

Multi-dimensions of Farmers's Food Insecurity under Commercial Agricultural Production : A Case Study of Ban Pa Phai ,Tambon Mae Pong, Amphoe Doi Saket, Changwat Chiang Mai

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Abstract

The qualitative and quantitative methods are used in this research which studied the development and situation of multi-dimensions of farmers's food insecurity under commercial agricultural production and their awareness .Moreover, investigated adaptive patterns and conditions of community that face food insecurity crises. with sampled who were leaders of the community, experienced agriculturists, senior citizens , agriculturists and the authoritarians from organizations related to process of community's adaptive productions. Results of studying;Multi-dimensions of farmer's food insecurity were complex negative situations of production and consumption of farmers from commercial agricultural production.Moreover,degradation of base resources for production, decreasing of food from both production and natural sources ,changing in relationship in agricultural community.In term of adaptive production behaviors,the farmers with high perception and farmers with low perception adapted themselves in terms of production which differences are statistically significant at the 0.001. The farmers with high perception had behaviors of adaptive production in high level

(\bar{X} = 2.82, S.D. = 0.31) whereas farmers with low perception had behaviors of adaptive production in obviously lower level (\bar{X} = 1.52, S.D. = 0.29). Learning process of farmers found the most attentive activity of farmers 's participation that was workshop about cultivation field crops 66.67% .Moreover, opinions of officers who related to learning process showed highly agreed with the issue ; farmers utilized land after receiving new knowledge to increase productivity and food and the officers highly agreed with this idea (\bar{X} = 2.80). The perception and awareness of villagers were the key of changes also with leaders who brought changes and the communitness in terms of kinship helped gaining the positive relationship in the manner of cooperation.

Keywords: Food Security, Food Insecurity, Adaptive Production,
Learning Process, Adaptive Process

Introduction

The global integration of economic trade has resulted in a global food system. Food supplies under a mainstream food security was an important phenomenon since 1960 (McKeown, 2006) and obviously was related to the Green Revolution throughout to the development of a new agricultural plan, which pushed agricultural production being a force for aim to create supply for the macro-level market. Production under this regime affected to food insecurity as well as negative impacts toward the livelihood of minor producer groups and factors related to their food production in many dimensions. Agriculturists relied on new technologies, thus they faced with unfamiliar production techniques and lost potential along with knowledge about the traditional production .Many minor agriculturists turned into a debt cycle as well as favorable relationships in the agricultural society, which declined. Natural resources and natural food were impacted from agricultural chemicals, decreased in quantity, quality, and variety. This also left continuous impacts to the ecosystem in the long term. It was found that amidst mainstream development caused food Insecurity of agriculturists in micro-levels became an issue that was overlooked through policies of food security that focus on food in market systems.

According to Saeed's work (1994:3) mentioned that the high complexity in a country's food security is due to several factors, including the lack of tools or methodologies capable of assessing the effects of long-term policies in the system, actors failures in playing proper roles in the system thus acting under different influences and pressure, the lack of a holistic system model to facilitate intervention and understanding of the system. However, this study aimed at being explanation of food insecurity's complex as they were not only economic production dimension. So this issue needed an understanding and coping mechanisms that responded to the complex relations of both the food production and communitness, as well as factors that supported and destroyed food security of agriculturists, who were both food producers and consumers which hopefully lay an initial foundation toward a deeper understanding of the complexities of food insecurity as well as the various adaptations and conditions in the practical area.

Research objective

1.To study the development and situation of multi-dimensions of farmers' food insecurity under commercial agricultural production and their awareness.

2.To investigate adaptive patterns and conditions of community that face food insecurity crises.

Research methodology

1.Research population and samples were classified into 4 groups
1.1) 2 leaders of the community and 5 experienced agriculturists 1.2) 5 senior citizens 1.3) 60 agricultural households from 201 households by purposive sampling to agriculturist households which have depended on agricultural as the main career which were approximately 30% of all households and also based on Robert V. Krejcie and Eayrle W. Moregan's determining sample size which defined ratio 70 population size (agricultural households) : 59 sample size. This group were classified into 1) 30 agriculturists that have high perception and adaptation and 2) 30 agriculturists that have not high perception and adaption 1.4) the authoritarians

from Huay Hong Krai learning center and other organizations related to the support of learning process and other production activities for the community.

