

# **Research for Knowledge Development of People about Decision Making for Voluntary Carbon Market: Case Study of Inpang Community Forest Network, Kudbag District, Sakon Nakorn Province 2010<sup>1</sup>**

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## **Abstract**

The purpose of this action research is to develop people's knowledge for making decisions in the voluntary carbon market by studying the case of the Inpang Community Forest Network, Kudbag District, Sakon Nakorn Province. The objective is to study regarding the voluntary carbon credit trading knowledge and understanding of the people in Inpang Community Forest Network, to create essential awareness and understanding regarding the advantages and disadvantages of voluntary carbon credit trading, and to follow up the operating result after providing knowledge to the people in the Inpang community and the decision making regarding voluntary carbon credit trading.

The research discovered that people's knowledge and understanding of the Inpang Community Forest Network are insufficient to make decisions on taking the community forest into the voluntary carbon market. Although the research results of the report discovered that people's knowledge and understanding is increasing, it is not a reason to omit a clear vision of that topic because the research discovered that people's knowledge and understanding of Inpang Community Forest Network are insufficient to make decision on taking Community Forest into the voluntary carbon market. On the other hand, the government unit should correctly and suitably provide knowledge and understanding to local people, especially for price negotiations in which the local people of Inpang Network still insufficient and need the

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assist of the govern units in order to achieve a suitable price of trading voluntary carbon credits.

Moreover, the research results are also pursued the hypotheses: the knowledge and understanding enhanced to people of Inpang Network of which the researcher influences on local people's decision making; people of Inpang Network have not signed on trading Voluntary Carbon Credit to the Chicago Carbon Exchange (CCX) related to providing knowledge and understanding of fair price trading together with the researcher's emphasis on future that local people might sell Carbon Credit to our country in which Carbon Credit trading with Thai Airways International Public Company Limited.

**Keywords:** Action research/ Voluntary Carbon Market/ Inpang Community Forest Network

## Introduction

Nowadays climate change and global warming are important issues for research and study around the world. All of human and animal activities release greenhouse gases, (consisting of water vapour, carbon dioxide, methane, nitrous oxide, chlorofluorocarbons and ozone) which are the main cause of global warming. As a result, the planet's temperature has increased gradually year by year leading to the meltdown of glaciers throughout the earth. With the earth's temperature rising every year, natural disasters like flood, ocean warming and storms, for example, are bound to follow.

Needless to say, as agricultural products are extremely susceptible to weather conditions, farmers themselves will have to adapt. Since carbon storage is in the soil itself, greenhouse gas emission necessarily is inherent in agriculture from the very beginning. Lobell and Field (2007) observe that warm weather has to some extent offset the fertilization effects resulting in increased carbon dioxide (CO<sub>2</sub>) levels and this leads to a greater combination of greenhouse gases.

Moreover, Johnson and Ward (1996) discovered that methane is an unexpectedly more potent greenhouse gas than carbon dioxide, and animals are the principal source of methane emissions. Livestock like cows, sheep and goats are herbivorous animals and during their normal digestion process they create large amounts of methane; so animals do contribute to global warming as well. Of course, animals have always produced methane and it is far more difficult to rectify this problem. Human activity, on the other hand, is something we can control, and what humans do is generally more harmful than animals. To successfully tackle global warming and climate change, international agreement should be created and both public and private organizations should collaborate to make it work.

Evidently, the global warming problem is a global issue that can only be solved at the international level. A part of an attempt to solve the climate problem is the market mechanism proposed by the Kyoto Protocol (Humbad *et al.* 2009) according to which something positive can be substituted for greenhouse gases emission. For example, afforestation must be compensated for by an increase. Understandably, when the earth has a lot of green areas, it will absorb carbon dioxide and reduce greenhouse gases in the atmosphere. An agent or a country responsible for the creation of green areas is thus entitled to a certain amount of "Carbon Credit" to be used to offset the damaging emission of greenhouse gases industrial or otherwise.

