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THESIS

COMMUNITY PARTICIPATION LEVEL MODEL FOR COMMUNITY FOREST MANAGEMENT IN KLONGTAGRAO WATERSHED AREA, CHACHOENGSAO PROVINCE

KITTIPOT PERMPUL

A Thesis Submitted in Partial Fulfillment of
the Requirements for the Degree of
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Kittipot Permpul 2009: Community Participation Level Model for Community Forest Management in Klongtagrao Watershed Area, Chachoengsao Province. Doctor of Philosophy (Forestry), Major Field: Forestry, Interdisciplinary Graduate Program. Thesis Advisor: Associate Professor Sittichai Tantanasarit, Ph.D. 224 pages.

Deterministic factors education which was influenced on the community participation level for community forest management in Klongtagrao watershed, Thatakieb district, Chachoengsao province. It was studied five villages which had community forest as follows: Nhongkhayang, Romphothong, Thammaratnai, Kao-krating and Khao-klouymai village by determining the eighteen factors which had expected to have influence on the community participation level. It was divided into each community mean, including 225 sampling families including with measurement tri-dimensions of the participation as follows: quantitative, qualitative and transferring dimension by assessment the level of the participation from three resources. That was from outsider experts, the leader's community working management for community forests and deep interview together with observation of the researcher then they were averaged and studied the correlation.

It was found that there were five factors against the level of participation. That was the understanding towards conservative information, interest towards conservative information, the potential of formal leaders, the potential of informal leaders and the potential of all leaders in the community. It was chosen proper equation by stepwise analysis with alpha in/out 0.1. It was found suitable equation for predicting the level of participation is Community participatory level (CPL) = -58.91 + 1.46 leader potential $R^2_{(adj)}$ 0.79, Quantitative CPL = -53.00 + 1.92 leader potential; $R^2_{(adj)}$ 0.89, Qualitative CPL = -57.35 + 2.00 leader potential; $R^2_{(adj)}$ 0.80, and Transferring CPL = -54.6 + 1.75 formal leader potential; $R^2_{(adj)}$ 0.80.

The suitable way to develop the participation level of the community in Khlongtagrao watershed area on community forest conservation was to develop the potential of formal and informal leader on interest, attention and also the correct way of conservation. In addition, the continuing distribution of the interesting information related to community forest conservation would result in positive effect over participation level, especially when the information was transferred through the community leader.

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Student's signature Thesis Advisor's signature

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Kittipot Permpul

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INTRODUCTION

Resource management towards community based is not a new topic but in the past it wasn't interested owing to law frame, improperly connected regulation. It made a state section didn't make decision on community based that was the cause non-stop argument until the period of Thai constitution since 1997. Thai society was aware of community resource more, at the mean time decentralization to rural areas was an urgently factor made the state have to change power, and some rules about resource management to rural organization more step by step.

Nowadays, an appeal for resource management of community it's found the most about resource management. The picture was shown confliction, shared resource and the right of stake holders, so the mentioned participation wasn't genuine amateur. It's said "Whenever the state's strong the community's weak but whenever the state's weak, the community's strong".

Looking with one side, it might say giving the owner's project was a fixed factor community's participation towards project management but looking both side, the level of community's participation was an important fixed factor as well. The difference of each community's participation made the difference one. And this cause was built construction, emphasized two things; there were conscious and high knowledge but low participation. It's indicated the two mentioned factors weren't enough fixed factor of the participation.

Other factors effected towards a level of some community's participation was an interesting topic, these are "Rely on natural resources" , "Community's history" , "Leader's potential" , "Community Strength" eg. Population pattern, Carrier, Relationship, Settlement period, Economic strength eg-debt rate/saving rate, gross

community product, income, social cost (emphasized trusted) culture, tradition, belief related to culture.

Besides, there were other unclear factors, which were considered – internal conflict, Local government's role and wisdom.

OBJECTIVES

1. To study the status of natural resource and the status of community's participation of the Klongtagrao watershed area.

2. To study and choose fixed factor community's participation towards natural resource management of the Klongtagrao watershed area.

3. To construct a relationship form of fixed influenced factors statistical important variable towards the level of community's participation of the Klong-tagrao watershed area.

LITERATURE REVIEWS

1. Frameworks Regarding Participation

The word “participation” has been defined in many ways, with most being relatively similar to each other. The definitions may be summarized as follows:

Jongwuttiwej (1984) stated that participation meant the mental and emotional involvement of a person in a group situation, where participation in said situation becomes the motivating force behind reaching the objectives of the group and thus becomes more than just being a part of the community. Wuthimatee (1983) stated that public participation gave the people opportunities to initiate, consider, decide, handle, and be responsible for various issues that have impact on them.

Daoweerakul (1996) was of the opinion that participation was a process where the people voluntarily participate in the planned changes, with the people able to participate in making decisions and proceeding with the plans, to meet objectives. This is similar to the belief of Preeyakorn (1992), who placed emphasis on the individual, group or organization that volunteered to participate in the decision-making process, the implementation, and the obtainment of the resulting benefits from the development project.

In addition, Sathiwittiyanan (1989) proposed three ideas concerning public or community participation, as follows: (1) the interest and concern from each individual turns into community concern; (2) the dissatisfaction felt toward the situation becomes a motivator for participation in the situation; and (3) the decision to cooperate as a group means working together at a certain activity.

The frameworks mentioned tend to focus on a certain situation becoming the motivating factor in starting the participation process. This framework may be

different from that of Techarint (1984), who declared that participation meant encouraging, leading, supporting, and giving opportunities for people to participate in the implementation of a certain project to meet objectives. At the very least, participation should have the following features:

1) Participation in studying problems, the source of problems, and community needs;

2) Participation in thinking and creating models to solve problems to respond to community needs;

3) Participation in creating policies, plans, projects, or activities for community development;

4) Participation in making decisions about how to utilize the community's resources for the greatest benefit;

5) Participation in improving the effectiveness of managing community development;

6) Participation in the investment of community activities according to organizational or individual ability to do so;

7) Participation in executing plans, projects, or activities to meet established objectives; and

8) Participation in evaluating the results of the plan/project so that it would proceed effectively.

In summary, participation is a process that needs to take place step-by-step. Government authorities should not come in to control the participation process directly, but instead take on a role that supports continuous participation. This is to let communities learn by themselves without governmental force. From evaluating the frameworks regarding participation, the process of participation can be summarized into the following 4 steps:

1) Planning – People must participate in the analyzing problems, ranking their importance, establishing objectives, planning ways to utilize resources, planning ways to monitor and evaluate the results, and making decisions.

2) Implementation – People must participate in implementing the plan or project in the targeted location.

3) Obtaining benefits – People must directly receive benefits from the activities fairly and equally.

4) Monitoring and evaluation – People must participate in directing, following up, and evaluating the results of the project continuously in order to review and revise the implementation so that it may better integrate with the community's needs.

Participation may be considered an important tool in watershed management, as it helps lessen the burden of the government in solving problems that occur. It also helps to increase the value of decision-making, creates building of consensus on various issues that would be further implemented, and most importantly, it is a way to avoid confrontations in situations of community conflict. Participation is a stage that lets all involved parties come together to find a solution together, which is a part of the foundation for true democracy.

Connected thoughts of community's participation

Community's participation form was the right appeal for management natural resource and community environment from the state or the government. The based thought of community claimed for the failure of state management but the state had monopoly right to mange resource for half century without concrete successes and there was non-stop great lose of it. The more tendency appeal for community's participation towards concrete resource to occupy and unclear-indicated one such as lands, forest areas, water resources management, shore management. It's managed to reach good environment and good quality of life.

Participation towards resource management + environment was not limited to only measurable things but it's gone beyond abstract ones. Society is more conflicted to explain clearly so it's made each community participation having difference by resource based, history, problems, population, social economics etc. Besides the

difference between communities there is difference both individual thought based, complicated of each society by showing in the form of conflict or non-participation etc.

2. Natural resource

Chunkao (2004) Natural resource means things having by nature and gives benefits to humans anyways.

Type of natural resource

A lot of environment dimension shows role/function towards resource one in the air, on the surface of the earth, and under the earth in many forms. Some are solids, liquids and gas, besides some can be changed and grown but some can't be grown but decayed. In order to understand easily conservator divided natural resources into 3 types are follows;

1) Non-exhausting natural resource which is vital to human needs such as weather, natural water, and sunlight. Anyway these mentioned ones may be reduced in quality.