2. Data collection and utilized in conducting the research, that were

2.1. In-depth interviewing for the community's leaders and senior citizens ;confirm the information from documentary study about the interaction between Chiang Mai's economic development and study area's production.

2.2. In-depth interviewing for old citizens, leaders of agriculturists, big agriculturists and general agriculturists related to the issues; the development and situation of food insecurity changing of production, dynamics of food from many sources and also new consuming including changing of livelihood which related to the food.

3. Questionnaires about adaptive production behaviors of farmers and their learning process used for

3.1 The 30 of agriculturists that has high perception, learning and adaptation and the 30 agriculturists that has low perception, learning and adaptation in term of adaptive production behaviors. Analyzing questionnaire consisted of rating scale in 4 levels regarding to messages about behaviors of adaptation and calculated these quantitative data as mean, standard deviation and level interpretation. Furthermore, t-test was used to find difference between variables of perception and understanding of farmers in the study.

3.2 The authoritarians from Huai Hong Khrai Royal Development Study Centre and other organizations related to the support of learning process and other production activities for the community for all times passing.

Results

1. The development and situation of multi-dimensions of former's food insecurity

This research defined this objective as dynamics of food insecurity which divided by types of food source into three time periods; the period before the community entering into commercial agricultural production (before 1967; period I), the period when the community entered into commercial agricultural production (from

1967 –1978; period II), and the period of their adaptation (from 1979 onwards;period III).

1. Domestic food (food produced from farms/ gardens,food produced/found in households)

1.1) Grain : Period I Glutinous rice was the community's main crop,mostly grown for consumption.Moreover, they planted some peanuts,but only a small amount.The diversity of rice generally planted during the period were all native glutinous rice varieties,such as Khao Lai, Khao Gaew,Khao Pah,Khao Ngaaw, Khao Muey Nawng and Khao Kum (Purple Rice), which were were entirely adequate for their consumption.

Period II Rice continues to be the main grain-type food, where the proportion of production for distribution to Chiang Mai increased.Local glutinous rice seeds that were replaced with new glutinous rice seeds such as RD 6 glutinous rice seeds for consumption and Sun Pa Tong glutinous rice for distribution. Local glutinous rices became unpopular .Afterwards,when village's routes were expanded in 1969 this allowed for production transition towards a commercial production system and increased rice production for markets such as the start of the cultivation of Leuang Yai 148 which was new rice seeds.Due to the soil's fertility that facilitated rice production, farmers yielded good produce despite infrequent soil maintenance. In a later time,there was the change of the main crop from rice to garlic,which occurred due to the motivation of the purchase price of garlic. In1977,there was a change of the ratio of garlic cultivation per household to as great as 5-10 plots for market. When production was accelerated, the soil became not friable. Remarkably, in this period community had the role as the one of rice and garlic producer for Chiangmai.

Period III The production of grains were more influenced by the spread of technical information of external agricultural sectors.It can be said that RD 6 glutinous rice and San Pa Tong glutinous rice,which still was popular among the community for growing,but during 2004 farmers were introduced to new rice grains from the Doi Saket District Agricultural Extension Office which was Sun Pa Tong 1 glutinous rice, which was a grain developed from the Sun Pa Tong glutinous with its better characteristics which suitable for modern harvest-machines and rapidly growing.

1.2) Fiber-typed food :

Period I The villagers planted tomato, cauliflower, cabbage, Thai eggplant, pepper, red onion and cucumber, by being planted after in-season rice during May October in sufficient quantity of household cooking. The food found in/produced in household were usually easy-to-grow vegetables, didn't need much maintenance, and were well resistant to disease and insects. Main such as White Popinac, Cowa, Ringworm Bush, Kaffir Lime, Hog Plum, Lime, Madan, Siamese Neem Tree and Sesbania. Vegetables planting Including Cauliflower, Flowering White Cabbage, Dill, Hairy Basil, Kitchen Mint, Ocimum sanctum, Greater Galangal, Turmeric, Ginger, Fingerroot and Cucumber etc. Fruits found in residences, including banana, mango, tamarind, papaya, jackfruit, star fruit. Note, they were natural mangoes such as Mamuang Nga, Mamuang Kaew and Mamuang Sam-Pee, which were not the same species as in the present. The planting of these fruits wasn't for the purpose of selling.

