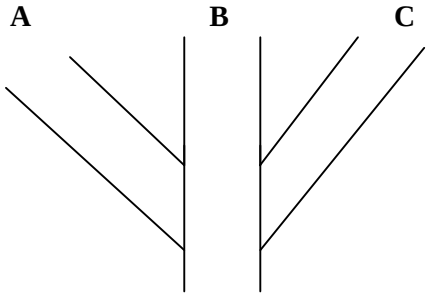
Date	Morning Session	Afternoon Session
3	• Arriving at hotel and check-in	• Registration
4	• Opening ceremony/ lecture by representative from Ayutthaya Agriculture and Cooperative Office • Introduction to the Project Frameworks by Mr.Oda, Project Manager • Adjust the expectations, explain the objectives and agenda of this meeting • Insight of "Strategic Planning and Strengthening the Community" by Acting 2 Lt. Akkrawit Muenkul and others	Separate the sessions into three small meeting rooms for the SWOT analysis of the PRA report • Current flood situations of the Tambons • Draft the "Visions" • Analyze the internal factor: strengths and weaknesses • Analyze the external factors: opportunities and threats
5	• In the main venue : guidelines for the preparation of the strategies, activities, visions, flood management by Acting 2 lt. Akkrawit Muenkul	• Draft the Strategic Planning for Tambon Flood Management 9visions, strategies, activities, projects) • Prepare the pilot project plans • Organize the study tour
6	• Study tour to the New Theory Project site at Mongkol Chai Pattana Temple, Chalerm Prakiat District, Saraburi Province	• Study tour to visit the Pasak River Basin Farmer Development Group and networks from Saraburi Province
7	• Review the strategic plans and the operational plans of each Tambon (small meeting room)	• Determine the patterns, mechanisms, roles for the cooperation of the Project and the local communities • Conclusion and closing remark

The speaker showed this picture and asked the meeting about what were these people doing.

People were standing on the boat. A man was carrying the feather, a man who looked like a soldier, and a man who did not dress as a soldier, these people were planning the war strategies, especially done by the warrior and the thinker (carrying the feather). Why did we need to bring civilians to work in the planning?

This implies that in planning the strategies, we need both practitioner and thinker. In each area, do we already have both types of people in the teamwork? Same to the meeting today, participants are like the practitioners and the guest speakers are the thinkers. We all have heard about the strategy since the long history, so Thailand, TAO, CEO governor all have to prepare the strategies.

For the activity before leading into the content of the strategic planning, the speaker asked a question "Look at this picture, which direction are you going to choose?"



Which direction are you going to go to? Attendees showed their answers differently. For example, go straight as because it is the central path. However, there is no wrong answer. The reason is simple, because we do not know where to go. Like in this morning session we had brainstormed about the expectations in order to know whether we have the same expectations or not. Once we know, we can manage it. It is the same as in the flood management, whether or not we have goals and good understanding together.

Impacts caused from Operations without clear Goals and Directions

- Actual problems and needs are still unsolved and overlooked
- Waste money
- Worthless supply of labor
- Waste time unnecessarily
- Loss or change of resources caused from the operations. For example, biological/ soil/ water/ forest diversifications, etc.
- Unhappy to repeat same old tasks

Comparison of the Old Management and Modern Management Styles

Old Management Style	Modern Management
Inputs	Outcome
Project	Outputs
Outputs	Project
Outcomes	Input

[One who knows the enemy and knows himself will not be in danger in a hundred battles]

6. Strategic Planning

6.1 Definition

Planning refers to the analysis of the current situations, foreseeing and planning ahead for the effective performance.

Strategy refers to an unordinary approach with the specific reconsideration to get the best approach and that can change all kinds of situations to be useful for the organization no matter under any circumstances, beneficial or lost.

6.2 Significance of the strategic Planning

- The “Knowing enemy – knowing himself” approach
- Strategy leads to the clear goals underlying with the vision/ missions
- Strategy is the best choice for solving problems and leading to the success
- Strategy clarifies the missions and roles of all related persons and agencies
- Strategy brings the clear and concise approaches into the assessment and evaluation

6.3 Principles of Strategic Planning

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

6.3.1 Study of Positioning (Where are we now?)

- Study the internal factors by consider:
  - Our strengths: what are our strengths/ capacity to be used for reducing the impacts of flood
  - What are our weaknesses?

- Study the external factors influencing the success and failure of the flood countermeasure tasks by consider:

6.3.2 Setting the Directions (Where would we like to be?)

Study the external factors influencing the success and failure of the flood countermeasures that we are going to implement. Consider these following issues:

- Our strengths : consider which matters/ issues/ organizations/ policies/ situations that could be beneficial to our operation on the flood countermeasures for the community.
- Our threats : consider about the external factors that may cause our operations on flood countermeasures failed.

7. An Analysis of Internal Factors of Khao Kaeo Sub-district

Final Dreams (Expectations) of Khao Kaeo Sub-district

- Capable of planting rice two times a year, sell crops at good prices as assured by the government
- To be the catchment area during September to November every year
- Community people can adapt themselves to live with flood happily and no flood affecting the community
- Development to be the agro-tourism community (Fish Capture)
- Having its own barns and rice incubator
- Having secured/ stable jobs and development of fish processing
- To be provided the Tambon Disaster Management Funds
- To have convenient and safety transportation systems, good infrastructure
- To be a community where food is plentiful and sufficiently provided
- To have secured and safe accommodation no matter under the flooding or drough situations
- To be the whole organic agricultural area/ Tambon

An Analysis of Internal Factors

Strengths	Weaknesses
1. Khao Kaeo is located in the fertile area with irrigation canals all over the sub-district 2. Soil fertility to produce good quality and quantity rice that can sell at good prices 3. Available number of fishes throughout the whole year long 4. Local administrative organizations and local agencies have well contribution and coordination in development projects 5. Leaders are well contribute their dedication, harmony and cooperation to develop the community 6. Having historical tourist attractions as being the maneuver route of the Burmese army in the Ayutthaya Period (Bang Rachan History), holy places in the community such as Nomtho tTemple, Khao Kaeo Temple, pagoda, Elephant trunk cave, Buddha footprints and Buddha image with long history. 7. Having the local intellectuals on survival (catching snakes and rats for food, etc.), traditional medicine, making fish traps/ nets and water hyacinth processing 8. Community reservation for the open bill birds that eat the golden apple snails in the paddy fields 9. The community realizes about the flood countermeasures and begin to adapt themselves (solving, prevention and monitoring) 10. The community still relies on the agricultural workers within the community	1. Flood affects the paddy fields every year 2. Lack of good Water management system in the community 3. No evacuation center in the community (villages Moo 2 and 5) and no flood management plans 4. Outbreaks of brown planthoppers and weedy rice 5. Use chemicals in the paddy fields and that affects to the farmers' health 6. Community does not eat their own produced rice, but buy from other sources 7. Old wisdom or lifestyle do not get support or restoration after the production style has changed to industrial system 8. No participation of people, only waiting from the leaders' operations. 9. Occupation Groups such as Making Dolls does not get support to find market and no continuing support 10. Most farmers do not own lands (rent about 70%), so cannot develop the rental land 11. No plans to solve problem for landless farmers during the flood yet 12. Workers in paddy fields for pesticide spraying have found the toxin in health (stop working or poverty) 13. People are in debts caused from rice and other crops planting (flood 1 year, being in debt for 3 rounds of planting) 14. No value add into fishes found in the community yet 15. The farm rent costs more expensive every year (wet season costs rice 17 buckets and dry season costs 13 buckets; now 20 buckets for all seasons) 16. The Water User Groups (WUGs) cannot work proficiently due to the lack of continuing support from related agencies (still active in villages Moo 1, 4 and 6 in cooperation with Hard Asa Sub-district) 17. Dirty water supply, low quality, rush contaminated, water filters out of order and cannot function properly and that cause people sick of kidney stones 18. There are numbers of cows in the community but no enough space for raising and facing the shortage of animal feeds and places, as well as for other animals in the community. 19. New generation does not want to be farmers

An Analysis of External Factors

Opportunities	Threats
1. The community is located close to the main transportation road – the Asia Road. 2. Rice Mortgage Scheme offers good prices for farmers 3. The Compensation Policy for farmers facing the flood 4. Thung Chiang Rak-Khao Kaeo Catchment Area is rewarded by soil fertility and compensation 5. Outside organizations support academically and financially in flood management such as JICA 6. The 3 year debt moratorium policy 7. Entering of the AEC 8. Trend of healthy food by domestic and overseas 9. Conservative and community lifestyle tourism has been more interested by both domestic and overseas 10. Alternative energy, environment care and global warming campaign 11. Reputation and quality of Thai rice worldwide	1. No continuing solutions for flood countermeasures from the government 2. No clear operational rules for irrigation so that villagers cannot handle with the situations well 3. Intervention of the agricultural industrial companies on rice cultivation 4. Regional Power Authority cannot provide sufficient electricity for the community 5. Landlords cancel the rent of the land 6. Vary to the domestic and international economy that causes increasing wages and production materials

Strategic Planning for Khao Kaeo Sub-district

Proactive Strategies of Khao Kaeo Sub-district

Strengths (S)	Opportunities (O)	Proactive Strategies (S+O)
1. Khao Kaeo is located in the fertile area with irrigation canals all over the sub-district 2. Soil fertility to produce good quality and quantity rice that can sell at good prices 3. Available number of fishes throughout the whole year long 4. Local administrative organizations and local agencies have well contribution and coordination in development projects 5. Leaders are well contribute their dedication, harmony and cooperation to develop the community 6. Having historical tourist attractions as being the maneuver route of the Burmese army in the Ayutthaya Period (Bang Rachan History), holy places in the community such as Nomtho Temple, Khao Kaeo Temple, pagoda, Elephant trunk cave, Buddha footprints and Buddha image with long history. 7. Having the local intellectuals on survival (catching snakes and rats for food, etc.), traditional medicine, making fish traps/ nets and water hyacinth processing	1. The 3 year debt moratorium policy of the government that has paid attention to the flood disaster management and Thung Chiang Rak-Khao Kaeo Catchment Area 2. Rice Mortgage Scheme offers good prices for farmers 3. Outside organizations support academically and financially in flood management such as JICA 4. The community is located close to the main transportation road – the Asia Road. 5. Reputation and quality of Thai rice worldwide 6. Trend of healthy food by domestic and overseas 7. Conservative and community lifestyle tourism has been more interested by both domestic and overseas 8. Alternative energy, environment care and global warming campaign 9. The Compensation Policy for farmers facing the flood 10. The Policy of Development the Provinces by promoting the goat raising, native chicken farming and promote the local residents to eat small animals like native chickens, fishes and ducks. 11. Entering of the AEC	1. **Promote organic/ non-chemical rice production in Khao Kaeo Sub-district** **1.1 Make the demonstrating plots/ model farmers, 10 Rais per village, total of 60 Rais in Khao Kaeo** • Establish the non-chemical rice production groups • Seek and research on good rice varieties • Study tour to visit the safety agriculture sites 1.2 Promote markets for the safety ricein the community • Small rice mills in Khao Kaeo hosting the “Eating our Own Rice Day” campaign • Campaign on “Stop burning stubbles” **2. Promote and develop the self-reliance and sufficient areas** • Promote the 1 Rai 100,000 baht of rice cultivation • Produce bio-fertilizer and bio extracts 3. **Develop community tourism** **3.1 Develop Khao Kaeo and Nomtho Mountains to be tourist attractions, survival and evacuation areas for the Tambon** • Strengthen the leaders capability in the management of the survival areas and tourist attractions • Prepare the public relations and

Strengths (S)	Opportunities (O)	Proactive Strategies (S+O)
		communication plans • Prepare the community tourist maps • Promote the pilot Home stay tour • Connect the Bang Ra Chan historical routes as tour program **3.2 Open-billed Bird Learning Center** • Exhibition rooms • Develop the study team for the open-billed birds • Souvenirs of open-billed birds **4. Develop the fish processing methods and Value add to the naturally available fishes** • Establish the Fish Processing Groups: fish sauce, fermented fish, etc. • Eating the Local Fishes Festival • Organize the Local Products Competition

Development Strategic Planning for Khao Kaeo Sub-district

Development Strategies for Khao Kaeo Sub-district

Opportunities (O)	Weaknesses (W)	Development Strategies (O+W)
1. The 3 year debt moratorium policy of the government that has paid attention to the flood disaster management and Thung Chiang Rak-Khao Kaeo Catchment Area 2. Rice Mortgage Scheme offers good prices for farmers 3. Outside organizations support academically and financially in flood management such as JICA 4. The community is located close to the main transportation road – the Asia Road. 5. Reputation and quality of Thai rice worldwide 6. Trend of healthy food by domestic and overseas 7. Conservative and community lifestyle tourism has been more interested by both domestic and overseas 8. Alternative energy, environment care and global warming campaign 9. The Policy of Development the Provinces by promoting the goat raising, native chicken farming and promote the local residents to eat small animals like native chickens, fishes and ducks. 10. Entering of the AEC	1. Flood affects the paddy fields every year 2. No evacuation center in the community (villages Moo 2 and 5) and no flood management plans 3. No participation of people, only waiting from the leaders' operations. 4. Most farmers do not own lands (rent about 70%), so cannot develop the rental land 5. People are in debts caused from rice and other crops planting (flood 1 year, being in debt for 3 rounds of planting) 6. Use chemicals in the paddy fields and that affects to the farmers' health 7. No plans to solve problem for landless farmers during the flood yet 8. Lack of good Water management system in the community 9. Dirty water supply, low quality, rush contaminated, water filters out of order and cannot function properly and that cause people sick of kidney stones 10. No value add into fishes found in the community yet 11. Old wisdom or lifestyle do not get support or restoration after the production style has changed to industrial system 12. Villagers' attitude of preferred to get help, offered survival kits during the flood 13. New generation does not want to be farmers 14. Community does not eat their own produced rice, but buy from other sources	**1. Agricultural Land Management during the Flood** • Adjust the cultivation calendar **2. Promote the community participation in water management for the paddy fields** • Strengthen and establish Khao Kaeo Water Management Groups and cooperate with Thung Chiang Rak-Khao Kaeo Network (6 Tambons) • Train/ educate/ workshop on community-based water management 3. **Develop and strengthen the capability of Khao Kaeo survival Areas** • Prepare the Flood Disaster Management Plans at Tambon level (equipment, material, survival supplies, etc.) • Find new innovations for food security during the flooding period such as soiless vegetables, floating vegetables, etc. • Promote/ campaign the survival areas at household/ community/ Tambon levels (plants, animals, food) 4**. Promote and develop the organic rice production/ safety agriculture** • Seek for the methods in reducing rice production costs/ agricultures • Make the pilot plots of cost deduction for rice cultivation in 6 villages • Seek for solutions, research, experiment about the elimination of the weedy rice 5. **Generate and support additional occupations for underprivileged people** • Promote non-chemical rice production for health for

Opportunities (O)	Weaknesses (W)	Development Strategies (O+W)
		workers and farmers • Promote the awareness and knowledge of health care for workers in the paddy/ agricultural fields **6. Develop and promote additional occupations which are suitable for the community readiness** • Strengthen the capability and promote the management of the Occupation Groups in the community (animal raising, raising cows, fish farming, iodine eggs, crochet, handicraft, etc.) ฯลฯ) • Establish the groups and develop the fish processing products • Find the market for occupation groups domestic and overseas **7. Develop the drinking/ consuming water in the community** • Seek for the methods and research and develop about the drinking water system for Khao Kaeo Community. (An organization from Malaysia supported the water purifiers, still unable to drink, Department of Mineral Resources had constructed the groundwater deep down to 70 meters, water still undrinkable and the 4-meter pipe was blocked by the limestone and manganese sediments). **8. Develop the Rice Cultivation Curriculum/ Agriculture in Tambon schools** • Model youth/ farmers • Motivate the awareness of students and youth of the community • Support scholarships for model youth/ students of agriculture

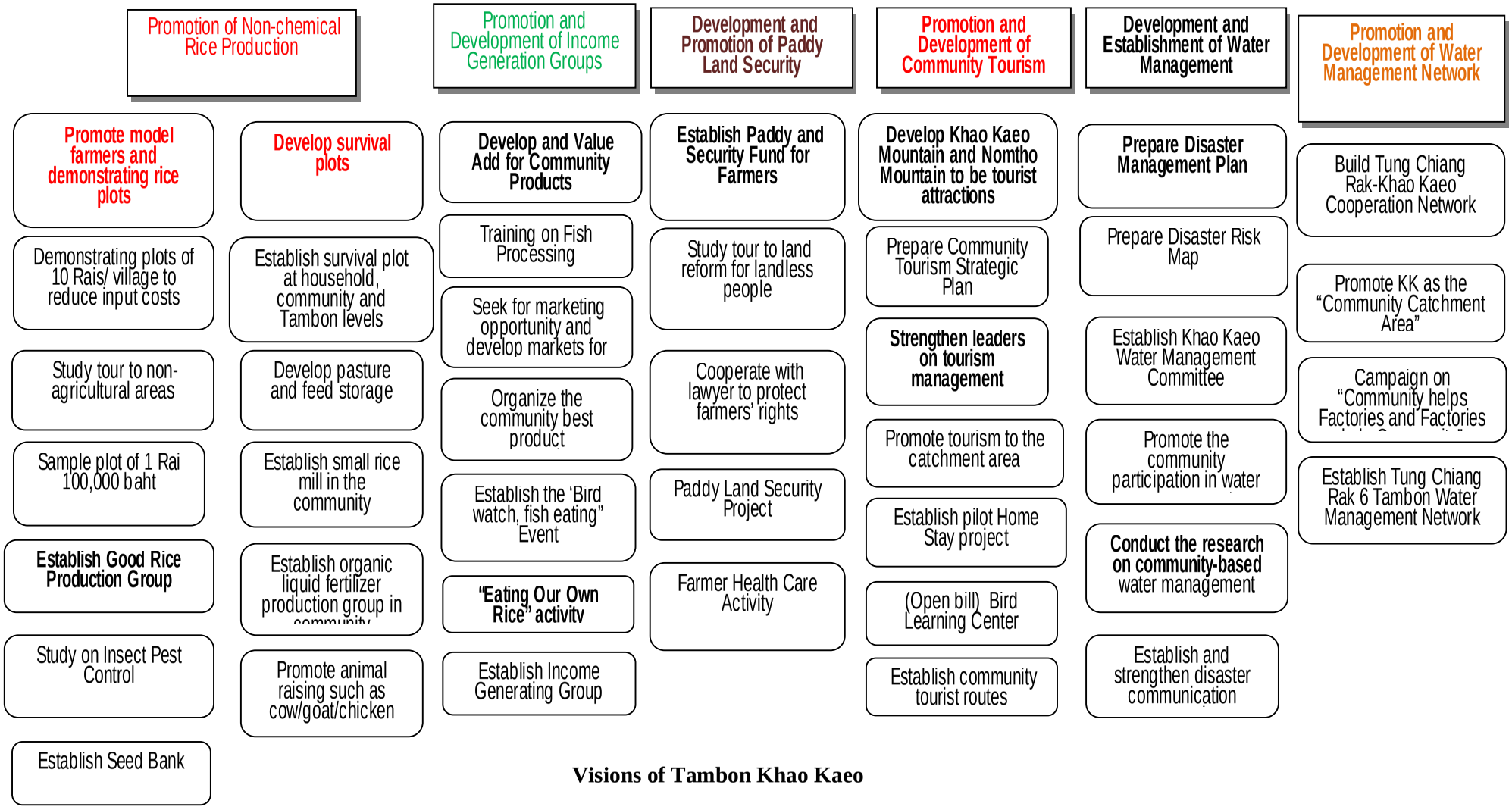
Preventive Strategies for Khao Kaeo Sub-district

Strengths (S)	Threats (T)	Preventive Strategies (S+T)
1. Khao Kaeo is located in the fertile area with irrigation canals all over the sub-district 2. Leaders are well contribute their dedication, harmony and cooperation to develop the community 3. The community realizes about the flood countermeasures and begin to adapt themselves (solving, prevention and monitoring) 4. Having historical tourist attractions (Bang Rachan History), holy places in the community such as Nomtho tTemple, Khao Kaeo Temple, pagoda, Elephant trunk cave, Buddha footprints and Buddha image with long history. 5. Available number of fishes throughout the whole year long 6. Being the maneuver route of the Burmese army in the Ayutthaya Period 7. Community reservation for the open bill birds that eat the golden apple snails in the paddy fields 8. The community still relies on the agricultural workers within the community 9. Having the local intellectuals on survival (catching snakes and rats for food, etc.), traditional medicine, making fish traps/ nets and water hyacinth processing	1. No clear operational rules for irrigation so that villagers cannot handle with the situations well 2. No continuing solutions for flood countermeasures from the government 3. Landlords cancel the rent of the land 4. Vary to the domestic and international economy that causes increasing wages and production materials 5. Regional Power Authority cannot provide sufficient electricity for the community	**1. Prepare the Disaster Management Plans along with the Tambon, district and Provincial levels** **2. Develop the information system/ report to be timely with the flood situations** • Develop the community disaster reporters/ communicators **3. Promote and strengthen the land security for farmers of Khao Kaeo Sub-district** • ιPresent the policy of "Secured Land for Farmers" • Cooperate with the lawyers for farmers • Funds for lands **4. Expand the electricity power service** (living in Chainat but supplied the power from Ta Klee District, Nakhon Sawan, insufficient power phase and that causes damages to the pumps) • Present the alternative energy- community solar cells

Avoidance Strategies or Changing Crisis into Opportunities

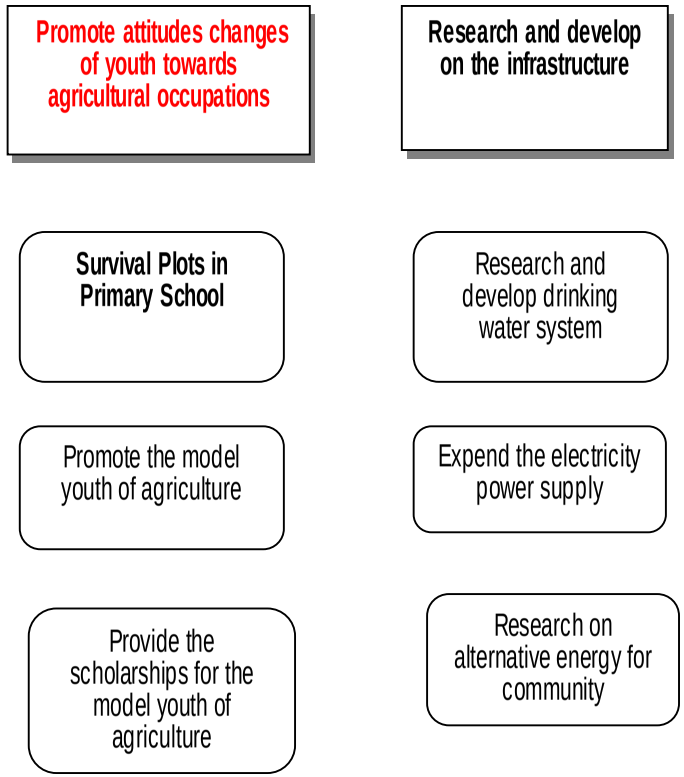
Weaknesses	Threats	Avoidance strategies/ Changing Crisis into Opportunities (W+T)
1. Flood affects the paddy fields every year 2. No evacuation center in the community (villages Moo 2 and 5) and no flood management plans 3. No participation of people, only waiting from the leaders' operations. 4. Most farmers do not own lands (rent about 70%), so cannot develop the rental land 5. People are in debts caused from rice and other crops planting (flood 1 year, being in debt for 3 rounds of planting) 6. Use chemicals in the paddy fields and that affects to the farmers' health 7. No plans to solve problem for landless farmers during the flood yet 8. Lack of good Water management system in the community 9. Dirty water supply, low quality, rush contaminated, water filters out of order and cannot function properly and that cause people sick of kidney stones 10. No value add into fishes found in the community yet 11. Old wisdom or lifestyle do not get support or restoration after the production style has changed to industrial system 12. Villagers' attitude of preferred to get help, offered survival kits during the flood 13. New generation does not want to be farmers 14. Community does not eat their own produced rice, but buy from other sources	1. No clear operational rules for irrigation so that villagers cannot handle with the situations well 2. No continuing solutions for flood countermeasures from the government 3. Landlords cancel the rent of the land 4. Vary to the domestic and international economy that causes increasing wages and production materials 5. Regional Power Authority cannot provide sufficient electricity for the community	1. Available for being the catchment area for three-month flooding (Sep. – Nov.) 2. Promote tourism to community, fishery, fish processing for domestic and international markets 3. Provide the public service boats

Khao Kaeo Sub-district is the Model Community of the Aquatic Adaptation, Community Catchment Area, Powerful Community Organizations, Secured Income and Occupations, a Source of Good Rice Varieties, Abundant Natural Resources and Interesting Community Tourist Attractions



Visions of Tambon Khao Kaeo

Khao Kaeo Sub-district is the Model Community of the Aquatic Adaptation, Community Catchment Area, Powerful Community Organizations, Secured Income and Occupations, a Source of Good Rice Varieties, Abundant Natural Resources and Interesting Community Tourist Attractions



Output Table for Khao Kaeo TAO

Strategy	Rational	Activity	Agency	Duration	Budget		Issues to be confirmed by Community	Issue to be confirmed by expert
					Jica	Local		
1. Promotion of non chemical rice production		• Promote model farmer and demonstration plot • Develop survival plot						
2. Promotion of group activities		• Develop and increase value of community products						
3. Paddy land security		• Establish paddy land fund and promotion of land right						
4. Promotion of community tourism		• Promote community tourism in Khaonomtho and Khao Kaew						
5. Develop and strengthen water management network		• Preparation of disaster prevention and management plan of Khao Kaeo and the neighboring Tambons						
6. Promote and develop collaboration network of people living in the water irrigation areas		• Establish and strengthen kaho Kaeo Water Management Group and cooperate with Tung Chiang Rak-Khao Kaeo Network (6 Tambons) •						
7. Promote attitude changes of youth towards agricultural occupations		•						
8. Research and develop on the infrastructure		• Research and develop on drinking water system of Khao Kaeo sub-district						
		• per village, total area of 60 Rais in Khao Kaeo Sub-district Seed Bank Funds						
9. Promote income generating groups in the community								

Strategy	Rational	Activity	Agency	Duration	Budget		Issues to be confirmed by Community	Issue to be confirmed by expert
					Jica	Local		
10. Develop and promote land security for farmers in Khao Kaeo		Study tour to site of "Land Reform for Landless Farmer in the Community"						
11. Promote and develop community tourism								
12. Develop and establish water management groups		• Train the disaster communicators in Khao Kaeo Sub-district • Prepare Flood Risk Management Plan						
13. Promote and develop collaboration network of people living in the water irrigation areas		• Strengthen and establish the Tambon Khao Kaeo Water Management Group and cooperate with Tung Chiang Rak-Khao Kaeo Network (6 Tambons)						
14. Promote and develop attitude changes of youth towards agricultural occupations								
15. Research and develop on the infrastructure		• Research and develop on drinking water system for Khao Kaeo Sub-district						

3. Pilot Project Sheets

Tambon Khao Kaeo, Sapphaya District, Chainat Province

		T.Khao Kaeo, A.Sapphaya	
Community-based Disaster Risk Management Against Big Flood (CDRM)	Drinking Water Supply during Flood Period (DWS)	(1) Drinking Water Supply System at School	KK-CDRM-DWS-1
Community Water Resources Management (WRM)	Preparation of Flood Hazard Map (HZDMP)	(1) Preparation of Flood Hazard Map	KK-WRM-HZDMP-1
	Participatory Flood Monitoring/ Information Management (PFIM)	(1) Participatory Flood Monitoring	KK-WRM-PFIM-1
Flood Damage Reduction in Agriculture and Livestock Sector (AGRI)	Paddy Cultivation Activities for Flood Adaptation(PADDY)	(1) Trials on rice transplanting methods (2) Reduction of Production Cost (3) Promotion of Service Provider of Parachuting	KK-AGRI-PADDY-1 KK-AGRI-PADDY-2 KK-AGRI-PADDY-3
	Good Paddy Seed Production/ Seed Bank (SEED)	(1) Community Seed bank	KK-AGRI-SEED-1
	Crop Diversification and Food Security (CRDV)	(1) Aquaponics	KK-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)	KK-iGEN-FISH-1
	Income Generation utilizing Local Resources (IGLR)	(1) Activation of Women Group through Utensil Making (no projet sheet)	KK-iGEN-IGLR-1
Networking, Supporting and Institution for Community Strengthening (NET)	Land Parcel GIS Database of Land Use and Ownership (LPGIS)	(1) Establishment of Land Parcel GIS Database	KK-NET-LPGIS-1

PILOT PROJECT SHEET

Project Code	Sector	Community-based Disaster Risk Management against Big Flood
CDRM-DWS-01	Program	Drinking Water Supply during Flood Period
Title	Drinking Water Supply System at School	
Purpose	*To secure and keep safety drinking water during flood period*	
Location	T. Khao Kaeo (KK), A.Sapphaya, Chinat Province (CN)	
Beneficiaries	2,700 people, 752 Household	
Implementing Agency	Wat Nom Tho School/ T. Khao Kaeo, Chompoonuch Beverage Ltd.	