2) Renewable natural resources mean natural resources used by human and can be rebirth as the four basis necessities such as plants, animals, forests, soil, and meadows. If the used rate wasn't balance, some would decrease in quality.

3) Exhausting natural resource there are necessary to comfort and convenience. Without the human can be alive such as petroleum, natural gas, lignite and minerals.

3. Watershed ecosystem

Watershed is the unit of area. There is the ecosystem, then there can be named "Watershed ecosystem". The watershed ecosystem consists of the natural environment and man-made environment. Watershed ecosystem management should be the management to the structure in natural or less changing and maintain the system flow as it should be natural. (Chunkao, 1996)

Many people named the meaning of "Watershed", but its meanings are similar. In this conclusion, "Watershed is an area of flow the water to river or valley". This meaning is not only a small watershed or any shape, but also includes the area of the river or canal. Furthermore in the present, this meaning covers more areas, not especially only the forest, but also the area of agriculture, grass, mineral, community, town, and industry area. (Chunkao, 1996; Boonyawat ,1996)

Chunkao (1983, 1996) said that watershed resources meant the all resources or all environments in the watershed, which is biotic, abiotic, and man-made. And also it might be biophysical or social environment such as plant, man, soil, rock, water, climate, mineral, town, house, street, river, culture. Or we can say that all in the nature is in the watershed, these resources are divided in three main groups as exhausting natural resources, non-exhausting natural resources and renewable natural resources.

Watershed is the open ecosystem. The main factors of the natural environment are soil, rock, mineral, water, climate, forest, wild animal that can transfer to be the matters and energy. These qualifications made the natural phenomena, in watershed as food, water flow and made to degradation or natural balance. (Chunkao, 1996; Boonyawat ,1996)

4. Principle of Watershed Management

The main concept for watershed management is to mark the area for sustainable resources utilization by conservation in practices. That is set the land zoning for the affected of their area, considered by the suitable area of each activity which is not affect to the environment in the watershed.

Some natural resources have to preserve for control the balance of the watershed ecosystem that should not get any use from the nature. In actual, to take the natural resources utilization has to realize people who get the useful from the national resources, because the economy, culture, rule, law of community causes to quality of utilities.

Watershed management means to provide the area for having enough all: water, quality and flow and also can control soil stability, can protect any losing from flood and can manage the natural of watershed in efficiency and usefulness to the people in area that will have more better living and sustainable resources utilization as in principle of conservation.

Watershed ecosystem has related in environment. Although the nature has been changed in anyway, nature has self-recovery without any management by human. But now a day, it has many factors to change the watershed ecosystem so that it must to manage the watershed and provide for resources utilization.

Chunkao (1996) reasoned that the necessary for watershed management that the result form (1) increase in population (2) water utilization need (3) water for irrigation (4) over land use that made land cover changed and (5) economic and social development such as people take the right to make agriculture in national preservation forest area. All affect the water management.

The watershed management has only the knowledge of watershed is not enough, it should include the knowledge in interdisciplinary science. Chunkao (1996)

said that watershed management was science for learning the relation between soil, water and forest and should set the system to these three resources in relation to each other. Soil must have the water and plant could grow up. To destroy soil was the same to destroy water and forest. Or to destroy forest was the same to destroy soil and water. Forest was destroyed that could make the soil qualification changed, especially infiltration and percolation, these meant water could not remain in the soil. When the rain fall, it would run off and flood or landslide.

Principle of watershed management has to manage all resources on the area. There are three principles to manage as follow.

1) Land use planning ; each area has individual on chemical, physical and biological properties of soil. These properties make soil capability of each area different. Watershed management must be start up a land use planning classification.

A general practical principle of land use planning use an elevation and slope of land indicates properties of land. Technology is also introduced to in areas productivity of land using.

2) Determine resources utilization and conservation planning; the natural resources utilization should be harmonize conservation principle to keep the balance of variety, quantity, proportion and distribution. Each of natural resource management change all the time. The resources planning should be appropriate with circumstance and needs. Especially, exhausting natural resources also should be use carefully. Bring a high and efficiency technology to produce these resources for waste minimization, make maximization of benefit, and control environmental impact.

On the other hand, the uses renewable natural resources such as forest resource, wildlife resource, soil resource, agricultural resource have to use on increments of that resource and have to preserve its resources stock.

3) Environmental Pollution controlling, Boonyawat (1996) describes pollution controlling can be manage in 3 methodologies

3.1) Biological controlling such as vegetative soil erosion control and wastewater treatment by activated sludge.

3.2) Mechanical controlling use tool or construction such as rock check dam, wastewater treatment plant.

3.3) Legal controlling is using regulation to enforce controlling environmental pollution such as industry or building wastewater standard regulation, national park act, planning law.

5. Present watershed management of Thailand

At the present, government reforming is established the Ministry of Natural Resources and Environment (MoNRE) is major agency on natural resources management. Watershed management become to a highlight national agenda that to immediately operate, particularly in participatory of a several agencies to build integrated management and planning. The related agencies are Department of National Park, Wildlife and Plants, Royal Forestry Department, department of mineral Resources, Office of Natural Resources and Environmental Policy and Planning (ONEP), and Pollution Control Department. The MoNRE strategies policy on Watershed management are (Department of Environmental Quality Promotion, 2003)

1) Reserve, protect, conserve, utilize and rehabilitation of natural resources and biodiversity through people participation.
2) Conduct, supervise environmental and reduce pollution.
3) Promote learning process and equitable access to public natural resources.
4) Proactive integrated management and administration.

The operating under MoNRE strategies are taken seriously e.g. surveying and determining boundary of a risky landslide area in Phetchaboon, Phare, Mae Hong Sorn and Chiang Mai Provinces, acceleration ecosystem rehabilitation, construction

small scale check dam, preparation to establish a new protected area, and promoting the local people to protect forest fire.

Besides its has a water resources management plan of Thailand, conservation and restoration a river basin, and Song-kla lakes and upper Ping watershed restoration. That all above strategies of government needs a participation approach.

The capacity building of local people learning in watershed resources management was operated in many campaign issues such as promoting community network to conserve protected area by forming a local organization of vicinity community area at least 737 villages, promoting permanent human settlement, training volunteers on forest conservation campaign and the most important campaign is establish 25 major watershed committees of country, and also establish network of sub-committee in provincial, district, sub-district and village levels.

However, community participation process has no exactly procedure. Many agencies operate by their own function and incorporate with each other. The conflict of resources utilization has still appeared in many watershed areas and need a guideline to accomplish resolution process. Developing the model of community participation, according to Area-Function-Participation (AFP), has got to be done to success on watershed management.

6. Natural resources management and environment by community's participation

MoNRE (2004) natural resource management and environment to areas by community's participation, it's mentioned for a long time in the AGENDA 21st years 2535, it's fixed every government on earth to develop natural resources permanently for better quality of life on the base of limited resources. Management and development have to be jointed altogether instead of unlimited countries. Many countries signed the AGENDA 21st – 10 years, it's found every country and state has focused on it but it's not reached the goal so leaders' summit was occurred in

Johunesberg, South Africa to check errors and mistakes including reformation, having fixed clearly practical plan in every level through people, community to widely co-operate. Human's dignity should be accepted and developed. An important phase was taken place "Think Globally Act Locally". So United Nations had to co-operate towards fixed policy, the same direction development without taking advantages especially environment, resources, cash market, cost market etc.

