

*Development of Appropriate Knowledge Cultivation and Production of Para Rubber for Farmers in Loei Province, Thailand*

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**Abstract**

This research aimed to study on 1, To create and promote participatory learning in the field of knowledge management of the para rubber in the community. 2, To develop a set of appropriate knowledge of cultivation and production of para rubber for farmers in Loei province, Thailand .The research methodology were both quantitative and qualitative research. Results showed that in order to create knowledge management in the community, we began from seeking the local instructor and upgrade the level of knowledge by dissemination of knowledge from the individual to the community. The best practice could convey their secret knowledge and techniques to the community that has little bit knowledge. This action could make participatory learn about plantation, maintain and production para rubber. Moreover, there were the dissemination of knowledge and exchange experience on para rubber cultivation and production. The seminar of knowledge exchange and transfer of knowledge to the participants ensure the participation of the farmers from various villages because participants revealed problems, ways to learn knowledge about para rubber in different points. This research methodology confirmed that all of secret knowledge about planting para rubber were able to be learned and disseminated. Ultimately, after we collected all of the knowledge from the interaction and sharing of each villager together we could summarize a set of the suitable knowledge for para rubber cultivation in Loei province, Thailand. This standard wisdom was ready to disseminate to others para rubber planting area.

Keywords: community, knowledge of rubber, knowledge management.

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## **Introduction**

Currently, Thailand is a country with natural rubber in the world. Moreover, Thailand's rubber plantation area ranks second in the world after Indonesia. In 2003, the government set up the plant to raise revenue to farmers in growing areas in 36 provinces, covering the North and Northeast. Thailand has led to the third development strategy of rubber according to National Strategy of Rubber Development. Although the most successful from the Rubber Development 3<sup>rd</sup> strategy is the expansion area of the rubber (now, the area of rubber is not limited only in South of Thailand anymore), in the opposite way, it failed to increase productivity of rubber to meet the strategy target. In Loei province is No.2 area of the Northeast, where has grown so much rubber as the planned development strategy rubber. However, farmers in Loei just started to plant rubber, so many problems appear because they lack knowledge about planting and caring for this new varieties, then, they face to many problems because rubber trees were planted in an area that looks different from the original in the South of Thailand. This research tried to find ways of acquiring and creating the set of knowledge for rubber plantation and rubber production in the Northeast of Thailand. All of these example problems affect the income of enormous farmers. For example, they use chemicals to kill weeds, farmers harvest incorrectly, rubber maintenance was treated improperly, investment anti the way of the natural methods such as the usage of chemical fertilizers, problems of planting the useless multiples cropping such as cassava which decrease productivity of rubber in long term. Therefore, the researcher tried to look for knowledge management and to educate the people in community together. Then create correct and suitable knowledge about a rubber that fits the community and geography. This is a process of collaborative learning in communication for leads to the problems resolve of rubber plant. The new knowledge from the research is transferred to each of the community where there are rubber plantations in Loei province. In this process, the Researcher believe that people can do the research PAR (Participatory Action Research) to create learning participation of the community. The process relies on communication and knowledge management to stimulate knowledge sharing with others in the community. It can be seen that we are able to manage knowledge until the goal is achieved. Achieving "Community of learning," it is necessary to have the communication and participatory process involved every step in order to find tactics to extract knowledge from the one villager to other villagers. This research also tried to seek the expert to teach others with expertise in rubber. The common goal is make them come together and participate to learn and share knowledge, experience of working to contribute the body of knowledge about specific aspects.

## **Objectives of Research**

1. To create and promote participation sustainable learning in the knowledge management about rubber in the community.
2. Develop the knowledge of appropriate planting and rubber production for farmers in Loei province.

## **Scope of the Research**

1. Scope of content: this study aimed to study only the knowledge management in the community about para rubber production where the rubber plantation in Loei Province.
2. Scope of the target group: Farmers who plant rubber trees in Loei Province.
3. Scope of the time: 1-year period of the research.

This study took the 3 concepts for guidance as follows;

1. The concept of participatory action research. (Participatory Action Research-PAR).
2. The concept of participatory communication. (Participatory Communication).
3. The concept of knowledge management in the community.