Background/Concept

Regular flood have occurred for every 8 years after drainage system was blocked by the newly constructed road and the water flows into the area from the southern direction of the Tambon. The damage to rice is not so much since the most of farmers could harvest before floods occur. However, flood in 2011 occurred on 17th September which caused a lot of damages to not only rice and household properties but also drinking water supply system. Due to said damage of water supply system and lack of drinking water storage so far, almost people in Tanbon are suffered from the water shortage and need to buy drinking water from the nearby Tambons. Under these situation, People in the Tambon gave a high priority and decided to improve the existing water purified system including vending machine at primary school behind TAO office in cooperation with JICA Study Team when the Participatory Disaster Resilient Planning Workshop held in September 2012.

Expected Outcome

- To secure safety drinking water during flood period.
- To keep safety drinking water always for flood period.
- To create income for Operation & Maintenance (O&M) cost by installing the vending machine
- Through O&M with vending system, solidarity in communal area will be enhanced

Component (Input/ Activities)

The Drinking Water Purifying System comprises of existing water purifying system house improvement and additional storage room construction dimension 3 x 4 m. including with the equipment as follows,

1. Raw Water Tank
2. Purified Water Tank
3. Ceramic Filter Column
4. Hardness Filter Column
5. Drinking Water Vender Machine

Related Program, if any		**Code**

Cost (w/ Source)

329,000Bt supported by JICA Study Team

Implementing Schedule

Component	Dec	Jan	Feb	Mar
Contract between JICA ST & Supplier	▲			
Explanation to the TAO,etc. (components, establish. of water supply management committee, WSMC)		▬		
Implementation			▬▬	
Final Inspection				▲
Support to strengthening the WSMC by JICA ST			▬ ▬ ▬	
Training to the WSMT				▲

Note: ST, Study Team

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2011	Receiving the quotations from 2 Suppliers during 24th Dec to 26th Dec and selected the Supplier JICA Study Team and Chompoonuch Beverage Ltd. conducted the contract on 26th December 2012.
Jan. 2013	Meeting for explanation of the project in the presence of TAO, school teaches and villages representative (component of the project, request to establish a water supply management committee and implementing schedule, etc.) on 8th January 2013 The supplier commenced the work on 24th January 2013.
Feb. 2013	Under implementation
Mar. 2013	Final inspection was carried out in the presence of TAO staff including school teachers (8 persons), supplier of Chompoonuch Co.,Ltd, and Study Team on 20th March 2013. Supplier explained the operation of the facility to the TAO staff, and water quality test of Ph and TDS (Total Dissolved Solid) was examined. Both of the results were cleared the standard value. Also, vendor machine handling was explained and trained. 4 copies of operation and maintenance manual were submitted to the TAO side and explained. Through the inspection of the system, it found the system is working without problems.

*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)	For Normal Condition, Nom Tho School will take responsibility for the Purified Drinking water system together with the new established related committee aim to produce free water for student and sale water for dwellers nearby. During normal and big flood, drinking water is able to provide to the people in and around the TAO with free of charge. Due to the construction of the storage room, it is possible to store drinking water tanks in the storage room and to eradicate worries about shortage of drinking water during flood period Through operation and maintenance of the system including vending system, solidarity in communal is enhanced.
Timing of Implementation (Pre-, During , Post-Flood)	During dry season, the purified water system should be implemented.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	At the beginning, the community would like to request JICA to repair the damaged existing water supply system for their utilization but not for drinking water. However after discussion and suggestion by JICA, Both accepted to improve the existing drinking water system in the School next to TAO office and will promote for Food and Drug Association (FDA) certificate and then the purified drinking water will be able to sell outside during the normal period for the next development plan to earn income for maintain and improve the water purifying system in future. However during flood period, the drinking water can be processed and provided for the affected villagers promptly without waiting from any donating agencies as usual condition. Before flood period, Purified Drinking water shall be processed and stored at the new improved storage room for 3-4 weeks in advance. During flood period, the system area shall be protected by any sand sag or soil embanked dike in order to be able to produce and distribute the drinking water for all flood victim. After flood period end, the house and system shall be checked and cleaned to assure the well function of the purified water system. Operation of the system is very easy for TAO staff but, maintenance should be asked for the supplier at least one time per year. Ordinary maintenance fee per year is estimated at 7,000 to 8,000Bt. Therefor water management committee should secure the maintenance fee from benefit of vending machine
Replication and extension (role of stakeholder, cost share, etc.)	Through Task Force Provincial Committee, the replication and extension can be determined and implemented for the other necessary and potential Tambon taking JICA Pilot Tambon into consideration as guideline. A water purified system is very compact and simple. The implementation of the cost is not exceed 250,000Bt excluding the system house. Therefor It will be possible to construct the system for other Tambon with his development budget.

Sustainability (incl. O&M, benefit during normal time)	The established committee will take responsibility for operation and maintenance by using vending machine income. In case of some big damages are happened and costly than obtained income, TAO and school shall provide for any excess repairing budget. The public relation and promotion shall be broadcasted to the villagers to convince and invite them to buy Tambon Drinking water for any kind of activities taken place in Tambon instead of buying outsider products so as to gain sufficient income to maintain and prolong the drinking water system for its sustainability. The achievement of this pilot activity shall be disseminated to the other Tambon Ability of purified drinking water production is around 6,000litter per day. So that the operation and maintenance cost could be secure from bending machine but an appropriate water fee such as 0.25 to 0.4 Bt/litter should be set prices of. To get income/benefit more, from plastic pet bottle selling business in effectively so that the FDA (Food and Drug Association) certification will be applied. Ceremonial functions (marriage, funeral, etc.) occur so often in community level and demand of purified water is very high. Therefor TAO and Water Management Committee should make a good marketing plan to promote the purified water system. For example of Shinhanat TA, TAO issues the monthly newsletter to introduce the water purified system to the people and during 2months from commence of the operation of the system, drinking water is free of charge to the people.

PHOTOS

Donation of pet bottles during flood in 2011

Meeting for explanation of the project in the presence of TAO, school teaches and villages representative (component of the project, request to establish a water supply management committee

Final inspection was carried out in the presence of TAO staff including school teachers (8 persons), supplier of Chompoonuch Co.,Ltd, and Study Team on 20th March 2013.

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management (WRM)
KK-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 Khao Kaeo, Amphoe Sapphaya, Chainat Province	
Beneficiaries	The entire population in Tambon	
Implementing Agency	T. Khao Kaeo 、 Kasetsart University	

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	(1) Community Flood Disaster Management Plan (2) Participatory Flood Monitoring/ Information Management	**Code** (1) KK-CDRM-CDRMP-1 (2) KK-WRM-PFIM-1

Cost (w/ Source)

The contract has been made between Kasetsart University and the total amount includes PFIM in Khao Kaeo and Cop Chao. The following items are a part of the total amount of the contract.

- PR Expenditure	125,000	
- Flood Risk Map	80,000	
- Building knowledge on flooding, warning system and prevention	160,000	
Total	365,000	(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)
Dec. 2012	- Prepare PR materials in the process of work to gain understanding of committee and community people on the Work - Collecting data for hazard map - Creating draft hazard map - Set up website for community water management, the website will show weather forecast, metrological information, RID water information, Hazard map, current water situation, historical water record in the community, and important web link. - Study tour to Chaophraya Dam with Gop Chao to promote the understanding and positive cooperation between RID and local community and encourage participatory water management approach.
Jan. 2013	- Prepare PR materials in the process of work to gain understanding of committee and community people on the Work - Creating draft hazard map - Set up website for community water management, the website will show weather forecast, metrological information, RID water information, Hazard map, current water situation, historical water record in the community, and important web link.
Feb. 2013	- Confirm PR materials to the community by workshop - Finalize hazard map by setting up participatory workshop - Complete website and teach how to update the water level data and record, how to show hazard map on website, how to use it effectively for flood management to the community, mainly engineers in TAO.
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

Kick-off meeting with community and KU explained about this project to the community.

Evacuation point in Khao Kaeo

Study tour to Chaophraya Dam in 6 Dec 12

Lecture of water level measuring at Study tour to Chaophraya Dam

Collecting infrastructure data for hazard map with village leader.

verifying the community flood hazard and evacuation map

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. Kao Kaeo, A. Sapphaya, CN	
Beneficiaries	T. Kao Kaeo	
Implementing Agency	T.KhaoKaeo、Kasetsart University	

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.

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.

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** KK-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
Oct. 2012	- Survey and Bench Mark setting for installation of staff gage - Staff gage installation
Nov. 2012	- Inspection by sub-contractor about staff gage installation
Dec. 2012	
Jan. 2013	- Formulation of recorded water level transfer system and monitoring the RID water level data system
Feb. 2013	- Final workshop for participatory water level monitoring activity
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 by contractor

Installed staff gage

Training for staff gage reading

Give education to the community people, teachers and students in school

Formulation of community communication tools for sharing the information with staff gage data and the government agencies data

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-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. Khao Kaeo, A. Sapphya, CN	
Beneficiaries	Paddy farmers (6 model farmers)	
Implementing Agency	Rice Research Center (RRC), Tambon Administration Office (TAO), Land Development Department (LDD)	

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 (6 farmers)
2) Detailed planning of activities and layout of the experimental plots (a total of 84 rai per 6 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

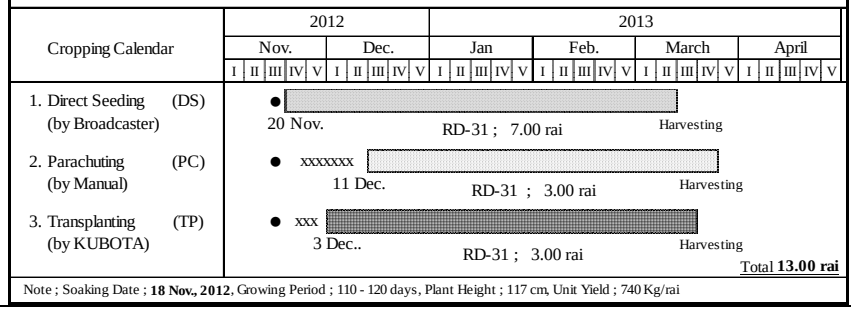
Related Program	Good Paddy Seed Production/ Seed Bank	**Code:**	AGRI-SEED

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

- Land preparation:	60,000Bt	(JICA)	
- Farm inputs:	150,000Bt	(JICA)	
- Monitoring (outsource):	40,000Bt	(JICA)	
- Media production:	20,000Bt	(JICA)	
- Yield survey(outsource):	30,000Bt	(JICA)	
- Total (approx.):	300,000Bt	*harvested rice is subject for cost sharing	

Implementing Schedule: *November 2012 to April 2013*

Fig. K-1 Pilot Activity for Paddy Cultivation, Khao Kaeo, CHAINAT



Note ; Soaking Date ; **18 Nov., 2012**, Growing Period ; 110 - 120 days, Plant Height ; 117 cm, Unit Yield ; 740 Kg/rai

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, excepting some Brown Spot Disease (BSD) found in Direct Seeding (DS) plots. - BSD was observed in all farmers' plots, which is severer in DS plots. - Narrow Spot Disease (NSD) was also found widely but not at the problematic level. - Some weeds including weedy rice, Kow Dee Kow Daen, were found in some farmers' DS plots. This was caused mainly by the inadequate land preparation, by which some particular places are exposed to air. - The way of parachuting is rough as compared to experimental plots of other two provinces. ➔ Parachuting is probably an appropriate term, rather, "darting" may better describe the proper way of throwing.
Jan. 2013	- NSD and BSD have been observed almost all the plots but not at problematic level. - In some farmers' plot, leafholder have been observed, which was severer in DS plots; it was suggested to apply bio-control agent (Tricoderma). - Brown Plant Hopper (BPH) has been observed especially in DS plots, probably because of preferable environment enriched by the densely planted paddy plants. - Weedy rice was observed in some farmers' plots, it was controlled manually in DS plot of K-3 farmer. - Rice Gall Midge (RGM) was observed in four of six farmers' plots. - Tillering was better in PC plot than TP plot, which may have been caused by two negative effects to transplanting method: 1) paddy plants easily get hurt, and 2) planting depth is deeper that may hinder the growth of paddy just after transplanting.
Feb. 2013	- In K-2 farmer's direct seeding plot, about 25/m2 BPH was observed at 8th. On the other hand, the number in the transplanting and parachuting field was lower, clearly. According to the situation, K-2 farmer used bio-control agent (Bauveria). - In K-5 farmer's direct seeding and parachuting plot, more than 30/m2 BPH was observed at 8$^{th.}$ But, in transplanting field, the average number is lower, 7/m2 of BPH was founded. Then, RRC recommended to use insecticide to the direct seeding and parachuting field. - Almost all plot, brown spot diseases and narrow spot disease were observed. Especially, the highest percentage of incidence and severity were in the direct seeding plot. For these plot, RRC recommended to use fungicide. - Direct seeding field of K-3 was harvested at 28th.
Mar. 2013	- Direct seeding field of K-1 was harvested at 1st. Direct seeding field of K-2 was harvested at 8th. Direct seeding field of K-6 was harvested at 10th. - Parachuting field of K-3, K-1, K-2, K-6 were harvested at 16th, 23rd, 26th, 23rd, respectively. - Transplanting field of K-3, K-1, K-2, K-6 were harvested at 11th, 15th, 26th, 15th, respectively.

*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)	- First time: Direct sowing, it starts from middle of November to middle of March. - Second time: Transplanting/Parachuting, It starts from middle of April (not later than May) to early of August.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- The root growing of the parachuting method was better than other method. - The weeding of the transplanting method was the easiest of the three. - Transplanting method could produce the good quality of seed than other method. - Due to a distance of the plant hill, agricultural chemicals could be effective in the parachuting and transplanting fields. - About the harvest, harvesting machine should be washed carefully to avoid the weedy rice expansion.
Replication and extension (role of stakeholder, cost share, etc.)	- The farmer should found the parachuting seedling supplier near the paddy field in order to reduce the transportation cost. - In the future, farmers want to establish skillful parachuting cultivation team for their main income. They already have a group and a plan for parachuting team and JICA study team could support to them to be skillful. DOAE also will support them about rice seed for community seed center establishment. The farmers have a community seed center plan with parachuting method.
Sustainability (incl. O&M, benefit during normal time)	- The community will establish community seed bank in the near future. The JICA project team support to have a study tour for the parachuting team. - That team should have a skill for good nursery making, good seedling transportation and good parachuting. - About parachuting method, the number of the seedling, should be used more than 130 trays (40 trays additionally). - In the past, farmers cultivate rice 5 times per 2 years. After the flood occurred often, farmers changed the rice cultivation 2 times a year.

PHOTOS

Manual direct seeding.
(Nov. 20, 2012)

Seedlings prepared for parachuting. Due to rough handling, some leaves have been damaged.
(Dec. 12, 2012)

For parachuting, seedlings are prepared in segregated holes of tray.
(Dec. 12, 2012)

In Khao Kaeo, seedlings were once put in a tub, which causes damages to the seedlings before parachuting.
(Dec. 12, 2012)

Comparison of growth between transplanting plot (left) and parachuting plot (right).
(Dec. 20, 2012)

Monitoring is being done every week. Here, number of seedlings (clumps) per square meter is counted.
(Dec. 4, 2012)

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-PADDY-2	Program	Paddy Cultivation Activities for Flood Adaptation
Title	Reduction of Paddy Production Cost	
Purpose	*Project*: Reduce the production cost of paddy by introducing biological method	
Location	T. Khao Kaeo, A. Sapphya, CN	
Beneficiaries	Paddy farmers (6 model farmers)	
Implementing Agency	Land Development Department (LDD), Rice Research Center (RRC), Tambon Administration Office (TAO),	

Background/Concept

If the investment cost to paddy cultivation is significantly big for a household, conceivable loss by flood would be also significant. It is the first option to consider avoiding the flooding period so that farmers can enjoy harvest before flood comes. Yet, it is not always the case that farmers can manage planting paddy on schedule due to lack of water at the planting season, lack of funding, or delay of previous cropping, for example. In such cases, minimizing the loss can be a second preferable measure to cope with flood.

Cost of paddy production is composed of land preparation, seeds, other inputs, harvesting and labors for maintenance. Reducing some of input cost can be a manageable subject through improved cultivation technique. By today, several biological methods have been developed by government agencies: "LDD bio-fertilizer (Por Dor)" a series of useful microorganism for making bio-fertilizer or bio-control agent commoditized by the Land Development Department (LDD) is a typical example. By applying such inexpensive biological substances, farmers can reduce the use of chemical agents. Moreover, by enriching good microorganisms in the soil, organic materials and minerals brought by flood can be smoothly decomposed into such structure that plants can absorb. As a result, paddy plants can be in a healthy condition strong against insects and diseases.

Expected Outcome

- Ecological environment in the paddy field is kept in good balance
- Appearance of insects and diseases is kept low
- Production cost of paddy is reduced

Component (Input/ Activities)

It is done as a subsidiary activity along with the AGRI-PADDY-2

1) Application of biological control agents (Podo, photosynthetic bacteria, and Beauveria)
2) Soil sampling survey
3) Technical assistances and monitoring by LDD
4) Yield survey and cost/benefit analysis
5) Preparation of leaflet for farmers' use

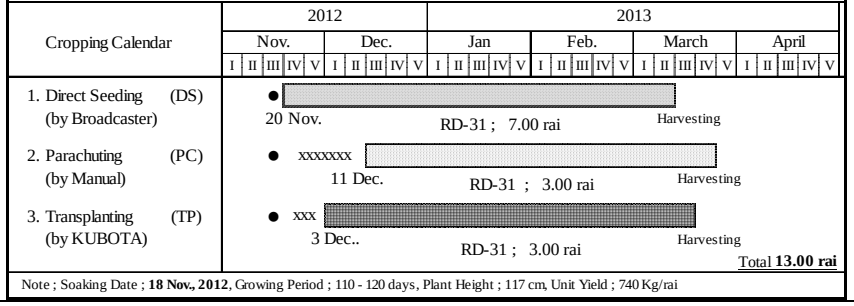
Related Program	Trials on transplanting methods of paddy	Code:	AGRI-PADDY1

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

- Biological agents and compost: 110,000Bt (JICA)
- Soil analysis 40,000Bt (JICA)
- Monitoring and tech. assistance: 40,000Bt (JICA)
- Media production: 10,000Bt (JICA)
- Total (approx.): 200,000Bt

Implementing Schedule: *November 2012 to April 2013*

Fig. K-1 Pilot Activity for Paddy Cultivation, Khao Kaeo, CHAINAT



Note ; Soaking Date ; **18 Nov., 2012**, Growing Period ; 110 - 120 days, Plant Height ; 117 cm, Unit Yield ; 740 Kg/rai

RESULT OF MONTHLY MONITORING

<table>
<tr><th>Term</th><th>Findings (Progress/ Problems/Other Issues)</th></tr>
<tr><td>Dec. 2012</td><td>
❖ For the monitoring of paddy cultivation, see the project sheet of AGRI-PADDY-1

Table: Application of bio-substances by plot
<table>
<tr><th colspan="2">Main Category</th><th colspan="4">Fertity Improvement</th><th>Insect Prevention</th></tr>
<tr><th colspan="2" rowspan="2">Plot</th><th>LDD2</th><th>LDD3</th><th>LDD12</th><th>Photo-Bacteria</th><th>LDD7</th></tr>
<tr><th>Bio-extract</th><th>Microbial activator</th><th>Bio-fertilizer</th><th>Organic matter synthesis</th><th>Insect repellant</th></tr>
<tr><td>K-1</td><td>13 rai</td><td>X</td><td>X</td><td>X</td><td></td><td>X</td></tr>
<tr><td>K-2</td><td>15 rai</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>K-3</td><td>13 rai</td><td>X</td><td>X</td><td>X</td><td></td><td>X</td></tr>
<tr><td>K-4</td><td>10 rai</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>K-5</td><td>18 rai</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>K-6</td><td>15 rai</td><td>X</td><td>X</td><td>X</td><td></td><td>X</td></tr>
</table>
-
</td></tr>
<tr><td>Jan. 2013</td><td>
- Those listed have been applied plot by plot based on the observation by LDD experts.
- K-2 and K-4 farmers applied bio-control agent, Beauveria, every week in Jan. Then put the case which made by bamboo with Beauveria in the field.
- Brown Plant Hopper (BPH) has been observed especially in DS plots, probably because of preferable environment enriched by the densely planted paddy plants.
</td></tr>
<tr><td>Feb. 2013</td><td>
- In the K-2 farmer's field, the huge amount of BPH was found. Thus the farmer applied bio-control agent and Po Do 7 at 8th.
- Po Do 7 was applied for K-4 field at 16th.
- According to the interview for farmers, the paddy filed soil was softer than previous at K-1, K-2, K-4 and K-6 field. They thought that it was an effect of the Po Do applying.
</td></tr>
<tr><td>Mar. 2013</td><td>
- Direct seeding field of K-1 was harvested at 1st. Direct seeding field of K-2 was harvested at 8th. Direct seeding field of K-6 was harvested at 10th.
- Parachuting field of K-3, K-1, K-2, and K-6 were harvested at 16th, 23rd, 26th, 23rd, respectively.
- Transplanting field of K-3, K-1, K-2, and K-6 were harvested at 11th, 15th, 26th, 15th, respectively.
</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)	- The farmer can reduce the cultivation cost due to apply the Po Do or Bio-control agent. However, at this moment, the labor cost is high. If the farmer apply Po Do or Bio-control agent without labor using, it is effective for cost reduction.
Timing of Implementation (Pre- , During , Post-Flood)	- The farmers can apply the Po Do or Bio-control agent for usual cultivation. -
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- In the direct seeding plot, it is acceptable for reduce the amount of seed (25-30kg par rai in usual, 20kg per rai for this trial) - Po Do can change the paddy soil to fertile soil. - Po Do not only can reduce the cost but can produce the low chemical rice. - Photosynthetic bacteria can make the fertile soil, also. - The farmers got the field monitoring method and control the agricultural chemicals. - In the field with Po Do application, it can reduce the chemical fertilizer. The amount of applying is 75% of recommended amount from RRC.
Replication and (role of extension stakeholder, cost share, etc.)	- The farmer group will start Beauveria making in this year. They use to make the Beauveria before the big flood coming. - The farmers need the seed of Beauveria, they will contact with Chainat bio-control center.
Sustainability (incl. O&M, benefit during normal time)	- The farmers want to use Po Do continually but it is difficult to get from LDD. - The farmers want to make and distribute the Po Do by them self in the future but they do not have knowledge to make it. - It takes long time to find the clear result for Po Do and photosynthetic bacteria. The farmers should use these things as long as possible. - The farmers got the field monitoring method - Monitoring methods are very useful for control agricultural applying. - Bio-control agent, Beauveria, could control insects in the transplanting and parachuting field, effectively.