Pintobtang and Onprom (2001) and Walaisathien *et al*. (2000) and Ganjanapan *et al*. (2000) gave attitudes as follows: The aim of resource management with community's participation dimension was the shared benefit from participation management. It's a form of economic outcome, social benefit including the co-operation of using resources and environment together but there was a lot of human resource development (figure1)

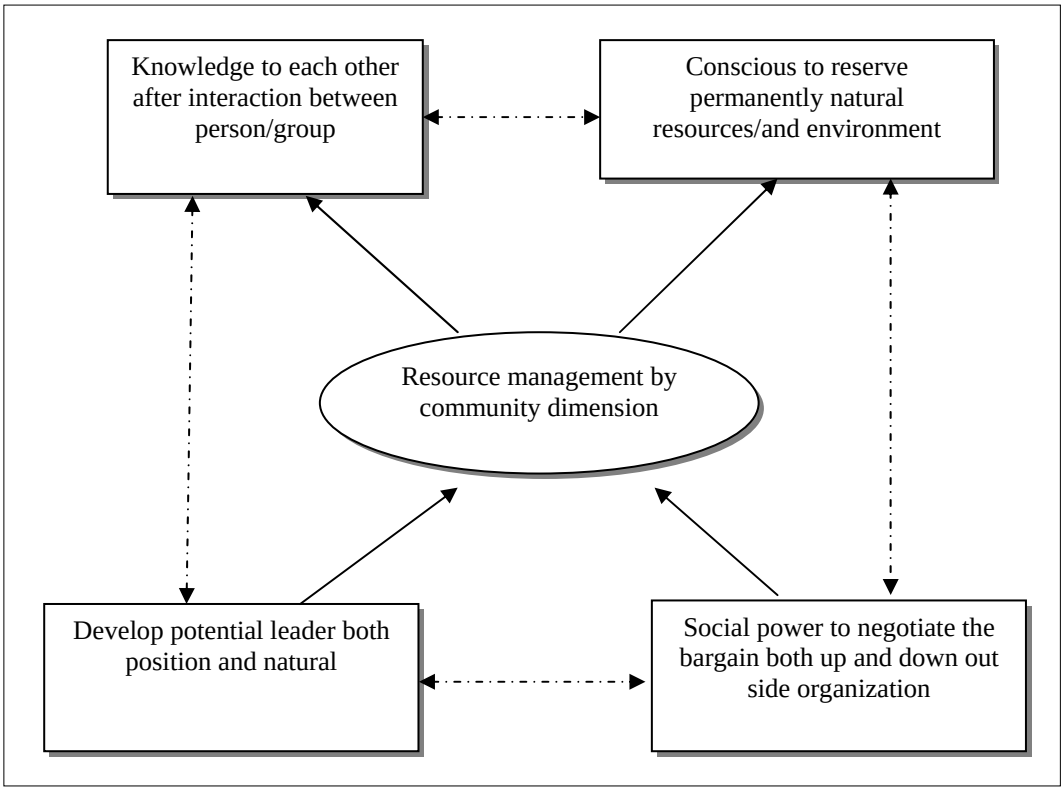


Figure 1 The importance of resource management by community dimension

1) It’s developed knowledge and understanding towards natural resources and environment. Awareness activities to reserve environment such as forest management programs, soil and water conservation, coral reefs and seaweeds conservation, wild-life conversation, training teenagers to conserve environment etc.

2) It’s developed leadership, making decision, transparency, good participation makes the various nets. Official leaders such as Kamnan, Phuyaibarn , Local government Chairman, the leader local council, these persons have direct roles by position.

3) Besides, there are natural leaders such as veteran people, teachers, monks and other respected ones towards public issues without and benefits.

4) Co-operative leaning together towards various careers, knowledge, ages, experience and activities then transferred new knowledge and data to one another. Other members know new things and developed thoughts and knowledge to conserve natural resources.

5) It’s developed to be power groups such as supplementary career group, rural conservation group, ecology tour group.

6) It’s connected management towards state policy to promote stronger community which’s interlocking to economic development plan & environment, the volume 9 to take a bargain towards other communities.

7. Technique for Community Participation research

7.1 Rural Rapid Appraisal: RRA Technique

Rapid rural appraisal is a set of techniques that can be applied as a preliminary stage when embarking on surveys of farmers. The technique essentially involves an informal, rapid, exploratory study of a specified geographical area designed to establish an 'understanding' of local agricultural conditions, problems and characteristics. They can provide basic information on the feasibility of beginning a survey project in an area, particularly when one is intending to survey an area about which little is known.

RRA Definition: Unfortunately, there is no generally accepted definition of RRA. RRA is more commonly described as a systematic but semi-structured activity out in the field by a multidisciplinary team and is designed to obtain new information and to formulate new hypotheses about rural life. A central characteristic of RRA is that its research teams are multidisciplinary.

Beyond that, the distinction between RRA and other research methodologies dependents upon its multidisciplinary approach and the particular combination of tools that in employs. A core concept of RRA is that research should be carried out not by individuals, but by a team comprised of members drawn from a variety of appropriate disciplines. Such teams are intended to be comprised of some members with relevant technical backgrounds and others with social science skills, including marketing research skills. In this way, it is thought that the varying perspectives of RRA research team members will provide a more balanced picture. The techniques of RRA include:

1) Interview and question design techniques for individual, household and key informant interviews
2) Methods of cross-checking information from different sources
3) Sampling techniques that can be adapted to a particular objective
4) Methods of obtaining quantitative data in a short time frame
5) Group interview techniques, including focus-group interviewing
6) Methods of direct observation at site level, and
7) Use of secondary data sources.

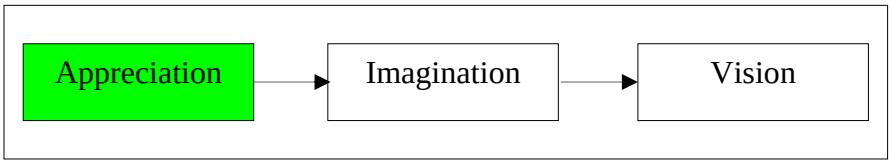
McCracken *et al.* (1988) describe, rather than define, RRA as an approach for conducting action-oriented research in developing countries.

Ellman (1981) With the idea of RRA in mind, he is "convinced that the same message could have been put across more quickly, cheaply and effectively, with evidence drawn from a smaller, purposively selected and studied sample and with no significant reduction in reliability".

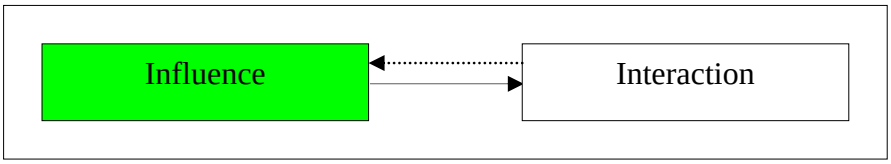
7.2 Appreciation Influence Control; AIC Technique

AIC process is a meeting to work together to formulate a plane. By this method, attendants of the meetings have forum to talk, exchange knowledge and experiences, present data and information to understand problems, needs, limitations and potentials of people concerned. It is a process which creates brain storming in the study, analyze, develop alternatives to solve problems and develop mutual decisions. It causes power of creativity and responsibility to local community development. Epidemic Division (2001); Niyomwan (1999); Anurak *et al*., (2000) described the AIC process which can be summarized as follows.

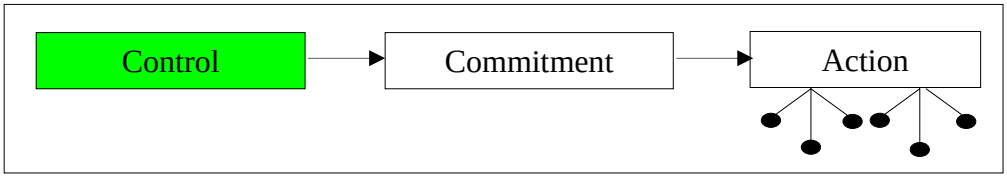
1) Appreciation: to make people accept and enjoy opinions of others without resistance or criticism. Imagination helps create visions. When visions of each people are sum together, this cause more power, they become shared vision or shared ideals.



2) Influence: use of initiatives of each people to help formulate strategies to achieve shared visions of shared ideals.



3) Control: it leads important methods to formulate action plans. At this step members voluntarily choose to be responsible for what actions, what issues, who participates and in what issue, who joins actions action plans. It is commitment to control implementation to achieve goals.



7.3 Empowerment Education Model

Hygiene Division (1999) stated that empowerment is development process of people and group or people by using education process stressing participation in teaching of learners. It uses conversation methods in exchange of knowledge and ideas among learners. Learners get together to address their problems, analyze causes and origins of the problems by reasons, visualize social scene as if ought to be and develop strategies to solve obstacles to achieve needed goals. Management or such education models will promote empowerment of learners in each group.

Empowerment is a process which persons and community have ability in control and cooperation to change lives and environment that they reside. Concepts of empowerment are conformed to real conditions in society such that persons and surrounding society always interact. Sometimes, persons can not behaviors or lives by themselves because of impacts from surrounding society, do not receive supports as agree meats from social groups.