### **Research Methodology**

As the research methodology used in the form of research and development. Which can be classified as follows;

#### **Population and samples used in the research.**

The population in this study was conducted to be rubber farmers in various districts in Loei province that the researcher has selected a sample of 3 districts where have specific criteria as below:

- 1.1 Communities were selected must be experienced and have knowledge of the rubber enough to share the knowledge to each other.
- 1.2 Communities where people are close together and are ready to learn together in community.

### **Research Instruments**

The instruments used in the study were divided into two categories: a tool used in quantitative research and tools used in qualitative research. The details are as follows:

1. Quantitative research tools, a questionnaire used in the process of collecting data are the basic elements such as the environment, community knowledge and understanding of the rubber plantation

2. Qualitative research tools are as follows;

To perform several times to participate in the process steps involved as follows:

2.1 The 1<sup>st</sup> participation, seminar rubber growers in the community was set. The farmers have the opportunity to share their thoughts, the existing knowledge with a focus on community involvement to determine the content of the knowledge about planting and rubber production together. The conclusions on the issues of the rubber to be modified and makes a point to the need to learn together. By the way, farmers were invited to come together to brainstorm and focus group discussion to find the body of knowledge about the plant in the community. To manage knowledge is to spread to the community as effectively as possible.

2.2 In the 2<sup>nd</sup> participation, shared knowledge of the rubber from various districts in the target by allowing the rubber to convey tells knowledgeable advisors to review their existing share knowledge about planting and rubber production stages. The issues that can come from a discussion on the participation of the first, then it is to study model community that has the vast knowledge about planting and adapted for use in the manufacture of rubber effectively.

2.3 In the 3<sup>rd</sup> participation, the evaluation, participation of knowledge management in the community to find a summary of important knowledge in planting and rubber production and the conclusion about most knowledge that farmers have.

2.4 In the In 4<sup>th</sup> participation, shared the communication process to convey knowledge in the community and outside the community occurring in each community.

Moreover, the Researcher used data from research conducted to analyze according to the objectives set both of "In depth interviews": the farmers were interviewed about rubber treatment and "Group discussion" to collect data on the total integration from the farmers who have long experience planting by accumulating knowledge about plantation and rubber production.

## **Data Analysis**

After the researcher collected data from all sources according to the research procedures, the researcher analyzed the survey data with quantitative way (the average and percentage analysis) and qualitative way for interviews, focus group and observations data (Descriptive analysis)

## **Results**

### **Results Part 1: Initial data from survey methodology about rubber farmers who want to improve their knowledge of the rubber in Loei.**

1. Knowledge of planting and production of rubber farmers in the Loei.

Researcher found that most of farmers thought that they have the knowledge to plant at moderate level maximum 72 percent, while those who thought they know about plantation at the most only 5 percent. Moreover, it was found that most farmers wanted to get the knowledge about fertilizer usage at 59.5 percent, wanted to get the knowledge about opening rubber tapping at 56.5 percent. There were farmers who wanted to get knowledge to improve the process of storage of rubber at maximum 60.5 percent. From this data showed that the government provided assistance to the farmers at a few level because the government mostly focused on only the young plant distribution while the government educated and trained farmers only 11 percent, so most farmers had no knowledge of the rubber before at 55.0 percent. Indeed, it means the rubber farmers in Loei Province began to plant rubber with either a little bit knowledge or no knowledge at all. Moreover, the researcher found that knowledge of farmers based on the theory ,on manual, on text book at 86.0 percent so it was not practical knowledge while the farmers who has been done and born of experience by themselves only 5.0 percent. Most of farmers did not know process of planting and lack of initial knowledge made the miss planting at begin. For example, the farmers did not follow the certain guidelines, such as the principle of hole digging, the planting hole must be a depth of two feet but they dig only a half foot. This shallow hole cause of the dead rubber due to lack of dampness in the hole. Moreover, some new farmers so adhere to the theoretical principles that overlooked the fact. For example, the theoretical introduction before the planting, they must cut the bottom of plastic bag to let the root spread out. However, the farmers did not know that in fact, cutting a bottom of bag for only young plant one foot height because its roots are still small and not spread down to the bottom of the bag. For the rubber plant that is 2-3 feet height, farmers must not avoid cutting the bottom of bag because the blade also cut the long root of plant that curl at the bottom, too. When rubber was planted with short roots rest, it was not enough long root to find food to feed the tree, it died. So, farmers had to consider the size of plant before cutting. The most important, theoretical knowledge arose from the experiment or demonstration plant growth factors that control the environment completely. On the other hand, the actual plant could not control other real factors according to the theory, so it was intervened by other factors such as soil and water, climate, also other details such as maintenance pruning, fertilizers usage. These different details made the demonstration plant be different practical plant in deed.