PHOTOS

The case of Beauveria in the field. The Beauveria was keep in the case to prevent the sunlight, it will distribute with window flow. It should set 5 to 8 pieces per rai. (12. Mar, 2013)

Po Do 12 (left) and 3 (right)
(12. Dec, 2-12)

Po Do mixed with organic matter. After mixing, it keeps about 2weeks with plastic covered.
(12. Dec, 2012)

Plowing after Po Do applying.
(20. Dec, 2012)

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-SEED-PADDY3	Program	Paddy Cultivation Activities for Flood Adaptation
Title	Promotion of Service Provider of Parachuting	
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	Ban Nong Kung, Moo. 2, T. Khao Kaeo A.Sapphaya, Chainat Province (CN)	
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
- Service provider of parachuting are available in TambonKhaoKaeo
- Rice cultivation by parachuting method are used in T. KhaoKaeo

Component(Input/ Activities)

1) Identification of participants
2) Study tour to a paddy seed center in Chainat and Phichit
3) Parachuting training in Phichit
4) Demonstration day of Parachuting in Chainat

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)
- Parachuting training: 44,300Bt (JICA)
- Demonstration day of Parachuting
  Supporting of equipment for parachuting:
  - Tray 9,000Bt (JICA)
  - Soil grinder machine 12,000Bt (JICA)
  - Slant net 1,700Bt (JICA)
  - Rice seeder 6,200Bt (JICA)

Implementing Schedule: *November 2012 to June 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 inChainat (larger scale) and Phichit (smaller scale)
- Mar. 2013 Lesson learned workshop, preparation of media
- Apr. 2013 Final workshop
- May 2013 Parachuting training
- Jun 2013 Demonstration day of Parachuting

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 TambonGobchao and TambonSihanat-Ayutthaya province, TambonKhaoKaew-Chainat province, TambonNakorn 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 LueTha Chai - Community Seed Center, Chainat province and Ban BuengPra Du-Community Seed Center, Phichit province. ❖ Activities at Nang LueTha 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 BuengPra 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	- Paddy Lesson Learn Workshop at T. KhaoKaew • Management of Moo 2 Seed Bank • Exchange opinion • Summary of knowledge that farmer obtain from study tour
Apr. 2013	- Cooperated with Phitsanulok Rice Research Center for site selection and preparation for intensive training course for parachuting (pointing technique).
May 2013	- The intensive training course for parachuting (pointing technique) is organized on 9-10 May 2013 at SirinthornChaipattana Agricultural Development Project, Phichit province. This training consist of topics listed below; • Seedling preparation • Process of seed distribution by seeder • Soil grinder process • Advantage and disadvantage of parachuting method (pointing technique) • Correct method for parachute by pointing technique • Real practice in field - After this training, plan to set the demonstration day for rice cultivation by using parachuting method (pointing technique) with famer in Moo 2, Ban Nong Kung. - Meeting with KhaoKaeo farmer to consult and prepare equipment for parachuting demonstration
Jun. 2013	- Invitation the participant in each sector such as KhaoKaewTambon Administration Organization, Chainat Rice Research Center, farmer of KhaoKaew and nearby Tambom, school, Provincial Agricultural Extension Office and etc. - The demonstration day for rice cultivation by using parachuting method (pointing technique) is organized on 10 June 2013at M.2 Ban Nong Kung, T. Khao Kaeo, A. Sapphaya, Chainat

*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 - Make a new job in this Tambon (Service provider of parachuting)
Timing of Implementation (Pre-, During , Post-Flood)	- During rice - growing season
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- The farmers are used parachuting method in this season of rice cultivation and they also applied some technique that they know and learn from study tour. - They agreed that parachuting method can be reduced and controlled weed/weedy rice.
Replication and extension (role of stakeholder, cost share, etc.)	- After study tour on intensive parachuting method at Nang LueTha Chai Community Seed Center at Chainat province andBan Bueng Pa Du Community Seed Center at Phichit province, the farmers who join in this study tour are interested in this cultivation method and they would like to know how to do each step of parachuting method. - Farmer jointed the parachuting training on 9-10 May 2013 for study about process of parachuting method, and after that they are set the demonstration day for parachuting on 10 June 2013 and all of them decided to use parachuting method for rice cultivation in this season to reduce weedy rice and to produce good quality seed. - They created a new job in their Tambon (service provider of the parachuting)

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. - For this rice season, it has already cultivated by parachuting method - Creation of new job in their Tambon - 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 - Service provider of parachuting are available in TambonKhaoKaew - Rice cultivation by parachuting method are used in T. KhaoKaew

Study Tour
Nang LueTha Chai - Community Seed Center
Chainat Province

Study Tour
Ban BuengPra Du - Community Seed Center
Phichit Province

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






Parachuting Training
At SirinthornChaipattana Agricultural Development Project
T. Noen Ma Kok, A. Bang Moon Nak
Phichit province






Parachuting Demonstration Day
At Moo 2, Ban Nong Kung T. KhaoKaew, A. Sapphaya
Cyhainat province











PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-SEED	**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. Khao Kaeo, A. Sapphya, CN	
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
3) Detailed planning of activities and rules of using seeds
4) Installation of storage at common house designated by the group
5) Technical assistances by DOAE and Rice Research Center for seed production
6) Processing of paddy seeds
7) Preparation of demonstration media
8) Preparation of guideline

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)
-	Media production:	20,000Bt	(JICA)
-	Storage:	500,000Bt	(JICA)
-	Total (approx.):	550,000Bt	(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 Ayutthaya province.
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 current practice)	
Replication and extension (role of stakeholder, cost share, etc.)	
Sustainability (incl. O&M, benefit during normal time)	

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-01	Program	Crop Diversification and Food Security
Title	Aquaponics	
Purpose	Food production even during flood or inundated season under the condition of shortage of clean water	
Location	Moo 3 , T. KhaoKaeo, A.Sappaya, C. Chainat	
Beneficiaries	Kindergarten and primary school pupils in Moo 3 , T. KhaoKaeo, A.Sappaya, C. Chainat	
Implementing Agency	DOAE (Monitoring and Evaluation), Bio Porous Co., Ltd.(Aquaponics construction)	

Background/Concept

Aquaponics system is the combination of aquaculture of inland fishes and hydroponics of vegetables.
During flood, majority of inhabitants did not evacuate from their villages due to slow increase of water level. If the inundated water is under control of plan or seasonal phenomena, the inhabitants prefer to stay in village in order to protect their properties. But long periods inundated periods make difficult to produce vegetables. Another limitation are availability of clean water and lands. Aquaponics system becomes familiar to islands and isolated areas in the world due to above-mentioned limitations.
The operation of the system is easy after keeping balance of fish waste supply and plant nutritional demand. The flow of water is:
Fish tank – Waste break down tank –Pipe - Vegetable bed - Water tank – Pump - Fish tank.
Water is recycled. This point is very important during flood and inundated periods.

Expected Outcome

The villager can produce fish and vegetable during food/ inundated periods.

Component(Input/ Activities)

- Selection of the site near primary schools at higher land level
- Identification of operators
- Agreement with the representative of Tambon
- Construction of aquaponicssystem
- Monitoring in initial stage of operation
- Preparation of manual

Related Program, if any	Auaponics	**Code:**GC-AGRI-CRDV-1

Cost (w/ Source)

Materials for Aquaponics system:	240,000THB
Construction of aquaponics system :	210,000THB

Implementing Schedule

November 2012:	Study Tour to AquaponicsSystem at T. Ban Kluay, A.Sappaya, C. Chainat
Discussion with stakeholders and identification of construction site and responsible person	
December 2012:	Procurement of materials and commencement of construction
January 2013:	Completion of construction works, start of operation
March 2013:	Evaluation of operation of aquaponics system

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- For activity location, site selection was offered by Head of village and leader group of Khao kaeo Sub-District, the area in Moo 2 and Moo 3 were offered but didn't agreed because they were private land . - The area near kindergarten in Moo 3 was selected, public land and at the high area, Khao KaeoTAO issued the certificate land use. Before construction work started TAO prepared and cleared the land and also set up the committee to operate the system. - Procurement of materials and commencement of construction system, drawing lay out and quotation were prepared by Bio porous company. - Construction work started - JICA Expert went to visit and inspect the construction work
Jan. 2013	- At the early of the month, 90% of construction work finished. After civil work the contractor planned to reduce alkaline in fish pond and test the system balance. - Khao kaeo Aquapocics system committee was established there are 15 members and head of village is the chairman and selection fished and vegetables for the system is the first task of the committee. - At the end of the month, all works finished and JICA expert went to check the construction and the system work. Gutter, Leakage and some electricity work were asked for redone and repaired
Feb. 2013	- The committee wanted to dredge the swamp near the system in order to be the water resource of community and system and asked for supporting form JICA. - Dredging work started and supported by JICA - Mongo fish or Nile Tilapia were fed and a few vegetables were trial such as mint, Chinese cabbage, Chili and Morning Glory
Mar. 2013	- JICA expert checked the work and system flow (from fish pond to grow beds). - Work submission

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	The Community had spared food during food and in normal time Aquaponics production will be food for Kindergarten and Primary school
Timing of Implementation (Pre-, During , Post- Flood)	- Aquaponics can implement all the time although cultivation period. It's not take time to operate. - In fish culture pond needn't to change water just fill water if decreased and feed once a day. - At grow bed also needn't apply fertilizer because waste from feeding pellet can be nutrients for plant growing. Water after plant absorption will turn back to fish in better condition. This is the typically of no discharged of water in normal operation
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- The community can operate the system because it's easy to operate. They think that they will get income from fish production. - For vegetables, they will use their knowledge to apply for their community.
Replication and extension (role of stakeholder, cost share, etc.)	- At the Aquaponics system location, the committee wants to establish learning center. - Some farmer group from Nakhon Sa Wan came to visit and interest in Aquaponics's work.
Sustainability (incl. O&M, benefit during normal time)	The committee has set up the plan to operate and manage the system and TAO will support the remaining component such as fence and level the ground. Provincial Fisheries Office will support the fingerling. Besides the committee, nowadays villagers also participate in this activity.

PHOTOS

Growth of vegetables in the existing aquaponics system

High densisty of mango fish (a kind of Tilapia) in the existing aquaponics system

Aquaponics System (During Construction) 1

Aquaponics System (During Construction) 2

Monitoring the construction

Start of operation

PILOT PROJECT SHEET

Project Code	Sector	Networking, Supporting and Institution for Community Strengthening
NET-LPGIS-01	Program	Land Parcel GIS Database of Land Use and Ownership
Title	Establishment of Land Parcel GIS Database	
Purpose	To construct a land parcel GIS database at a Tambon level in order to facilitate an accurate and faster compensation payment system.	
Location	T. Kao Kaeo, A. Sapphaya, CN	
Beneficiaries	T. Kao Kaeo	
Implementing Agency	T. Khao Kaeo, OAE and Sub-contractor (ABS Prompt Co., Ltd)	

Background/Concept

Damage caused to the agriculture sector by the 2011 Flood was estimated to be as much as 72 million baht (OAE), and compensation for farmers consisted of 17,847 million baht for crops. Out of this total, 58% (10,560 million baht) was paid to one (1) million rice farmers. However, it was reported that payment of compensation was delayed due to a lengthy and time consuming process required to confirm the damage and actual identity of the cultivators and land owners. Some farmers received compensation without damage of paddy after harvest. Therefore, it is important for the government to be equipped with a tool which can facilitate faster and a more accurate evaluation of crop damage and complete the payment of compensation to the farmers.

To calculate the amount of compensation for farmers who are hit by a disaster such as the flood in the target area, we use the GIS application. For this application to work correctly, the most important factor is to have sufficient and up to date data, both in spatial and attribute data. The OAE (Office of Agricultural Economics) has implemented pilot projects for creating a land parcel database based on ortho-photo (adjustment or correction using images) in seven model areas to establish a database link with the Department of Agricultural Extension (DOAE)'s farmer registration data and to gain information on the planning of production or marketing for crops. This concepts hall be applied for this project, and uses data on land parcel with information stored in a land use database, which can be used for calculating amounts correctly for compensation payments.

Expected Outcome

- To identify necessary data sources and agency of data sources.
- To define the processfor establishing a land use database.
- To define data structure and portrayal of a land use database.

Component (Input/ Activities)

1) Data preparation : Data from several agencies have been collected such as Satellite images from Geo-Informatics and Space Technology Development Agency (Public Organization) (GISTDA), Cadastral map, Land Owner registration from Khao Kaeo Tambon Administration Organization (TAO) and Department of Lands (DOL) Chainat Provincial Land Office, Farmer registration from Department of Agricultural Extension (DOAE) Sapphaya Office, Land use classification from Office of Agricultural Economics (OAE).
2) Land parcel input : Cadastral map at scale 1:4000 have been digitized, farmer registration data from DOAE in hard copy format have been input to Excel file format.
3) Field investigation : The farmers of each village were informed for date of interview, they had come for interview, and the details of land use have been recorded in the form and farmer's photo also been captured.
4) Land Use Database creation : All Land use data have been linked with Land parcel data, some land parcels which have been used for many proposes such as the use of both farming and housing have been divided into two parts and so on. Land uses from the interview data have been verified with the satellite images, shapes of land use have been adjusted corresponding to land parcels and satellite images.

Related Program, if any		**Code**

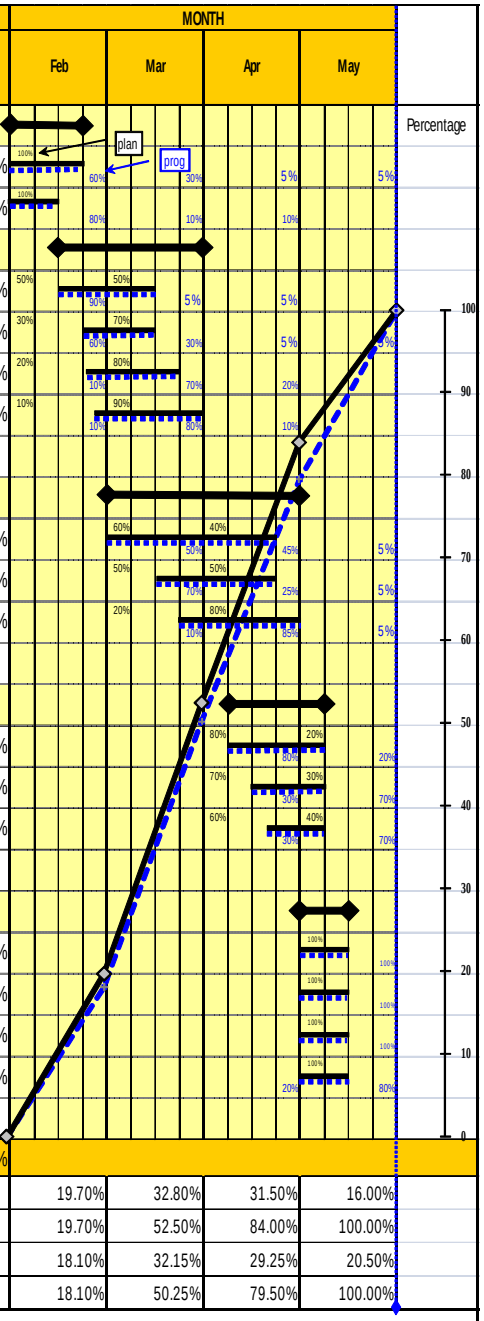
Cost (w/ Source)
1 million baht

Implementing Schedule
January to May 2013

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)

ACTIVITIES	% of Proj.	% Progress of this month	Accumulative Progress	
			% of Activity	% of Project
1. Data preparation	**14.0%**			
1.1 Collection of related data (Satellite images, Cadastral map, Title deed, etc	12.0%	0.6%	100.0%	12.00%
1.2 Design of data structure	2.0%	0.2%	100.0%	2.00%
2. Land parcel digitizing	**17.0%**			
2.1 Cadastral map digitizing	7.0%	0.4%	100.0%	7.00%
2.2 Adjust cadastral map according to title deed and satellite images	4.0%	0.2%	100.0%	4.00%
2.3 Registration data input	4.0%	0.8%	100.0%	4.00%
2.4 Plotting cadastral overlay on satellite images	2.0%	0.2%	100.0%	2.00%
3. Field investigation	**42.0%**			
3.1 Land use classification	20.0%	9.0%	100.0%	20.00%
3.2 Land's owner interview	17.0%	4.3%	100.0%	17.00%
3.3 Data input	5.0%	4.3%	100.0%	5.00%
4. GIS land use database	**15.0%**			
4.1 Data corrections	9.0%	7.2%	100.0%	9.00%
4.2 Plotting land use map (draft)	2.0%	0.6%	100.0%	2.00%
4.3 Quality verifications	4.0%	1.2%	100.0%	4.00%
5. Final maps and documentations	**12.0%**			
5.1 Land parcel maps	6.0%	0.0%	100.0%	6.00%
5.2 Land parcel database	2.0%	0.0%	100.0%	2.00%
5.3 Final report	2.0%	0.0%	100.0%	2.00%
5.4 Guideline	2.0%	0.4%	100.0%	2.00%
% of Project	100.0%			100.00%



% Work Plan	By Month	19.70%	32.80%	31.50%	16.00%
	Accumulative	19.70%	52.50%	84.00%	100.00%
% Actual Work Progress	By Month	18.10%	32.15%	29.25%	20.50%
	Accumulative	18.10%	50.25%	79.50%	100.00%

Progress .vs. Plan for GIS Land Parcel Database Project

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments

The boundary of Khoa Kaeo from the project overlay with the boundary from DOL's data and the FARMER's Interview data, we have got the data as following table.

Location	*No. of Land parcel*	*No. of Agricultural parcel*	*No. of farmer's interview*	*Farmer's data not completed*
Inside boundary	2,585	1,989	1,533	517
Outside boundary	-	-	238	

Table: Number of land parcel

The total number of farmer registration data from DOAE of Sapphaya District = 1829 parcels;

- 108 parcels, the farmers have not come for interview.
- 1,721 parcels, the farmers have come for interview.

The total farmers come for interview are 1,771 parcels (some of them are not in the list from DOAE);

- 1,533 parcels are inside the boundary.
- 238 parcels are outside (light green color in the following map).

For the area inside this boundary, there are 517 parcels; the farmer's data are not completed;

- Expected that some of them in the list of the farmers have not come for interview (108 parcels).
- The remaining 409 parcels, there is no farmer registration data, and 229 of 409 parcels are outside Tambon Khao Kaeo according to DOL's data.

Land parcels with owner's data shown in Light Green color.
The Orange color, there are no owner data.

The red boundary has been digitized according to DOL's data and FARMERS' interview data. For Land uses outside the boundary have been classified according to satellite images are shown in the following figure.

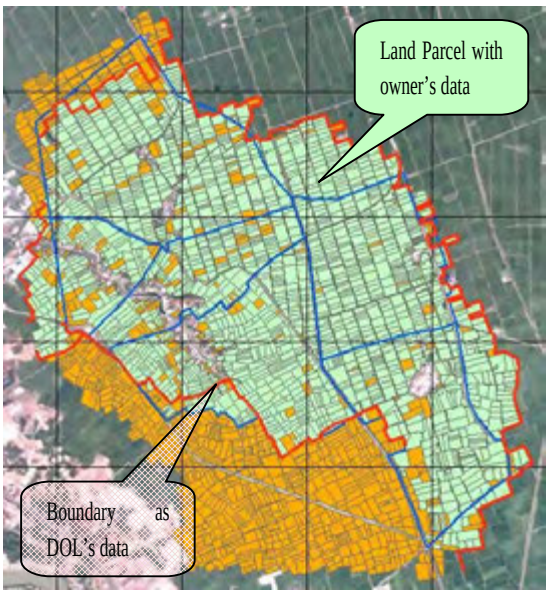


Figure: Land parcels and DOL's boundary

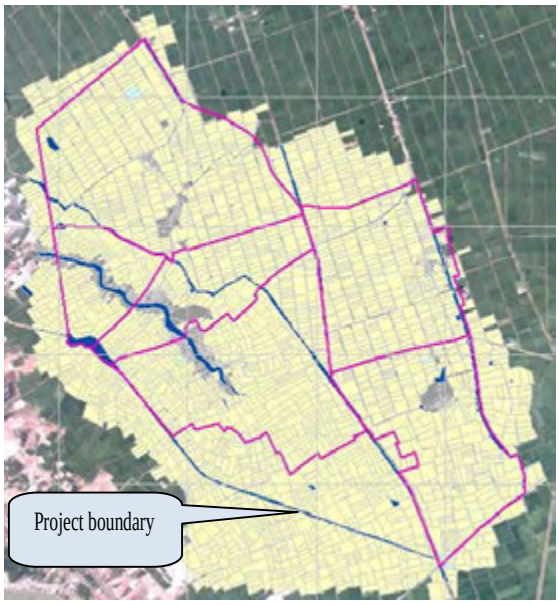
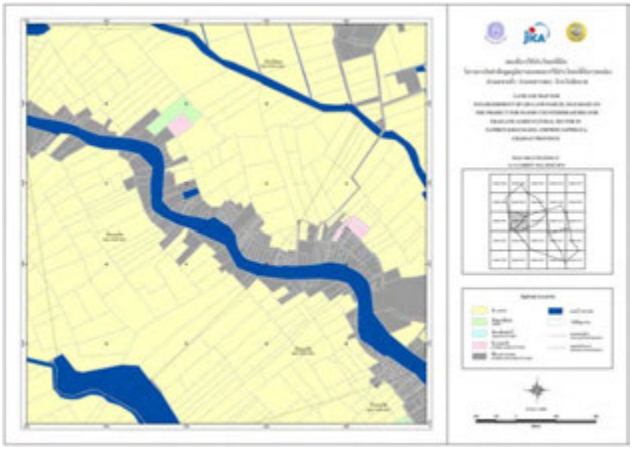


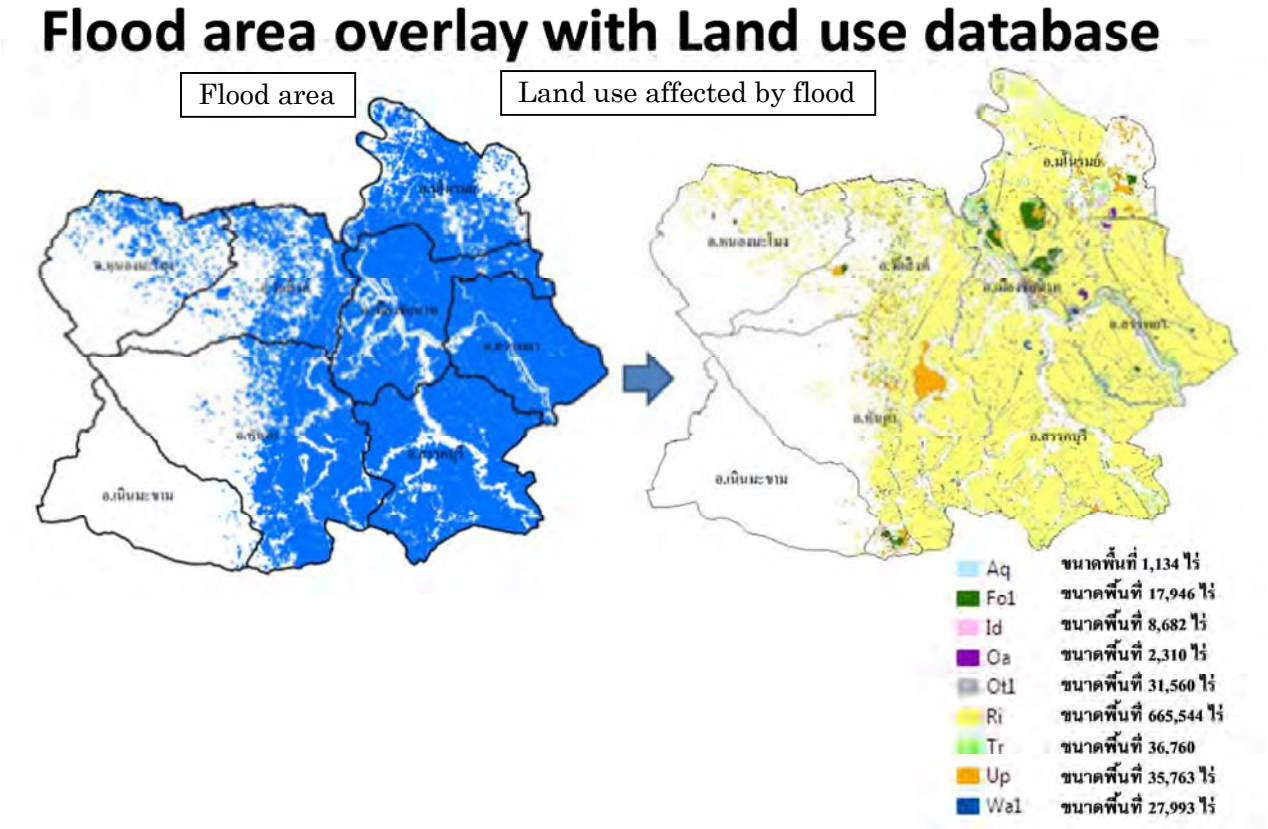
Figure: Land use and project's boundary

PHOTOS

Example of Land parcel map



Example of Land use map.



Tambon Disaster Resilient Plan of Khao Kaeo TAO

Vision: *"Khao Kaeo is the model area to live with flood, to be water retention area with strong community organization. People have secure occupation. Good rice seed variety is produced. Community tourism is promoted under environment protection and good natural resources".* The community maintain this vision after the project implementation.

Strategies

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

a) Promotion of chemical free rice production
b) Strengthen of production groups
c) Secure agricultural land for farmers
d) Develop and promote community tourism
e) Prepare disaster management plan
f) Network with other 6 Tambons on management of Tungchiangrak water retention area
g) Involve young people in agriculture
h) Improve infrastructure

The community follows these eight strategies for flood countermeasures.

Activities

Activities are grouped into four after implementation of pilot activities namely

1) Pilot activities (green)
2) Short term activities (orange)
3) Follow up activities from pilot project (old rose)
4) Long term activity (blue)

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

KK-4-2

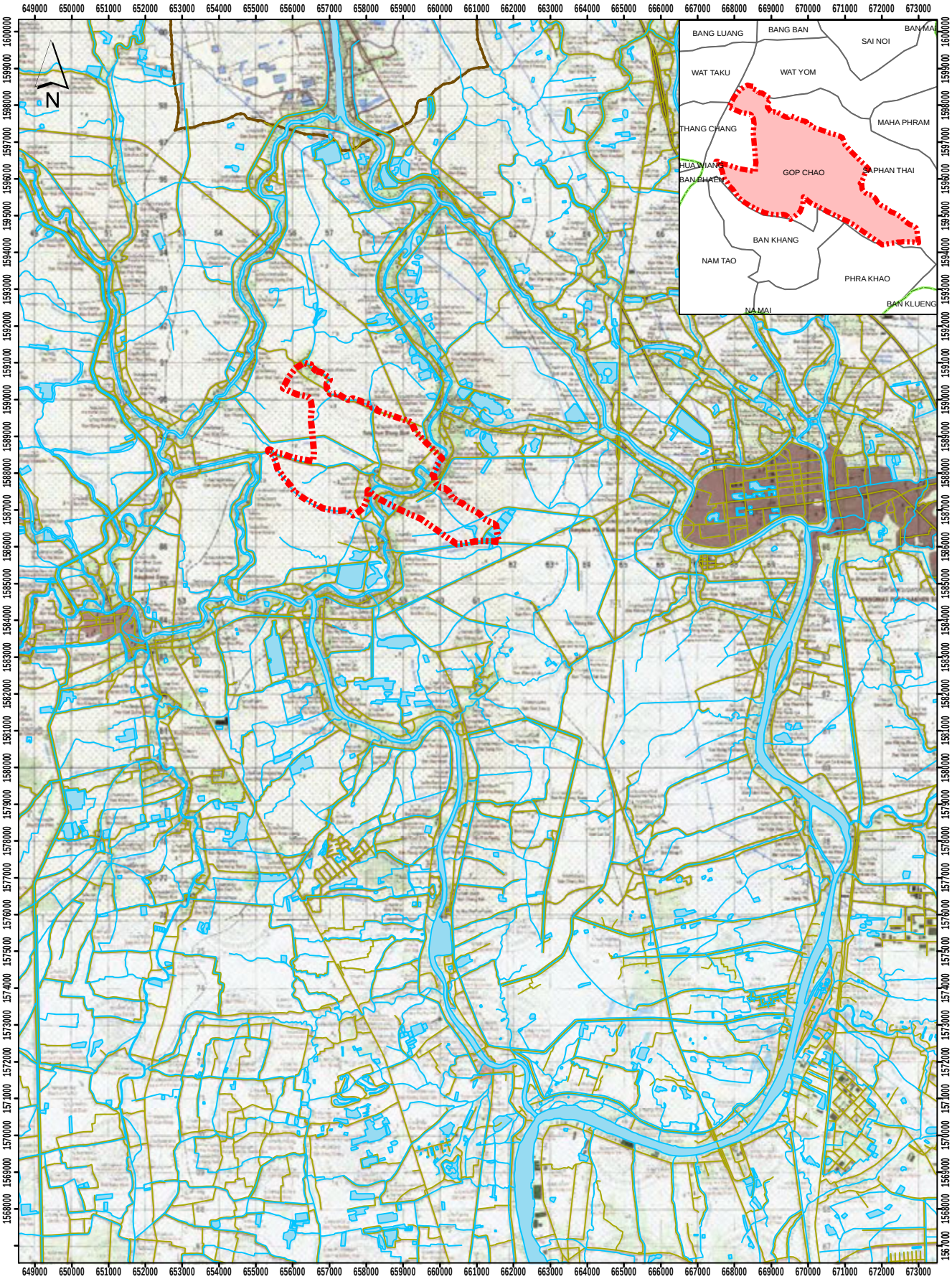
Khao Kaeo is the model area to live with flood, to be water retention area with strong community organizations. People have secure occupation. Good rice seed variety is produced. Community tourism is promoted under environment protection and good natural resources

Community Case Study

Tambon Gop Chao, Bang Ban District

Ayutthaya Province

Content



Legend

- Provincial Boundary
- Tambon Gop Chao
- Water body
- River
- Road

Note

Data Source:
Tambon Boundary of Gop Chao: 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 Gop Chao, Amphoe Bang Ban, Ayuttaya Province

PRA Report for
Tambon Gop Chao, Amphoe Bang Ban, Nakhon Si Ayutthaya Province

1. Socio-economic Situation in Tambon Gop Chao

Map 1 : Community Map

Tambon Gop Chao is located in the low alluvial flats of the Chao Phraya river. The area has also a delta character because there's the accumulation of soil residue, sediment and remains of organic substances and forms a vase flat plain area. The area was domesticated into farm land with neither mountain nor forest.