Concepts of empowerment education stress learning to initiate changes both individual level and as a group to change the society and environments. Therefore, the concepts should be use to manage activities in hygiene.

The researcher applied empowerment education by empowerment the community, aiming to make farmers know situations of disease occurrences, aware of importance of health and education problems, conduct learning activities, cooperate in heath promotion, control and surveillance of diseases and manage environments which have effects on protection and solve problems for people in the community from pesticide poison.

7.4 Group Process

Tharapoch (1990) mentioned purposes of group process as:

1) To gain knowledge and understanding concerning important characteristics of group process.

2) To understand principles and methods of group working.

3) To exchange opinions among persons in the group which is guidelines to solve problems of the group.

4) To understand themselves and others to build good relations in group working.

5) To enable individuals to build and develop their capability.

6) To apply knowledge from group process in everyday lives properly.

Group sizes

Ottaway (1996) indicated that size of the group should be small in order that members have changes to express freely and thoroughly. Members do not need to use loud noises; therefore size of the group should not be more than 12 persons or at most not exceed 20 persons. Otherwise, pattern of behavior may from usual. Appropriate size of the group should compose of numbers of members that works effectively.

Jobs of group leaders

1) Define purposes of grouping clearly explain to group members to understand purpose and implementing methods of the group. As members join the group without knowing clear purposes will make than more apprehensive.

2) Build pattern of grouping to make grouping more efficient, help group members energetic and participate fully in the group, there should be planning of structures and outside compositions which influence the grouping such as number of numbers, timing, place seating and characteristics of numbers.

3) Stimulate and increase interaction among members. Group leader must stimulate members to have conversation and exchange of ideas on the some issue. These enable members to know problems of the other members, to know that they have the some problem, understand problems of each other and find the way to solve these problems. Interactions among members may be in forms of mutual dialogues or understandings. These create belongingness, group membership, friendliness and security of the group. Besides, group leader may stimulate interactions in the group by using audiovisual instruments, game playing and others.

4) Stimulate members to speak out, exchange problems of the some sorts. Group leader must try to get the members express their ideas fully. Grouping is meaningful and catches attentions from members if what they talked in the group is problems of all members or the majority of members. In addition, it evades mutual, feelings, making marking group members feel acceptable and share helps and sheerings each other.

5) Plan grouping for each member. Because each, member has different ability in achieving group purposed. Group leader must be able to find solving methods for the group identify what components make discontinuous actions or make meetings unsuccessful.

6) Reduce apprehension of members. Group leaders should reduce apprehension of members since the beginning of grouping. Leader must inform clear objectives of grouping and procedures the members have to do to achieve the objectives. He must be sympathetic, understand willing and ready to help the members.

7) Summary of progress of the group. Group leader must control and takes care of progress in the undertakings of the group at all time until the end of grouping it achieve the dot objectives.

From these concepts, the researcher applied group process by let the members know and acquaint, introduce each other, group activities such and games to be acquainted, willing and accept to help members in the some group.

7.5 Group discussion process

Nursing Division (1997) stated that group discussion process is used an instrument in qualitative education. It is a dialogue in small group with in – depth characteristics of specific headings or concepts. It can study and search for factors and processes in needs of target groups comprehensively. In formations obtained are useful in planning any works. Therefore, group discussion can be used to study problems and needs before planning the grouping.

Group leader or group discussion conductor play roles in stimulating group members to participate in responding reactions, Giving in formations and expressing opinions freely. Group leaders should be sensitive to feelings of group members. He should not propose only his opinions, but pay attention to hear information from members, importantly, group leader must have good knowledge and experiences in the dialogue, to attack important issues, identify issued clearly and receive exact information.

Group discussion is a consideration or discussion within 6-20 members concerning any issues of common interest or common use. Conductor may give the issue as a problem or case study to find solution by discussion to express opinions. In the discussion, there must be a conductor (leader of the group) to stimulate all members to address their opinions. There might be a group secretary to record group reports. Solutions derived are not belonged to any members but belong to the group.

Advantages

1) All members can express their opinions freely and fully, which is regarded as the most democracy.

2) It is collaboration of opinions from many people which leads to good and suitable solutions.

3) It helps group members to listen and accept opinions from other and to practice shy people to show off.

4) It develops people to be leaders.

Limitations

1) If the conductor has less ability, he might not be able to control the group. Some members may talk too much, some do not talk.

2) If people who join the discussion do not have enough knowledge or experiences, the solution derived may not be good enough.

3) If group members are different such as in knowledge experiences, positions, and age, these may be disadvantages because of pressures from the superiors.

4) If group members do not understand the purposes of the discussions, this may make the discussions complicated and do not proceed in a desired direction.

5) It group members are many time for discussion may not enough for collaboration of all opinions.

From above concepts, the researcher applied group discussion process for discussion of opinions concerning control and surveillance of pesticide poison diseases as the derived solutions do not belong to any members but belong to the group.

7.6 Participatory Action Research; PAR

Participatory Action Research (PAR) has been defined relatively similarly by many experts, all of whom have stated that it is a process where a certain number of people in an organization or community participate in the study of a certain problem through participating in activities with the researcher from the start of the research until it ends. The research is problem-oriented, starting from the problems in the community. This kind of research would be flexible, the research plans re-adjusting constantly to what is happening within each phase (Whyte, 1991; Praputnitisarn, 2003; Dulyakasem, 1993; Teewakul, 2000).

In addition, Walaisathien *et al*. (2000) emphasized that PAR placed people in the status of community members, with important aspects being the handling of community problems and the participation of the community. The people in the community must participate closely in the research with the researcher. In any case, participatory action research differs from scientific research because it places emphasis on the acceptance or consensus of people in the community. Therefore, in this type of research, the researcher must constantly evaluate the people in the community (Jantwanij, 2002).

8. Deterministic variable

The study of Deterministic variable or Independent variable which has an influence on participation level used “Multiple linear regression analysis”. The study can show the level of influence from each deterministic variable which affect to the participation of community in natural resources management especially in watershed area, moderate steep area, low land area and city area which has different life’s style, resources quality and economic-social conditions.

8.1 Regression Analysis

Panichwong (2003) Regression Analysis is the study of a relation between Dependent variable or Response variable. Usually represented by “Y”, and another variables call Independent variable or Predictor variable or Deterministic variable which mostly represented by “X”. The “X” variable will be used to estimate or predict the dependent variable which is the sample variable from Independent variable. In this research, the relationship between levels of participation will be “Y”, in the other hand, the Independent variable or Predictor variable or Deterministic variable are the factor which has affected on the participation such as resources utilization, history, educational level and conscious, etc.

8.2 Multiple Linear Regression

Panichwong (2003) “Multiple linear regression” is the study of relationship among 3 variables which one of them is Dependent variable and the left are Independent variable. If the independent variable has linear relation with dependent variable, it is multiple linear regressions.

The Multiple linear regression will be used when theory or reason suggest that the predicted value of dependent variable has more accuracy when increased the number of independent variable and in case of independent variable had linear relation with dependent variable.

Kijpreedaborisut (2003) The variables that will be used in Multiple linear regression both dependent variable and independent variable need to determine an interval or a proportion. However, to study the relation between dependent variable and independent variable, it is not possible to measure the interval of all independent variable, only some independent variable can measure the group interval or range.

For example the study of factors the related with weight of initial baby , the independent variables are mother’s age , womb’s age , a medicine that promotes baby in worm , and mother’s occupation . All of them are qualitative variables which can measure by group interval.

8.3 Type of independent variable

From Regression analysis, found that type pf independent variable are

1) Quantitative variables; It is a variable which can measure in term of numeral such as income, temperature, goods, etc.

2) Qualitative variables; It’s is variable which can not measure in term of numeral or when measure as number, it can not show any relations. This variable is used for dividing type of data or categorizing data such as sex, occupation, type of

company, etc. Therefore, it is necessary to convert Qualitative variables to be dummy variables before analyzing in regression analysis.

Converting of Qualitative variables to be Dummy variables

Kijpreedaborisut (2003) Qualitative variables for 2 groups called Dichotomous variables. In this case, it will convert to 1 Dummy variable. For example take a medicine for baby in womb, it is only “take” or “not take” By converting this variable, one group becomes 1, other group becomes 0 and should set the purpose of research to be a first priority.

