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### The Security of Drought-prone Community in Upper Chi Watershed\*

Sombat Serthpol<sup>1</sup> and Prasit Kunurat<sup>2</sup>

<sup>1</sup> PhD student of Development Science Program, Faculty of Human and Social Sciences University asked greats  
E-mail: [Nabaknajang@hotmail.com](mailto:Nabaknajang@hotmail.com),

<sup>2</sup> Associate Prof. Department of Public Administration Faculty of Human and Social Sciences Khonkaen University  
E-mail: [kprasi@kku.ac.th](mailto:kprasi@kku.ac.th)

**Abstract:** Although many communities in Upper Chi watershed always experience the continued drought on a regular basis, but they can exist all along. So I have the question that how do they can exist? How are their security? Therefore, this research aims to study the security of drought-prone communities in upper Chi watershed. The qualitative method was used in this research. Data were collected by in-depth interviews the 50 key informants. They are 1 community reader, 5 local scholars, 1 the chief executive of the Sub-district Administrative Organization (SAO), 20 group and network committees and 23 farmers. The data was analyzed by content analyzing and descriptive. The results show that the security of the drought-prone community in Upper Chi watershed is the ultimate results of adaptability to internal and external factors. Until the community can still maintain and build the security through using process the capitals. The security in various dimensions consists of; 1) economic dimension: working and incomes on farm and non-farm, debt management, more saving and invest on farm and non-farm, 2) social dimension: more group and network building, community fairs and participants, 3) food dimension: adequate food sources, abundant food and varieties, accessible, useful, safety and decreasing food, 4) environmental and resource dimension: allocation, protect and conserve.

**Key words:** The security, adaptation, drought-prone community, upper Chi watershed.

#### 1. INTRODUCTION

Human security is the ultimate goal. But at present human security is extremely challenging from various disasters, both from human acts such as terrorism, racism, food shortages and homelessness and so on, and natural disasters such as floods, earthquakes, tsunami and drought, etc., (UNDP. 1994 [1], Brauch, HG

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2005 [2] & Beck, U. 2009 [3]). These disasters have affected to the human security seriously. Especially the drought.

Drought is lack of the rain or little rain. Because the rain does not fall in the seasonal, it falls little, it not fall so long time and it fall once a long time. So it makes the shortage of both runoff and groundwater and it impacts on human such as shortage of water for the farming, consumption and using for livestock. So the drought effects on the global warming and human security. (IPCC. 2014 [4], Spring, U. O. 2015[5], Steffen, W., 2015 [6] & Yusa, A., Berry, P., Cheng, J.J., Ogden, N., Bonsal, B., Stewart, R. & Waldick, R. 2015 [7]).

Thailand experiences the drought on a regular basis. Because it's located in the equatorial zone which is the hot weather. So every region of Thailand suffers the drought every year, especially the Northeast, because it's in the rain shadow. The average annual rainfall in northeast is mostly less than 1,000 millimeters in many regions. The Chi watershed which is the three major watersheds in northeast is lowest rainfall, it's only 1,600 millimeter. (Ministry of Natural Resources and Environment, 2010 [8]). However, although the Chi watershed is the lowest average rainfall, but each area has different average rainfall, especially in the upper Chi watershed. It's lowest, because it's in rain shadow. Some areas have rainfall less than 1,000 millimeters. And it stopped fall in the rainy season for 15-20 consecutive days. (Center of Geoinformatics for the Development of Northeast Thailand, 2007 [9], Ministry of Natural Resources and Environment, 2010 [8]). So they are experience the drought 1-3 times per year which is the most severe drought. (Office of Natural Calamity and Agricultural Risk Prevention, 2013 [10]).

But there are many researches pointed out the communities in the upper Chi watershed can maintain and built their security, despite they experience the drought on a regular basis. Such as the researches of Teerawat, S., 2003 [11], Thongyoo, M., 2005 [12], Prakhrongsri, P., 2008 [13], Ministry of Natural Resources and Environment, 2010, and Kerdsook, W. and Kerdsook, W., 2010 [14]). So this article is to study the security characteristics of drought-prone communities in the upper Chi watershed. It has applied the human security concept of UNDP. (1994) [1] and the Ministry of Social Development and Human Security (2012) [15]. It consists of economic, social, food and natural resources and environmental dimensions.

The results can be applied to drought-prone communities. It can be policy recommended to relevant agencies such as: the Office of Social Development and Human Security (NESDB), the Office of the National Economic and Social Development Board, Municipal and SOA etc.