Tambon Gop Chaoextends over a land area of approximately 6,731 Rai which is subdivided into 9 villages (Muban). The northern border is connected to Tambon Mahabrama, Amphoe Bang Ban, Ayudthaya. The southern border is connected to Tambon Mahabrama, Amphoe Bang Ban, Ayudthaya. The eastern border is close to Tambon Nam Tao, Amphoe Bang Ban, Ayudthaya, and The west border is connected to TambonBan Klang and Phra Kao, Amphoe Bang Ban, Ayudthaya. There are two road routes for the main community and transportation. There are 4 main canals which people use for household consumption and for agricultural purposes namely:

1. Khlong Bang Ban (Noi River)
2. Khlong Manorha
3. The 5thDistributor canal (Irrigated canals)

The housing character

Since the geographical character of Tambon Gop Chao is flat and considered to be natural monkey cheek, it is normal to have the area flooded in the raining season from the history. For that reason the housing character significantly has an elevated first floor (the Thai traditional central style) to suit the condition of flood. The average height of the floor is at 3 meters. Grouping of the house is due to closeness of family members along the river line and near their agricultural water source. There are a few houses that are contemporary style without the elevated floor

Housing character

2. Socio-Economic Characteristic

Population

The population number of Tambon Gop Chao is 2,620 which make 743 Household. The most populated villages is Moo.2 Ban Kae; 506 (19.31%) people, Moo.3 ban Tai Wat 401; (15.3%) people, and Moo.1 Ban Kwang; 356 (13.58%) people consecutively. The least populated village is Moo 6 Ban Moo Yai. 111 (4.23%) people.

The population in Tambon Gop Chao consists of 1. Native people who are mostly farmer 2. the new comers. Residential characters of the people are either permanently resident in Tambon Gop Chao or temporary come in and rent apartments which mainly describe people who are employees in the industrial sectors, small size factory, or employed in the farm. Main occupation of people in Tambon Gop Chao is employment of all sectors that marks 55.18%, secondly paddy farmers 24.52% and thirdly animal farming 0.82%.

Occupation	Household	Percentage
Employee	405	55.18
Animal Farming	6	0.82
Merchandising	35	4.77
Paddy farming	180	24.52
Government Officer	108	14.71
Total	734	100

Vulnerable group

The following number of people classified as vulnerable would be support financially by TAO due to the government policy.

Elderly	Disabled	HIV Infected	Financially challenge Family
459	57	-	70

Income

The income source of Tambon Gop Chao is classified into 4 major parts being; 1.agricultural products 2. Wage and salary of the household members (both registered and non-registered in the labor system) 3. Private merchandising 4. Public welfare (divides from fund groups, government welfare, elderly allowance).

Occupations in Tambon Gop Chao are majorly employee of all sectors, following by farmers. By considering the number industrial park near to Tambon Gop Chao which are Rojana and Bang Pa In industrial park,and the fact that the transportation to and from the work place is supportive, a high number of employment of such manner can be estimated.

In addition to the employment sector, there are as many as 10 small size bricks factories as a local business in the area especially in Moo 3 Ban Tai Wat. There are said to be around 10 employees for each factory, are mainly from north-eastern part of Thailand and some are alien employee. As it is easy to find the main material for the production such as clay and rice husk and people have skilled know-how of brick production, the business become significant. The revenue of this business is calculated per lot of production which is around 6-80,000 Baht per truck. The cost of production is at 80% of the revenue. However, there's a remarkable drop of order due to the 2011 flood in the central area which is their usual market.

Fig: Brick factory

Straw binding is also a part time business for housewife. It is to make straw chuck out of the remains of straw and hey from the farming and sell it to ceramic factories to make a buffer. But this makes it significant because straw binding makes a lot of income to the household at around 200 Baht per day.

Fig: Straw binding

Household expense

The average household expense of people in Tambon Gop Chao is 25,421 Baht/household/year (Living standard survey), The household expense of people in Tambon Gop Chao is caused by their production cost, children education, and extravagant goods such as mobile phones, motorcycles and electronic devices, in the consecutive order.

Debt

Tambon Gop Chao's debt situation regarding agricultural household is caused by the cost of production and to by production input equipment and tools, followed by extravagant cost (mobile phone, motorcycle). Most people get loan from Bank of agriculture and agricultural cooperative, followed by commercial bank and loan outside the banking system consecutively. The government's one million one village project also provided villagers with loan that help people of the particular village with any expense in the household. People outside the agricultural sectors usually get quick loan from outside the banking system either from their relative without the interest (borrowing inside the family) or from the local capitalist with high interest.

Saving

Important saving source of Tambon Gop Chao people are the Bank of agricultural and agricultural cooperative for famers and commercial bank for non-farmer members. They can also deposit their saving the any social group such as rice farmer group, that they are the member to.

Labor

Tambon Gop Chao is located close to the industrial zone. Resident who age ever 15 year old and finish compulsory education would tend to move to the capital cities and downtown rather than continuing their family's farming business.

1. Labors in small industry, factories, business and construction sites or agricultural business. There are cases that workers who work for small operations or work in a day-by-day basis would not be registered in the government data base and cannot be tracked for the existence. The workers in such work character are usually migrants from the north-eastern part of Thailand or Burmese.

2. Labors in big industry, factories in the nearby industrial park. As such work place is more systematic in payment and welfares, labors in such work places are registered in the government data base system therefore their existence can be tracked, therefore the Burmese in this sectors would be

formally registered. And as the bigger industries require more advanced knowledge, it is more likely that workers from central Thai would be employed.

As Tambon Gop Chao is more urbanized and easy to commute to the nearby work place, Tambon Gop Chao resident whose work place is in Bangkok or downtown Patumthani can stay in Tambon Gop Chao and commute to the work place, but those from the north-east and the alien worker would rent cheap apartment as stated earlier.

Tambon Administration Organisation.

Tambon Gop Chao Administration Organizationcurrently holds the following number of manpower and budget.

Table 3: The number of TAO's executive and officers

TAO Council Board	Amount	Executive board TAO	Amount
1. Chairman of TAO council board	1	Chairman of TAO Executive board	1
2. Vice Chairman of TAO council board	1	Vice Chairman of the TAO	2
3. Secretary of council members	1	Secretary of the TAO	1
4. TAO council members	16	Chief Administrator of the TAO	1
		Administrator of the TAO	8
		Finance Division	5
		Public Works Division	1
		Civil Defense Volunteers	150
		Civil boy scout	20
		Health Volunteer	90
		Woman Group	

Table 4: Budget, Number of TAO's project from the 3 years development plan from 2011-2013

Strategy	2011 Budget		2012 Budget		2013 Budget		Total 3 year	
	No. Project	Amount (Baht)	No. Project	Amount (Baht)	No. Project	Amount (Baht)	No. Project	Amount (Baht)
1. Promotion of the development of Public Utility.	11	2,267,000	38	18,166,690	41	60,965,000	90	81,398,690
2.Promotion of Good living standard and social welfare	40	14,465,000	42	5,921250	43	22,235,000	125	42,621,250
3. Promotion of good living environment	10	590,000	13	2,740,000	11	740,000	34	4,070,000
4.Promotion of public health service	12	615,000	12	615,000	12	615,000	36	1,845,000
5.Promotion of Development of local economy	8	370,000	10	1,050,000	8	370,000	26	1,790,000
6. Promotion of good governance	17	3,020,000	17	3,020,000	18	4,620,000	52	10,660,000
Total	98	21,327,000	132	31,512,940	133	89,545,000	363	142,384,940

Education

Tambon Gop Chao's Education Institutes consist of 2 primary schools namely Wat Pho (Moo.2) and Wat Mai Moo.7 The proportion of teacher per student is 1:20, Room : Student is 1:25

Table 5:Number of students.

School	Moo	Number of Students			Number of Teachers		
		Male	Female	Total	Male	Female	Total
Wat Pho	2	23	24	47	2	3	5
Wat Mai	7	49	69	165	5	12	15
Total		72	93	165	5	10	20

More people in Tambon Gop Chao tend to support their children's education until high school. It's favorable for people to attend vocational school and attain vocational certificate or high technical certificate.

Health Situation

Health stations in Tambon Gop Chao are located at Moo3 and 1. In addition there are 9 health service sub-stations. The condition which people receive medication from the Health Stations the most are respiratory disease, blood circulation related disease consecutively. And the chronicle patients who receive monthly medical prescription are those with diabetes and high blood. The health station receives assistance (20 members) from the health volunteer from each village who always keep records of chronicle, immobilized and patience. Health officers and Health volunteers have to be prepared during the flood period to patrol around houses according to their set up schedule. Their mission was done without major problem but lack of equipment such as sphygmomanometer.

Relationship of people in Tambon Gop Chao

Tambon Gop Chao people are agricultural based society. As a characteristic, they're deeply connected to nature. Almost all of the residents are Buddhists therefore the Buddhist rituals people have in common are; rite of passage involving ceremonies of birth, death, ordain; ceremonies related to nature such as the praying of the river and forest. People pay very much respect to community leaders and very socially-oriented. There's full participation in the time of crisis, or other important public activities.

Land Use

People in Tambon Gop Chao are mostly farmers, as the result, the location of the house are close by the water for agricultural purposes. It can be concluded that most of the land use is for paddy farming as shown in the following table.

Table 6: Land Use in Tambon Gop Chao

Total Land	Paddy Land	Horticulture	Factory	Government Place	Water Source	Others
6,731 Rai	6,147 Rai	75Rai	22Rai	86Rai	129Rai	272Rai

Source: Land Development Department Office

Land Right

Land use in Tambon Gop Chao is mainly paddy farmland but categorized into two type 1.the rice farming business owned by the legal owner 2. The paddy farm land was rented from the owner. As many Tambon Gop Chao people own a piece of land but do other business as far as being employed in the city. From the PRA it is estimated 20% for the farmers to own their land and 80% for the farmers who rent their farm land.

Civil Defense Volunteers and One Tambon One Security team(OTOS)

In Tambon Gop Chao, there are altogether 20 Civil Defense Volunteer who are responsible for making sure of public peace that can varies from traffic work, security work emergency call and many others. Working together with the EMS (Emergency Medical service) the team can provide immediate medical care for urgent cases. For the team service, people can contact the team members or TAO officers for further coordination to the Health Station or bigger hospital.

Social Group

The enterprise groups are for example; artificial flower from lotus fiber, camphor product, salted eggs, Thai sweet. Their product is internally consumed. There are occasions that they promote their products in important events but still not largely consumed by people from outside because of the lack of mass production materials.

The rice farmer group in Tambon Gop Chao was established to promote organic farming and strengthening of farmers' member. These are 48 members and the revolving fund of 10,000 baht. The group's main activities are 1. Fund raising to grant loan for member 2.Sell cheap seed for members3. Produce seeds to rotate within the group for next production 4. Promote organic farming by producing Beauvaria and Trichoderma (Fungus treatment for pest insect) for the member to use free of charge.

The profit made from the group is mainly use for operation cost, but they're considering buying themselves a small milling machine.




Communication System

For communication system, Tambon Gop Chao's information was distributed by the head of the villages to their residents, and authorities make use of the broadcasting tower situated in every village. The towers were not in their best condition, which more or less affect the effectiveness of the community's communication.

Electricity

There was no problem concerning electricity in Tambon Gop Chao even in normalcy or flood, every household can get the access to electricity.

Water work

Water for consumption in Tambon Gop Chao is to systemize ground water (wells) into filtered quality and distribute among each villages in Tambon Gop Chao. The water quality was fair for drinking and people usually filter rain water and buy bottled water for consumption.

2. Agriculture Situation in Tambon Gop Chao

Geographic and agricultural character

Tambon Gop Chao has total area of 7,975 Rai. Most area is flat basin. Land registering for agriculturalis 6,222Rai. Water resources for agricultural use are from rainfall and irrigation canals. Generally, farmers bring water into agricultural plots by pumping machine. Most farmers grow rice both types i.e., wet season rice and dry season rice.

Fig. 1 – 3 Cropping and livestock

Table 1 Agricultural area of Tambon Gop Chao

No.	Area	Number (rai)
1.	Dry seasonrice	5,818
2.	Wet seasonrice	329
3.	Other areas	75
Total		**6,222**

Source: Agriculture Office Bang Ban district (2554 BE)

Report from Agriculture Office Bang Ban district, General profile and information of agricultural at Tambon level Year 2554/2555, total agricultural land of 6,222 Rai are categorized to land use as follows (Table 1);

: Dry Season rice : total area: 5,818Rai.
: Wet Season rice : total area: 329Rai.
: And other areas, such as vegetables and animals : total area: 75 Rai

Contribution of Agricultural land use

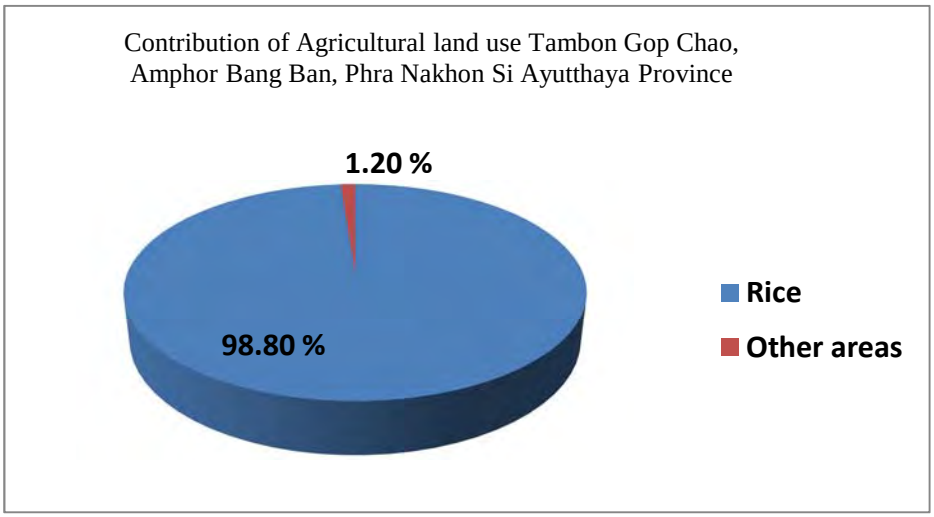


Fig. 4 Contribution of Agricultural land useof Tambon Gop Chao

Land registering for agricultural use at Tambon Gop Chao has total area of 6,222 Rai. Rice is significant economic crops. Table 1 and Figure 4 Showed Contribution of Agricultural land use for wet season rice (Na Prang) is 5,818 Raior 93.50% of total agricultural area. Dry season rice (Na Pee) is 329 Raior 5.30 % . Other areas of 75 Raiare for growing vegetables, raising animals, representing 1.20%. General view of Tambon Gop Chao is a traditional farming community. There is continuation of the agricultural farming as inherited, generation to generation.

Table 2 Land damaged by flooding at Tambon Gop Chao

Moo	Farmer	Rice (Rai)	Agronomycrop (Rai)	Orchard and others (Rai)	Assistance in cash (Bath)
1		185.00	-	40.75	618,813.50
2		668.50	-	24.25	1,609,033.50
3		10.00	-	24.50	147,121.00
4		14.00	-	22.25	144,538.50
5		12.75	-	12.50	92,055.50
6		8.00	-	12.50	81,501.00
7		190.00	-	12.75	487,179.50
8		150.75	-	13.50	403,789.50
9		70.25	-	12.50	219,820.50
Total	**180**	**1,309.25**	**-**	**175.50**	**3,803,852.50**

Table 2 shows agricultural land which was damaged by flood. 180 farmers have been affected. Total damaged area is 1,484.75 Rai., categorized as follows; rice production area is 1,309.25 Rai contribute to 79.20 %, horticulture area and others(Mango, Banana, Sweet corn, Bitter gourd, Chili Eggplant, Sweet basil, and Basil etc.) is 175.5 Rai. Subsidy and support by government is estimated as 55 % of investment cost per Rai per year in 2554 BE. This subsidy is paid 100 % of actual damage area as follows:

- Rice growing area subsidy for 2,222 Bht per Rai
- Agronomycrop area subsidy for3,150 Bht per Rai
- Orchard and others subsidy for 5,098 Bht per Rai

Total amount which government aid to farmers at Tambon Gop Chao, in cash is 3,803,852.50 baht.

Learning Center of Farmers at Tambon Gop Chao

There are places of learning centers located in Tambon Gop Chao., i.e., Agriculture Technology Transfer Center of Tambon Gop Chao.

Fig. 5 – 6 Community Rice Center at Tambon Gop Chao

Results from interviewing for the agricultural district of Bang Ban district, Community Rice Centers at Tambon Gop Chao, farmers require to produce dry Beauveria by their own but still lack of funding. The advantage of using dry Beauveria is the rapid preventing method to control pest outbreak. While fresh Beuvaria is a time-consuming process. If produce fresh, once the outbreak occur, there is still on process to obtain Beuvaria, this can cause damage to rice readily.

Supporting Organization

Gla Dee Project is supported by King Phumiphol. The donation is seedling stocks and seeds i.e., eggplant, chili etc. Department of Livestock, Ministry of Agriculture donate rice straw for cattle feed and vaccines.Department of Livestock Development to support rice and cattle vaccines.

Table 3 Crop Calendar

Crop season/ type	Varieties	Month												Product (Kg/rai)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Raining period						X	X	X	X	X	X			
Flooding period										X	X	X	X	
Drought period					X	X								
Wet SeasonRice	RD31, RD41													700
Dry SeasonRice	PSL 2,RD 31,RD41,RD 47,51	1st Paddy												800
		2nd Paddy												
Coconut	Local varieties													
Mango	Keow Sawoey													
Bitter gourd	Chinese Bitter Goued													4,000
Sweet Corn	Lady Sweet													1,000
Banana	Hom thong													1,000 comb

Table 3 Shown the cropping annual plan in the agricultural area at Tambon Gob Chao. Farmers grow Dry Season Rice (Na Pee) during May to January of the consecutive year. Rice varieties are RD 31 and RD 41, average yield is 70 Tang/Rai. Wet season rice will be 2 rounds in one year i.e., first round starts from January to April and second round starts from May to August using varieties PSL 2,RD 31,RD41,RD 47and 51according that the phenotypes of these varieties are dwarf not sensitive to water level and average yields are 80 Tang/Rai.

Perennial crop such as coconut and mango are not main economics crop. Farmer grows for household consumption. If surplus produce, farmer will sale at local market. Bitter gourds are planted during January to March. Variety is Chinese bitter gourd with average yield 4,000 Kg/Rai.

Sweet Corn are planted 2 rounds, first round begins on January to April, while second round begins from May to August. Variety is lady sweet with average yield 1,000 Kg/Rai. Banana are planted during January to September variety is Hom Thong, average yield is 1,000 comb/Rai, however, base on agricultural practice individually

Table 4 Trend analysis of Crop/Livestock Farming

Type of Commodities	History	Present	Future
1. Wet Season Rice	Kaw Pijit, and Pin Gaew 56	PSL2, RD31,RD 41, RD47 and 51	Certified seeds Flood-resistant rice varieties
2. Dry Season Rice	PSL 2	RD29, RD41 and RD 47	RD29,RD41 and RD 47
3.Vegetables		Bitter gourd and Sweet Corn	
4. Orchardand Perennial plant	Coconut and Mango	Coconut, Mango and Banana	
5. Livestock	chicken, duck, pig and cattle	Chicken, Duck and Cattle	

Table 4 Shown present and future trend of Tambon Gop Chao, farmers prefer growing rice and vegetables. According that vegetable is a short season crop, therefore, farmer can easily plan for production at farm and harvesting as well as reduce risk from flood damage. Orchardand Perennial plant are not suitable for trade according to the long life cycle as well as higher risk to confront flood crisis. Livestock i.e., cattle for feeding cattle and for meat while chicken and duck are farmed for household consumption as well as trade to market.

Table 5 Production cost of Rice /Rai

No.	Items	Value (Bht)
1.	Land lease	1,000
2.	Soil preparation	550
3.	Rice seed including broadcastin	660
4.	Chemical fertilizer including application	1,380
5.	Pesticide including application	1,480
6.	Fuel	600
7.	Harvesting including transportation	600
Total production cost		**6,270**
Yields (Tang/Rai)		90
Income in average (Bht)		11,700
Net income (Bht/Rai)		**5,430**

Table 5 Shown that production cost of rice in average per Rai is 6,270 Bht. Average yield is 90 Tang/Rai. When calculate and deduct investment cost, farmers will receive net income ca. 5,430 Bht/Rai. Depends on rice quality.

Table 6 Production cost of Banana /Rai

No.	Items	Value (Bht)
1.	Plant shoots	4,000
2.	Pit	2,000
3.	Chemical fertilizer including application	4,000
4.	Pesticide including application	200
5.	Poles	2,000
6.	Wage	2,400
Total production cost		**14,600**
Yields (bananas/Rai)		1,000
Income in average (Bht)		20,000
Net income (Bht/Rai)		**5,400**

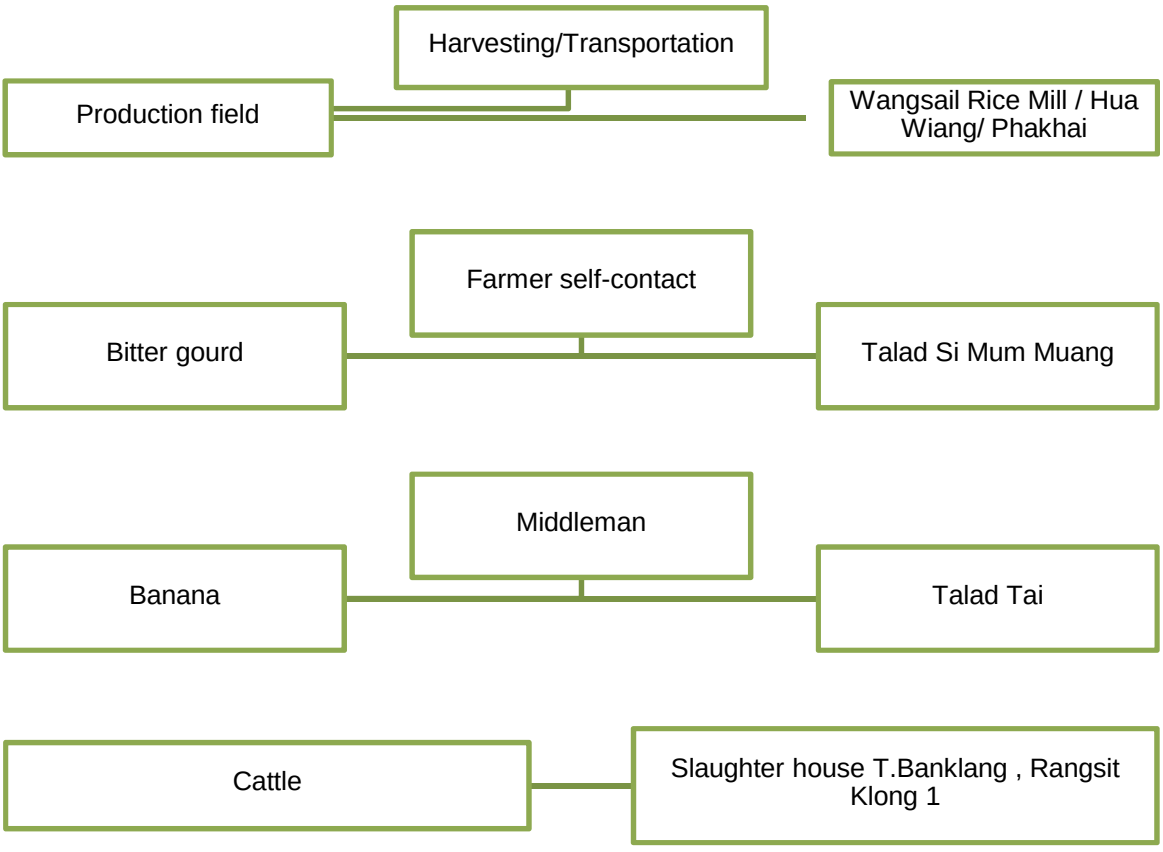
Table 6 Shown that production cost of banana in average per Rai is 14,600Bht. Farmers will receive net income 5,400Bht/Rai. However, price is varied depends on market price and harvesting season.

Table 7 Production cost of Bitter gourd/Rai

No.	Items	Value (Bht)
1.	Bitter gourd seed	500
2.	The ground equipment (rope, wood, mesh)	5,000
3.	Chemical fertilizer including application	3,200
4.	Pesticide including application	4,000
5.	Wage	3,000
6.	Harvesting including transportation	1,500
Total production cost		**17,200**
Yields (kg/Rai)		4,000
Income in average (Bht)		20,000
Net income (Bht/Rai)		**2,800**

Table 7 Shown that production cost of Bitter gourd in average per Rai is 17,200Bht. average yield 4000 Kg/Rai. Farmers will receive net income 2,800Bht/Rai. However, price is varied depends on market price and harvesting season.

Transportation and Market



Farmers who feed cattle Moo 3 has objective for feeding cattle and for meat. Total cattle is 30.

Constraints

- Over use of chemical fertilizers
- High production costs
- Brown plant hopper outbreaks

3. Water management in Tambon Gop Chao

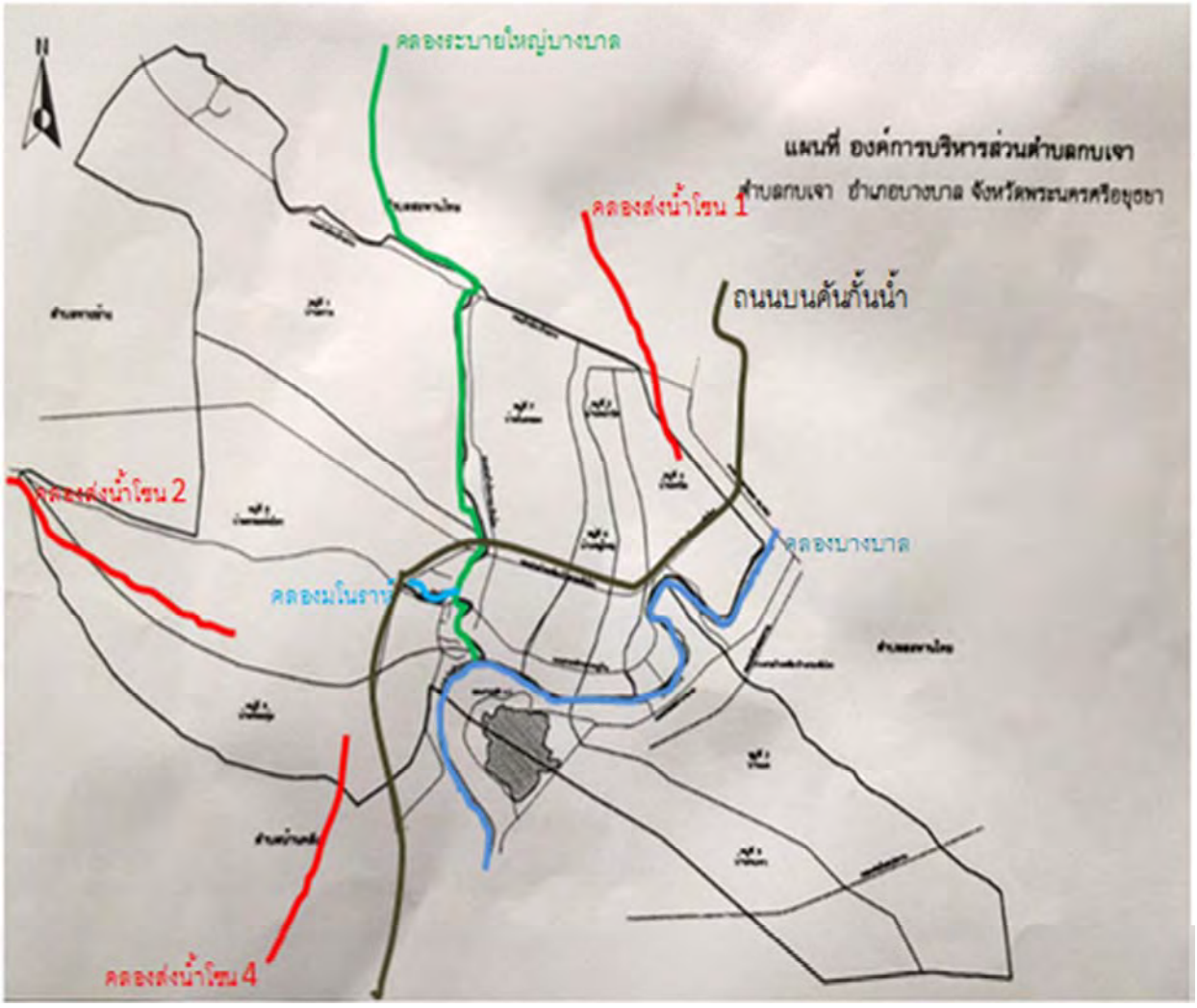


Fig. Water resources in Tambon Gop Chao

Major water resources

Surfaced water resources in Tambon Gop Chao can be divided into two sources as followings. 1.Natural water resource comes from two sources which are Khlong Bang Ban and Khlong Manor 2. Watercourse comes from irrigation cannel and borrow pit

Water management for agriculture

Irrigated area

Irrigated water in Tambon Gop Chao is pumped from pumping station No. 1, 2 and 4. Pumping station No.1which is located in the north of Tambon Gop Chao while pumping station No. 2 pumps water into the canal running from the west to the east of Tambon Gop Chao and it is terminated around TAO office. Water from pumping station No. 4 runs from the north to the south and is terminated at the southern part of Tambon Gop Chao. Water, pumped from those pumping stations, is pumped into borrow pit before farmers pump it to their paddy field. To pump water into their paddy field, each farmer has to pay 100 baht for electricity fee to Bang Ban O&M Irrigation Project.