Period II Edible plants produced in farms such as lettuce and cabbage were excessive to the needs so villagers sold them to merchants. Plants that were mainly produced for distribution and little consumption included tomatoes, green chili (Prik Man) and Thai eggplant chili, and shallots. However, some villagers began to grow single type of plant for distribution such as growing cabbage. Home-grown vegetables in households for consumption were are not different from the past, and had no distribution objectives. The sharing of home-grown fruits and vegetables still remained. However, villagers more depended on market for their consumption

Period III The growing of fiber-type foods in this period emphasized for distribution rather than consumption, which main types included lettuce, cabbage, tomatoes, green chili. Thai eggplants. Regarding in 1983, the Huai Hong Khrai Royal Development Study Centre provided technical and budgetary help for a mushroom cultivation youth group. Fruits that were grown in small degrees. As modern cooking changed towards vegetable cultivation as raw materials, patterns of cooking have changed as well. Nevertheless later on, farmers were campaigned for the growth that can be used for cooking such as Agasta, Cassia simea, drumstick trees, and neem trees in the community. Moreover, it began to study the nutrition of local

vegetables along with the Institute of Nutrition, Mahidol University as basic data in considering the spread of those vegetables for culinary and pharmaceutical uses.

1.3) Protein-typed food :

Period I Raising animals for labor in agricultural production system, such as cattle about 1-2 pairs per household on the average. Cattle were also able to transport their agricultural products to be sold in other areas. For raising animals for meat was still a secondary objective. Raising chickens and ducks for their meat and eggs. The raising style was to simply raise around their own houses. As to pigs, the villagers tended to raise 1 pair / household on the average.

Period II After transportation and communication became more convenient, thus, the role of cattle merchants decreased and cattle domestication reduced, which left only little domestication for consumption. Animal domestication emphasized pigs, chickens and ducks. Production quantities increased as production could be done to create revenues. Domestication was done in one's own home areas and did not leave them to feed for themselves as in the past.

Period III There were only 2-3 agriculturists that mainly emphasized on cattle domestication activity and had to move to the farm because of requiring a large area. Pig domestication clearly decreased due to their odor disturbing the residents. In 1987-1988 in which communities faced crises as fall of garlic prices, production costs rose, the soil degradation as well as agriculturists' increasing reliance on labor-saving devices and various chemical substances, which effected to of living cost. Cow domestication groups arose from the Office of Accelerated Rural Development and the Office of Livestock Development's investment fund and animal breed support in this period. Nowadays the cattle domestication in the village were enough for consumption within the community in quantitative terms. Moreover, fish domestication group in floating baskets, which Huai Hong Khrai Study Centre supported the members with breeds. Duck and chicken domestication that still remained in 20% of all households. In addition, in 1996, training sessions of the blue frogs in cement pits's domestication, which provided the community's part-time job. Remarkably, villagers also obtained protein from natural water sources

as a result of the community's aquatic animal conservation. Furthermore, they have earned additional income from the edible insects such as crickets as food sources and distribution. Supporting of food security in households also obtained from the training session at the end of 2015-2016 consisted of training sessions about the domestication of black-tailed Pradu chickens and *Cairina moschata* for agriculturists which allow agriculture to create more food and income.