## **2. OBJECTIVE**

To study the characters of the security of drought-prone community in upper Chi watershed.

## **3. METHODOLOGY**

This research is qualitative research. The data were collected on households and community level by in-depth interviewing the 50 key informants or the target groups; which consist of the community leader, local wisdoms, village and group committees and the chief of SOA. They were purposive selected by follow characteristics 1) lives in the community for 30 years or more to know the change of the community, 2) important plays the role in community development to know the direction of community security. The semi-structured interview guideline is the tool. The key informants or the target groups were individual

and group interviewed. For getting the complete information, Observing both participant and non-participant are used for data collection. After the data were collected in each day, they were organized by compiling, categorizing, grouping, making tables, entering code and meaning. And after that, they were checked the validity to confirm the reliability by triangulation as follows: 1) data triangle; examine the data from different sources, 2) Researcher triangle; by using collaborative research assistants to confirm the information obtained, 3) Theoretical triangles; by using different theories. The data were analyzed and reported by descriptive, synthesis, interpretation and definition follow as the based on the realities of social phenomena.

## **4. RESULTS**

The results can be divided into 2 parts: 1) the characteristics of drought in the upper Chi watershed; 2) the characters of the security of drought-prone community in upper Chi watershed.

### **1. The characteristics of drought in upper Chi watershed**

Chi watershed is one of the three major rivers in the Northeast; Khlong, Chi and Mon. Chi watershed is the longest watershed in Thailand. It has the length 765 km and total area of 49, 476 square kilometers. (Royal Irrigation Department. 2009) It's in the 14 provinces of the Northeast or 3 quarters of the region. Upper Chi watershed is the largest area. It is 28,768 square kilometers which in Phetchabun, Chaiyaphum, Loei, Nong Bua Lam Phu, Udon Thani, Khon Kaen and Nakhon Ratchasima.

Drought in upper Chi watershed can be divided into 4 types: 1) Meteorological drought; it's of the result of the lack of rain. Because it's in shadow rain, so it has little rain. The rain does not long time. Some areas have the rainfall average less than 1,000 mm. per year. During the rainy season the rain has been discarded for 15-20 consecutive days. 2) Hydrological drought; it found that the water in the canals, swamps and pools was reservoirs decreased. Some years it has passed such as 2014 and 2015 A.D. 3) Agricultural drought; it's the shortage of rain and water. The agricultural systems of the community are damaged and the skinny animals such as dried chilies, dead leaves, aphids, curly leaves are yellow and the cows and buffalos are thin. 4) Socio-economic drought; it's the results of the three drought types on above mentioned which affected to the way of life of the community to changed: namely; down and loosed productivities. The Community members worry and migrate out for working. These results are affected to the relationship of community remembers; the relationships of community are far way and lack of warmth at the household level.

### **2. The security of drought-prone community in upper Chi watershed**

The security of drought-prone community in upper Chi watershed is the results of the adaptation ability to both internal and external factors such as drought, labor shortages in the community, policies to promote economic growth, labor markets, capital markets, technology markets, etc. These factors caused the changed community security but the community is still maintain and build the security on economic, social, food and natural resources and environment: as detailed below;

#### **2.1. Economic dimension**

Economic security consists of ....

1. **Jobs and income;** the community economy is “Twilight.” It’s the both agriculture and non-agricultural economy. The main jobs and income are in the agricultural sector. Because the community makes the agriculture for sale. At present, the community cultivates sugarcane for more than 80%, the rice about 20% for consumption and chilli for sale about 7-8 acres per household in the summer. As someone said

*“...There is sugarcane more than rice about 80%. The rice is planted less because there is not the water and it’s hard for planting and watching out. Someone has finished planted sugarcane, he can go out for working and after that he will come back to cut it. Someone is rich. He can buy the fertilizers for the sugarcane. He will get several hundred thousand. ...”*

Based on the calculations income numbers of community in the agricultural sector, it can be calculated that the average annual income of the community is approximately 6,220,500-32,652,000 baht. More addition the community also non-agricultural works both in and out community such as the commissioning of trade, government and private sector employees and grocery stores, etc. By calculating the out farm income number that can be calculated, it is found that the community has out farm income about 4,352,000-4,816,000 bath per year. So in each year the community has an estimated working income 10,572,500-37,468,000 bath. When comparing the basic necessities of the National Economic and Social Development Board (NESDB), the average annual income of community is limit 25,000 baht per one person. So the annual community income is only 5,900,000-8,850,000 baht per year which is lower than the community income from working. Therefore, the community is more secure than the basic necessities criteria.