Besides the water from pumping stations, farmers can also use water from Bang Ban drainage canal running from the north down to the south to the middle of Tambon Gop Chao.

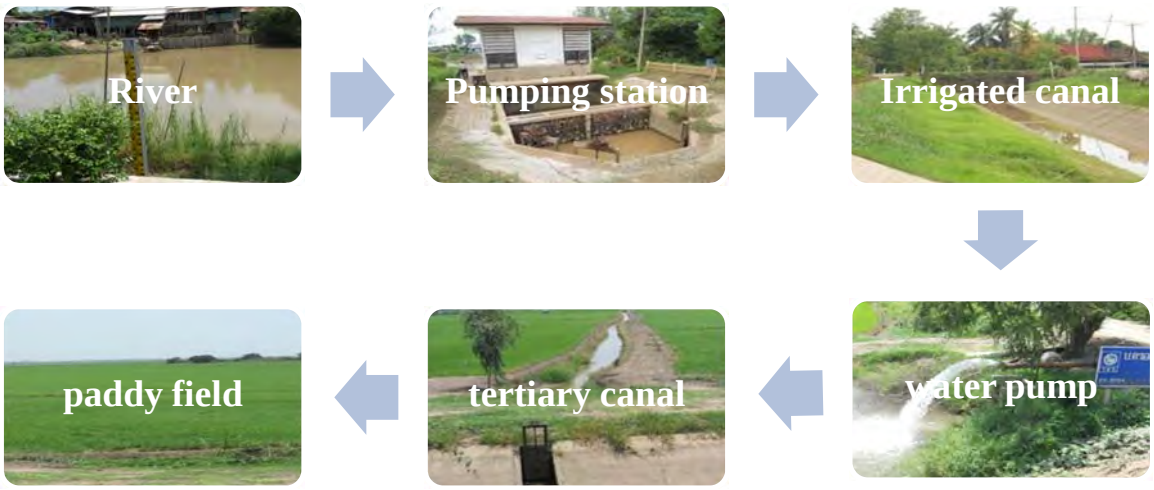


Fig: Water distribution system from the river to rice field

Drainage System

Water from drainage in paddy field is percolated down to borrow pit and then runs to 2 adjoining drainage canals namely Khlong Bang Ban running from the north down to the south and Khlong Mahona running from the west to the east of the Tambon before it meets at the Khlong Bang Ban (Noi river) drainage canal which is located at the south of Tambon Gop Chao TAO office and then flows down to Noi river.

Non-irrigated area

People's residential area is in the non-irrigated land and scattered along the Khlong Bang Ban tributary. There are almost 200 rais of paddy filed in this area that use water pumping from Khlong Bang Ban, a natural water resource of Tambon Gop Chao. By this way, farmers do not have to pay for electricity to get water into their paddy field.

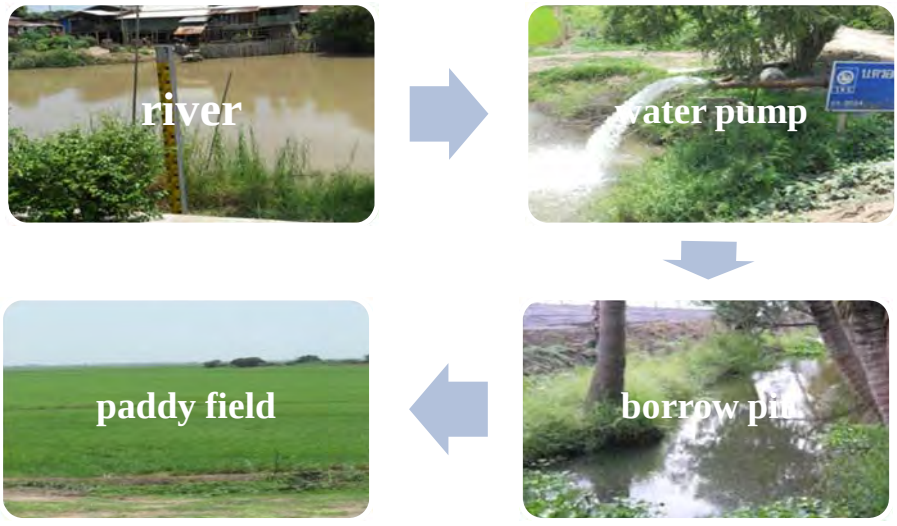


Fig: The diversion system in non-irrigated land

Water for consumption

Village tap water facility: 8 places in which are in Moo 1,2,3,4,5,6,7,9
Water tank: 8 places which are in Muban 1,2,3,4,5,6,7,9

Fig: Village tap water

Fig: Water tank

General flood situation

General flood situation in Tambon Gop Chao is normally started after harvesting season. In Tambon Gop Chao, cropping pattern for paddy is usually start the 1st crop from December to April or May and the 2nd crop starts from May to August or September. Then, after harvesting of the 2nd crop, the land is usually flooded at a depth of 3 meters from paddy field. This is considered a general situation for people in this community. Some people who can't stay in their houses will move to stay at a prepared shelter on village's dike road closed to their houses. So that means the flood could not reach to the dike roads and it can still be in use. As for livestock farmers, they move their cattle, poultry, and herd of pigs to the dike and stock food and other necessary items to cope with the situation as usual.

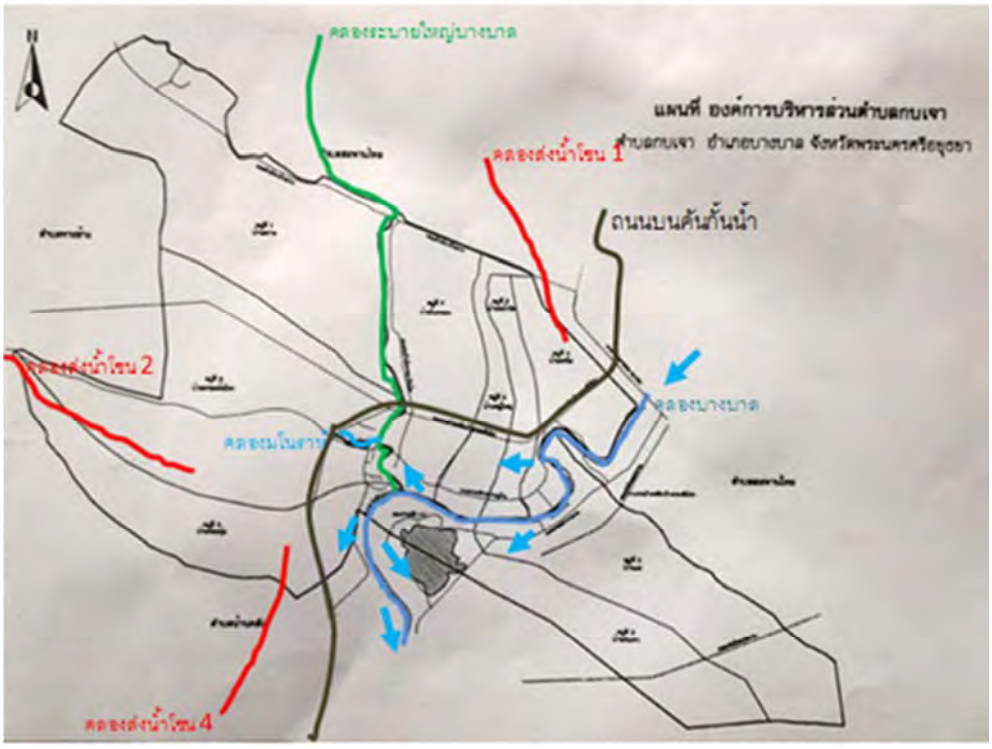


Fig: Direction of the flood

Direction of water flow

Flood situation in 2011

Because Tambon Gop Chao is a natural monkey cheek area where the whole area is always flooded, people are familiar with living condition surrounded by flood. The area of Tambon Gop Chao can be divided into two zones; 1. Irrigated area which composes of Muban no. 1 , 4 , 5 , 6 , 7 , 8 , 9 and 2. Non-irrigated area, closed to Khlong Bang Ban, which composes of Moo 2, 3and some part of Muban no. 4 , 5 , 6 , 7 , 8 , 9. Housing character in these two zones isa Thai styled house with a long-leg underneath.

On 25 August 2011, water level in Khlong Bang Ban was continuously rising up until the river was in flood and flew into Moo 7, 8. At that time, flood water was not so high that people had to flee their house. Flood water had not reached the second floor of the houses and water and electricity supply was still in use. However, flood water level was gradually increased until the beginning of August that the total area was covered with flood water. During that time people were warned to keep their belongings on high shelters. Thus, some houses had to build up another floor layer to live on or move their things up there.

Yet, flood level kept increasing every day until some houses were forced to flee to evacuation shelter on the village's dike. At that time, only a dike road in front Tambon Gop Chao TAO office that was still dried and was used for evacuation center for people. From the effect of rising level of flood water, people who lived along the river started to angrily protest Bang Ban O&M Irrigation Project to open water gate to percolate some part of flood water into paddy field in irrigated area but they denied opening it until harvesting of paddy was carried out. At that time, Director of Bang Ban O&M Irrigation Project had to come himself to negotiate with people in non-irrigated area for extending time of opening the water gate for another 7 days, or around 20 August 2011, to save people's production in irrigated area. Unfortunately, there was only a little change in flood level. Flood had stayed until beginning of January in 2012 before it was completely dried up.

Fig: Flood damaged area

Flood response

Tambon Gop Chao people are very familiar with the flooding livelihood. As the raining season that usually cause flood is at around September to October, the flood occurs annually during the season at 1-2 meters height. From the PRA, the 2011 flood was the same as usual but the higher, which was 3-4 meters

As the housing character of Tambon Gop Chao is elevated floor, the flood may cause inconvenience and irritants but doesn't make it a serious problem. These are the pattern of practice in the usual flood situation in Tambon Gop Chao. TAO broadcasts the news of the coming flood through the

broadcasting tower. TAO coordinates with Civil Defense volunteer to patrol for safety and provide help such as distribution of survival bags, assistant for evacuation. TAO would rent a big tent for people to evacuate.

Tambon Gop Chao people wouldn't leave the house during the flood. People would build up extra level of the house to stall their belonging out of the water. Those who can't bear the water situation would come out to the pedestrian part of the road nearest to the house and stay in a tent. Apart from the tent, people use temporary material such as bamboo and plastic mat. A few people stay at TAO. People rely on the donation items and catch fishes from the flood water especially the drinking water. Therefore there's no provided drinking water free of charge.

The health volunteer would be responsible for the health of the household in their care. It is reported that disease from fungus infection, athlete foot, and stress are major problem found during the period. The health volunteer would coordinate with hospital and health station for the medicine. For critical patients with diabetes and high blood pressure and need continuous medication, health volunteers would have to make sure the patience receive their monthly medicine, in order to do that the health volunteer would utilize boats to transport the medicine to the patients.

Flood Damage

Financial Compensation for flood victims is a strategy used for aiding people suffering from loss and damage of their assets. For those who are affected by severe flooding in year 2011, they can receive financial compensation earmarked for the post-flood rehabilitation budget at the cost of their actual damage certified by community leaders or photographs. However, an unclear of estimation cost for compensated damage or differentiation of practice in each Tambon causes delay and unacceptable cost for damage compensation people could receive. Thus, this issue has become a long dispute with government officials in many regions.

The following details will show number of loss or damaged houses, assets divided into 4 categories which are owned house, rent house, lightening instrument, working equipment, and total compensation cost. However, this information may be changed based on the result of appeal for revised compensation.

The table shows that there are totally 1215 household requested for the compensation and Moo 6 has the highest number of houses and compensation, following by Moo 10 and the least is Moo 2.

Muban	Number of reported damage households	Amount of compensation proposed by Amphoe.	Compensation admitted by Committee				
			House damaged	Rent	Lights	Working equipment	Total
1	119	774,300	368,200	-	-	28,300	396,500
2	74	685,200	150,500	-	-	15,000	165,500
3	103	760,700	418,300	-	-	33,000	451,300
4	113	731,240	407,400	-	-	37,800	445,200
5	76	539,800	233,800	-	-	22,000	255,800
6	161	1,363,330	525,800	-	-	-	525,800
7	101	609,800	394,200	-	-	-	394,200
8	120	816,100	190,300	-	-	34,500	224,800
9	101	717,100	352,500	-	-	35,500	388,000
10	156	1,154,600	458,800	-	-	11,700	473,500
11	91	785,600	251,500	-	-	-	251,500
Total	1215	8,937,170	3,751,300	-	-	217,800	3,972,100

Fig: Recurrence damage of dike road along Bang Ban (Noi river)

Monkey Cheek Project

Thung Bang Ban is a large delta area surrounded two major rivers namely Chao Phraya and Noi. It covers the total area of 170,000 rais in Amphoe Bangban, Sena, Bangsai, Bang Pa-In, Phranakorn Sri-Phra Nakhon Si Ayutthaya, Phra Nakhon Si Ayutthaya province including with some part of Amphoe Pa-Mok in Angthong province.

In this total area of Thung Bang Ban, the monkey cheek project was built and separated into 2 parts which are Bang Ban Monkey Cheek project 1 and 2. Tambon Gop Chao is one of Tambon in Bang Ban Monkey Cheek project 1 which has capacity to reserve flood water of 160 ml3.at the depth of 3 meter high. Following details are acknowledgement of people about Monkey Cheek project and their concerns.

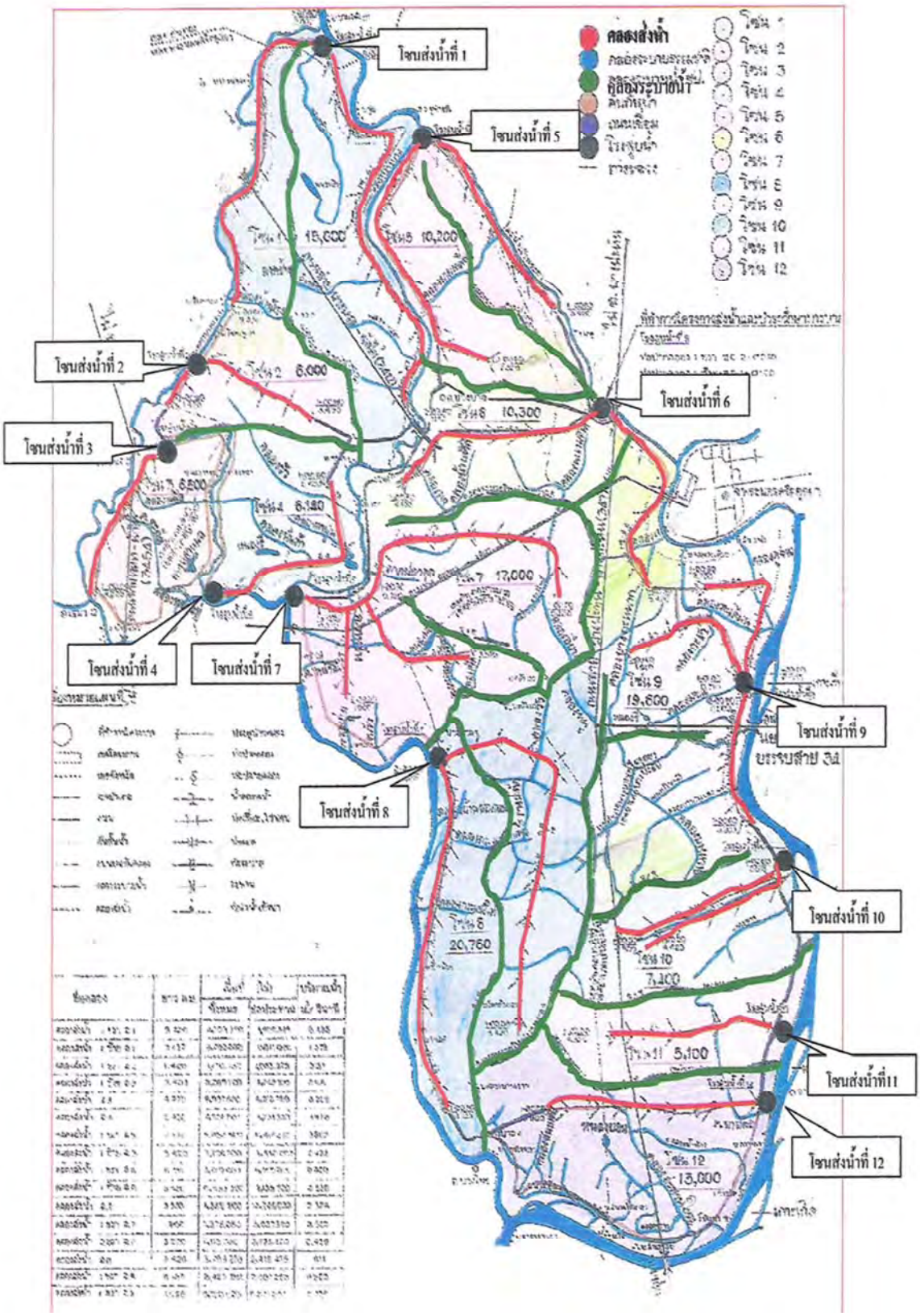


Fig: Boundary of Bang Ban O&M Project

Acknowledgement of people toward Bang Ban Monkey Cheek Project 1

Bang Ban Monkey Cheek Project1 is covered area of 10 Tambon in total namely 1.Namtao2. Thang-Chang3. Wat Ta-ko4.Bang Luang5.Wat Yom6. Bang Ban7. Bang Luang Doad8. Bang Cha-nee 9. Bang Huk10. Saphan Thai11. Tambon Gop Chao12. Ban Klung

People who live in Monkey Cheek area will receive 5,000 baht per rai/ time financial compensation for damage of their paddy (for not yet harvesting paddy field). Note that, duration of water reservation will be official announced by concerned government agency. People who live in Monkey Cheek area will receive 600 baht per rai / time financial compensation for damage of their land (for paddy field that is already harvested). Note that, duration of water reservation will be official announced by concerned government agency. Farmers will get support from rice pledging scheme for 2 times in a row each year.

People acknowledged that construction of percolated canal has been started since 2006 from Khlong Phong-Pheng, Amphoe Pa-Mok, Angthong province cut into Thung Bang Ban; Tambon Namtao and Tambon Ban Kwang respectively. (at 100 meters width of percolated canal and expanding size of drainage from 1x1 to 2x2 meters)

After construction of Monkey Cheek Project is completed, people will be benefit from the project as followings 1. The project will help decelerating of flooding flow down to the southern area which will improve drainage capacity of its watercourse. 2. Level of flood water around the residential area along Khlong Bang, non-irrigated area, will be reduced.

Concerns about Monkey Cheek Project from the community

If duration of flood reservation in Monkey Cheek is longer than what it has been announced, damage of paddy production will be larger than offered compensation from government resulting in loss of income to all farmers.

It is mandated that people have to receive right to information and access of information. The information should be clear, accurate, transparent, and disclosure. Whenever the information is changed, people have to be able to access to disclosed information, and open opportunity for people's widely participation.

Duration of flood reservation in Monkey Cheek must not be prolonged. Government should not put all burdens to people in this area to be responsible for its capacity in water management. If water reservation in Monkey Cheek area is prolonged, this can be directly effect to farmers' cropping pattern, production and income.

If the project happened, people are aware that road dike in the area will be regularly damaged by flood erosion. This will affect to budget on infrastructure restoration funded by government or concerned organizations. Quality of water reserved in Monkey Cheek area for a long duration can be deteriorated from decaying organism composition if water stay still. So, construction of water circulating system should be highly considered.

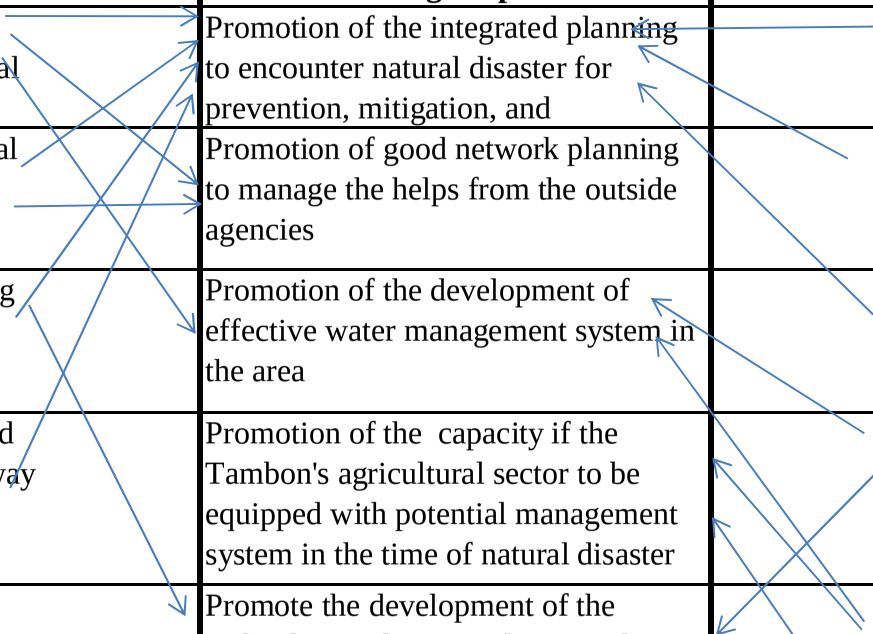
2. SWOT Analysis

Strength		Weakness		Opportunity		Threat	
TAO also acts as the assemble point of civil defense volunteers is the point of contact for external help	**Several governmental places can provide dry space.**	The network of information route is ineffectively systemized.	**The communication system regarding the public warning system is ineffective.**	Budget allowance from TAO to implement various projects	**Kob Jao receives funding and necessity from various external organizations.**	Demand of the rent of tent from the area outside KobJao resulting the lack of tent during flood	**Limitation of procurement of objects for flood mitigation**
There are many dry place such as school and temple.		There's no wired speakers		Budget allowance from the central government for the rehabilitation of flood		Lack of mobile toilet	
Community people have the ability to adapt to the flood situation.	**Tambon's people have the potential to live with flood situation.**	Lack of motor boat for public use	**The systemized management regarding transportation is inadequate during the flood.**	Rice price guarantee scheme from central government		Supply of clean water from outside was shut, resulting lack of drinking water	
There's a some extra income from snake catching even though not much.		The system of transportation was ineffectively arranged.		Aid from many private sectors for any necessities needed during flood.		Main transpiration route was shut, resulting	
Community people live in good harmony.	**Kob Jao is full of potential people.**	Lack of extra income during flood.	**Lack of income during flood**	1 village 1 Million bath loan scheme from central government that helps rehabilitation of flood.		Lack of repair budget of the broadcasting tower	**Limitation of budget to implement various projects**
Community people respect and follow the lead of the community leaders		There's no source of income generation during flood.		KobJao is well-known by the flood-this brings recognition of help to the area.		Limitation of budget from RID	
People can produce vegetable for their own consumption during flood.		There's no marketing network during and shortly after flood		The woman empowerment funds		The fluctuation of the water height is unexpectable.	**The flooding season each year is beyond expectation.**
Civil defense volunteers took turn to patrol at night during the flood	**There are potential volunteers in the Tambon**	A number brick business are shut down and move away.		Ayuthaya vocational college hold a workshop for basic boat and mobile toilet construction.	**Kob Jao receives technological transfer from the external organization.**	The period of flood can't be precisely expecting-usually too fast	
Health volunteers are eager to assist community people.		There's no water purification technology that owns by Tambon Kob Jao	**Lack of food management system.**	JICA hold a food processing workshop for flood rehabilitation to promote income generation		The factories in the industrial estate were unable to operate.	**Factors that affect the decrease of income**
Health sectors had an offensive strategy to deal with health issue during flood		Community people can't not stock food.			**More dry land can be expected from the government's floodway scheme**	The market demand of local brick product was reduced	
The leaders had the potential to lead under disaster situation.	**The community has strong leaders**	Water for consumption isn't clean enough.		Fish can be caught and sold to make some extra income during the flood	**New jobs were founded during flood.**	The middle man of brick business lower the price of bricks of the producer.	
Community leaders have external connection that can bring help.		TAO has no tent provided	**There's no systemized plan to protect, mitigate and rehabilitate flood.**	Family with boat can generate income by doing boat taxi		Lack of production input during flood	
TAO can provide transportation service.		There are not enough mobile toilet				Raise of the expense of the livestock feed	
TAO can provide repair service		There's no systematic measure to deal with sanitation				Contamination of weed seed in the rice seed production-resulting low quality of rice seed	
There's a pattern system of boat hiring and help distribution.	**The community has support from government and private sectors.**	There's no measure that deals with still water					**Increase risk of health deterioration**
The main road through the Tambon was partly dry.	**Although not much, there's some area that is dry for transportation.**	Community people are incapable of basic mechanic repair					**Water level information from RID is usually imprecise.**
Cars can still be used in shallow water.		There's no waste management system during and after flood.					
Rice farmer group.	**There are establishment of agricultural groups.**		**Tambon's farmers lack of knowledge of production applicable in flood period.**				
Organic farming group.			**Tambon's farmers lack of the knowledge of post-harvest management and vale adding of the product.**				
Seed production group		Rice seed can not be kept for the next season.	**Tambon's farmers have no systematic measure that decrease the agricultural effect of flood.**				
Thai sweet (Kanom Kong)	**There are enterprise groups that promote extra income generation of Tambon people.**	The establishment of agricultural groups are not strongly formed					
salted eggs		There's a scarce of animal feed					
Thai candy (kayasard)			**There are no systemized water management for household consumption during flood.**				
Flower and handicraft group							
Hay binding							
	There are sources of product input naturally founded in the area						

GC-2-1

Strategic Option Table for Tambon Kob Jao

Opportunity	Strategic Option	Threat
1 Kob Jao receives funding and necessity from various external organizations	Promotion of the integrated planning to encounter natural disaster for prevention, mitigation, and	1 Limitation of procurement of objects for flood mitigation
2 Kob Jao receives technological transfer from the external organization	Promotion of good network planning to manage the helps from the outside agencies	2 Limitation of budget to implement various projects
3 New jobs were founded during flood.	Promotion of the development of effective water management system in the area	3 Increase risk of health deterioration
4 More dry land can be expected from the government's floodway scheme	Promotion of the capacity if the Tambon's agricultural sector to be equipped with potential management system in the time of natural disaster	4 Flooding results several factors that affect the decrease of income
	Promote the development of the technologies that contributes to the value-adding of local material	5 The flooding season each year is beyond expectation
		6 Water level information from RID is usually imprecise.