Furthermore, carbon credit is also given to users of alternative or renewable energy since using fossil fuel or coal energy is the main cause of the carbon dioxide build up. So in 1997 under the United Nation Framework Convention for Climate Change, the Kyoto Protocol to reduce carbon dioxide emission and the idea of carbon credit were born. It should also be noted that the carbon credit trade in the Kyoto Protocol is strictly limited to carbon dioxide decreasing procedure with Clean Development Mechanism (CDM) and this is the only mechanism which is legally bound by world community's agreement under the Kyoto Protocol.

The carbon credit markets can be divided into two prominent types which are the regulatory (compliance) carbon credit market and voluntary carbon credit market. First, the compliance market has internal regulation, is operated under the Kyoto protocol, the convention against CO<sub>2</sub> emission, under the United Nations Frameworks on Climate Change. Second, the voluntary carbon market is built up from the cooperation between entrepreneurs and individual companies; it is the market in which the purchaser and seller will conduct agreements on their own without associating or approving by the government. The voluntary carbon credit market was built up in 1989 and from 2002 onwards, this market successfully thrives. The voluntary market can also be classified into two types. First, it is a Cap-and-Trade System; it is the market which sets the amount of gas emissions. The Chicago Climate Exchange (CCX) which operated a carbon market is counted in the Cap-and-Trade System. Second, it is a bilateral agreement market in which purchaser and seller will make a bilateral agreement on carbon credit trading directly or via middleman.

The above information can illustrate that the cause of global warming was originated by human. The solution to human caused global warming is implementing the Clean Development Mechanism (CDM) via the carbon credit markets, both the compliance and voluntary carbon markets. By this point, the research question has been raised--the majority of the population all over the world knows the impacts of global warming. However, there are not many people who know how to tackle this problem. Executing a carbon credit market mechanism is considered one solution. The researcher firmly believes that the groups of

people who know this mechanism thoroughly and have very good knowledge on carbon credit trading are environmentalists, members of the private sector (who are striving to reduce the gas emission for their businesses) and groups of businessmen (who want to take profit from carbon credit trading via the CDM project). At the present time, the voluntary carbon market is widely broaden, and has penetrated into the community level, especially via the afforesting project which is operated by the Chicago Climate Exchange (CCX), the University of Michigan in USA by trading carbon credit in forestry community areas in many countries such as China and India.

The issue that the researcher is concerned with is that the people in the community lack carbon credit trading knowledge and understanding. The researcher pays more attention in the “knowledge” issue because under the global warming topic bringing about new word “carbon credit” to the mechanism of global warming resolution. Carbon Credit is a very new topic for Thailand. The researcher has had a chance to converse with cousins, bachelor's, master's and PhD degree students regarding the carbon credit topic, and every time this topic is raised, the prompt question following is “what is carbon credit?” By this, the first priority that the researcher needs to fulfill to the community is knowledge of the topic. What the researcher would like to know is how much do the people know about carbon credits, what knowledge the related government sector or private sector organizations have already provided to the people.

The researcher therefore conducts this research by studying a case of the Inpang Community Forest Network, Kudbag District, Sakon Nakorn Province. The reason why the researcher chose the Inpang Community Forest Network is because since the beginning of December, 2008, the Inpang community has joined in the voluntary carbon credit trading project and it is the first forestry community where the CCX project has gotten involved in voluntary carbon credit trading. The reasons why the Inpang community participated in the Carbon Credit trading project is that faculty from the Department of the Environment, Science Faculty, Mahasarakham University have conducted many research projects regarding plant varieties of the Inpang community for 20 years and also had a site visit at the University of Michigan. There are projects over there that help to reduce greenhouse gas emissions. From this project, the developed countries can purchase carbon credit from developing countries in compensate with carbon emissions from their countries. Therefore, a carbon credit trading project has arisen in the Inpang Forestry Community Network with the cooperation with the National Research Council of Thailand. There are teak forest 625 rai (minimum criteria has been set at 100 hectares) and there are 957 members of agriculturist but they do not need to participate in the voluntary carbon credit trading project. They can join to attain knowledge regarding global warming and carbon credit issues. From 957 agriculturists, only two people have a teak forest which has been planted more than 15 years under the government

afforestation project. The people who join the carbon credit trading project must keep their teak forest for 15 years and at the end of 2008 the carbon credit was sold to CCX in USA via the University of Michigan.