2. **Debt and debt management;** the debt is also a continuing problem for the community, both formal and informal debt. Because the community can access the more and faster funding sources. The most importantly, some policies encourage the community to get into debt easily, like the million fun, loan fund of the community and the helping policy the farmers of the bank, etc. Although the community has a lot of debt. But the community can still handle the debt properly through the processes as follow: 1) postponement; sometimes the community does not bow to pay debts. The community can postpone debts from creditors. As one member said “... someone is familiar with the creditors, he can postpone the debt. But if he is not familiar with the creditors, he can’t postpone...” 2) Debt circular, which is borrowing the debt from other to pay the other, like someone said “... Someone borrowed the money from one creditor to pay another...” 3) The compromise or debt division; sometimes the community has insufficient funds to pay off debt. But the community wants to reduce debt. The community can compromise or divide the debt by agreement with the creditors. 4) Abeyance which is the one policy of the government. The communities have joined the debt abeyance program. It helps to abeyant the debt.
3. **Saving;** when the community has money, most of money is saved in the banks and another is saved with its self. Thus, there are two types of savings: 1) Self-savings of 20-30%, which is spent on daily life, such as living, philanthropy, neighboring, etc., 2) Savings with financial institutions or the savings group is about 70-80%. The real savings of the community is about 20% of the remaining money spent, like someone said;

*“...Suppose that someone has about 100 baht, he has used about 80 baht and other 20 baht was saved. But most people used up and no saved it. ...”*

- 4. Investment;** in the past, the community mainly invested in agriculture. But when the community suffers from the drought. The community turns to invest in more non-agricultural sectors. Therefore, at present, the community invests in both agriculture and non-agricultural sectors, such as buying the tractors, fertilizer pesticides, drilling groundwater, sending children to study, selling, coin drinking water, wool hat, bicycle repair and savings, etc. The proportion of investment found that although the community did not set a budget for direct investment, but the community invests annually. The average is not less than 5-10% of earns per year, as one member said;

*“... We invest every years such as in the first year I brought the sugarcane about 5,000 bath per 1 ace for planting, plowing about 1,200 bath per 1 ace, buy the fertilizers, injectable drugs. ...”*

Therefore, the economic security of the community. Because the community has several works, both in the agricultural and non-agricultural sectors. The community has more income and can bring income to invest in both agriculture and non-agricultural sector. At the same time, the community can continue to save. These process can make the community to security.

## **2.2. Social dimension**

Social security features include:

- 1. Social groups and networks;** they important role plays in social security. It shows the good relationships of the community at the family, kinship, neighbors and community level, although the organizations, institutions and department stores have the role paly in community. These groups and networks are informal and informal, such as the butler / maid group, food group, buffalo children group, community committees, temple's committees and public forest committees, 25pineapple eyes committees, wool hat group, women's development group, etc. These groups play an important role in maintaining the common interest of the community. As one member said

*“...Worked in group, worked for the community, if the people in the community do not work, there will be on one to work. In the first, I thought that I worked for the community for long time, I would stop because I am trier. But members selected me to work again, they think I am a good, I can be useful for the community, and more importance, I can contact to the adults or masters. ...”*

In addition, there are also social networks that contribute to the preservation and build the social security. There are two types of social networks: 1) horizontal social networks, which result from good relationships at the community level. It is an informal relationship, such as Tha Khro, Krang, Jod village and the savings network of 4 district village, etc. 2) vertical social network, such as official agencies / organizations/institutions, the municipal administration, the province, the health department, the department store and so on. These social networks have helped, supported and protected the community to obtain the security.

- 2. The community welfare system;** It's the helped, supported and protected system the community to maintain and building the community security, divided into 3 categories; 1) the allocation of natural resources and environment for equal utility, such as finding water resources, establishment of interest public forest, community forest, 2) support when faced drought, it has two types; the first, repairing drought-damaged homes, second, take the fund for livelihood, 3) Helping the dead's family or building the cremation fund.

- 3. Participation;** divided into 5 types: 1) planning and decision making together by both informal and informal talking, such as the discussion of the elders and discussion at the meetings, 2) working together; after planning and decision making together the community has always worked together. 3) Get the results together; after the works have been completed. How the results were happened, all community members must have accepted together, 4) evaluation or monitoring together; when the work was ended, the community also evaluation or monitoring through formal and informal discussions, 5) Modifications and improvements together; if the activity is defective, the community always willing to modifications and improvements together.