2. Food from natural ecosystem (food found in forest, farmland and water resources)

2.1) Fiber-typed food :

Period I The villagers in the this era mainly had leaned on the forest. Non-timber forest products were partly supporting the consumption at household level in both providing food and other useful stuff. The purpose of gathering food from the forest for their consumption only, not for trading purpose. The outstanding fiber food of the area with the genera of vegetable was Oak Fern, because it could normally, easily be found. As to mushroom, including Greenish Mushroom and Num Khao Mushroom, because they were widely found in the area. Amanita Caesarea Mushroom had length of time for yielding much longer than other mushrooms. The bamboo shoots which had been found most were Phai Bong and Phai Sang. In gathering forest fruits was considered an outgrowth from gathering forest vegetables and mushrooms. The important areas for gathering plant food were the forests from the northeastern side and the southeastern side of the village. The villagers in Ban Pa Phai community and from the nearby communities could share with each other for gathering food without conflict. Rice field was another food resource of the villagers, where could find abundantly food plants growing up along the farm plots so rice field, the area had both fiber food (vegetables) and animal protein food, including Phak Gud Doi, Phak Gud Nam, Phak Gud Kher, Phak Wad, Phak Nam, Oak Fern and Amaranth.

Period II : it was discovered that wild edible plants, especially wild vegetables and mushrooms greatly decreased. Because of frequent occurrences of forest fires. The lifestyles of some villagers began to associate with monoculture. Food reliance from forests for consumption was not as great as in the past, but still, there were some villagers that relied on forests as a source of food and

additional income by finding honey in dry seasons and mushrooms in rainy seasons. Wild edible plants found less included wild *Melientha suavis*, *Hydrocotyle siamica*, *Eupatorium tiplinerve* Vahi, elephant ears, vegetable ferns, *Lapia spinose*, sweet bamboo shoots, *Lentinus polychrous*, Barometer Earthstars, log fungi, goose egg mushrooms, Wild fruits decreased as well, which included *Castanopsis* spp., wild mangoes, wild santol, wild rambai, Ma Ham Fan (*Ellipanthus tomentosus*), Ma Nom Maew, and Ma Nom Wua. Wild edible plants that increased in quantity in this period included *Premna obtusifolia*, *Commelinaceae*, land hog plums, *Selaginella argentea*, *Adenia viridiflora* Craib, and *Lactarius* sp. Wild fruits such as Ma Nom Maew, Ma Ham Fan, and Mamao that used to be snack fruits enjoyed by children began to disappear. Furthermore, natural edible plants in natural ecosystem that were gradually decreased due to increased usage of agricultural chemical substances during the past 35-40 years such as various types of vegetable ferns and *Lasia Spinosa*.

Period III Many types of wild edible plants increased in quantity from the construction of check dams, as well as the reduction of forest fires that occurred from the end of March to April along with firebreaks that the community's villagers continuously cleared to reduce the accumulation of decomposed plants.

2.2) Protein-typed food :

Period I The abundance of protein food in natural ecosystem of Ban Pa Phai showed the

animals which were found and caught for being the villagers' food including bullfrog, frog, green flog, snake, squirrel, small gong, crab, river snail, Golden Applesnail, shrimp, rat, Minnow, Batrachain Walking Catfish and Climbing Perch. Moreover, the insects that could be eaten, such as Subterranean Ants, cricket, Mole Erieket, Cockchafer, Maeng Neiw and Maeng Niw, which lived in muds of the fields. However, there were a few large animals in the forest, they occasionally came across a snake, besides, they also encountered some insects such as wasps or in the form of a honey bee/honey bee larvae. Ant eggs could be well cooked and stored for household consumption in the long term. Food found in Mae Pong river the area were Walking Catfish, Siamese Mud Carp, Stonefish, Climbing Perch,

Green Carfish, Tire Track Eel, Minnow, Mystacoleucus, Sik Fish, Chevron Snakehead, Jullien's Golden-Price Carp, Nile Tilapia, Swamp Eel, shellfish and shrimp. Catching fish and other aquatic animals were very easy, because there were many patchy habitat of aquatic animals in Mae Pong river, thus, the fish were numerous and large.

Period II Protein sources from small animals included frogs, small toads, snakes, crabs, Fresh water mollusks, rice paddy mollusks, etc. as well as edible insects such as subterranean ants, etc. became harder to find. Besides, natural food from water sources as aquatic animals decreased in number from both drought, changes of water management systems and agricultural chemical usage. In addition, after weirs disappeared, the river bends in the village were more shallow. Thus, fish reproduced less and decreased in number in all species.