The researcher expects that the result from the action research will be helpful in developing knowledge and decision making regarding voluntary carbon credit trading. The case study of the Inpang community will be used as a pilot project for other communities to study. Moreover, the topic regarding environmental policy planning on voluntary carbon credit trading will be useful in further research study.

## **Research Objectives**

1. To study regarding the voluntary carbon credit trading knowledge and understanding of the people in Inpang Community Forest Network, Kudbag District, Sakon Nakorn Province.
2. To create essential awareness and understanding regarding the advantages and disadvantages of voluntary carbon credit trading.
3. To follow up the operating result after providing knowledge to the people in the Inpang community and the decision making regarding voluntary carbon credit trading.

## **Research Hypothesis**

The knowledge and understanding on voluntary carbon credit trading of the people in the Inpang community is not sufficient to make a decision whether they should join the voluntary carbon credit trading project. To provide knowledge and information to the people is considered as an effective way of decision making for voluntary carbon market and can give bright insight to the people whether they should sell or not sell carbon credit to the CCX project, USA.

## **Methods**

The researcher used a systematic literature review process to collect the data and information about the Clean Development Mechanism (CDM) and the Voluntary Carbon Market (VCM). The methodology can be divided into two steps as the follows:

### Step 1: Research Preparation

The researcher used secondary data by collecting data from internet-based resources, articles, journals, document review, video and voice recording and textbooks. Sources of secondary data are used to understand the topic and problem before collecting primary data.

### Step 2: Research Execution

The researcher then collected primary data by conducting field research which is divided into two stages;

The first stage took place on May 1-2, 2009 comprised of conducting field research which included in-depth interviews with key informants. This process was then followed by focus group discussions with 5-7 people. The focus group interviews were particularly useful for getting the story behind a participants' experiences. The researcher chose snowball sampling or chain-referral sampling which is the use of existing study subjects starting by choosing the eligible and potential sampling group who can contribute to a specific study for the first round. Snowball sampling uses recommendations and connections to find people. Thus the sample group appears to grow like a rolling snowball. With this way, the researcher can include people in the survey that they would not have known and can locate people of a specific population. The data provided by chain-referral can be used as references when making a decision.

The second stage took place on October 7-8, 2009 by conducting field research. The workshop was organized to provide basic knowledge and essential understanding of the Carbon Credit Market for 50 people from five provinces of the Inpang Community Forest Network. From the workshop, the researcher could gather more information apart from stage 1 including the follow-up result on the operation of the people in the Inpang community network regarding the decision making on voluntary carbon credit trading with the CCX project, USA. The researcher also opened a space for the people to share their opinion by raising open-ended questions.

## Literature Review

### 1. Carbon Credit Market and the Kyoto Protocol

There are two kinds of carbon credit trade. The first one is the carbon credit market established under the Kyoto Protocol agreement. It is a regulated market, such as the one in Europe which is under the Clean Development Mechanism Project.

The second kind is the Voluntary Carbon Market (VCM) which, as already said, is basically the voluntary agreement between air polluters (buyers) and owner of green areas (sellers) is the so called "carbon credit" trade.

### 2. The goals of Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM) aims at avoiding the greenhouse gas emission and at the same time to absorb the greenhouse gases in the atmosphere.

The requirements of Clean Development Mechanism are as follows: First, the quantities of greenhouse gas reduction have to be in accordance with the standard set by the United Nation Framework Convention for Climate Change (UNFCCC) on the Kyoto Protocol. Secondly, each member country has to join on the voluntary basis and needs to be approved by every country member. Thirdly, the quantity of greenhouse gas reduction must be real benefits and can be measured. This requirement is to be understood that it is above and beyond the business as usual both in terms of greenhouse gas reduction and absorbing more greenhouse gases. Moreover, this whole process has to conform with a sustainable development policy of a developing country. Finally, the transparency, efficiency and accountability of the whole enterprise (through auditing and verification) are to be expected.

Evidently, the Clean Development Mechanism is a very complex process requiring each participant to pass through many procedures. More importantly, the cost of management and production of the new clean air technology has made it easier for industrialized countries to purchase carbon credit in substitute of their share in decreasing the greenhouse gas emission.