Qualitative variables for many groups: In this case, it can convert many Dummy variables such as if dividing into 3 groups, 2 dichotomous variables were converted. If dividing into 4 groups, 3 dichotomous variables were converted. In summarize, the maximum Dummy variables can be calculated from total group minus one. (k-1, if k= total group). To converting the variables, it is not necessary to convert all of them but the need of convert and sample size of that group should be considered.

The use of dummy variables is limited. It can vary between 0 and 1 only while the Regression analysis requires high alternating of variable. Therefore, if it is not necessary to use, the Dummy variables should be avoided by good planning before gathering data such as try to take a deep detail or attempt to take data in term of quantitative variables.

In some case, the use of Dummy variables can give advantages and reasonable to do. For example need to know the influence of occupation or to solve non-linear relation between independent variables and independent variables.

In order to convert independent variable to be Dummy variable, the independent variable will be divided into phase by phase. Then determine the relationship between dummy variables in each phase and dependent variable. The

result of relationship will be more linear than analyzing the independent variable together without separating.

8.4 Multiple linear regression equation

The Multiple linear regression analysis is the analysis of many independent variables. When independent variable (X) k variables and dependent variable (Y) 1 variable, the Multiple linear regression equation for prediction the dependent variable can be written as following

The general equation which obtained data from population is,

$$Y = \alpha + ß_1X_1 + ß_2X2 + \ldots\ldots + ß_3X_3 + \varepsilon$$

Actually, obtaining data from population is impossible. Thus, sampling should be used instead of population and the equation can be re-write as following;

$$Y = a + b_1X_1 + b_2X_2 + \ldots\ldots + b_kX_k + e$$

In the sampling equation, the error can be occurred. Thus, the least square technique should be applied in order to eliminate the influence of error. The equation is shown below;

$$Y = a + b_1X_1 + b_2X_2 + \ldots\ldots + b_kX_k$$

Where α and a are an intersection point in Y axis of Regression equation when other independent variables are equal to 0

Where ß and b are partial regression coefficient of independent variables which mean the vary ratio of dependent variable (Y) when independent variable change 1 unit where the other independent variables are stable.

8.5 Coefficient of multiple correlation

It's a relationship among many variables which can be represented by "R". This "R" has a value falling between 0 to 1 ($0 \leq R \leq \pm 1$). If "R" is near "0" means dependent variable has low relation with independent variable. If R is equal to "0", mean dependent variable has no relation with independent variable and If R is near "1", means dependent variable has strong relation with independent variable.

8.6 Coefficient of multiple determinations

In order to use multiple linear regressions to determine the dependent variable, the Regression analysis must be evaluated before. The simple Regression analysis can be evaluated by determines the coefficient of determination with slop (b). By the same way to determine the Multiple linear regression, if can be evaluated by determine coefficient of multiple determination with partial regression coefficient.

Coefficient of multiple determinations is equal to the coefficient of multiple correlations to the power of two or can be calculated by the equation below;

$$R^2 = \frac{SSR}{SSY}$$

Where; SSY = Total sum of squares, SST of Y

Which can be evaluated from;

$$SSY = \sum y^2 - \frac{(\sum y)^2}{n}$$

SSR = Sum of square due to regression

$$SSR = b_1 SPX_1 Y + b_2 SPX_2 Y + \ldots\ldots + b_k SPX_k Y$$

SSE = Sum of square Regression or error sum of square

$$SSE = SSY - SSR$$

8.7 Adjusted R^2

If increase a number of independent variables into Regression equation, the SSR will be increased and lead to a raise of R^2 even though that independent variables has no relationship to the dependent variable. Therefore, R^2 must be adjusted as shown in the formula below;

$$R^2_{adj} = 1 - \{\frac{(1 - R^2)(n - 1)}{n - k - 1}\}$$

8.8 Multicollinearity

When evaluate the multiple linear regression, some independent variables (X) can have a self-relationship. If between independent variables in regressive form has incomplete relation or no relation, it called “Orthogonal” .When other independent variables are not orthogonal or incomplete orthogonal. Therefore, it is possible that the error was occurred. When independent variables have a self-relationship, it can cause multicollinearity. The multicollinearity has 3 main affects as described below;

1) The regression coefficient b_j of independent variable X_j can be changed, if the other independent variables have overcome the relation. The b_j in Regression analysis equation will have no influence from independent variable X_j and will not effect to average $\mu_y(X)$

2) The calculated regression coefficient tends to has high standard deviation. When standard deviation of regression coefficient Sb_j is increased, the t-Test will be below the normal value which lead to acceptation of H0 : j = 0 and can conclude that X_j has no relation with Y eventhough X_j has relation with Y . Moreover, if use F-Test, the result shown inconformity with t-Test.

3) Multicollinearity has no effect to determine the average of Y or prediction of Y

The study of participation has high possibility for Multicollinearity to occur because social factors are tentative to have self-relation especially in community participation. Therefore, the researcher must pay more attention the influence from multicollinearity by;

1) Select Bangpakong watershed to be a studied area because many researches shown that it has low development, ambiguously about a right in resources management, population has high individual and difficult to instruct. Therefore, the influence of direct factors or indirect factors to the community's participation is lower than other watershed area.

2) Careful of self-relation among the variables such as owning of the land and income.

8.9 Selection of independent variable into Regressive Equation

The analysis of multiple linear regressions is to determine the relationship between 1 dependent variable and many independent variables. The number of equation will be increased, when number of independent variables, it will cause a self-relation problem called "autocorrelation". The study might take a long time and more expensive because it takes an unnecessary variable. The selection of independent variable into Regression equation can be done in many ways such as Enter, Remove, Backward, Forward, and Stepwise. In this research, the stepwise method was implemented.

The stepwise method is similarly to forward method except in step no.2 which is to select the second independent variable into the equation. The variable that has highest coefficient of partial correlation and significant, will be selected to the equation. Then, bring the previous independent variable and new independent variable to find coefficient of partial correlation with dependent variable, and compare a

signification of regressive coefficient with partial F. If it has a significant, it will be accepted. This method can ensure that the previous independent variable will have no relationship with a new independent variable.

9. Related research

In general watershed area of Thailand, they have conflicts in natural resources right between government and community. But people participation pattern in Banpakong watershed is difference from other watershed. From many researches, they figured that community in Bangpakong watershed have lower interested in natural resources management than other area. Banpakong's peoples have high response to economic system change, social change, production change but low conservation in their occupation or traditional life.

Petplai (1998) Study on community participatory models for watershed management: a case study of Banpakong river basin, found that people participatory level ($CPL_{average}$) are depend on forest cover, income, schooling period and settlement period. The relative model was shown below;

$CPL_{average}$ = (-1.9516) + (0.1709) Forest cover + ($9.95x10^{-6}$) Income + (0.6613) School period + (-0.0128) Settlement period

$R^2 = 0.5231$; Sig.F = 0.0446

People participatory models in 5 types;

1) Opinion of participation; CPL_1
2) Activities of participation; CPL_2
3) Actions of participation; CPL_3
4) Need of participation: CPL_4
5) Pattern of participation; CPL_5

CPL_1 and CPL_5 have a statistical significant and $R^2 > 0.50$. The relative models were shown below;

CPL_1 = (1.987) + (0.4279) Forest cover + ($1.355x10^{-6}$) Income + (-0.0535) Age + (0.4486) Watershed function

$R^2 = 0.7702$; Sig.F = 0.001

CPL_5 = (-0.6098) + (0.3511) Forest cover + ($2.5238x10^{-6}$) Income + (0.3453) School period + (0.1516) Watershed function

$R^2 = 0.5471$; Sig.F = 0.0134

Banpasirichote and Wangaeo (1996) Concluded that Eastern part community participatory is not progress, even though peoples are interested to join the area developing process. Comparing to North-eastern part, Eastern part has few NGOs to push up community organization roles.

Junwanij (1986) The important participator's heritage of Eastern agricultural community may be Social-politic movement experiences, cultural succeed in resources management, folk ways in resources management. May be concluded that Eastern part area have no culture to overarch resources by community.

Banpasirichote (1993) Found after production pattern change in 1970's, the importance of paddy field community in Eastern part of Thailand were reduced especially if compared with the Central part. The paddy field is not mainly income for Chachoensao's peoples and only an old man who does paddy field because they unable to adjusted themselves in capitalism economy.