*“...Nowadays, other communities think that we are harmony, assistance. So we have gotten the trust in Thumbon level. Therefore, the TAO established our community to be pilot community for doing the activities such as Boon Bang fire, drug-free community, etc. ...”*

So, social security is results from the good relationship between members of the community and the others which they helped each other through group and social networks. In addition, the allocation is the system to make community access to and use the resources all times. And the community participant has become an important process for maintain and build the community secure.

### **2.3. Food**

Food security features include:

- 1. Adequate food source;** there are two types of food sources: 1) physical food source which has 2 types, first; natural food sources, in the past, natural food sources were very abundant, but nowadays they are decreased. Somewhere has been destroyed and diminished. But the community has adapted to find the new natural food sources from the outside which far from the community such as Cern, Prom River and canals, creek, pus and swamp which near Kaset Sombun district. These food sources are immediately accessed because there is not the Prohibitions, especially the community has the cars convenient transportation system. As one member told me,

*“...The food in the community is less and rarely, it's hard to find. If we have any time, we took a motor out to sow near Ban Non Kok or Kaset.Sombun district. Because over there is a lot of fishes. We could fine the fish from morning to evening. Sometimes we caught fish in ponds which are opened for catching the fish in one a year. We can play to access which according to each fishing equipments such as 20 baht for a book and small net and 100 baht for large net, etc. ...”*

Second; market or food selling cars, which is the main food source of the community in nowadays. 2) Food resources in the social and cultural dimension; they are sharing, changing, borrowing and food fund. So these processes are the food sources of community for maintaining and building the community security.

- 2. Abundance and variety;** even today, the community's natural food resources have diminished and disappeared. But the community has still the food for livelihood such as frogs, fish, shrimp, shells, vegetables, shade, vegetables, tilapia, neem, mango, tamarind, coconut, bamboo shoots, mushrooms, etc. These foods have brought from the markets and nature in and out the community.
- 3. Food accessibility;** although food sources and food in the community have decreased. But the community can create the ability to access the food from outside the community, such as buying food.

Food production Building a food network. These processes are accessibility to food.

4. **Useful and valuable food;** although the main community's food is depended on markets. But the community still maintains the food security by buying the useful and valuable food such as food fresh, seafood, meal, egg and fish etc. The community does not popular consume the instant food such as the fast food and canned food. The community continues popular consumes the new cooked food and varieties, such as the consumption of each meal also includes the rice, egg meal and vegetables. These foods has Nutritional value.
5. **Safety food;** although the community mainly buys food from the markets. But the community still realizes to food safety. The community focused on local and seasonal food on the first. Sometime before buying food, the community has check the food sauces by asking where the food came from.
6. **Reducing the food;** in the past there were a lot of community members, especially for each family, because some families have about 8-10 members, so the amount of food for each meal is large. It is a burden. But nowadays the number of household members is about 2-3, so the amount of food for each meal is reduced. Reducing the amount of food makes the community feel that; the community can access to food at any time. Even though the community has buy regularly food. But the community is still purchasing power. Because the community has more income. As one member said

*"...Previously, if there is less food. It would not be enough to consume for big family, because there are about 7-8 people in some family. But nowadays there is a little people in family, it's only about 2-3 people. The food quantity was reduced, less eat and eat just enough. The community can existence with little food. The community can buy the food from the markets about only 1-2 types for eating in diary.*

In summary, although the natural food sources in the community were degraded and diminished considerably. But the community can still maintain and build the food security through the process; finding more food sources, food network building, reducing the food number, increasing potential to access, consuming the safety food and self-food production.

#### 2.4. Natural resources and environment

Natural resources and environment security features;

1. **Allocation and Utilization of Natural Resources and Environment;** to make the community can access and thoroughly use the natural resources, it can divide into two types: 1) Increasing and replacing the natural resources; such as digging ponds, making clean water tap, establishment the community forests / public forests, etc. 2) Canal allocation; it's allocation the water for the community in the area of field. 3) The coil canal; the community has dug a canal to get water into every household's fields.
2. **Protecting the natural resources and the environment;** it is a process of preserving the natural and environmental resources of a community that can exist forever to respond the full utilization needs, effective and balanced as follows:

**2.1. Preserving;** in the past the natural resource and environment was less preserved. The community only used it without realizing to preserve. But nowadays, since 1999 the natural resource and environment were concrete preserved by following; 1) Using zones; such as forests, ecotourism, ecological tourism, 2) the economically natural resources and the environment using; In addition,

some activities that affect the deterioration of natural resources and environment were reduced or abolished such as burning, cutting and feeding the animal in the forbidden area etc. 3) Let it be natural; it is the one of an important preservation processes, for example, the community has let the trees spontaneously occur. Only within 5-6 years, the forest has become more fertile, etc.