### 3. The Voluntary Carbon Market (VCM) and the Carbon Credit Market

The new alternative of carbon credit trade emerged not under the Kyoto Protocol is the Voluntary Carbon Market (VCM). According to the Voluntary Carbon Market (VCM) system, the buyers, which are mostly industrialized countries, can directly buy carbon credit from sellers which are mostly developing countries. Therefore, the Voluntary Carbon Market (VCM) is opening the opportunity for industrialized countries to have easy access to carbon credit (Jindal *et al.* 2007). But while the carbon credit's free trade makes a gain-it is unfortunately detrimental to the environment as a whole because according to the

environmental principle of Polluter Pays Principle (PPP) (Cordato 2001) whoever pollutes natural and environmental resources must pay higher tax. Thus, if developing countries release more greenhouse gases, they should decrease the greenhouse gas emission in their own countries and pay the high value tax for the damage they cause. If they can easily find the solution through the Voluntary Carbon Market, they will not reduce the greenhouse gases. This is certainly not fair to all living organisms on this planet. Hence, the Voluntary Carbon Market has both advantages and disadvantages. (Suthammakid, 2008)

#### 4. Advantages and disadvantages of the Voluntary Carbon Market (VCM)

*The Voluntary Carbon Market has the following advantages (Suthammakid, 2008):*

**The first benefit** is that it helps to raise awareness among the pollution producers that if they do not strictly adhere to the regulations, it will have negative impact on the economy in the future.

**The second advantage** is that of the Voluntary Carbon Offset Program, especially in the forestry sector is low transaction costs. Particularly, forestry project can change to land use for afforestation or use efficiency energy in biological energy's project. In other words, seller can sell carbon credit at relatively low cost. All the seller needs to do is first of all to take care of the forest for 15 years' duration without cutting down trees, although they can be used for other benefits as normal. When the 15 years is up, the carbon credit can be sold to the purchaser. The opposite is the case of the CDM, since it needs huge sums of money to invent new technology. Moreover, the CDM participants need to pass a complicated process and requirements according to the Kyoto Protocol. Therefore, the low cost of voluntary carbon credit might encourage the expansion of the voluntary carbon market which will thereby help reduce greenhouse gas emissions.

**The third advantage** is that it provides a sustainable development opportunity in the community, especially for those mini-projects that release greenhouse gases of less than 15,000 tCO<sub>2</sub>e per year. This arrangement should benefit sellers from the sale of carbon credit/carbon offset, because normally there are only a few major traders in the carbon market. In developing countries the reforestation project is usually considered an effective way to reduce greenhouses gases permanently much more effectively than other activities such as using wind power, or tidal and solar energy to produce electricity. If there is good forestry management together with the integration of local knowledge, the forest will last till to the next generation, while the industrial activities normally live only 20-30 years.

**The fourth advantage** is that it provides opportunity for consumers to participate in a climate change solution through the purchase of products with a label indicating that they

are manufactured with greenhouse gases control or have a symbol indicating that the products and services are under the Carbon Offset program.

**The fifth advantage** is that the voluntary carbon market serves to support uncertified carbon credit. The carbon credit in this process is called "Verified Emission Reduction (VERs), and the price of VERs is lower than CERs. In addition, the voluntary carbon credit market also serves to support carbon credit from reforestation, especially in local communities in undeveloped countries because the clean development mechanism is too strict to be effectively applied.

**The sixth advantage** is that while there are many working certified standards of the Voluntary Carbon Market, it is still better than CDM under the Kyoto Protocol in terms of flexibility. The Voluntary Carbon Market clearly motivates local people to reduce greenhouse gas emissions. The reasons are the following: the voluntary carbon market project requires a small budget in reforesting for the purpose of the sale of carbon credit. Therefore, the selling price is totally lower than CDM, thus bringing about the incentive for the purchaser to buy. Naturally, industrial countries prefer to invest in voluntary carbon credit rather than the CDM project because the CDM project requires a lot more administrative budget including advanced technology for greenhouse gas reduction. Consequently, voluntary carbon credit leads to the greenhouse gas reduction even though the quality measurement of the voluntary carbon market is still far from certain.