3. Strategic Plan, T. Gop Chao

<Selected Pilot Activities>

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	Remarks
					JICA	Thai			
1.Promotion of the integrated planning to deal with natural disaster for prevention, mitigation, and rehabilitation	Kob Jao is geographically at risk of flood every flooding season around October therefore having a disaster management plan would very much systemize the disaster management throughoutly and effectively. The plan would fulfill the existing activities to near perfection and introduce new activates that still inadequate for the completed disaster management plan.	1.1 Disaster Management Planning Project Examples of the activates - Effective maintenance of the name lists of supporters for past flooding events - Establishment water management center - Procurement of water management and measurement system technologies -Additional training for the survival volunteer teams (civil defense volunteer, health volunteer) - Procurement of equipment needed to deal with flood, eg tent motor boats etc., - Establish a food management system for natural disaster period - Development of a broadcasting system to effectively broadcast warning or news throughoutly - Repairmen and development of a dike to prevent the farmland from flooding in Moo4 - Promotion of a clean drinking water that can be consumed during the flood and in normalcy - Form a natural disaster mitigation fund in community level -Training for many community sectors to be self-reliance and to assist others in the time of the natural disaster	RID, water user groups, line department, community volunteer, community leaders,TAO Key person: water user groups Mr. Surin Wingwin 082 2383845 Health Volunteer Ms Samorn Kongjingda Civil Defense Volunteers Mr.Krittiyos TAO Chief : Mr. Pum Kaosamlee	ASAP (First community meeting will be confirmed next week)	Assist Disaster Management Activities including training workshop and study tour Financial support for tents, boats, water purifier equipment, and other necessaries	Joint Budget 1.1facilities eg tents boats 1.2 broadcasting systems equipment 1.3 water purifier equipment	1.1 confirmation of the project from community people 1.2 implementers from the community 1.3working schedule 1.4 Budget and funding details	1.1Confirmation of the project details from the Jap expert	
2. Promotion of the capacity of the Tambon's agricultural sector to be equipped with potential management system in the time of natural disaster	Promotion of the project that can mitigate the negative impacts of the flood is essential because the area is annually flooded and the foundation of the income source in the area is from rice cultivation.	2.1 Project to strengthen the capacity of the existing technological transfer center and set up the experimental plantation. Examples of detailed activates - Development of good plantation seed of the community - Training for the organic farming -Introduction of the new cultivation technologies -Training for good counter measures to deal with the damage of flood	Local Agricultural agencies Key Person: Mr.Banjade Rampeungchit 0874110119 Local agricultural officer Mr. Pipat Chanta 0815712953	ASAP (First community meeting will be confirmed next week)	Assist Disaster Management Activities including training workshop and study tour	To be discussed	1.1 confirmation of the project from community people 1.2 implementers from the community 1.3 Working schedule 1.4 Budget and funding details	1.1Confirmation of the project details from the Jap expert	
3. Promotion of the development of the technologies that contributes to the value-adding of local material	Kob Jao has a diversity of local material that can be the important source of extra income generation. Once the establishment is strengthen, this can be taken to further mitigate the impact of the natural disaster in terms of income.	3.1 Project to strengthen the existing vocational learning center and the setting up of local product display center. -Trainings for food processing, handicraft etc. -Marketing activity training	TAO, villages chiefs, enterprise group Key Person: Kesinee Kongchareon 085 8128768	ASAP (First community meeting will be confirmed next week)	Assist Disaster Management Activities including training workshop and study tour	To be discussed	1.1 confirmation of the project from community people 1.2 implementers from the community 1.3working schedule 1.4 Budget and funding details	1.1Confirmation of the project details from the Jap expert	

4. Pilot Project Sheets

Tambon Gop Chao, Bang Ban District, Ayutthaya Province

Sector	Model Area / Program	Pra Nakorn Si Ayutthaya Province (AT)	
		T.Gop Chao (GC), A.Bang Ban	Project Code Number
Community-based Disaster Risk Management Against Big Flood (CDRM)	Community Flood Disaster Management Plan (CDRMP)	(1) Community-based Disaster Risk Management Plan	GC-CDRM-CDRMP-1
	Drinking Water Supply during Flood Period (DWS)	(1) Drinking Water Supply system	GC-CDRM-DWS-1
	Evacuation/ Rescue Center and Equipment (EVC)	(1) Improvement of Communication System	GC-CDRM-EVC-1
Community Water Resources Management (WRM)	Preparation of Flood Hazard Map (HZDM)	(1) Preparation of Flood Hazard Map	GC-WRM-HZDMP-1
	Participatory Flood Monitoring/ Information Management (PFIM)	(1) Participatory Flood Monitoring	GC-WRM-PFIM-1
Flood Damage Reduction in Agriculture and Livestock Sector (AGRI)	Paddy Cultivation Activities for Flood Adaptation(PADDY)	(1) Trials on Rice Transplanting Methods (2) Reduction of Production Cost	GC-AGRI-PADDY-1 GC-AGRI-PADDY-2
	Good Paddy Seed Production/ Seed Bank (SEED)	(1) Good Paddy Seed Production/ Community Seed Bank	GC-AGRI-SEED-1
	Crop Diversification and Food Security (CRDV)	(1) Safe Vegetable Promotion (2) Floating vegetable Cultivation	GC-AGRI-CRDV-1 GC-AGRI-CRDV-2
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)	GC-iEN-FISH-1
	Income Generation utilizing Local Resources (IGLR)	(1) Improvement of Fish and shrimp Processing (2) Application of Processed Water Hyacinth	GC-iGEN-IGLR-1 GC-iGEN-IGLR-2

PILOT PROJECT SHEET

Project Code	Sector	Community-based Disaster Risk Management Against Big Flood
CDRM-CDRMP-1	Program	Community Flood Disaster Risk Management Plan (CDRMP)
Title	Community Flood Disaster Risk Management Plan	
Purpose	To improve/ develop community disaster risk management plan with the participation of the community people	
Location	T. Gopchao, A. Bang Ban, Ayutthaya Province	
Beneficiaries	Community people	
Implementing Agency	Committee for the Community-based Flood Disaster Risk Management, which is to be set-up during the pilot project, with the support of TAO and Provincial Department of Disaster Prevention and Mitigation (DDPM).	

Background/Concept

It was understood through the PRA survey conducted at the early stage of the project and other opportunities for communication with the affected people that impact/damage by the flood disaster in the community was severed due to the lack of appropriate disaster risk management plan/method, such as communication line, evaluation plan, supply system of necessities. Accordingly, the pilot project to develop the Flood Disaster Risk Management Plan was identified and selected by the community people during the planning stage of the pilot projects. As the tambon is located in the natural monkey cheek area and affected by the flood disaster regularly, development and implementation of the disaster risk management plan is considered important to mitigate the impacts of the disaster. The JICA project supports the development of the plan as well as implementation of some of activities to be conducted based on the plan during the project period.

The pilot project will be implemented with the support from JICA/DDPM 'Project on Capacity Development in Disaster Management in Thailand (Phase II)' and Provincial DDPM. DDPM's guideline for Community-Based Disaster Risk Management will be utilized for making the Flood Disaster Risk Management Plan. However, the plan will focus on the flood disaster and impacts on the community will be addressed more comprehensively.

Expected Outcome

- Development of Community Flood Disaster Risk Management Plan, including hazard map, action plan, and committee members to implement the plan.
- Implementation of activities based on the plan.
- Enhancement of the awareness and preparedness of the community against the future flood disaster risk.

Component (Input/ Activities)

- Analysis of problems and impacts caused by the flood, including massive flood in 2011 (as a part of PRA)
- Study tour to the advanced site implementing community-based disaster risk management activities
- Workshop to develop Community Flood Disaster Risk Management Plan, including hazard map, action plan, and committee members to implement the plan
- Implementation of the planned activities by the community, with the technical and financial support from JICA study team for some of activities.

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

Cost (w/ Source)

THB 150,000 (JICA Study Team)

Implementing Schedule

Analysis of problems and impacts caused by the flood, including massive flood in 2011 (as a part of PRA)	May 2012
Study tour to the advanced site implementing community-based disaster risk management activities	Jan 2013
Workshop to develop Community Flood Disaster Risk Management Plan, including hazard map, action plan, and committee members to implement the plan	Feb 2013
Implementation of the planned activities by the community, with the technical and financial support from JICA study team for some of activities.	Feb-Mar 2013

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	● Study tour to the advanced site was designed with the support of JICA/DDPM 'Project on Capacity Development in Disaster Management in Thailand (Phase II)' and through the discussion with the community leaders. Li District in Lamphun Province was selected as a visiting site by the recommendation and coordination of JICA/DDPM project. ● Discussion on the selection of participants was started in the community. ● The JICA study team contacted Ayutthaya Provincial DDPM for possible support/collaboration.
Jan. 2013	● Pre-study tour session was conducted with the expected participants of the study tour on 15 January. Outline of the community-based flood disaster risk management plan was introduced as well as the detail of the study tour. Some learning materials, such as 'Guideline for Community-based Disaster Risk Management', which was provided by the JICA/DDPM project, were distributed to the participants. Staff of Ayutthaya Provincial DDPM also joined the session. ● Study tour to Li District at Lamphun Province was conducted during 23-26 January as planned with the representatives of 3 tambons, namely T. Khlong Ha, T. Gopchao, and T. Singhanat. 11 participants participated from T. Gopchao.
Feb. 2013	● Workshop to develop the Community Flood Disaster Risk Management Plan was held on 5-6 February. The plan, including issues/challenges to be tackled and countermeasures/actions as well as function and members of committees to implement the plan, was developed with the support DDPM Ayutthaya and JICA study team (see the detail in the 'Report on the Development of Flood Disaster Risk management Plan and Practice of Evacuation Drill at T. Gopchao') ● Workshop for planning evacuation drill was hold on 26 February with the participation of the school, community, and JICA study team, and other concerned agencies. Detail of the drill, including date, venue, management, and actions to be taken in the drill was set.
Mar. 2013	● Evacuation drill was conducted on 8 March at the compound of TAO based on the plan. There were about 200 participants from the community, schools in the community, TAO, district hospital, health station, police, JICA study team (see the detail in the 'Report on the Development of Flood Disaster Risk management Plan and Practice of Evacuation Drill at T. Gopchao'). ● Result of the pilot project, from the development of Flood Disaster Risk Management Plan to the evacuation drill was presented by the community during the wrap-up seminar at T. Gopchao on 19 March.

*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	● Development of Flood Risk Management Plan is considered effective for the community to prevent and mitigate negative impacts on the flood. Ideas and experience gained the 2011 flood was reflected in the plan. ● Degree of knowledge and awareness of community people on the flood disaster risk management is enhanced through the activities. ● Through the planning process, including the development of hazard/evacuation map as well as identification of responsible persons and necessary actions to be taken before and during the inundation, the community could have pictures on how tom prepare for another flood disasters. ● As the tambon is located in the natural monkey cheek area and regularly flooded, the development of the Flood Risk Management Plan as well as the experience of the evacuation drill could be effectively utilized as countermeasures for the inundation. ● With its geographic characteristics, the flood disaster risk of the area is not by the flash flood but by the gradual and relatively long-term inundation, which provides the community relatively long time to prepare for inundation and requires community's long-time response during the inundation. It is expected that the Flood Disaster Risk Management Plan is used as a kind of a check-list for the school and community to prepare themselves before and during the possible future inundation.
Timing of Implementation	● Developed Flood Disaster Risk Management Plan covers each stage of the flooding. It is good if the plan is developed/ reviewed by the community before the flood season to prepare for the possible inundation.
Acceptance of technique by community	● Flood Disaster Risk Management Plan was developed and evacuation drill was practiced with ideas gained through the study tour to the advanced site (Lamphun Province). The approach is considered effective to enhance the awareness and to strengthen the initiative of the community on the flood disaster risk management. ● Concepts and methods for community-based disaster risk management, which was introduced by DDPM, was also appropriate and a good leaning for the target people.
Replication and extension	● Development of Flood Disaster Risk Management Plan and practice of evacuation drill can be introduced at other tambons effectively, particularly at the flood-prone areas like T. Gopchao. It does not cost much, but need strong commitment by the stakeholders, i.e., community people, TAO, and school. ● DDPM is working in the issue and its support to the community is essential for the implementation. ● Development/implementation of some activities for Flood Disaster Risk Management, such as evacuation drill may be easier to replicate/extend as an education tool in the school.
Sustainability	● The developed Flood Disaster Risk Management plan can be maintained without costs to be utilized at the time of disaster, though some planned activities require supports from external organizations. ● The plan, including the function and members of committee, should be further examined for the finalization. The plan should be regularly reviewed/ revised for effective use. ● Strong interest and commitment of the community leaders, particularly of committee members nominated during the pilot project, is an essential factor for the sustainability of activities.

PHOTOS

Learning steps to make disaster management plan during the study tour

Interviewing community people on disaster (flood) impacts and countermeasures during the study tour

Learning water management from DDPM staff during the study tour

Workshop for Flood Disaster Risk Management Plan

Evacuation Drill

Evacuation Drill

Evacuation Drill

Evacuation Drill

PILOT PROJECT SHEET

Project Code	Sector	Community-based Disaster Risk Management against Big Flood
CDRM-DWS-01	Program	Drinking Water Supply during Flood Period
Title	Drinking Water Supply System	
Purpose	*To secure and keep safety drinking water during flood period*	
Location	T. Gop Chao (GC), A.Bang Ban, Pra Nakorn Si Ayuttaya Province (AT)	
Beneficiaries	1,200 people, 200 Households and nearby Tampon people	
Implementing Agency	T. Gop Chao and Chompoonuch Beverage Ltd.	

Background/Concept

Flood occurs after their second harvest in a year in August or September normally. The land is usually inundated with a depth of 3 meters from paddy field. This is considered as a regular situation for people in the community. However, during the 2011 Flood, the area was inundated in August. At the peak time of the flood, only a dike road in front of the TAO was not submerged. 439 households out of 762 were damaged not only rice and orchard but also houses, working equipment and water supply facilities and people evacuated to Tambon office. Due to said damage of water supply facilities and lack of drinking water storage so far, almost people in Tanbon were suffered from the water shortage. Under these situations, People in the Tambon proposed and decided to introduce a water purified system in cooperation with JICA Study Team when the Participatory Disaster Resilient Planning Workshop was held in September 2012.

Expected Outcome

- *To secure safety drinking water during flood period.*
- *To keep safety drinking water always for flood period.*
- *To create income for Operation & Maintenance (O&M) cost by installing the vending machine*
- *Through O&M with vending system, solidarity in communal area will be enhanced*

Component (Input/ Activities)

The Drinking Water Purifying System comprises of a water purifying system house dimension 3m x 4 m. and its equipment as follows,

1. Raw Water Tank
2. Raw Water Pump
3. Color and Odor Filter Column
4. Hardness Filter Column
5. Rusty Filter Column
6. Reverses Osmosis System Equipment
7. Purified Water Tank
8. Ultra Violet Light Set
9. Purified Water Outlet for bottles and tank
10. Drinking Water Vender Machine

Related Program, if any		**Code**

Cost (w/ Source)

438,000Bt supported by JICA Study Team

Implementing Schedule

Component	Dec	Jan	Feb	Mar
Contract between JICA ST & Supplier				
Explanation to the TAO,etc. (components, establish. of water supply management committee, WSMC)				
Implementation				
Final Inspection				
Support to strengthening the WSMC by JICA ST				
Training to the WSMT				

Note: ST, Study Team

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2011	Review on the existing water purified system and discuss the water purified system which is the best for cost-benefit, easiness of operation and maintenance between TAO and JICA Study Team during the beginning of Dec 2012. Requested the Quotation to the several suppliers and received the quotations from 2 Suppliers during 24th to 26th Dec. and selected the successful Supplier JICA Study Team and Chompoonuch Beverage Ltd. conducted the contract on 26th December 2012.
Jan. 2013	Meeting for explanation of the project in the presence of TAO and village representatives. (components, request establishment of water supply management committee, WSMC) on 11th January 2013
Feb. 2013 **Final Inspection**	On 15th February, in the presence of TAO members, Purified Water System Management Committee member, Supplier and JICA Study Team, Final Inspection was carried out. After checking the inspection the JICA Study Team pointed that the drainage pipe to outside of the purified water system house should be expanded. 2sets of Operation manuals were submitted to the TAO. Water quality result for hardness and turbidness was cleared the standard value. The TAO was decided the main members of Water Purified System Committee (WPSC) namely Chairman, Vice Chairman, Secretary, Finance, Operation & Management, Supporter. The additional members of WPSC and objectives and roles of the WPSC will be decided on 18th February 2013 in the presence of related stkeholders.
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)	During normal and big flood, drinking water is able to provide to the people in and around the TAO with free of charge. It is possible to store drinking water tanks in the storage rooms, etc. and to eradicate worries about shortage of drinking water during flood period Through operation and maintenance of the system including vending system, solidarity in communal is enhanced.
Timing of Implementation (Pre-, During , Post-Flood)	During dry season, the purified water system should be implemented.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	Operation of the system is very easy for TAO staff but, maintenance should be asked for the supplier at least one time per year. Ordinary maintenance fee per year is estimated at 7,000 to 8,000Bt. Therefor water management committee should secure the maintenance fee from benefit of vending machine
Replication and extension (role of stakeholder, cost share, etc.)	A water purified system is very compact and simple. The implementation of the cost is not exceed 250,000Bt excluding the system house. Therefor It will be possible to construct the system for other Tambon with his development budget.
Sustainability (incl. O&M, benefit during normal time)	Ability of purified drinking water production is around 6,000litter per day. So that the operation and maintenance cost could be secure from bending machine but an appropriate water fee such as 0.25 to 0.4 Bt/litter should be set prices of. To get income/benefit more, from plastic pet bottle selling business in effectively so that the FDA (Food and Drug Association) certification will be applied. Ceremonial functions (marriage, funeral, etc.) occur so often in community level and demand of purified water is very high. Therefor TAO and Water Management Committee should make a good marketing plan to promote the purified water system. For example of Shinhanat TA, TAO issues the monthly newsletter to introduce the water purified system to the people and during 2months from commence of the operation of the system, drinking water is free of charge to the people.

PHOTOS








Donation of pet bottles during flood in 2011

Meeting for explanation of the project in the presence of TAO and village representatives. (components, request establishment of water supply management committee, WSMC) on 11th January 2013

On 15th February, in the presence of TAO members, Purified Water System Management Committee member, Supplier and JICA Study Team, Final Inspection was carried out.

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 Gop Chao, Amphoe Bang Ban in Ayutthaya Province	
Beneficiaries	The entire population in Tambon	
Implementing Agency	T.Gop Chao	

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) 9 sets of Walky Talky (using existing license)

Related Program, if any	**CDRMP/ Participatory Flood Monitoring**	**Code: CDRM-CDRMP, WRM-PFIM**

Cost (w/ Source)

43,200 THB for purchase 9 sets of walky talky

Implementing Schedule

1. Installation by end-May

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management (WRM)
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	T Tambon Gop Chao, Amphoe Bang Ban, Ayutthaya Province	
Beneficiaries	The entire population in Tambon	
Implementing Agency	T. Gop Chao、Kasetsart University	

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		**Code**
	(1) Community Flood Disaster Management Plan (2) Participatory Flood Monitoring/ Information Management	(1) GC-CDRM-CDRMP-1 (2) GC-WRM-PFIM-1

Cost (w/ Source)

The contract has been made between Kasetsart University and the total amount includes PFIM in Gop Chao and Khao Khaeo. The following items are a part of the total amount of the contract.

- PR Expenditure	125,000	
- Flood Risk Map	80,000	
- Building knowledge on flooding, warning system and prevention	160,000	
Total	365,000	(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)
Dec. 2012	- Prepare PR materials in the process of work to gain understanding of committee and community people on the Work - Collecting data for hazard map - Creating draft hazard map - Set up website for community water management, the website will show weather forecast, metrological information, RID water information, Hazard map, current water situation, historical water record in the community, and important web link. - Study tour to Chaophraya Dam with Khao Kaeo to promote the understanding and positive cooperation between RID and local community and encourage participatory water management approach.
Jan. 2013	- Prepare PR materials in the process of work to gain understanding of committee and community people on the Work - Creating draft hazard map - Set up website for community water management, the website will show weather forecast, metrological information, RID water information, Hazard map, current water situation, historical water record in the community, and important web link. - Participate CDRMP meeting and discuss about linkage with CDRMP
Feb. 2013	- Confirm PR materials to the community by workshop - Finalize hazard map by setting up participatory workshop - Complete website and teach how to update the water level data and record, how to show hazard map on website, how to use it effectively for flood management to the community, mainly engineers in TAO.
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

Flood hazard and evacuation map construction

Collecting elevation data and confirm flood level in 2011

Interview to the farmer about flood situation

Evacuation Drill organized by community

Collecting infrastructure data for hazard map with village leader.

verifying the community flood hazard and evacuation map

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. Gop Chao, A. Bang Ban, Ayutthaya	
Beneficiaries	T. Gop Chao	
Implementing Agency	T. Gop Chao、Kasetsart University	

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.

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.

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** GC-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
Oct. 2012	- Survey and Bench Mark setting for installation of staff gage - Staff gage installation
Nov. 2012	- Inspection of staff gage installation
Dec. 2012	
Jan. 2013	- Formulation of recorded water level transfer system and monitoring the RID water level data system
Feb. 2013	- Final workshop for participatory water level monitoring activity
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 by contractor

Installed staff gage

Training for staff gage reading

Give education to the community people, teachers and students in school

Formulation of community communication tools for sharing the information with staff gage data and the government agencies data

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. Gop Chao, A. Bang Ban, AY	
Beneficiaries	Paddy farmers (1 model farmers)	
Implementing Agency	Rice Research Center (RRC), Tambon Administration Office (TAO), Land Development Department (LDD)	

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 (1 farmers)
2) Detailed planning of activities and layout of the experimental plots (a total of 25 rai per 1 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

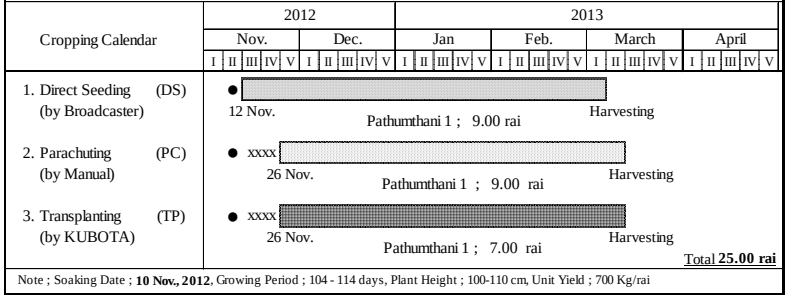
Related Program	Good Paddy Seed Production/ Seed Bank	Code:	AGRI-SEED

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

- Land preparation: 20,000Bt (JICA)
- Farm inputs and application: 50,000Bt (JICA)
- Monitoring (outsource): 20,000Bt (JICA)
- Media production: 10,000Bt (JICA)
- Yield survey(outsource): 20,000Bt (JICA)
- Total (approx.): 120,000Bt *harvested rice is subject for cost sharing

Implementing Schedule: *November 2012 to April 2013*

Fig. G-1 Pilot Activity for Paddy Cultivation, Gob Chao, AYUTTHAYA



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, excepting some weeds in Direct Seeding (DS) plot: (1) Tall Fringerush, (2) Red SprangleTop, and (3) gooseweed. - Some weeds such as (1) and (2) defined above have been found in Parachuting (PC) and Transplanting (TP) plots, and therefore 2,4-D based selective herbicide was applied to those two plots (Dec 20, 2012). - Enemy insects such as (1) Long-jawed spider, (2) Fabricius, (3) Rambur, (4) Hymenoptera (Braconidae) have been found, which are good to control pest insects. - Weeds (1) and (3) have been found in PC plot a week after the application of herbicide, though they were still at the young stage. - Brown Plant Hopper (BPH) was observed in PT plot. - 1st chemical fertilizer (compounded 16-20-0) was applied for all fields about 25kg per rai (Dec. 5, 2012)
Jan. 2013	- BPH was observed in DS plot and TP plot. - Some enemy insects have been found, while the pest insects were not significant ➔ ecological balance seems good at this stage - Until week 7, not much problems have been observed. - In week 8, number of BPH has increased to a total of 65 individuals in 10 sampling points, which might have been caused by raised temperature during this period. - When the number of BPH exceed 10 per one sampling point (one square meter), countermeasure has to be implemented. - Beauveria, an entomo-pathogenic fungus used as bio-control agent against insects such as BPH, has been applied (sprayed) every week. - Brown Spot Disease (BSD) and Narrow Spot Disease (NSD) have not been observed much in this plot, while they were observed more in the experimental plots of Chainat. - 2nd chemical fertilizer (Urea) was applied for all fields about 10kg per rai (Jan. 4, 2013) - Weed cutting by labor in the direct seeding field.
Feb. 2013	- Trichoderma, biological control agent for fungus, was applied at 9th. - The small amount of BPH and other insect were observed, but almost all observed insect could categorize to good insect. - The leaf collar were observed good collar among the three methods. - The number of insects in the direct seeding plot was higher than others, especially; the number of BPH was higher. - In the direct seeding plot, the weed was hardly observed due to high plant density. On the other hand, the small number of weeds were found in the transplanting and parachuting area.
Mar. 2013	- Harvesting for direct seeding field at 5th and transplanting field and parachuting field at 16th.

*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	- 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)	- This area suffered flooding every year. After flooding, cultivation should be used by direct seeding method. It can be used flood water. It will be taken from November to March. Then second cropping should be used with transplanting method or parachuting method, it will be taken from April to August. - For second cropping, transplanting method and parachuting method should be preparing the seedling. It should be start 10-20 days before planting the paddy field.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- Transplanting method could be produce the qualities of seed, so this method could be accept for seed making farmers. - Management of water level, soil condition and seedling quality are very important for cost reduction. - Transplanting method and parachuting method could be reducing the amount of seed and input cost. - Transplanting method and parachuting method could be weeding and using of agricultural chemicals easily; hence, it can reduce the input cost. - For transplanting, the transplanting machine with working operation should be used in the deep mud field. The transplanting machine with riding operation is difficult to control in the field.
Replication and extension (role of stakeholder, cost share, etc.)	- Parachuting method is still not famous in the area, because of the lack of skillful supplier. - The community will establish skillful parachuting planting team in the future. - The transplanting method is the best method in the area; therefore it will be expand in the area in near future. - Direct sowing method is the largest expanded method in the area. Because it is easiest way and familiar for farmers. But it is difficult to control weed and it spend much seed and agricultural chemicals. It will be changed for transplanting with machine method or parachuting method.
Sustainability (incl. O&M, benefit during normal time)	- Transplanting method and parachuting method should be used in the weed prone field. - Farmers should use the good quality of seed for not only plant growing but cost reduction, because it can reduce the amount of seed and labor cost for weeding. - Transplanting method is suitable for selling seed production. - Farmers should be careful for transportation of seedling about transplanting method and parachuting method. - Land reforming, it includes field levering and canal making, could be good for stable rice producing. - For supplemental planting in the transplanting and parachuting area, more amount of seedling should be prepared.