Period III Animals from natural ecosystem can be found in slightly larger numbers as a result of aquatic animal conservation in water sources which had a total distance of 300 meters. Even though the size, quantity, and type of aquatic animal breeds, especially of fish found in the present cannot be compared with the past, but villagers were satisfied with the results.

2. Results about awareness of food insecurity under commercial agricultural production.

Community's awareness is the turning point for community's adaptation especially 2 issues:

2.1 Awareness of production resource bases and production cost was highly raised especially when soil became decadent as a result of using chemical pesticides for more than 40 years. They had to use more chemicals subsequently. Long-time commercial production could obviously bring about consequences during 1982-2000 as most lands had high acidity and productivity decreased among debts as a result of agriculture. Commercial production pushed drastically hurry crop and cash, farmers use a tractor to save energy so that they can keep on growing rice resulting in incomplete product. For growing time, the notice that there still remains rice and farmers purchase fertilizer resulting in waste of money in vain. Since 1982, rice productivity continually decreased. Then in 1987 farmers have been

using chemicals which they were distributed by the government without charges. Initially, rice was productively grown but later purchasing more fertilizers resulted in increasing production cost. Moreover, the ecosystem in cultivation area of the community obviously changed. Frogs and other small animals in agricultural areas are sparsely seen and nobody dared to cook them as food due to chemical agriculture production. In addition, farmers confronted economic recession as a result of high production cost with low-price productivity in 1997. Some farmers started thinking of such unsustainable production circumstances leading to learning and asking for advices from Huay hong krai development learning center. The initiator included Mr. Sommai Thain, Mrs. Suwan Fongwanna and Mr. Surachai Morakotwichitkarn. They originated producing compost from natural materials such as rice stubble, sawdust, old mushroom germs and weeds fermented for maintaining soil together with cow droppings. This experiment had been conducted for 4 years and they realized better condition of soil.

2.2 Awareness of health of farmers and residents in the community: during 2002, villagers had symptoms of respiratory disease but they did not critical change behaviors. In 2002, Dr. Sithinat Prabudhanitisarn and his team motivated the community to pay attention to health issue and agricultural product cost by with training about how to produce bio-fertilizer. After that, villagers paid attention to changing their own agricultural production methods. However, the turning point that made people to pay attention to issues of commercial production which affected health was blood inspection which was arranged in Ban Pa Phai School on 8 February 2003. The blood result indicated that there were only 5 from 102 people who had blood test in normal level. Consequently, the health issue was an essential condition enabling the leaders and farmers to initiate discussion about the adaptations which advantaged to their's health.

3. Adaptive production and learning process of Ban Pa Phai's farmers through academic knowledge and technique transmission showed as follow;

3.1 Analyzing behaviors of adaptive production of 2 farmer groups, it was found that,

Table 1 Adaptive production's behaviors of farmers

Adaptive production's behaviors	Farmers with High Perception		Farmers with Low Perception	
	\bar{X}	S.D.	\bar{X}	S.D.
producing bio-fertilizer in the household	3.28	0.85	1.52	0.82
producing herbal pesticides in the household	2.40	1.07	1.06	0.24
utilizing bio-fertilizers in agriculture	3.53	0.56	1.76	0.98
utilizing herbal pesticides to eliminate pests	2.56	0.98	1.22	0.62
implementation of organic agriculture	3.00	0.80	1.63	0.58
implementation of mixed agriculture	3.06	0.66	1.68	0.99
growing vegetables for household consumption	2.96	0.99	2.08	0.95
growing fruits for household consumption	2.21	0.97	1.92	1.00
raising livestock for household consumption	2.12	0.90	1.79	0.65
gaining benefits from reducing chemicals in agriculture	3.43	0.56	1.92	1.02
gaining benefit from reducing the pesticides	3.28	0.85	1.70	0.77
recognition on ecosystem 's balance in farms	2.81	0.64	1.57	0.49
practicing agriculture with various types of plants	2.78	0.79	1.86	0.79
associating in the community's agricultural activities	3.37	0.79	1.28	0.67
associating in village's network for exchanging knowledge with other communities and external organizations	3.09	0.73	1.35	0.48
Average	2.86	0.31	1.52	0.29