- 2.2. Prevention;** it consists of 1) building the forest fire protection, 2) watching out the fire, 3) creating the rules, 4) creating consciousness, 5) Proper disposing the waste 6) exhibition to cut the forest at edged river. Moreover, one of the factors that affect the protection of natural resources and environment is the leader, especially the monk who is the spiritual leader. He is the mainly play a role to protect the forest fire although natural resource and environment. Because in the past, the forest fire was occurred every year, but since 2010 he had lived in the community, the forest fire does not occur. As one member said

*"...In the past, there was a fire every year. Because no one cared and watched out. But, since the monk has come here. He watches out the forest fire always. Sometimes he took the community's member to around the mountain for forest fire protection lines such as small walking and leaf sweep, etc. So there is no forest fire for 5-6 years. ..."*

- 2.3. Recovery;** it's repair process the degrade natural resource and environment for reusing, better and not to lose by following; 1) Replacement; the community planted more than 10,000 trees in more than 400 aces, 2) weir and canal dredging, 3) Removal the hyacinth or wood chips in the water source.

In summary, natural resources and environment security, it's a result of the ability to the community's adaptation thought the allocation, conservation, protection and restoration the natural resources and environmental, or for using the natural resource and environment again.

## 5. DISCUSSION AND CONCLUSIONS

### Discussions

The community security is ultimate results of adaptation to the drought-prone community to external and internal factors. The adaptive processes for security were occurred from using the capitals in the community. They are the natural, physical, human, social and money capitals. These capitals are the main factors to success the community' security under drought-prone. The adaptation by using the capitals is the manage ability the drought for maintaining and building the community security which related to the IPCC' natural disaster management concept, it showed that adaptability is the sum of the strengths or special attributes of community resources or capitals that will be used to manage or mitigate the natural disasters, (IPCC. 2012). In addition, the findings according to research by Dulal, H. B., Brodnig, G., Onoriose, C. G. & Thakur, H. K. (2010) [16], pointed that communities need the capitals to build the resilience in facing the effects of climate change. However, although the community maintains and build the security by using the capitals, but the community gives the importance on economic dimension, especially to increase revenue which relates the research of Mingtippol, O. (2009)[17] and Tejagupta, C., Soonthorndhada, K., Poney, W., Pothawin, T. & Jirawattananon, M. (2010) [18], which found that the community attaches importance to economic security. It focused on income increasing. Therefore, the community adapts to maintain and build the security by variety workings in both non-agricultural and agricultural sectors, such as employment,

farming, trading, animal husbandry, etc. So the community economy is bilateral, according to the research by Inmuong, Y. (2556) [19], Sirisatitkit, P. (2559) [20], which found that the occupations in both agriculture and non-agricultural sectors such as animal husbandry, cropping, contract farming, selling and employment etc., are adaptive process of community or agriculturists in northeast. So the adaptation to maintain and build the security of the drought-prone community in the upper Chi watershed is the diverse characteristics on economic; such as the selling, motorcycles repairing, farming, employment and husbandry, etc., and social; such as cultural heritage conservation, etc., cultivation; such as reducing the crops amount and choose the drought-tolerant crops, etc., which relates to the studying of FAO (2006) [21] mentioned that succeeded local adaptation to climate change and variability has many ways, one of them is modifications the socio-economic activities, such as various livelihoods, marketing facilitation and integration of cultural knowledge, etc.

### CONCLUSION

Although communities in the upper Chi watershed are always drought risk, and the drought has occurred and affected the community continuously. More additions, there are also external factors affects to the community security; namely, capital markets, labor markets, product markets, government policies and technology. But community in the upper Chi watershed is also able to adapt to maintain and build the security in various dimensions by effective deploying existing capitals in the community, which consist of economic, social, food and natural resources and environment capitals. And although some capitals are dwindled, but the community can still use other capitals to replace or convert other capital to maintain and build the community security so on.

### SUGGESTION

1. Should have the study the community security related to the climate change on other dimension such as flood for finding the guidelines to protect, empowerment and support to maintain and build the sustainable security.
2. The closely agencies in local level; such as Sub-district Administration Organization (SOA) and Municipal administration, etc., should have the policies to concretely encourage the community to have occupations in both non-agricultural and agricultural sectors such as product integration, marketing and working networks etc., because the community will have occupations and incomes which are the community security warrantee so on.
3. Should have the networks to support and assistance the communities before, during and after the community concretely faces drought. So that the community can maintain and build the sustainable security.

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