In conclusion, the voluntary carbon market aims at sustainable development rather than technological or innovation development. As such, it is more flexible; it needs less transaction cost and it certainly gets a lot more attention from the media.

*Nevertheless, the voluntary carbon market suffers some disadvantages which can be summarized as follows:*

**The first disadvantage** is that the greenhouse gas reduction resulting from the voluntary carbon credit market involves various ways of measurement of greenhouse gases. Therefore, the reliability and quality of carbon credit is still questionable. Too many organizations are involved in the price and quality of carbon credit, and this makes the universal standard a still much needed goal.

**The second disadvantage** may be sub-divided into the five following setbacks:

(A) It may have a problem regarding the carbon credit owner (this problem occurs in the CDM project too).

The law has to be clear on the ownership issue between the right of the land owner, the investor's right (after reforesting, for example), and the right of the buyer of carbon credit.

(B) The reforestation project is a long term commitment so the land owners cannot use the land for other purposes during that period. The land owner may face problems in developing the surrounding land such as road and dam construction. This may affect the land expropriated by the government.

(C) The payment of carbon credit/carbon offset in the voluntary carbon market is usually done before the greenhouse gas reduction activity takes place. While it might benefit the project owner to use that money to build up this project, it may create risk for the carbon credit purchaser. In this case, risks are associated with the difficulty in making a carbon footprint report.

(D) The assessment of a reforestation project may face a dilemma. Though, the transaction cost of reforestation is less than other greenhouse gas reduction projects, it may face negative externalities costs. These problems have occurred in the undeveloped countries that are hired by multinational enterprise to reforest.

(E) The carbon credit and carbon offset from reforestation halts or delays the development of greenhouse gas reduction technology because the reforestation cost is relatively less compared with R&D cost. Therefore, there is no incentive to invent new techniques to reduce greenhouse gases

**The third disadvantage** is that the voluntary carbon credit expansion, in effect, helps to reduce greenhouse gases to a certain extent. It, however, is not a true gas reduction mechanism since the greenhouse producer might probably turn to purchase into more carbon credit. The efficient and effective method to genuinely reduce greenhouse gas is to change habits to lessen energy consumption. In other words, the acceptance of carbon credit from Carbon Offset activity is simply the way developed countries take advantages of developing countries by spending a little more money to purchase carbon credit or carbon offsets thereby avoiding the responsibility of the activities which are going on at their production plants.

**The fourth disadvantage** is that the voluntary carbon market is not the only way to reduce greenhouse gases. There are other projects such as the changes in vehicle technology, the use of renewable and alternative energy which can be implemented without having to wait for the income from carbon offset sales. However it takes more funding and government support for R&D of any country to develop efficient and effective technology.

**The fifth disadvantage** is that the advantages of the voluntary carbon market are limited to only those actively involved in the deal while outsiders are actually always part of the whole clean air problem. To put the same thing differently, there are many people involved in greenhouse gas emissions but voluntary carbon credit does not address those people involved.

## 5. The Inpang Community Forest Network

### *5.1 The Inpang Community Network Development*

Inpang community, in the past, was the network for the people in Inpang. It was established in 1987 at BanBua, Kutbak district, Sakonakorn province in cooperation with the Village Foundation and Sakonakorn Teacher's College (Sakon nakhon Rajabhat University at present). They together studied the Kaleung's way of life. It was found that the people in the community have a very simple life and they are bound with the Pupan forest. The Pupan forest has been considered as one of the factors in their lives from the past to the present. The forest is very abundant. However in the past 25-30 years, external factors and encouragement of monocropping such as cassava and sugar cane brought about deforestation and chemical use. This renders effects on the environment and human life. The people in the community have to purchase food from external markets for consumption. The leader of the community, therefore, has to find a resolution with the head of the village in order to set up future plan. Eventually, they have built up a group named "local plant fund" with the objective to rehabilitate and promote local planting in paddy fields.

In 1993, teacher Buasri Srisoong, Head of the North-east Thai Community, changed the name of the group to the Inpang community with an intention to refer to an abundance of the forest which the Indra had established for the people. In Thai "Pang" mean plot. It may also refer to the meaning of village plan which ancestors built for descendants.