Analyzing adaptive production behaviors in two groups of farmers with high and low perception comparatively as such $t=22.465$, $p<0.001$. Thus in summary, the farmers with high perception and farmers with low perception adapted themselves in terms of production which differences are statistically significant at the 0.001. The farmers with high perception had behaviors of adaptive production in high level ($\bar{X}=2.86$, $S.D.=0.31$) whereas farmers with low perception had behaviors of

adaptive production in obviously lower level ($\bar{X}=1.52, S.D.=0.29$)

3.2 Learning process of Ban Pa Phai's farmers through academic knowledge and technique transmission emphasized the agricultural activities and professional developments such as meetings and workshops could be summarized that ;

Table 2 Learning process of Ban Pa Phai's farmers through academic knowledge and technique transmission.

Activities	Participation		Implementation of Participators	
	N = 30	(%)	N Varied on Types	(%)
Workshop about livestock promotion				
Raising beef cattle	4	13.33	4 (N=4)	100
Raising chicken	15	50	15 (N=15)	100
Rising pig	5	16.67	5(N=5)	100
Rising frog	6	20	6(N=6)	100
Raising duck	2	6.67	2(N=2)	100
Growing forage plants	1	3.33	1(N=1)	100
Workshop about fishery				
Fishery in creel	13	43.33	10 (N=13)	76.92
Workshop about cultivations				
Field crops	20	66.67	20 (N=20)	100
Fruits	12	40	7 (N=12)	58.33
Vegetables	2	6.67	2 (N=2)	100
Workshop about agricultural product processing				
Fruits	11	36.67	5 (N=11)	45.45
Field crops	8	26.67	7 (N=8)	87.50
Vegetables	4	13.33	4 (N=4)	100

3.3 The perspectives of the officers who operated the supportive agricultural projects in study area about their collaborative activities.

Table 3 The opinions of officers about farmer's learning process .

Issues	\bar{X}	S.D.
Initiation to solve the problems of agricultural production and relevant processes		
Farmers participated in initiating the projects according to problematic circumstances and their own needs	2.50	0.850
Farmers participated in operation effectively	2.20	0.768
Asking for advices about agricultural production issues and vocational development with the officers	2.70	0.571
Farmers had the responsibility to their duties.	2.45	0.605
Technological adoption of farmers		
Farmers utilized local resources to reduce production cost	2.55	0.887
Farmers were interested in new knowledge and technology to develop their careers and life quality	2.70	0.657
Farmers utilized land after receiving new knowledge to increase productivity and food	2.80	0.768
Results of working as agricultural group		
Working as team/organization originate self-reliance through mutual activities	2.60	0.681
Working as team/organization can increase production power and/or agricultural capital to farmer	2.80	0.616
Working as team/organization create better household economy	2.70	0.801
Average	2.52	0.711

According to this collaborative activities, officers performed as the process skillful facilitators that helped groups's objective met effectiveness as the explanation

“flexible processes and open interpretation furnished favorable circumstances for collaboration”. (Carloni,A. 1997 in FAO: 156)

3.4 Enabling conditions of adaptive production in Baan Pha Phai

3.4.1 The important roles of community leadership and communitness as the conditions for food insecurity management.To manage food insecurity was initiated by the leaders and also external officers who stimulated problem solving. Leaders and active farmers build up the learning especially, to gather people for the participation on research by asking for the financial support from Thailand Research Fund in working on the research 'Strengthening the Community by Using the Traditional Custom ; The case study of Ban Pa Phai, Tambon Mae Pong, Doi Saket, Chiang Mai in 2001'. This origin made the people in the community come to work on it together by developing a new communication mechanism along with using cultural events.Strengthening the mechanism and encouraged people in talking about the food security which related to commercial production and reflecting on opinions and feelings supported the expansion of ideas, knowledge and content of food insecurity issues continuously.Leaders had important role in taking shape the collaborative managements between people in the community and other supportive organizations.That leaders's role which Moore (2003: 12) stated as the networker,who offers procedural assistance and links the vulnerable groups to outside technical experts and resources that may enable them to draw up acceptable settlement options.