2. Communication and media to increase knowledge about planting and rubber production.

The researcher found that most farmers have been informed about rubber from the various communication channels as follows; Farmers have learned and heard about rubber through activities such as participation in training at maximum of 69.5 percent, while they heard about rubber through the mass media such as from television at 13.5

percent and from radio 13 percent. After learned about rubber, most farmers never shared that knowledge to others as many as 63.5 percent. In addition, most farmers need a mobile unit to advise them about growing rubber plants at 43.0 percent and followed by group training at 30.5 percent. Most of farmers wanted academics or experts to train them about the rubber maximum of 62.5 percent. For the pattern of exposure to learn about the rubber, found that most farmers wanted to get knowledge of rubber through a person media who was an academics or the officers from government at 52 percent, most farmers would like to learn more about rubber at 89 percent.

### 3. Barriers to the rubber plantation.

According to survey data found that farmers faced many problems in the rubber plantation, most important problem was high cost of fertilizer at 52 percent. Other secondary problems were capital problem, disease and insect problems, varieties of plants. The most common problems in the production and sale of rubber is a depressive price of rubber product at 65.5 percent. The most common problem caused by insect and plant diseases were the young rubber plant were dead due to termite destroyed at 45 percent and also dry bark disease. The most common natural disasters was that farmers experienced the rubber damage due to drought at 60.5 percent, followed by a wildfire burnt rubber at 20 percent. Problems caused by workers were most of workers lack of knowledge to work in rubber farm at 50 percent, followed by the issue of high wages at 25.5 percent. Problems in the marketing of agricultural products were the most common problems of price instability at 90.5 percent. The resolution for farmers for planting and maintain of rubber found that most of farmers choose to consult the officer of Rubber Fund maximum of 55 percent while they consulted with neighbors only 8 percent.

## **Results Part 2: The way for the creation and support of learning and participatory knowledge management for rubber.**

### **The research was conducted according to the following procedures:**

The process of questing the knowledge and raise the level of the knowledge. Researcher has searched for the learned persons or any local scholar who has knowledge in planting and rubber production in each village. Then, invited these learned persons to come together to find ways to create and support learning and participation in the community where planted and produced rubber in Loei province. Researcher provided people with the best practice to convey knowledge to other communities that have little knowledge also people who are beginner to plant rubber. The learned persons and people have participatory learning about planting and rubber production. After an exchange between scholars and farmers we found many points as follows;

### **The discussion of the important knowledge to have in the cultivation and production of rubber.**

For the knowledge of rubber plantation, there was question in the forum of farmers, what should be the first priority to know. The conference heard from people's experiences to examine the data to each other in the community by themselves. They exchanged knowledge, cross checked and discussed in the community to determine themselves whether that knowledge was correct or not. After brainstorming and voting of farmers, they concluded that the most majority knowledge of the finds in the rubber was the varieties of rubber. They explained that if farmers selected varieties of

rubber well since beginning plantation, the good varieties of plants was resistant to disease and made high yield, also reduced the cost of care. This meant consequently, increased revenue of farmers. Minority knowledge was treatment and maintained of rubber tree. The final knowledge was knowledge of the rubber tapping. If the rubber tapper has good skill to sharpen jabon knife and learned how to tap the rubber correctly, the farmer get more latex and it makes rubber bark grow faster; moreover, the rubber tree is longevity. On the other hand, if the rubber tapper was not expert, used the blunt jabon knife it caused wasteful bark; moreover, rubber tree is short life and reduced yields.

### **The process to convey knowledge to other communities**

The important mechanism to transfer knowledge from one community to outside community was dissemination through community communication, such as through traditional ceremony or celebration. These opportunities made a small group communication happen. People could talk among the neighborhood. A conversation group occurred in villages and community ceremonies, such as weddings, funerals, ordination. People have the opportunity to exchange knowledge about rubber. Moreover, they might require the use of simple channel in the community which was able to transfer their knowledge to other people, such as by the horn speaker tower in village.