Banpasirichote (1993)The Banpakong riverside village in-depth studies on people response for developing and village's structure pattern change assessment in Chachoengsao province, Result; prawn culture area were magnified, peoples highly responded to capitalism economy, rapid land use land cover change, Industrial growth, wild and uninhabited part problem, resources management gap by

community, land use conflict, slightly initiate for built resources management system and government power was slightly roles for solved community problem.

Phuchongkakul and Puapongsakorn (1992) The pattern of forest lands pioneer in Eastern was similar to Central, investigated though the past they notice about 2 important periods of deforestation is 1) high farm/annual crops prices in 1973-1976 and 2) quashed communism in 1978-1982, that causing high rate deforestation in border forest of 5 provinces, After that time the he 2nd Army Area was Declare off logging and stop peoples migration to live in forest area, then deforestation was lowly. Analyze data in Eastern and Central of Thailand, found 4 main reasons of deforestation namely;

1) Deforestation for farm crop's land and charcoal; cause from population rise and lack of land, then they must magnified their land around their village. This is slowly deforestation, rate of deforestation depend on number of new family and stopped in late 1960's; an example Ban Nern District, Amphur Pakpli, Nakornnayok province.

2) Concession to work a forest and follow with magnify farm crop's land; an example Klong ta krao District, Chachoengsao province.

3) Government's development project; an example: dam construction or reservoir construction, the highest deforestation rate was considered for this reason.

4) Deforestation for building resorts and economic forest; the presence situation of deforestation.

Now rate of Eastern deforestation is very low, however found deforestation in border forest of 5 provinces cause from outer influences; an example: reforestation, tourism business and commerce crops.

Wiset and Boonserm (2004) Made model after lessons in Ing watershed development, Chiangrai province and Payao province. Found the situation of natural resources were declined, while the community need to rely on natural resources, have

faith and ceremonial in natural resources management. Factors of resources declination came from 1) over carrying capacity usage 2) lack of good plan 3) big project's impacts from government or local government. Now; Ing watershed has many conflicts, resources declining and natural resources recovery is difficulty.

Daoweerakul (1984) Study on Factors effecting people's participation in village development project: a case study of the first prize winning village of Nakornsawan province by interviewed 116 family's leader, found participatory pattern level from high to low; meeting, activities, donation, invite neighbor, tool donation, monitoring, coordinate activities, controller and opine, respectively. Could separate factors to 2 groups

1) Individual factors; namely, individual social position in village, felt important by himself for village, activities enthusiastically. But sex and age were no significant effect.

2) Economic factors; no factors were significant for Participatory level. Factors were observed are occupation, income and land ownership.

3) Social factors; namely, honor requirement, invitation from village committee/neighbor/sheriff/district officer. But prize requirement and neighbor relation requirement were no significant effect.

Thammachart (1998) Study on participation of the local people toward coastal resources conservation: a case study of Langu district, Satun province by interviewed 360 samples. Analysis of data showed that most of the sample had participation in coastal resources conservation at moderate level. Examination of the relationship between the local people participation coastal resource conservation and other factors showed that participation of the local people toward coastal resource conservation depended on sex, age, occupation, opinion and information received significantly at the level of 0.05 while other factors such as education level, social position and the duration of residence in community were found to be non-significant.

Sirikhantanon (2002) Researched in participation on mineral resources management, important factors for mineral resources management to achieve public goal are to clarify the effective use of mineral resources by prioritizing the benefits of each natural resource to the security in economics and social development. Information access must begin with transparency of the public sector by set up a clear and transparent information system of every involved unit.

Hemthanon (2003) Studied on Banglumpoo's community participation in tourism resource conservation by using in-depth interviews of 30 key-informants, participative observation and document analysis, the study result reveal that Banglumpoo Community member's participation in tourism resource conservation in positively related to their knowledge about tourism policy, their intention to conserve local traditional lifestyles and ancient remains, and their consciousness in protecting community interests. The more they know about tourism policy, intend to conserve local traditional lifestyles and ancient remains, and are conscious in protecting community interests, the more they participate in tourism resource conservation activities.

From the previous researches, it is not possible to clearly define the factors that have an influence on community participation in natural resources management. Some said that because of different period of study, studied-area, surrounding factor (Table1)

Table 1 Deterministic factor of quantitative community participation level in natural resources management

Factor	Participartory level factors													No. of researches
	Petplai (1998)	Hem thanon (2003)	Sirikha ntanon (2002)	Daowe erakul (1996)	Thamma chart (1998)	Saisor (2003)	Tride chee (2003)	Kaow nont (2002)	Neam kong (2003)	Tech arat (2003)	Sa-ard (2002)	Hom saen (2003)	Watcha raphog (2003)	
1. Sex	-	-	-	χ	√		√	√						3
2. Age	√	-	-	χ	√		√							3
3. Income	√	-	-	-	-									1
4. School period	√	-	-	-	χ				√	√			√	4
5. Forest cover	√	-	-	-	-									1
6. Watershed/resource fully	√	-	-	-	-									1
7. Attitude in important of Resources	-	√	√	-	√			√						4
8. Beneficially	-	√	√	-	-	√	√			√				5
9. Occupation	-	-	-	χ	√									1
10. Social status	-	-	-	√	χ					√			√	3
11. Information received	-	√	√	-	√	√	√			√	√		√	8
12. Invitation	-	-	-	√	-									1
13. Local traditional lifestyles conservation	-	√	-	-	-									1
14. Settlement period	√	-	-	-	χ									1
15. Participation trend		√		-	-									1

Table 1 (Continued)

Factor	Participartory level factors													No. of researches
	Petplai (1998)	Hem thanon (2003)	Sirikha ntanon (2002)	Daowe erakul (1996)	Thamm achart (1998)	Saisor (2003)	Tride chee (2003)	Kaow nont (2002)	Neam kong (2003)	Tech arat (2003)	Sa-ard (2002)	Hom saen (2003)	Watcha raphog (2003)	
16. Member of conservation group							√					√		2
17. Relationship to officers											√			1
18. Race												√		1

Remark √ meaning: influence factor for community participation level
χ meaning: non significant factor for community participation level

Conclusion from above table; manifest deterministic factor of participation level are

1) Attitude in important of Resources
2) Received the information of management
3) Benefit of Resources management
4) Age

Ambiguous factors or conflict with other research are;

1) Sex 2) Income 3) Education
4) Occupation 5) Social status
6) Rich of resource / rich of watershed
7) Forest area 8) Lead by other person / be led
9) Way of life 10) Settlement period
11) Participation trend 12) Member of conservations group
13) Relation to officers 14) Race

Moreover, the prize from competition, the relationship with neighborhood, and the land owner are not affecting to participation level.

10. General characteristics of studied area

Klongtagrao subwatershed area is located in Bangpakong watershed, Tha Takiab district, Chachoengsao province. Subwatershed area about 371.27 km^2 or 232,043.75 rai, the sub watershed is look like dendritic shape, main channel length about 31.9 km, covered 10 village in Tha Takiab district. Klongtagrao channel flow from southern highland to plain land at the outlet.

Geographic coordinate; UTM 47P

Latitude 777874.5 – 808565.6 east
Longitudes 1458283.5 – 1485910.7 north

Most of area is slope areas. The populations in this area are 7,864 persons, 2,103 families. Most of lands used are agricultural (farm crop, paddy field, para rubber), forest and residential area. Detail of study area shown below;