PHOTOS

Direct seeding by knapsack broadcaster.
(Nov. 12, 2012)

Seeding machine for nursery tray, which helps equally distribute the paddy seeds on the tray.
(Nov. 10, 2012)

Nursery tray set out on the ground (for parachuting).

Nursery tray for transplanting; while seeds are put in holes for parachuting, seeds are put on the tray without segregated holes for transplanting.

Transplanting facilitated by 6-row type machine.
(Nov. 26, 2012)

Parachuting (behind) and hand transplanting (front). Hand transplanting (30cm by 30cm) was done for demonstration in a small plot.
(Dec. 4, 2012)

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-PADDY-2	Program	Paddy Cultivation Activities for Flood Adaptation
Title	Reduction of Paddy Production Cost	
Purpose	*Project*: Reduce the production cost of paddy by introducing biological method	
Location	T. Gop Chao, A. Bang Ban, AY	
Beneficiaries	Paddy farmers (1 model farmers)	
Implementing Agency	Land Development Department (LDD), Rice Research Center (RRC), Tambon Administration Office (TAO),	

Background/Concept

If the investment cost to paddy cultivation is significantly big for a household, conceivable loss by flood would be also significant. It is the first option to consider avoiding the flooding period so that farmers can enjoy harvest before flood comes. Yet, it is not always the case that farmers can manage planting paddy on schedule due to lack of water at the planting season, lack of funding, or delay of previous cropping, for example. In such cases, minimizing the loss can be a second preferable measure to cope with flood.

Cost of paddy production is composed of land preparation, seeds, other inputs, harvesting and labors for maintenance. Reducing some of input cost can be a manageable subject through improved cultivation technique. By today, several biological methods have been developed by government agencies: "LDD bio-fertilizer (Por Dor)" a series of useful microorganism for making bio-fertilizer or bio-control agent commoditized by the Land Development Department (LDD) is a typical example. By applying such inexpensive biological substances, farmers can reduce the use of chemical agents. Moreover, by enriching good microorganisms in the soil, organic materials and minerals brought by flood can be smoothly decomposed into such structure that plants can absorb. As a result, paddy plants can be in a healthy condition strong against insects and diseases.

Expected Outcome

- Ecological environment in the paddy field is kept in good balance
- Appearance of insects and diseases is kept low
- Production cost of paddy is reduced

Component (Input/ Activities)

It is done as a subsidiary activity along with the AGRI-PADDY-2

1) Application of biological control agents (Podo, photosynthetic bacteria, and Beauveria)
2) Soil sampling survey
3) Technical assistances and monitoring by LDD
4) Yield survey and cost/benefit analysis
5) Preparation of leaflet for farmers' use

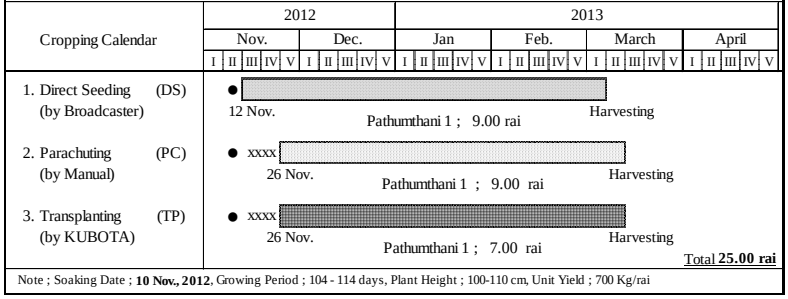
Related Program	Trials on transplanting methods of paddy	Code:	AGRI-PADDY1

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

- Biological agents and compost: 30,000Bt (JICA)
- Soil analysis 20,000Bt (JICA)
- Monitoring and tech. assistance: 40,000Bt (JICA)
- Media production: 10,000Bt (JICA)
- Total (approx.): 100,000Bt

Implementing Schedule: *November 2012 to April 2013*

Fig. G-1 Pilot Activity for Paddy Cultivation, Gob Chao, AYUTTHAYA



RESULT OF MONTHLY MONITORING

<table>
<tr><th>Term</th><th>Findings (Progress/ Problems/Other Issues)</th></tr>
<tr><td>Dec. 2012</td><td>
❖ For the monitoring of paddy cultivation, see the project sheet of AGRI-PADDY-1

Table: Application of bio-substances by plot
<table>
<tr><td colspan="2">Main Category</td><td colspan="4">Fertity Improvement</td><td>Insect Prevention</td></tr>
<tr><td colspan="2" rowspan="2">Plot</td><td>LDD2</td><td>LDD3</td><td>LDD12</td><td>Photo-Bacteria</td><td>LDD7</td></tr>
<tr><td>Bio-extract</td><td>Microbial activator</td><td>Bio-fertilizer</td><td>Organic matter synthesizer</td><td>Insect repellant</td></tr>
<tr><td>G-1</td><td>25 rai</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr>
</table>
- 1st chemical fertilizer (compounded 16-20-0) was applied for all fields about 25kg per rai (Dec. 5, 2012)
</td></tr>
<tr><td>Jan. 2013</td><td>
- Beauveria, an entomo-pathogenic fungus, is applied every week to control pest-typed insects such as Brown Plant Hopper (BPH)
- Po Do 7 & Po Do 2 liquid was applied at 13th to control disease.
- 2nd chemical fertilizer (Urea) was applied for all fields about 10kg per rai (Jan. 4, 2013)
</td></tr>
<tr><td>Feb. 2013</td><td>
- Trichoderma, biological control agent, was applied at 9th to control disease.
- Release water from direct seeding field to outside at 20th.
</td></tr>
<tr><td>Mar. 2013</td><td>
- Harvesting for direct seeding field at 5th and transplanting field and parachuting field at 16th.
</td></tr>
</table>

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

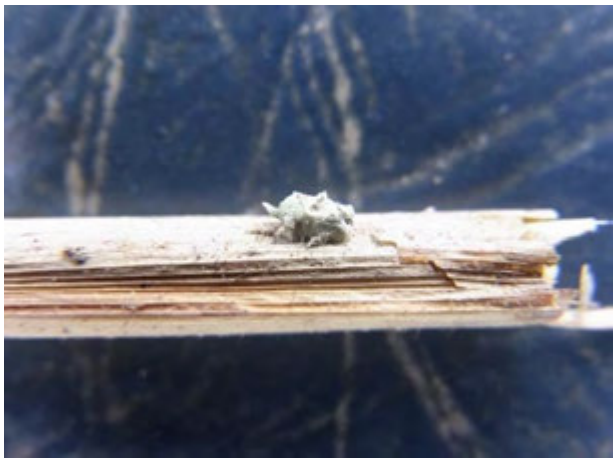
LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	- Microbial resources can reduce the investment cost. If the flood occurred and damaged the production, it could be reduce the cost loss.
Timing of Implementation (Pre- , During , Post-Flood)	- Po Do and photosynthetic bacteria could be used all cropping. - Biological control agent such as Bauveria and Trichoderma should be used for winter cropping. Because of the low temperature, the number of insect and disease are lower than monsoon crop.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- Po Do and photosynthetic bacteria became the soil smoothly, thus farmers want to use Po Do and photosynthetic bacteria continuously. - It will be help for cost reduction due to reduce the amount of chemical fertilizer. - Beauveria could protect the BPH's damage almost 100 percent. - Beauveria could reduce the agricultural chemical using and that cost. Farmers want to use for winter crop. Because the number of the BPH or other insect are smaller than monsoon crop.
Replication and (role of extension stakeholder, cost share, etc.)	- The farmers want to use the Po Do and photosynthetic bacteria. Thus, these things have a possibility to expand the area. -
Sustainability (incl. O&M, benefit during normal time)	- It is difficult that farmers get the Po Do and photosynthetic bacteria. LDD or other organization should make the opportunity of distribution and have an instruction lectures. - The cost of Beauveria is cheaper than agricultural chemicals. It could be reduce the production cost. But it has to apply many times such as every week. Because of the labor cost for applying, the cost of Beauveria will be higher than usual method. Hence, it can contribute the cost reduction, in case of the owner applying it by themself.

PHOTOS

Po Do 2, 6, 12 and photosynthetic bacteria were mixed with water around the paddy field.
(Nov. 11, 2012)

Po Do and photosynthetic bacteria liquid was applied with water intake flow to the paddy field.
(Nov. 11, 2012)



Dead insect by biological control agent (bauveria)
(March. 5, 2013)

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. Gop Chao, A.Bang Ban, PhraNakorn Sri-Ayutthayaprovince (AY)	
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 TambonGobchao and TambonSihanat-Ayutthaya province, TambonKhaoKaew-Chainat province, TambonNakorn 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 LueTha Chai - Community Seed Center, Chainat province and Ban BuengPra Du-Community Seed Center, Phichit province. ❖ Activities at Nang LueTha 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 BuengPra 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, TambonKhaoKaew, AmphurSapphaya, 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 LueTha 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 LueTha Chai - Community Seed Center
Chainat Province

Ban BuengPra Du - Community Seed Center
Phichit Province

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






PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-CRDV	Program	Crop Diversification and Food Security
Title	Safe Vegetable Production	
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 enablegenerating quickcash or securing foods for home consumption. *Project*: Promote safe vegetable production for home consumption and for marketing.	
Location	T. Gop Chao, A. Bang Ban, AY	
Beneficiaries	Farmers' group(1 model farmers)	
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.

Expected Outcome

- Farmers gain new skill on safe vegetable cultivation
- Farming portfolio of individual farmer household is diversified
- Learning center is established
- Floating vegetable can be one alternative for farmer to live with flood (GC-AGRI-CRDV-3)

Component(Input/ Activities)

1) Identification of participants (1 model farmer)
2) Discussion for planning of safe vegetable production as learning center
3) Training on safe vegetable cultivationand net house building, including making compost fertilizer and making insect repellant.
4) Technical assistances by DOAE/LDD
5) Preparation of guideline

Related Program	Trial on floating cultivation of vegetables	Code:	GC-AGRI-CRDV-3

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

- Farm input and material	20,000Bt	(JICA)	(materials for net houses included)
- Public relations	10,000Bt	(JICA)	
- Total (approx.):	30,000Bt	(JICA)	

Implementing Schedule: *November 2012 to April 2013*

- Jan. 2013: Discussion for planning, construction of net houses
- Feb. 2013 Construction of net houses, and training on seedling preparation including making compost and bio-insect repellant. Trial on floating vegetable growing in various methods such as foam, bamboo and other (GC-AGRI-CRDV-3)).
- Mar. 2013 Preparation of media, establishment of learning center,lesson learned workshop
- Apr. 2013 Final workshop

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- At the community level workshop, no much people got interested in doing vegetable cultivation as paddy cultivation is prevailing in this area. - The implementation was therefore suspended.
Jan. 2013	- After a series of discussions with some leader farmers, it was decided to establish a learning center for farmers in the area to learn what the concept of safe vegetable cultivation is and what the advantages of this activity are which can stimulate other farmers' concern on crop diversification for adaptation to flood. - Accordingly, net house type C net house, a simple one without wall structure, was constructed. - As the scale of the activity is small, farmers are encouraged whatever vegetables they want and review on the type of vegetable will be done later. - Different from the net house in Klong Ha, PTT, steel wire was employed to fix the net on the roofing structure—cost effective.
Feb. 2013	- Seedling preparation of leaf vegetable was instructed by using tray for 2 kinds of vegetable i.e. kale and green pak choy, including direct seed of morning glory.
Mar. 2013	- From the monitoring of safe vegetable growing under saran net found that vegetables can grow well under saran net even during hot weather. Mr. Thong suk who is the owner of learning center said "In the area of 10 sq.m., I can sell the morning glory and earn income with a total amount of 1,000 baht."
Apr.2013	- From the monitoring of safe vegetable growing under saran net found that harvesting of kale and green pak choy for selling in community can create additional income to Mr. Thong Suk about 2,000 baht. In consequence, the total income from selling vegetables in the area of 60 sq.m. under the saran net house is 3,400 baht per one production cycle.

*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)	- Generally, available materials in Tambon Gob Chao for vegetable growing are limited because most areas are used for paddy cultivation and cut off from the outside when flood occur. However, materials can be found in this area is cow dung fertilizer for compost making and ashes from brick house for seedling preparation and so on.
Timing of Implementation (Pre-, During , Post-Flood)	- Before and after flood
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- The roof of net house is made of saran net with level of shade of 50%, which is suitable for sunlight quantity passing through the net house because the weather inside is not so hot and workable all days. - Mr. Thong Suk mentioned that "if comparing between grown vegetables in the net house and without net house it was found that vegetables grown outside the net house shall wilt obviously and soil surface shall be dried, which is opposite to grown vegetables in the net house certainly. - Application of compost and Por Dor3 and Por Dor12 for leaf vegetable is effective and accepted by farmers. - As for promotion of insect repellent, the problem is that most farmers used insect repellent after finding insects get into the plot, which is ineffective because insect repellent application with leaf vegetable must be applied in the dilute rate by mixing with the water in order to prevent damage to leaf.
Replication and (role of extension stakeholder, cost share, etc.)	- It is more difficult for replication in Gop Chao area because the vegetable cultivation areas are limited. Thus, vegetable growing activity can be conducted with some farmers only. - From observations, most farmers in Gob Chao area are not familiar or interested in vegetable growing because it needs to be taken care every day. They don't want to waste time. Even though, in present, customers will come to buy vegetables at their plots, but it is not enough with customer demands, especially in April-May, of which the weather is hottest causing vegetable cannot grow in time.
Sustainability (incl. O&M, benefit during normal time)	- For the outcome of vegetable growing in net house, farmers, who do trial, have more confidence in a leaf vegetable production under the net house. Moreover, compost and Por Dor application with products are effective and shall be continued implementation. - The average income from selling vegetables in the first production cycle is approximately 56 baht/sq.m. It is worthwhile if comparing with the cost of net house, which is about 40 baht/sq.m. In addition, the main cost of vegetable growing is labor cost in household only, but vegetable seeds and organic fertilizer are very cheap.

PHOTOS (1)

To be the learning center, location was selected at a household close to TAO. The famer leader discuss with the land owner of potential site.
(Jan. 18, 2013)

For construction of the net house, farmers started digging the holes on the ground.
(Jan. 30, 2013)

Two primary schools joined the program for education of sufficiency agriculture to young generation.
(Jan. 30, 2013)

Wooden poles were employed for the pillars, while bambooswere used for roofing structure.
(Jan. 30, 2013)

For safety reason, surface of the bamboos was smoothened.
(Jan. 30, 2013)

For roofing, a combined saran net was once rolled up.
(Jan. 30, 2013)

PHOTOS (2)

Roofing was done step by step with a good cooperation among the people who are assigned in each side.
(Jan. 30, 2013)

Being keptstretched, saran net was fixed to thehorizontal bars using iron wire.Cooperation is required.
(Jan. 30, 2013)

A simple net house completed; saran net roof will mitigate strong sunshine during summer time and reduce excessive rain during rainy season.
(Jan. 30, 2013)

This place will be a learning center of safe vegetable cultivation techniques.
(Jan. 30, 2013)

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-CRDV	**Program**	Crop Diversification and Food Security
Title	Trial on floating cultivation of vegetables	
Purpose	*Overall*: Cultivate vegetables during flood for home consumption. *Project*: Test feasibility of floating cultivation methods of vegetables	
Location	T. Gop Chao, A. Bang Ban, AY	
Beneficiaries	Farmers' group(2 model farmers)	
Implementing Agency	Tambon Administration Office (TAO), Department of Agricultural Extension (DOAE)	

Background/Concept

As to cope with unexpected flood, it is preferable to adapt one's farming system more suitable to flooded condition. One of recommendable adaptation methods is to use such cropping methods that can be facilitated even during flood. The good practice survey reported that floating raft was being used to cultivate certain types of vegetables that are relatively tolerant to water such as Pak Bun (morning glory). Based on that successful practice, use of floating raft can be applied for vegetable cultivation during flood and even during ordinal time on any watersurface like a farm pond or a river. To be more practical to Thailand context, raft should be made of locally available materials such as bamboo, empty bottles and/or polystyrene foams.

Expected Outcome

- Farmers gain new skills and knowledge on floating-raft cultivation
- Feasibility of each method is clarified
- Learning center is established

Component(Input/ Activities)

1) Identification of participants
2) Trial on several methods of floating cultivation of vegetables (bamboo raft, polystyrene foam, etc.)
3) Evaluation of each method (lesson learned workshop)
4) Preparation of leaflet for farmers' use (if applicable)

Related Program	N/A	**Code:**	

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

- Farm input and material	30,000Bt	(JICA)
- Public relations	10,000Bt	(JICA)
- Total (approx.):	40,000Bt	(JICA)

Implementing Schedule: *November 2012 to April 2013*

- Jan. 2013: Discussion for planning
- Feb. 2013 Trial on several types of floating cultivation methods
- Mar. 2013 Evaluation, 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
Jan. 2013	- After a series of discussions with some leader farmers, it was decided to do trial. - It was found that one farmer ever tried floating vegetable cultivation during flood and was willing to do more.
Feb. 2013	- Materials for floating vegetable growing were purchased,including 1 polystyrene form sheet size 1.2m x 3.0m x 0.3m and 30 polystyrene form boxes size 39cm x 54cm x 21cm. Polystyrene form is applied as an alternative material since it can float on the water andit can carry a heavy load. - Alternative materials for vegetable growing were introduced by considering from lightweight stuffsi.e.burned rice husk and coconut huskorbeing the food sources of vegetablesi.e. cow dung, compost (pig dung), thesoil from a rain tree leaf andso on. - Experimented vegetables are leaf vegetables i.e. green pakchoy, kale with plant spacing of 10cm x 10cm. As for morning glory, theyshall be planted by sprinkle the row.
Mar. 2013	- Frommonitoring of floating vegetable growing, it was found that each vegetable in all boxes can be germinated and grown well, but the growth rate of each vegetable is different depending on the used materials for example the growth rate via compost application is better than cow dung. - The issues were found: 1) In the boxes that were grown by using cow dung, vegetables were damaged from fungus 2) Seed drilling with closely spacing and applying toothick saran net (70%) caused vegetable stretching.
Apr. 2013	- From monitoring of floating vegetable growing, farmers who do trial has summarized a lesson learned as below; 1) Floating vegetable growing can do and can be a food source even though the growth rate is not as good as a normal growing. 2) Compost application shall provide an outcome better than fresh/dried cow dung. 3) Since the box has not much room for growing vegetables, soit is necessary to grow with more closely spacing by picking every other trees basis with over 2 weeks of age. 4) Floating vegetables should be grownbefore flooding occurin order to have vegetables for consumption during flood. 5) Polystyrene form boxes can be also utilizedin normal situations with normal spacing or growing for home consumption such as spring onions, mints and so on.

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

LESSONS LEARNED

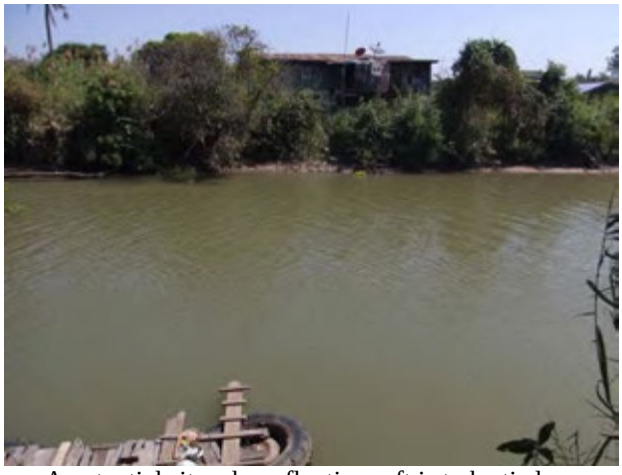
Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	- Floating vegetable growing in the polystyrene form boxes is one alternative of vegetable cultivation for home consumption during flood, because it is not costly. (39 baht/box) - If the price of polystyrene form sheetsis expensive, alternative materials that are available in the area should be considered such as bamboo or water hyacinths for making floating raft. - Presently, plants from natural water sourcesin the flooded areas such as water hyacinths or grasses can be applied for floating vegetable growing.
Timing of Implementation (Pre-, During , Post- Flood)	During flood
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- Due to vegetable growing in the polystyrene form boxes is not effective well, affecting some interesting farmers are not confident in investment or hesitating to do trial. Therefore, it is necessary to get support from agencies concerned.
Replication and extension (role of stakeholder, cost share, etc.)	- There is no clear promotion plan for floating vegetable growing so far, if this activity is considered, it is believed that this activity implementation is more acceptable since the price of polystyrene form boxes is not costly. - One interesting alternative materialfor floating vegetable growing in TambonGop Chao is utilization of water hyacinths as a floating raft, because there are many water hyacinths in the area of Moo 3
Sustainability (incl. O&M, benefit during normal time)	- In fact, it is hard to persuade many farmers to do floating vegetable growing. However, there is a possibility,if government sector will support some materials such as polystyrene form sheets. - Waste stuffs in the local may be used as an alternative material for floating vegetable growing such as waste plastic bottles by putting them in the sack about 10 bags, tie them up and cover with saran net like a raft.

PHOTOS

It was found that one farmer is still trying a cultivation of vegetables in the polystyrene form boxes, which are put on a big floating mat.
(Jan.18, 2013)

Floating mat is as thick as 40cm in height where boxes of vegetables are put on.
(Jan. 18, 2013)

A farmer once tried a raft made of empty bottles; it was however not successful as it takes so much time to tie them up.
(Jan. 18, 2013)



A potential site where floating raft is to be tied up.
(Jan. 18, 2013)

PILOT PROJECT SHEET

Project Code	Sector	Income Generation Activities towards Recovery of Rural Livelihood
iGEN-IGLR-1	Program	Income Generation utilizing Local Resources
Title	Improvement of fish and shrimp processing	
Purpose	To improve existing processing activities of fish (fermented fish, Pla Ra) and shrimp (shrimp paste, Kapi) for income generation and keeping preserve food during flood period.	
Location	Village No.8, Tambon Gop Chao	
Beneficiaries	20 members from 4 villages, especially elders and females based on existing unofficial group in the community	
Implementing Agency	Community Development Department (CDD)	

Background/Concept

The group produces fish (fermented fish, Pla Ra) and shrimp (shrimp paste, Kapi) processing foods at house industry level. These food processing activities have been continued traditionally so the technical skills are accumulated in the community. Due to lack of equipments for processing, their product amount has been lower level. With the linkage of the Project, they are aiming to expand product amount and sales. Raw materials (fishes and shrimps) are caught in the local area by fisherman. The group purchases fishes and shrimps from local fisherman. So Local economy also has good effects by the activity. The groups sale the product through existing marketing route such as local community, local market etc.

Expected Outcome

- To increase product (Pla Ra and Kapi) amount and expand group production
- To generate extra income during flooding season
- To store processed food necessary for consumption during flooding season
- To make a linkages local materials to local market

Component (Input/ Activities)

- Business planning by the processing group
- Study tour for OTOP fair
- Procurement of processing equipment
- Training for hygienic purposes in processing activity

Related Program, if any	**Study on Fish Variety and Value in Flood prone area (FISH)**	**Code: GC-OTHER-FISH-1**

Cost (w/ Source)

Study tour (JICA Project)
Mincing machine cost 17,500 THB and blender cost 25,000 THB (JICA Project)

Implementing Schedule

1. Planning through PRA workshop (Jun. 2012, supported by JICA project)
2. Business planning by the processing group (Nov. 2012, Supported by JICA and CDD)
3. Study tour for OTOP fair (Dec. 2012, supported by JICA)
4. Procurement of processing equipment (Dec 2012, supported by JICA)
5. Production of Pla Ra and Kapi (Dec 2012)
6. Staring sales of product (Pla Ra Feb. 2013 and Kapi Apr. 2013)

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	● Business plan was prepared by the group with support of Community Development Department. ● Study tour for OTOP fair was organized. ● Equipment for processing was procured by group.
Jan. 2013	● Started processing activity by the group. With use of new equipment they increased production four times and shorten time for processing compared to before. This year, with support from JICA project the group can increase their capacity from approximately 100 kg to 400 kg. ● The sales of this season's product will generate income to members and to build stronger group's financial capacity for future expansion. This season, for shrimp paste, the group expects to sell around 48,000 THB (from approximately 30,000 THB of production cost) whereas they are expecting to sell 14,200 THB (from approximately 5,500 THB).
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)	・Production of fish was very much increased during flood period. Activity which utilizes resources available during flood period is beneficial for local community. ・Vitalization of group activity is strengthening group relationship and providing motivation even during disaster period when people cannot get out from houses especially for elders and females. ・Processed food which can be kept for long time like fermented fish or shrimp can be utilized for preserved food for disaster period, especially for long flooding in rural area.
Timing of Implementation (Pre-, During , Post-Flood)	
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	・Support existing group and existing activity is easy to be adopted and started by group. Therefore, the support rapidly could get good results especially for income generation and group strengthening ・Utilization of locally caught fish and shrimp will have good effect on local economy for fishers group. Linkage of local economy through income generation activity is effective.
Replication and extension (role of stakeholder, cost share, etc.)	・In case of food processing activity, it is difficult to obtain Thai FDA certification. It is because that income generation activity at community is usually house industry level and investment for facility is necessary for obtaining FDA certificate. Therefore, it is difficult to gain large income from food processing activity at community level.
Sustainability (incl. O&M, benefit during normal time)	・The group activity can operate continuously and can sustain through sales to local customers. ・With machinery support by the project, the group can industrialize the production and create other production items for future expansion

PHOTOS

Discussion of group activities through PRA meeting

Group member of Fish and Shrimp Processing

Equipment procured by group for processing

Processed Fish to be fermented

Sun drying Kapi

Manual for processing of Pla Ra and Kapi prepared by the group

PILOT PROJECT SHEET

Project Code	Sector	Income Generation Activities towards Recovery of Rural Livelihood
iGEN-IGLR-2	Program	Income Generation utilizing Local Resources
Title	Application of processed water hyacinth	
Purpose	To carry out community processing activity utilizing "water hyacinth" growing naturally in pond or canal in local area for income generation for revival from flood damages	
Location	Village No.3, Tambon Gop Chao	
Beneficiaries	18 female members from 5 Villages formed after PRA workshop by the Project based on discussion among community	
Implementing Agency	Community Development Department (CDD)	

Background/Concept

From problem analysis session which JICA study team conducted for Gob Chao, one problem concerning lost of income during flooding season had been found. As water hyacinth baskets and bags are becoming more famous in Thai and overseas market, Gob Chao woman group was formed to process water hyacinth as an income generation activity during the flood. Water hyacinth is suitable in this situation because not only there are plenty of water hyacinth locally found in their pond, but in the flooding period excessive water hyacinth can cause blockage problem in the water way.

The group produces bags processed from water hyacinth growing in ponds or canals in the local area. They sells primary processed product without decollation, handle etc. to producers group who provided training to Gop Chao group. After secondary processing, final product with decollation or handle can be sold to Ayutthaya floating market, Prathumthani flea market etc. They are planning to expand sales channel after trail processing and sales with improvement of technical skills. Raw materials of water hyacinth can be collected in local area. The group started to collect water hyacinth from local pond and canal once a week as a group activity.

The products can be retailed as well as wholesaled in many variations. Nevertheless, it is quite a high competition market, the group need to develop their own product with identities and improve their skills as much as possible.