### **The approach to learning together of villagers**

In the forum of participatory learning, villager proposed that there should be community events that stimulated people learn together easily. For example, finding interchangeable knowledge or technique of occupation to be a way to keep people coming together to find a way to encourage people to talk. The best way was creating a leader or moderator in the small group forum. Especially, in special event such as “collective and rubber auction day”, participants in the event were able to create the opportunity to share their knowledge and learn from their neighbors in the community by making the activity occurs naturally. Moreover, there were other ways to discuss with neighbors, such as learning by doing and observing in the rubber farm of neighbors. However, in forum of participatory learning, the researcher found that most of people from the villages really did not have any knowledge about planting and rubber production. Therefore, there were only a few knowledge exchanges than the existing knowledge in the community. Furthermore, some of this knowledge was not the quite correct knowledge. Many people accepted that actually, they did not have enough knowledge in rubber but they still plant rubber without any skill. Finally, the rubber farmers face many problems in the long run. From this phenomenon made researcher found that if in any community has not experience in rubber tree , no good principle to compare, no good consultant also lack of “learned person” who has the actual and correct knowledge, that community became bad for the rubber plantation and treatment. If rubber farmers in any community did as they knew and acquainted but never realized or never compared to the different knowledge, they lost their opportunities to improve their agricultural product.

People raise awareness by making the forum for knowledge exchange between the community and the community with two events as follows;

1. Make an opportunity for people who lack of knowledge to travel to study the case of success rubber farmers. When they saw the appearance of the rubber and maintenance in fact, they shared their knowledge to each other.

2. The summarization to review knowledge of people to determine the knowledge that people have inherited. The researcher surveyed by questionnaire and found that many rubber farmers in 3 villages such as Sri Ubol Village, Ban Sam Kokkhor Village and Kokdoo Village, knew the distinguished varieties of rubber RRIM 600 most. Moreover, most farmers were not aware of old bud in young rubber plant, so this cause became big problem at present because farmers could not tap the rubber due to tree rubber became old tree and never produce latex since second year. Most of rubber farmers lack of knowledge about the disease such as dry bark rubber and the black fungus disease, so they did not know how to protect this deleterious effects for rubber. In addition, when farmers used fertilizer, most villagers often used chemical fertilizers as the main but they did not pay attention in organic fertilizers in spite of organic fertilizers were better and cheaper. They lack of knowledge about multiple cropping between the line of rubber trees, so they could not compare the advantages and disadvantages of each type of multiple cropping. This is why it is inappropriate cropping in the rubber farm which affected the productivity and growth of the rubber tree. While in detail, knowledge of rubber tapping is very important but farmers never tried to learn, so they could not tap the bark well in order to get much more latex.

### **The approach and process to distribute knowledge to other communities**

In the forums there was a question to ask villagers who attended the discussion in order to brain storm about rubber. The one majority question was: How to create a process to transfer knowledge to other communities to enable exchange knowledge from one community to another community. The one interesting proposal was revealed that there should be circulation of knowledge and convey to others on a monthly basis to have a meeting for rubber farmers continuously. This was the way to create opportunities to meet and talk when anyone learned anything there was word of mouth to other people and expand their knowledge go on. Besides, people also used community radio to broadcast the knowledge or news about rubber to the community. This activity required the creation of a network which community leaders come to talk and made network together. A major problem was the lack of an intermediary link as community leaders and small group head because if community leaders did not pay attention to the rubber, it may not be the network group. There was suggestion in the forum has been proposed that people could use traditional opportunity and folklore scholars combined with rubber academician from official organization. When people were not confident or unsure of their knowledge, they could cross check with a village philosopher and academician.

### **Conclusions and recommendations**

#### **Research Discussion**

There are two key findings from the research according to the research purposes.

1. Create and support learning through participation in the knowledge management about rubber in the community must be designed and modified to suit the learning community and be accordant with the lifestyle of the community in order to encourage participatory learning. The important step should begin with the best practice or learned person in the community to convey knowledge to another community.
2. According to development of knowledge in proper planting and rubber production for farmers in Loei province, researcher could classify the group of appropriate knowledge into 10 groups as follows;

1. Knowledge of the rubber varieties.
2. Knowledge of preparing a young plant of rubber, appropriate source of plants.
3. Knowledge of soil preparation.
4. Knowledge of the plantation.
5. Knowledge of maintenance of rubber tree.
6. Knowledge of termites and pests elimination, diseases and problems of rubber.
7. Knowledge of fertilizer and fertilizer blending technique.
8. Knowledge of multiple cropping.
9. Knowledge of rubber tapping.
10. Knowledge of rubber farm management.