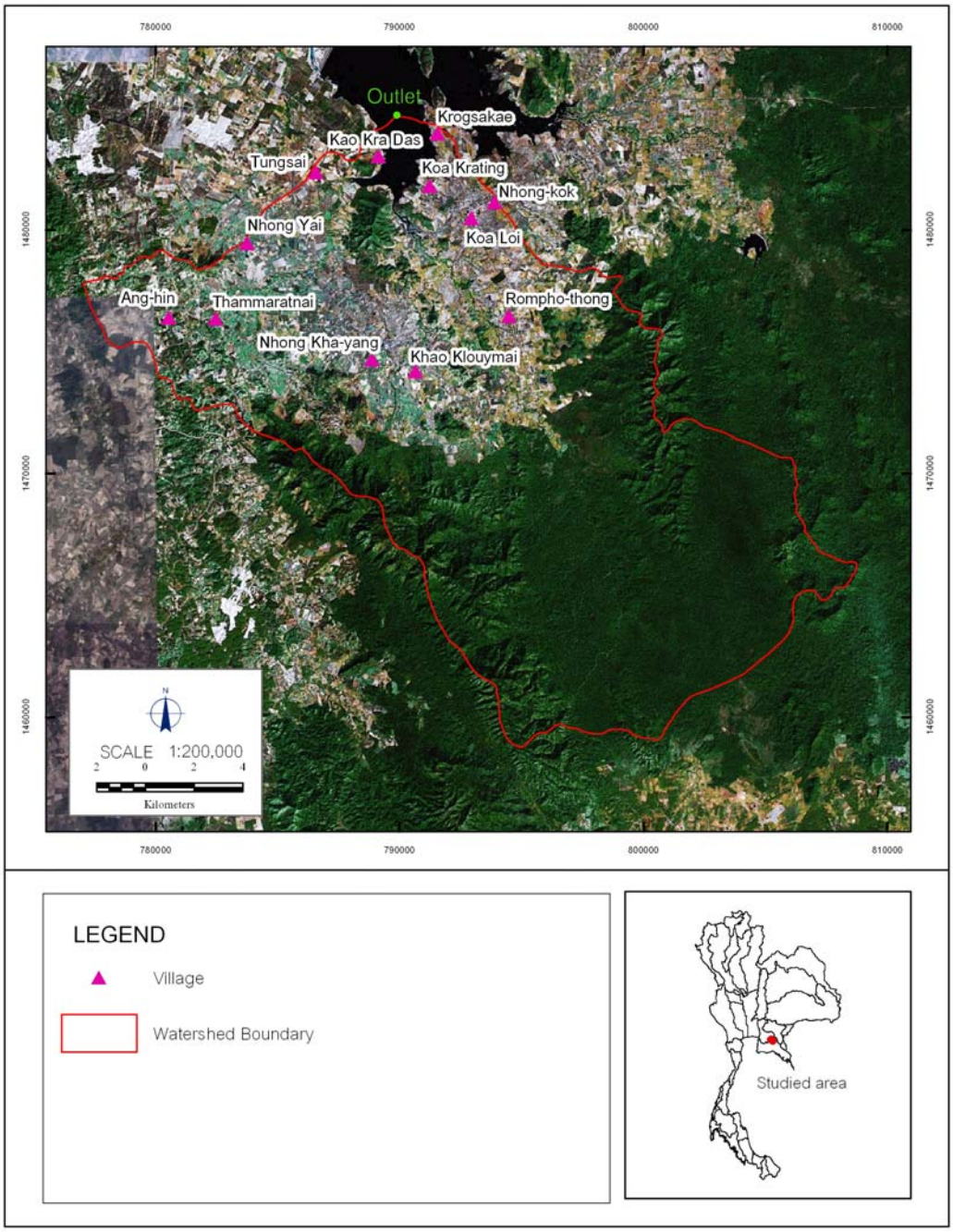


Figure 2 Satellite's image of village site in Klongtagrao watershed area

MATERIALS AND METHODS

Materials

1. Watershed classification maps of Klongtagrao watershed
2. Topographic maps scale 1:50,000 of Klongtagrao watershed
3. Land use maps: maps were prepared officially by Department of Land Development (DLD).
4. Microcomputer: personal computer operated under Department of Conservation, Faculty of Forestry, Kasetsart University, and Notebook at home.
5. Questionnaire
6. Observation form
7. Semi-structure in-depth interview form
8. Professional's Community Participation Level form
9. Neighboring Community Participation Level form

Methods

This study is integrated research for studying an important deterministic variable which has an affect to the level of community participation in natural resources management in Klongtagrao watershed, Thatakiab district, Chachoengsao province. The study utilized both quantitative research and qualitative research by interview, in-depth interview and observation in order to gathering all necessary information for determining the participation factor that influenced level of community participation. The methodology are shown as follow;

1) Preparation
2) Research design
3) Primary information gathering
4) Compiled and analyzed data

1. Preparation

The purpose of this study is to determine the relationship among the factors that affect to level of community participation. The researches studied and gathered all factors for being a base in this study as shown below;

1.1 Study and gather secondary data

Study about principle, measurement technique, and factors that has effect to the level of community participation in Bangpakong watershed and other watershed areas to define the factors concerning in this study.

Study primary data and natural resources management

1) Study natural resources in the study area in the aspect of importance, constituency, structure and responsibility.

2) Study the format of natural resources management of studied community.

1.2 Site selection

Criteria for site selection;

1) Small watershed area
2) Many types of land use; forest, crops, city, etc
3) Had participation activities
4) Distance between community less than 10 kms
5) Low disturbance from outer factors

In this research, the studied area is Klongtagrao watershed, Thatakiab district, Chachoengsao province. The study area has 371.27 square kilometers or 232,043.75 rais, 12 villages, detail shown in figure 3 and 4.

The study area is rural area close to Khao Ang Rue Nai Wildlife Sanctuary. Almost villagers in this area had worked a forest in concession area and moved out from wildlife sanctuary in 1990 decade. Some villagers have conflict history with the conservation officer, such as land conflict, hunting conflict or resources used conflict. The villagers thrust to their community leaders more than government officer to lead them.