In 1993, the Inpang community expanded to the surrounding villages. In total, seven villages including government organizations such as the Sakonnakorn Land Reform Office, the Agriculture Research Institute, Sakonnakorn, and Rajamangala University of Technology Sakonnakorn were interested in being Inpang community members. The Agricultural Land Reform Office also organizes integrated farming training program to the people in the Inpang community with the target to set up a sustainable development foundation. The Agriculture Research Institute, Sakonnakorn, supports research development and food processing in order to add value. The famous processed food products in Sakonnakorn are wine (produced from local fruits), red ant egg soup can and savory powder (in place of monosodium glutamate).

In 1996, the training course expanded to five provinces which are Sakonnakorn, Udonthaini, Kalasin, Nakornpanom and Mookdaharn with a

target to educate people regarding sustainable agricultural development and ecology network development. It is an approach working strategy to preserve the forest in a sustainable way.

In 1999, approach strategy, for example the sustainable agricultural development program, occurred by joining hands with the Department of Agricultural Extension, the Village Foundation and UNDP in developing a sustainable agriculture district level scheme. It was started with 12 districts in Sakonnakorn at the beginning and expanded to five more districts later on. This program is considered as an efficient community joining force program. In 2001, the community district's original paradigm had been set for 50 more districts, with the total of 890 villages in 84 districts. The paradigm also includes the four requisites of stability, forest protection and resources management.

### *5.2 Inpang Community's Concept and Mission*

Inpang Community network was established in 1987 with the support of various government organizations. The network firstly covered five provinces: Sakonnakorn, Udornthaini, Kalasin, Nakornpanom and Mookdaharn (890 villages in 84 districts). The starting point campaign is to promote local agriculture plants such as the planting of 175 kinds of plant in 6 rai of land. This brings about the four principal concepts of the Inpang community.

1. Pupan forest in local field: it is the change of a single crop to integrated planting. The core concept of Pupan forest protection is to create the value of forest and to build four requisites stability in families. This concept is to bring seeds from the Pupan forest to plant in local fields which are called "Sampati plantation". At present, there are not less than 1,000 families having forest agricultural plantations. With this method, the people can rely on their own plantation and live sustainably. Moreover, by implementing this method the forest is not destroyed.
2. Community enterprise encouragement: this is focused on food processing in order to increase the goods' value and standard. The target of the community enterprise establishment is to support the people in the community to have more income and develop the community to be the

center of agricultural products processing according to the Inpang network's sustainable project. The processed goods made from local resources are for example wine, fish sauce, organic fertilizer, soap, dish liquid, shampoo.

3. Financial institute establishment: a farmer's financial institute (community bank) was built up with the target to help the people in the community. Example, give the money to help medical fees or funeral rites. The financial institutes are located at Bannongsanai Banbua Kudhad and Pupan Agro Forestry.
4. Educational institute establishment: education is the core factor in sustainable development. A "Life University" was established with objectives to exchange knowledge and educate people in the community. In each year, there are not less than 5,000 people registering in the university's courses such as sustainable agricultural development, community health care, resource management, etc.

All four principal concepts bring about an independent community, jobs and income. Moreover, the relationship between the people in the community is strengthening. The most crucial thing is to follow His Majesty's project. His Majesty's sustainable development projects are based on morality, true knowledge and understanding of the situation, the expertise of the society and communities and local wisdom. His principles have been simplicity with all projects tailored to meet the needs of localities and solve problems at their root causes bringing about happiness to the community. These make the Inpang community to earnestly pursue the project.

### *5.3 Inpang Community Forest Network's summary*

Inpang Community Forest Network's physical description shows that the land is abundant with natural resources. The people in the Inpang Community Forest Network have protected their natural resources and environment by following the model of the Pupan forest to apply in their fields. This is the starting point of self-sufficiency. The Inpang Community Forest Network also develops the community's capacity together with folk wisdom. Community enterprise is established for selling forestry products. It will help generate revenue for the community. Moreover, there are also

finance and welfare communities to support and help the people during emergencies. The Education Institute "Life University" was also founded at the Inpang Community.