3.4.2 The communitness in terms of kinship helped build a great relationship in the manner of cooperation,coordination and compromise rather than conflict.This was regarded that food security management in Ban Pa Phai has rehabilitated the community strategically and created positive thinking that would bring success in practical term.

Conclusion and Discussion

1. Multi-dimensions of farmer's food insecurity were complex negative situations of production ,consumption of farmers and natural resources and natural foods's degradation from commercial agricultural production.Beside changing in relationship in agricultural community.

2. In term of adaptive production behavior of farmers showed mean and standard deviation of adaptive production behaviors in two groups of farmers with high and low perception comparatively as such $t=22.465, p<0.001$. Thus in summary, the farmers with high perception and farmers with low perception adapted themselves in terms of production which differences are statistically significant at the 0.001. The farmers with high perception had behaviors of adaptive production in high level ($\bar{X}=2.82, S.D.=0.31$) whereas farmers with low perception had behaviors of adaptive production in obviously lower level ($\bar{X}=1.52, S.D.=0.29$).

Learning process of Ban Pa Phai's farmers through academic knowledge and technique transmission revealed 3 most favourite activities that are workshop about cultivation field crops 66.67% raising chicken 50% and about fishery 43.33%

Moreover, opinions of officer who relate to learning process showed highly agreed with the issue ; farmers utilized land after receiving new knowledge to increase productivity and food and the officers highly agreed with this idea $\bar{X}=2.80$. Farmers were interested in new knowledge and technology to develop their careers and life quality $\bar{X}=2.70$ and asking for advices about agricultural production issues and vocational development with the officers. $\bar{X}=2.70$

3. The outcomes after adaptations of in-farm and off-farm activities, we could see that the occupation of agriculture would still focus on cultivating rice and garlics. However, forming of in-farm and off-farm groups that created additional revenue and food sources and formed by combining of variety purposes such as capital group for the production and savings, health and welfare groups, wisdom and development resources group etc. which make villagers have better lives gradually. Shifting the focus of food security to food producer would also reduce pressures on their agricultural resources, enabling them to move towards more sustainable

agricultural practices. According to sustainability, for which Chambers and Conway emphasized the social as well as the environmental dimension such like enhancing capability—in facing change and unpredictability (Chambers and Conway, 1992: 31).

4. Conditions of successful adaptation ;

4.1 The perception and awareness of villagers were the key of changes, while based on empirical evidences and local knowledge into existing efforts to identify causal relationships between environment, economy and food outcomes as the concept of contemporary food security study which has raised awareness of the importance of local knowledge and local perceptions of problems and insecurity in understanding the causes (and results) of that insecurity, as in the rural development work of Carney (1998: 2).

4.2 There were leaders who conducted changes and solved problems in the manner of active learning which extended to other agriculturist's movement. These were relevant to assertion of Carroll (2010: 54) that said wider structural and economic barriers often exist and affect local economies, most of which are beyond the reach of grassroots initiatives. There is a need for real leadership as well as an organized effort in order to bring about change and tackle the problems. Significantly the driving process of community's adaptation under the assistance of Huai Hong Khrai Royal Development Study Centre who sponsored the process so that the community could strengthen potentials to figure out the crisis's causes as well as planning to cope with problems with using efficiency strategies from brainstorming which was flexible by situations, inspecting and improving the managements continually. According to that situation and process, there realized as Agranoff and McGuire (2003:15) mentioned cooperative management may be collaborative actions with mutual goals, officially or unofficially in action processes of organization groups with mutual arrangements in solving problems that one single organization cannot easily solve such like which remarked on Carloni's point of view; operation of the participatory process therefore depends on how narrowly the government prescribes its development policy and how narrowly the policies are interpreted and implemented government staff (Carloni, personal communication, 1997 in FAO: 156).

3) It showed reflection community's horizontal relationship such as neighbors, and the relationship with the outside; vertical relationship. Maintaining a food security which the communitness in terms of kinship helped build a great relationship in the manner of cooperation.

Suggestions

The guidingly-suggested issues for next researches that are the dynamic issues such as an in-depth study of the food security and adaptations to climate change, contract farming and its effects on food security, the contribution of NTFPs to support food security and livelihood.

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