Expected Outcome

- To develop skills to produce water hyacinth product
- To strengthen community relationship through the activity
- To gain cash income by sales of the product

Component (Input/ Activities)

- Establishment of group for water hyacinth processing activity
- Study tour for advanced area of water hyacinth processing
- Community meeting regarding activity
- Training for water hyacinth weaving technique
- Study tour at OTOP fair to see market feasibility
- Production and sales of water hyacinth product

Related Program, if any		**Code**

Cost (w/ Source)

Study tour for advanced area (JICA Project)
Dryer 20,000THB

Implementing Schedule

1. Proposal of activity from community at PRA workshop (Jun. 2012, supported by JICA)
2. Formation of group from community (Nov. 2012, supported by JICA and CDD)
3. Planning and carry out study tour to advanced area, Khlong Nok Kratum, Kakorn oratum (Nov. 2012, supported by JICA)
4. 7-days training sessions for basket and bags production techniques (Nov. 2012, supported by JICA)
5. Group discussion of activity (Dec. 2012, supported by JICA)
6. Study tour for OTOP fair (Dec. 2012, supported by JICA)
7. Carry out second study tour by group themselves (Jan. 2013)
8. Carry on production of water hyacinth bag and sales activity (Jan. 2013)
9. Join Final workshop

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	• The group formed out of the discussion in the activity selection session of JICA project in June 2012. • Some members were taken to see the existing water hyacinth production site at Klong Nok Kra tum, Nakornpratum in November 2012. Group members decided to receive the training for the production technique and group formation by CDD in November 2012. • Training session was held for 7 days at Gob Chao at a group members' house in December 2012. 21 members attended the training sesson. After training session, members attended study tour to OTOP fair to study marketing and sales options in December 2012. The group first sale was not long after the training session in Provincial service mobile in Gob Chao area on November 2012.
Jan. 2013	• Group members took themselves to a study tour to Klong Nok Kra Tum again to learn more techniques without JICA officers' supervision in January 2013. This indicates a group progress for improvement and good enthusiasm and if any that can response their need. • Regarding group's product marketing, the group distributes the products through their members' channel such as Ayuthaya floating market, Prathumthani flea market. The product price is 100 to 200 Bhat/one piece of bag, each person can make one to two bag(s) per day. • There are some people from another area interesting on their activities and directly visited the activities and also try to learn how to make it.
April. 2013	Joined Project Final Workshop
May. 2013	Purchase dryer to cope with more order during rainy season

*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)	• Handy craft processing which can be done at home in spare time and kept for long time has positive effect on income generation especially for female group in rural area. • Activation of communication inside and outside of group would strengthen community relationship. It might be effective at disaster period. • Vitalization of group activity is strengthening group relationship and providing motivation even during disaster period when people cannot get out from houses especially for elders and females.
Timing of Implementation (Pre-, During , Post-Flood)	
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	• Member can generate supplementary income enough for everyday's expense (80-200 Bht/day). Amount of the money depends on the number product produced each day (1-2 pieces). The money received each day is equivalent to the amount received from labor work, therefore members choose to stay home and weave the basket. • The group members choose to stay at home to weave the basket rather than working outside before they did. It enables members to take care of their family members. It showed that the activity for income generation which can be done in the house at spare time is effective for female. • It was observed that the activity motivated group communication inside a group and stimulated people outside of group for the activity.
Replication and extension of (role of stakeholder,	
Sustainability (incl. O&M, benefit during normal time)	• Group members received good comments from community people that the activity will bring about better and cleaner environment in their community canal. • The group recognizes that materials available in local area and even during flood period are useful for processing activity.

PHOTOS

Discussion of group activities through PRA meeting

Group member of water hyacinth processing

Raw and dried water hyacinth collected from local area

Training of water hyacinth processing

Weaving basket by hand

Final Product of water hyacinth bags

5. Tambon Disaster Resilient Plan, T. Gop Chao, Ayutthaya						
Project	Planned Activity	Procedure detail	Related Agencies	Progress Problems/constraints	Countermeasures Actions to be taken	
					Short-term (1 year)	Long-term (5 years)
1 Community disaster protection and mitigation plan	1.1 Community disaster protection and mitigation plan, including drill of evaluation	1. Form members 2. Recruit more members 3. Held WSfor every villages to plan 4. Procurement plan and data base 5. Implement the plan and drill 6. Follow up and evaluate.	TAO/JICA/ DDPM /Village /Volunteers	Activities • Study tour • Planning session for disaster risk management • Evacuation Drill Constraints • The committee felt community participation is not satisfactory.	The plan should be used together with existing plan of TAO.	The plan should continuously be practiced especially the evacuation drill
	1.2 Set up a rescue center		TAO/JICA/ DDPM /Village /Volunteers	The activity was canceled due to lack of labor and budget	TAO member can raise the issue to allocate the budget in the next fiscal year.	-
	1.3 Installation project of quality water purifier	1. Form members 2. Orientation meeting with team members and study the area's respond 3. Specify the spot for water filter. 4. Procurement and Installation 5. Follow up and monitoring process	TAO/JICA/ DDPM /Village /Volunteers	• The building was constructed in January and operation was started in March before the system was broken. • The committee claim for the contractor's repair service. They didn't provide good service.	• The contractor provide 1 year warrantee. After that TAO must be responsible for maintenance. • Constantly hold committee meetings to report the progress of operation to public.	• If the progress is satisfactory in the future, the service may be expanded to other Tambons.
	1.4 Installation project for wiredspeakers	1. Form members 2. Orientation meeting with team members and study the area's respond 3. Specify the spot for water filter 4. Procurement and Installation 5. Follow up and monitoring process	-	The activity was canceled due to lack of labor and budget	TAO member can raise the issue to allocate the budget in the next fiscal year.	-
	1.5 Rescue equipment	1. Inspect required equipment 2. Radio communication devices		In the progress of negotiation for procurement (walkie talkie)	The equipment will be used for future defense and rescue duty.	The equipment would be TAO's property with maintenance responsibility.

5. Tambon Disaster Resilient Plan, T. Gop Chao, Ayutthaya						
Project	Planned Activity	Procedure detail	Related Agencies	Progress Problems/constraints	Countermeasures Actions to be taken	
					Short-term (1 year)	Long-term (5 years)
	Additional issues	Hazard Map, booklet and handouts GPS systems and tools Staff gages		• Hazard map, booklet and handouts for "livelihood with the water" were made. • The Tambon received GPS system and equipments, staff gage, a personal computer to update the data and a mobile phone • The project supports 37,000 Baht for operation cost.	• The community must find responsible person who can routinely update the water level using provided technology to get effective result. • Handouts and booklets will be distributed to schools, TAO, and any center that need reference.	• After support from the project, TAO must be responsible for operation costs. • The committee and the network will record and update the water level once a week in normalcy and everyday in crisis.
2 Capacity building of the Tambon's farmer to handle the effect of natural disaster	2.1 Experimental plantation for the good practice of the rice seed production.	1. Publicize the program and form members 2. Specify the experimental sites. 3. Implement 4. Post harvest activity (packaging+ sales promotion)	TAO/JICA/ Local Agricultural Office/ Related group members	• JICA study team provided costs necessary for the experiment while the farm owner recorded data and actions in plantation (7 Rai for sowing, 9 Rai for parachuting, 7 Rai for transplanting in 126 days) • After the experiment, the farm owner received payment and spent for the operation cost support for setting up of the technological transfer center.	• The farm owner will transfer the knowledge through the Tambon technological transfer center for interested farmers.	• Improve the technical transfer center by compiling more agricultural knowledge.
	2.2 Study tour for alternative income in disastrous period and normalcy- ornamental fish breeding.	1. Form members 2. Planning 3. Study tour 4. Conclusion meeting 5 Specify sites 6.Implement	TAO/JICA/ Local Agricultural Office Private companies	• Study tour to Aquaponic site • After the problem from the misconception on the construction, the activity was canceled. • For the community, Aquaponic system isn't suitable for the area due to the high cost and the practicality. Community people is rather interested in Hydroponic.	• Interested members are planning visit a site for Hydroponic. • Once they receive the technology, they will invest with their own money in small portion.	-

5. Tambon Disaster Resilient Plan, T. Gop Chao, Ayutthaya						
Project	Planned Activity	Procedure detail	Related Agencies	Progress Problems/constraints	Countermeasures Actions to be taken	
					Short-term (1 year)	Long-term (5 years)
	2.3 Study tour for alternative income in disastrous period and normalcy-vegetable		TAO/JICA/ Local Agricultural Office	• JICA study team introduced green vegetable plantation at the farm of Mr. Thongsuk with the provision of small equipment, nursery house, and seed. • The vegetable can be now on sales since March.	• Mr. Thongsuk will expand his plantation area and experiment new kind of vegetable.	• If there are interested farmers in the area, Mr. Thongsuk can teach so that he can expand the network.
3. Development project for processing and value-adding of products from local material.	3.1 Expansion of local food processing group and woman enterprise group-shrimp paste/fermented fish	1. Form members 2.Planing and coordination 3. Procurement of equipment. 4. Implementation. They have now form 16 members	Village chiefs/ woman enterprise group/Social Development Department	• Shrimp paste was ready to sale in March while fermented fish was ready in April. • The production depends on the season, to expand the production, the group must purchase raw material from other area.	• The group will circulate the money from the first production to invest in the next production. Production of 2-3 times /year is planned. • The production will expanded by the machines provided by the project	• The group plans to improve the quality and packaging to meet the standard
	3.2Morning glory waiving project	1. Form members 2. Route survey and study tour 3. Planning 4. Procurement of equipment.	Village chiefs/ woman enterprise group/Social Development Department/ OTOP officers	• Training was conducted. • There are products for sales with around 20 items a month with an average unit price of 300-700 Baht. • In the rainy season, water hyacinth can't be sun dried. It is important for the group to purchase an oven.	• Procure an oven to enable the production during the raining season. • Training to learn more new techniques and patterns	• Expand the market • Expand the production • Improve the quality

Report on
the Development of Flood Disaster Risk Management Plan and Practice of Evacuation Drill at Tambon Gopchao, Ayutthaya

1. Workshop on the Development of Flood Disaster Management Plan

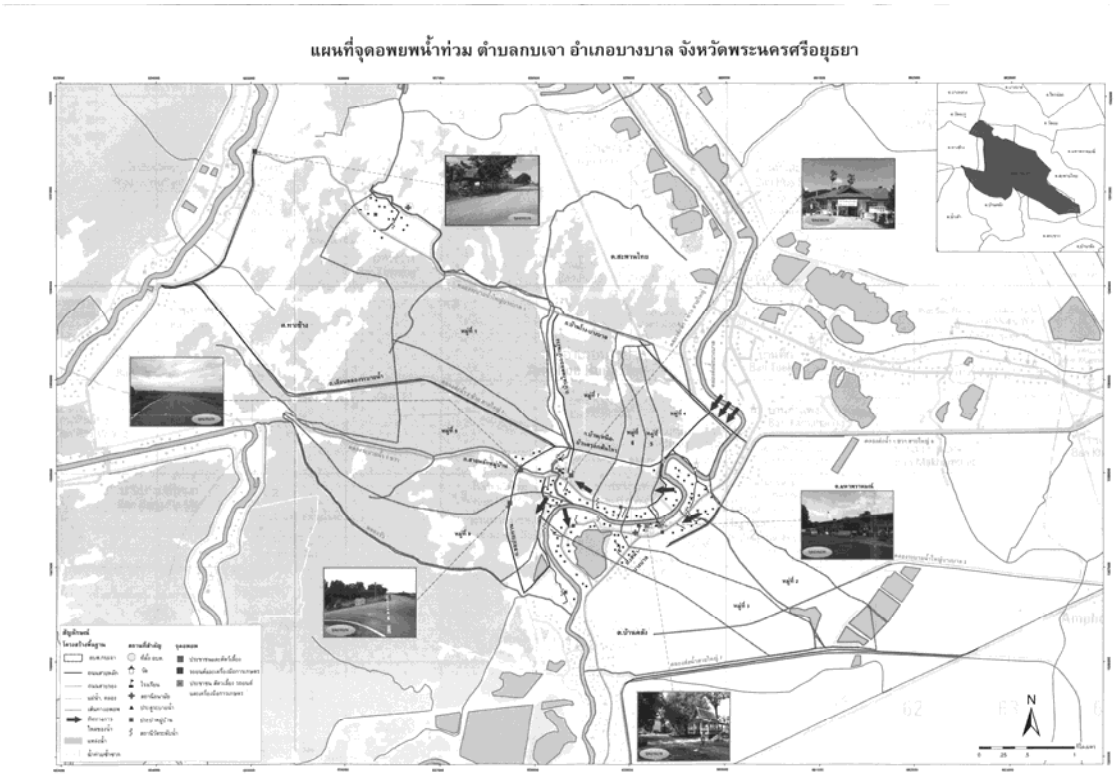
Date:	5-6 February, 2013
Time:	5 Feb AM: Workshop on Hazard Map (by KU team) PM: Workshop on Flood Disaster Risk Management Plan 6 Feb: Workshop on Flood Disaster Risk Management Plan
Place:	Meeting room of TAO, Gopchao
Objective of the meeting:	To prepare action plans for Community Based-Flood Disaster Risk Management with the community
Number of attendants:	About 75 persons from the community and JICA study team.
Participants from the project:	Iwaki, Bubpachart, Thita

<Process of the workshop>

1) Introduction
Background of the pilot project and objective of the workshop were briefly explained by the study team member.

2) Explanation of the CBDRM process
The resource person from DDPM Ayuttaya explained the process of CBDRM.

3) Confirmation of Community Hazard/ Evacuation Map
Community Hazard/ Evacuation Map developed with the support of the JICA study team through Kasersart University team was shared to confirm the evacuation route.



Community Hazard/Evacuation Map

4) Set-up of a management committee to implement the Flood Disaster Risk Management Plan

Committees to implement the Flood Disaster Risk Management Plan for the community of T. Gopchao were formed tentatively as below by the participants with the facilitation of the resource person from DDPM. However the draft of the committees needs approval from authorities.

1. Community Flood Disaster Risk Management Committee		
	1. Plan and approve preparation actions for disaster prevention with other flood committees 2. Give directions and approval to any actions concerning flood risk management 3. Collaborate with both internal and external organizations during flood period	
		1. Mr. Phamorn Temrak (Chairperson)
		2. Mr. Chalow Janlikhit
		3. Mr. Udom Laksanayothin
		4. Ms. Somwong Kleebpikul
		5. Ms. Monthip Chumckokedee
		6. Ms. Maneerat Khamnil
		7. Ms. Sanit Pisaphak
		8. Ms. Somsri Kijenee
		9. Mr. Chaowalit Kongjinda
2. Warning and Preparation Committee		
	1. Hold community meetings to inform preparation process and warning signal for flood 2. Keep records of the Tambon's demographical data, e.g. number of elders, animals, vehicle in community household 3. Identify evacuation places 4. Prepare sand bag and other necessary items (boat, floating toilet) to be used for flood risk management 5. Prepare consumption supplies for evacuees during evacuation period	
		1. Mr. Adisorn Khamsot (Chairperson)
		2. Mr. Naphadol Phansuphol
		3. Mr. Nichanat Jitreedej
		4. Mr. Suchart Rompikul
3. Public Relations Committee		
	1. Receive information from internal and external organizations 2. Distribute information to public	
		1. Mr. Somsak Khaongernyuang (Chairperson)
		2. Mr. Pongsak Chareonsap
		3. Mr. Watchara Thampate
		4. Mr. Samarn Klaiubol
4. Disaster Prevention and Mitigation Committee		
	1. Coordinate with volunteers to set up flood protection system 2. Mobilize community people to put up water protection sandbags	
		1. Ms. Somsri Siriwong (Chairperson)
		2. Mr. Pratuan Konnak
		3. Mr. Manas Suanfah
		4. Mr. Natthawut Mondopyai
5. Evacuation Committee		
	1. Coordinate with committees for disaster evacuation process 2. Provide assistance to move people, animal and vehicle to evacuation spots 3. Prepare registration process for the evacuated people	
		1. Mr. Sanong Rojburanont (Chairperson)
		2. Mr. Somchai Jamdao
		3. Mr. Sangwal Buaprasert
		4. Mr. Ubol Deetae
6. Security Guard Committee		
	1. Set up security guard team to patrol in the evacuation centers and around the community	

	2. Report situation to DDPM	
		1. Mr. Bamrung Suwanhong (Chairperson)
		2. Mr. Than Kanpetch
		3. Mr. Phongsak Klaitham
7. Support Committee		
	1. Coordinate with warning and preparation committee to understand flood situation 2. Procure all necessary supplies for evacuation center 3. Plan and manage distribution system for donation items	
		1. Ms. Pratumporn Mantham (Chairperson)
		2. Mr. Withayawut Jamdao
		3. Mr. Surat Jitrak
		4. Mr. Prasert Premjit
8. Medical Committee		
	1. Provide medical care to all groups of patients. 2. Coordinate with hospital in the area when emergency case happens 3. Provide information on disease and danger caused by flood to community people	
		1. Mr. Banhan Wutthisak (Chairperson)
		2. Ms. Malinee Kasikam
		3. Ms. Chaluay Klaiubol
		4. Mr. Samart Pong-or
9. Recovery Committee		
	1. Survey post flood damage 2. Prepare report to community headman 3. Restore basic damage of people's houses and equipment	
		1. Mr. Boonthalika Khamsot (Chairperson)
		2. Ms. Somsong Jamkrajang
		3. Mr. Phisoot Phasokbutr

5) Development of Actions Plans on Flood Disaster Risk Management

Drafts of action plans on Flood Disaster Risk Management were developed for community based on the discussion among participants as provided below.

Issue/ Problem	Countermeasures and Actions
1. Flood Information and Water measurement	**Cross-check flood information from several sources** • Obtain information from RID (Bangban, Pakhai) • Appoint a flood information coordinator in the Tambon to collect information from official agencies and Tambon's own measurement • Publicize the information using a formed committee. The committee should take full responsibility in the meeting and publication of the information. (through broadcasting tower and village's headmen) • Raise public awareness about the importance of keeping tracks of water and flood's information **Set-up of warning system** • Form a team responsible for the warning system that coordinates with the Tambon's water measurement center • Create other communication routes to disseminate the news and information effectively using broadcasting tower, walky-talky, personal contact, mobile phone, etc • Put up signs that indicate risk and safety areas.
2. Internal and Inter-Tambon coordination	• **Establish Tambon Coordination Center at TAO as a center of activities** • **Develop an effective coordination network in Tambon, such as** broadcasting the news through broadcasting tower and Tambon's radio communication, and spreading the news though personal contacts and phone calls

3. Transportation System	**Development of an effective transportation system** • Set up a public hearing session to examine the situation and the solution of the transportation by boat in each village **Procurement of adequate number of boats and their appropriate storeage.** • Develop appropriate accounting system in case Tambon has some boat renting service • Examine the number of boats needed to be procured • Increase the number of small boats to stock. • Develop proper installation and maintenance system
4. Evacuation (Center, Route, Pattern, Safety)	**Identification of vulnerability group such as disables, elders, pregnant women, children less than 6, unmovable patience, chronically ill patient** • Survey vulnerable groups by health volunteer preferably monthly • Share the information to the Tambon health station to plan the evacuation and rescue pattern • Prepare the evacuation center for both people, property and animals • Prepare Pho temple, TAO, and RID roads to be the evacuation points • Coordinate for tents for evacuees and animals • Coordinate with DLD for animal feeds • Coordinate for mobile toilets • Prepare essential items for surviving at the evacuation center beds mosquitoes net, torch, battery • Develop systems for sanitation control **Development of an effective security system at evacuation spots and banished houses** • Bring in helps from the civil service volunteer to take care of security issues • Patrol by village chiefs/ headmen for peace/ security during disaster • Set up some mobile medical and first aid unit that can patrol the village • Set up a complaint counter, and some speed rescue unit available around the clock • Conduct an evacuation drill • Simulate the the warning system, evacuation center, evacuation patterns as well as some medical and rescue units • Educate the people for proper practice for the disaster management, including important items to bring such as ID card, personal medicine, house registration etc.
5. Storage of essential consumption items for both people and animals	**Storage of essential survival items for people and animals** • Systemize the donation item distribution to match needs of Tambon people thoroughly and effectively • Coordinate for donation • Procure consumption items necessary for survival during flood period. • Repair the existing equipment ready to use • Elevate the electric transformer off from the water level **Distribution system** • Examine the number of household • Utilize coupon for distribution • Set-up distribution system for elders or disables (by the village heads) • Equip houses with containers for water. • Household with vulnerable people should contact with village chiefs
6. Other Relevant Service	**Set up of a medical service team from volunteers from health station and hospital, civil service volunteers, TAO, Police, DDPM other agencies** • Examine health situation of each household preferably every month. • Provide health information to the health station in order to plan the evacuation

	• Dispatch officials to serve in the evacuation spot and the abandoned houses • Coordinate with health stations in the emergencies.

<Comments/Follow-up Issues>

- Committee of T. Gopchao was tentatively set-up with the support of from DDPM team. The committee needs formal approval from the concerned agencies.
- Action plans for both community and school was developed during the workshop. However, the plan needs further examination and sharing with the community members.
- At the end of the workshop, the participants agreed to have a evacuation drill in March. The detail of the drill and preparation in the late February with the support of the project and DDPM Ayutthaya.

Discussion during the workshop

2. Planning Workshop for Evacuation Drill

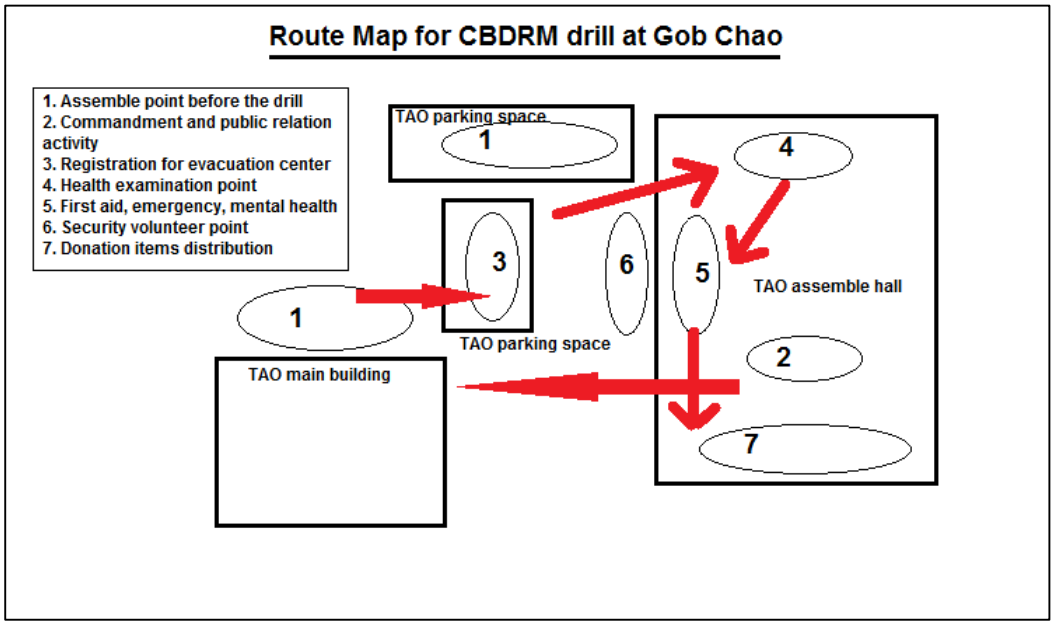
Date:	26 February 2013 (1400 – 1530)
Place:	TAO, T. Gopchao
Objective of the meeting:	To plan and prepare for flood evacuation drill
Number of attendants:	About 50 persons from community, DDPM Ayutthaya, JICA study team
Participants from the project:	Iwaki, Bubphachart, Thita

<Discussion issues before the drill>

1) The committee and community members including village chiefs and TAO members gathered with other agencies e.g. the health station, the police and DDPM Ayutthaya, to discuss plans for the drill.

2) The venue of the drill was set at the cement yard and the conference hall in front of the main TAO building The date of the drill is on Friday, 8 March.

3) The committee members prepared tentative location of the simulation of the drill utilizing TAO facilities including parking space, assembly hall and the space in front of TAO main building as below.



4) Tentative actions of the drill are as follow

Simulations: The news about the danger of the flood water breaks to warn community members to evacuate to safer places or provided evacuation center by the community. The warning simulation being "The red muddy flood water has rapidly risen in Klong Bang Ban Moo.7 to the danger level. Community member should put their possessions and belonging to drier place and evacuate lives to the prepared places"

Act 1: After the committee is informed about the water situation, a committee meeting is held to set roles of each responsible team. The public relation team will announce the situation to community about the water situation and preparation process to move belongings to high place.

Script for the reporter *" The water level in Klong Bang Ban has risen to a danger level. The committee received an announcement from RID Chainat that they are draining out the water at 1500 cubic meters per second, therefore it is estimated that flood water will cover Gob Chao area in two days. The staff at Gob Chao's staff gate reported that water level reach 4 meters already. Civilians should now lift their belongings and prepare themselves for evacuation."*

Act 2: After a while, the public relation team will announce the emergency evacuation to community including the opening of the evacuation centers. At this point people will move to the evacuation spot where there're settings similar to the evacuation center.

Act 3: To recreate the real situation of the evacuation center to learn about proper management, after people move from their houses to the spot, evacuee will first make a registration at the set up point, then to medical screening process before being sent to appropriate spots.

Act 4: Young school children will be escorted by their school teacher to meet up with their parents at the assembly point around the TAO area. This act will teach small children to line up readily and obey their supervisor for evacuation safety. The children will get registered before taken back by their guardians.

Act 5: Two rescue practice concerning health rescue and defense rescue will be performed while participants lined up for registrations.

1. One aging man has a heart attack and is rescued by health volunteers before receiving emergency treatment. In this case, Emergency Medical Service team will take part in the role to show the good way of practice.

2. An elderly woman was lost from the family. Defense volunteer members help retrieving her and bring her back to evacuation center's registration area before meeting with the family. Defense volunteer team helps to find lost person. This will show the process of retrieving lost person by the rescue team.

Act 6: From the assembly point, the public relation team will announce the rooms and other facilities prepared for them. Then they move into the prepared room

Act 7: The public relation team will make an announcement to inform the evacuee to pick up all necessary supply at the distribution point. At this point, emergency bags will be prepared for distribution for the participants to keep.

6). There are 200 participants expected to join the drill. There should be 20 from each village that include village chief, volunteer, and ordinary people.

7). Emergency bags will be prepared by the community with the support of JICA study team for this drill as an imitation of the actual disaster management situation. Each emergency bag contains; 1kg of rice grain, 1 bottle of vegetable oil, 1 bottle of fish source, 1 bottle of water, 1 canned fish, 1 bag of biscuit, 1 carton of milk, 1 set of pain killer medicine, 1 toothbrush, 1 toothpaste, 1 bar of soap, 1 bottle of dish detergent. Cost of each emergency bag is set as 150 baht.

Scene of the workshop

3. Evacuation Drill

Date: 8 March, 2013 (0900-1100)
Place: TAO, T. Gopchao
Objective of the meeting: To exercise the evaluation drill
Number of attendants: About 200 persons from community, kindergarten, TAO, health stations, and JICA study team

<Process of the Drill>

1) Introduction of the drill and preparation (0900-0930)
   - Introduction of the objective and process of the drill
   - Clarification of setting and function of each station and responsible persons

Participants of the drill

2) Preparation of each station (0930 – 0945)

3) Practice of evaluation drill and wrap-up (0945 -1100)
   - Practice of the drill based on the planned acts, i.e., committee meeting to discuss/decide evaluation, announcement of the evaluation, registration, and necessary support to evacuees.

Committee meeting to assess water situation

Evacuation to the evacuation center

Students evacuate to the evacuation center

Receiving evacuees at the evacuation center

Registration of evacuees

Receiving evacuees at the evacuation center

Role play of finding a lost person by OTOS

Medical check by medical staff

Medical check by medical staff

Distribution of emergency bags