These show that the Inpang Community Forest Network is a self-sufficient community. From now, it is quite a challenging to the people in the Inpang community to confront the western capitalism for negotiating the fair carbon trading agreement.

## **Research Findings**

The researcher will classify the results regarding decision making on voluntary carbon credits: case study of Inpang Community Forest Network, Kudbag District, Sakon Nakorn Province as the following.

1. Knowledge and understanding of the people in the Inpang Community Forest Network, Kudbag District, Sakon Nakorn Province regarding voluntary carbon credit

The researcher found that the people (six community leaders) do not have sufficient knowledge of this issue. Only one, the Inpang network's coordinator (coordinating leader with CCX, National Research Institute and Mahasarakham University), of the National Research Council of Thailand, a researcher on Voluntary carbon credit at Mahasarakham University had some knowledge on voluntary carbon market trading, but not profoundly in detail.

The second time of field research, the researcher found that the people in the Inpang Community Forest Network (50 people) have more understanding and clearer thought on carbon credit. They know what the advantages and disadvantages of voluntary carbon credit trading are after the research team conducted field work and provided knowledge to them. Open ended questions were asked up with the target to reduce opaqueness by providing clearer knowledge.

2. Follow up the operating result after providing knowledge to the people in the Inpang Community Forest Network (7-8 October 2012).

The research found that the people in the Inpang Community Forest Network are interested to sell voluntary carbon credit under the fair price condition and agreement. They also require assistance from the government to negotiate the price including the benefit the people will receive from the carbon credit trading.

The Inpang Community Forest Network has not signed an agreement on carbon credit trading yet because of an unreasonable of price negotiation. Thai Airways International Public Company Limited (THAI) conferred with the Inpang Community Forest Network regarding the voluntary carbon credit trading with the reason that European Union countries

had legislated that all airlines which fly across European territorial skies must purchase carbon credit to compensate for the CO<sub>2</sub> emissions of the plane. This is counted as one alternative for the Inpang Community Forest Network to make a decision regarding voluntary carbon credit trading.

The reason why Thai Airways International Public Company Limited (THAI) should purchase voluntary carbon credit from the Inpang forest network is because the Inpang forest is the first community forest in Thailand dealing with voluntary carbon credit trading. If voluntary carbon credit is to take place in the future, Thai Airways should purchase carbon credit internally before considering carbon credit trading projects from overseas. The cost of forestry carbon credit is relatively low compared with other carbon credit from other production segments or Kyoto carbon credit trading. Under the Kyoto protocol, it is the trading under a compliance market which is the trading in the way of bioenergy from plants via a clean development mechanism- cdm). This way is considered as formal carbon credit trading which costs more.

On the contrary, the Inpang forest network should sell carbon credit to Thai Airways International in order to reduce greenhouse gas emission in country. Therefore, the Inpang forest network should not sell voluntary carbon credit to CCX, USA.

It can be summarized that the research result is related with the assumption that the people in the Inpang Community Forest Network require knowledge and understanding regarding carbon credit trading. The government or other related organizations should continually provide knowledge and keep them updated especially in the price negotiation issue about which the people still lack understanding and require assistance from the government to ensure fairness.

## **Conclusion and Recommendation**

1. To get involved in voluntary carbon credit trading may render disadvantages to Thailand, because the lack of essential knowledge and understanding in negotiating the price with overseas organizations. Moreover, carbon credit trading has no supporting law regarding "income" from the carbon credit trading. It may cause problems regarding inappropriate greenhouse gas management in the future. From the case study of the people in the Inpang Community Forest Network toward voluntary carbon credit trading, it finds that the people do not have sufficient knowledge to negotiate the price which means they may be taken advantage of by an unfair agreement.

Therefore, it is very necessary that the government and other related organizations should assist in providing knowledge to the people in the community in order to protect the benefits they should receive and for the fairness to the people in the community.

2. There are other alternatives for the people in the Inpang Community Forest Network to consider regarding decision making on voluntary carbon credit trading. At the present, Thai Airways International Public Company Limited (THAI) is another alternative. Therefore, the researcher suggests that the decision making should go step by step by studying advantages and disadvantages of trading carefully including the trading partner, trading purpose, trading cost, trading agreement and so forth.

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