### **The Process of Research**

In this study, it was a participatory action research orientation. This study aimed many community have shared knowledge to each other slowly raise the knowledge step by step. Finally, all of knowledge became appropriate knowledge series for rubber farmers in Loei Province. The research process began by seeking the local philosopher with the best practice to convey knowledge to another community. The important basis was the experienced and learned person who has the correct knowledge about planting and rubber production from the community went to propagate in other areas of rubber plantations. This process happened several times by creating a forum to exchange knowledge between the community and the community. This process enable farmers shared the lessons, experiences, fault, misunderstandings in rubber plantation and rubber treatment and have joint examination as well as confirmed the existing knowledge in the community that was accurate. There were 2 ways to examine the accuracy of practical knowledge; 1. Cross check knowledge from practice and doing in rubber farm (farmers planted as a validation of knowledge itself) 2. Agricultural academicians confirmed accuracy of the data with the theory. When that knowledge was crystallized and was generalized as a standard practice, they have the reliable knowledge to convey to other communities.

### **Research problems and solutions**

To conduct this research, there were problems in doing research for several reasons. Some circumstances were out of control by the process of research, these were classified as follows;

1. People in the community who want to learn and share knowledge lack of real interest and enthusiasm cause learning discontinue.
2. Some of the community leaders did not have a life circle in the cultivation and production of rubber rarely paid attention to significant of learning and made the learning process be slowly.
3. Communities were far apart to each other. There was no absolutely the exchange of knowledge by normal ways at all, so it need a mediator acts to coordinate to achieve networking and knowledge convey.
4. Farmers who lived in communities with a little bit knowledge and lack of experience in the rubber plantation often ignored the importance and knowledge communication. This ignorance the fact conduce them towards errors in the rubber plantation and they later came to repent. Moreover, there were damage and undermine for rubber farm in long term. For example, they never know about multiple cropping, so they planted cassava between lines of rubber tree. Then, cassava consumed and destroyed the abundance in soil and caused rubber tree became dwarfed.
5. Some farmers took an ego about planting and treatment for a rubber plantation by



arguing with unreasonable and affected the planting and rubber production in the long term, such as wrong tapping, wrong pruning made plants be grown inappropriately.

6. Conditions and factors that contribute to success learning need to include awareness of the desire to learn and sacrifice.

7. Knowledge exchange conducted towards to other important effects, such as learning to establish the cooperative groups. They learned how to create mechanism of sheet rubber quality control, to bargain the sell price with the middlemen as well as formed a coalition to negotiate to buy fertilizer at cheaper cost.

8. Approach to succeed the knowledge conveyance should combine with a small group communication. Leader of community should take the role to encourage group to discuss in specific issues, such as the price negotiation or be the mediator for some farmers to talk together about rubber circumstances.

9. It was necessary to learned from other agencies such as agricultural academicians, officers from the Office of the Rubber Replanting Aid Fund who have the knowledge and theoretical information to assist farmers and confirms accurate knowledge. Also, those officers could propose other beneficial options to the rubber farmers.

### **Recommendations to the communities.**

1. Some of the village should communicate with the outside communities in order to learn and develop rubber farm as in other villages.

2. The community leader is very important person to stimulate rubber farmers and create the opportunity for the learning process occurs continuously.

3. The process to reinforce the learning of the community need to be familiar with the people in community by observing and talking to create a friendly atmosphere.

4. The convey of knowledge from one community to another community , there was one important condition to make it a success, farmers needs to be attention and took the time to share and learn together and took the result of knowledge to practice seriously.

5. Local philosopher in each community was an opinion leader who has credibility and was able to persuade the audience to understand and appreciate the importance of the subject matter, such as the use of organic fertilizer and leaving the herbicide, insecticide in rubber cultivated area.

### **Recommendations for future research.**

1. Future research should focus on creating a network of knowledge to study in particular one subject about planting and rubber production.

2. Future research should research on community base as for the development of knowledge about rubber by the real way of the community.

3. Future research should allow the people take action to create media or tool to broadcast or convey and dissemination of knowledge from their community by themselves to other communities.

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