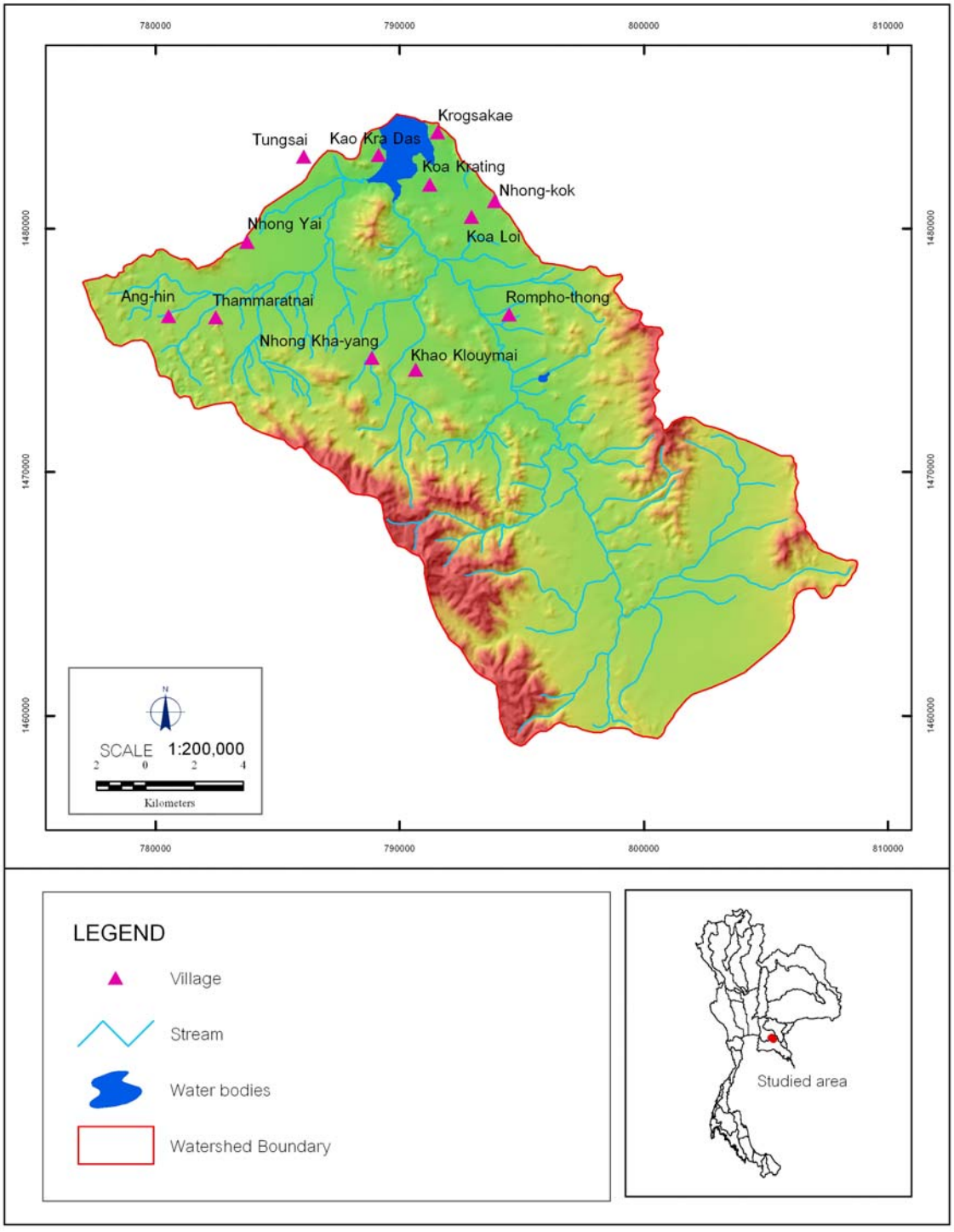


Figure 3 Boundary of Klongtagrao watershed area

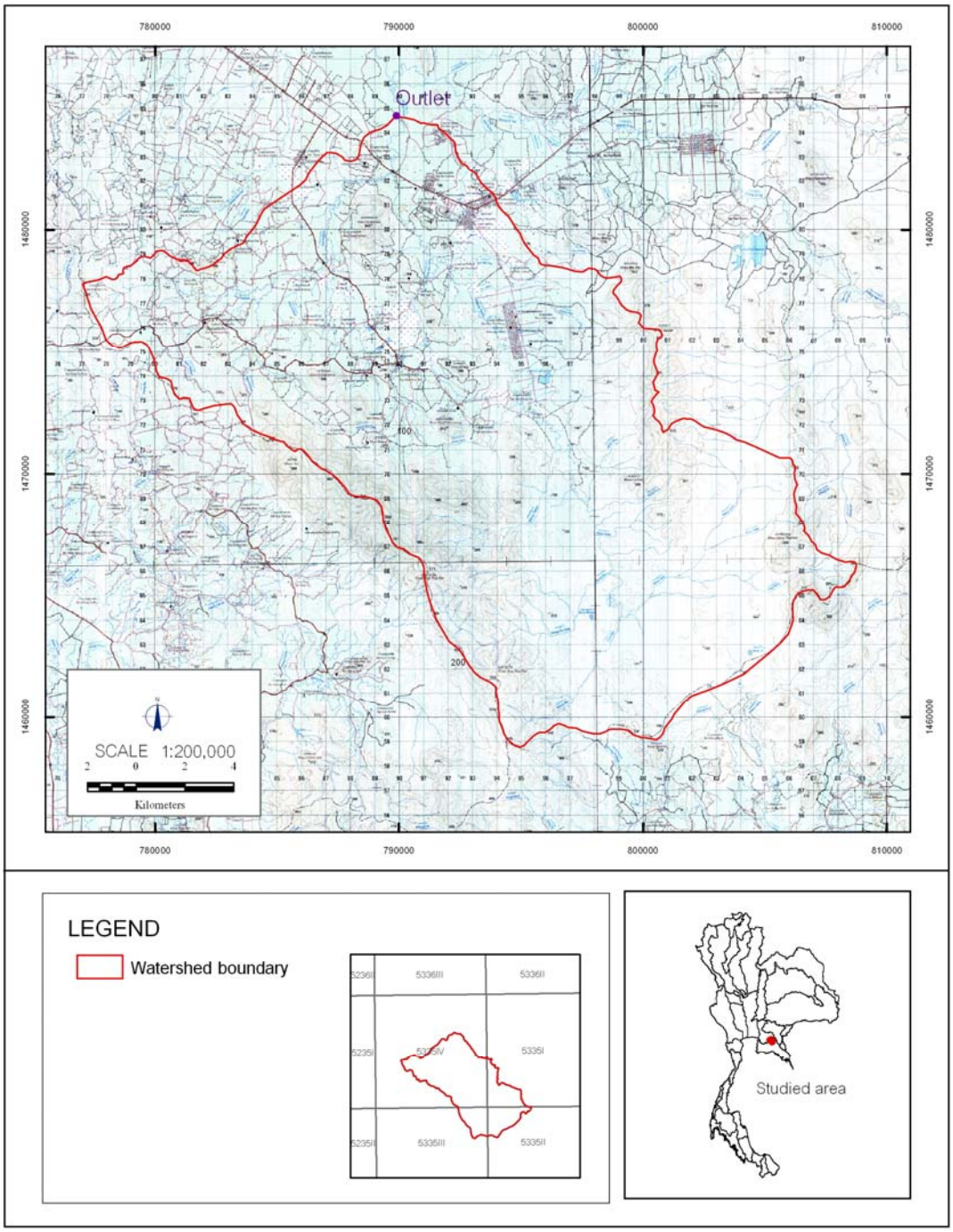


Figure 4 Topographic map of Klongtagrao watershed area

1.3 Population

General population

The population in Klongtakrao watershed is 8,609 persons or 2,348 families 12 villages in Klongtakrao sub district as shown in table 2 (Community Development Department, 2003).

Table 2 Population data in Klongtakrao waterahed area

Village	Moo	No. family (family)	No. People (People)	Main occupation
1) Krogsakae	1	87	331	Agri-crops
2) Nhong-kok	2	458	1,483	Agri-crops, para rubber, paddy field
3) Koa Loi	3	315	1,396	Agri-paddy field
4) Nhong Kha-yang*	5	235	708	Agr-crops
5) Thammaratnai*	6	68	257	Agri-crops, paddy field
6) Rompho-thong*	7	249	1,018	Agri-crops
7) Tungsai	12	160	603	Agri-crops, paddy field
8) Koa Krating	13	150	660	Agri-crops, paddy field
9) Khao Klouymai*	14	190	686	Agri-crops, paddy field
10) Nhong Yai	15	191	722	Agri-crops, para rubber, paddy field
11) Ang-hin	16	180	448	Agri-crops, vegetable, para rubber, field
12) Khaokradas	19	65	297	Agri-crops, eucalyptus
Total		2,348	8,609	

Remark: * Upper stream area

Source: Adjusted from Community Development Department (2003)

Klongtagrao watershed consists of 12 villages, 2,348 families and 8,609 persons. Five villages were managed community forest activities namely: Nhongkhayang, Romphothong, Thammaratnai, Khao-klouymai and Koa-krating. These five areas were employed as the representatives for this study.

Sample

Family sample; population in Nhongkhayang, Romphothong, Thammaratnai, Khao-klouymai and Koa-krating village is 892 families as shown in table 2 (Community Development Department, 2003). To calculate the sample set, Khajornsilp (1996) suggested sampling of small population (less than 1,000 samples) is 25%. The calculated and adjusted samples were shown in table 3.

To sampling the families sample used basic method called “Simple randomized sampling” as shown in table 3.

Table 3 Sampling the sampled families in 5 villages

Target population	Quantity (families)			Sampling method
	Population	Sample	Sample (adj)	
General population				
1) Nhongkhayang	235	58.75	59	Simple randomized sampling
2) Thammaratnai	68	17.00	17	Simple randomized sampling
3) Romphothong	249	62.25	63	Simple randomized sampling
4) Koa Krating	150	37.50	38	Simple randomized sampling
5) Khao Klouymai	190	47.50	48	Simple randomized sampling
total	892	223.00	225	

Community leader sample; In-depth interview was used for at least 1 official leader and unofficial leader by Purposive sampling.

Government officer**;** In-depth interview conservation officer from Chachoengsao controlled forest fire station and Khao Ang Rue Nai Wildlife Sanctuary.

1.4 Measuring of community participation levels

Dimension of community participation measure

This research measures community participation in 3 dimensions

1) Quantitative dimension is a countable participation factors such as the percent of the participated families, frequency of the participation, size/area of doing activity, and budget.

2) Qualitative dimension is a quality of participation activities such as variation of the activities, willingness to participation, difficulty, results of the activities against the conservation, forms of the conservation with the state and push-forward groups.

3) Transferring dimension mean ability of community to transfers or manifest participation to member and sustainable maintain it such as transferred ideas to the whole member of the community or to the young to practice, variation of participated groups, and ages.

Methods of community participation measure

This study used 3 integrated methods to measure community participation;

1) Rating from professional; using 3 community participation specialists from educated institute; Assoc. Prof. Dr. Wicha Niyom, Assoc. Prof. Dr. Sittichai Tantanasarit and Dr. Kitichai Ratana from Department of Conservation, Faculty of Forestry Kasetsart University.

2) Rating from own villagers; using 3 community well-informed persons known about their community participation activities for each community.

3) Rating from researcher; by using in-depth interview and observation community participation.

Analyzed data from 3 dimensions of community participation measure with 3 methods of community participation measure to individual community participation levels.

Framework of research and methodology framework are shown in figure 5 and 6.

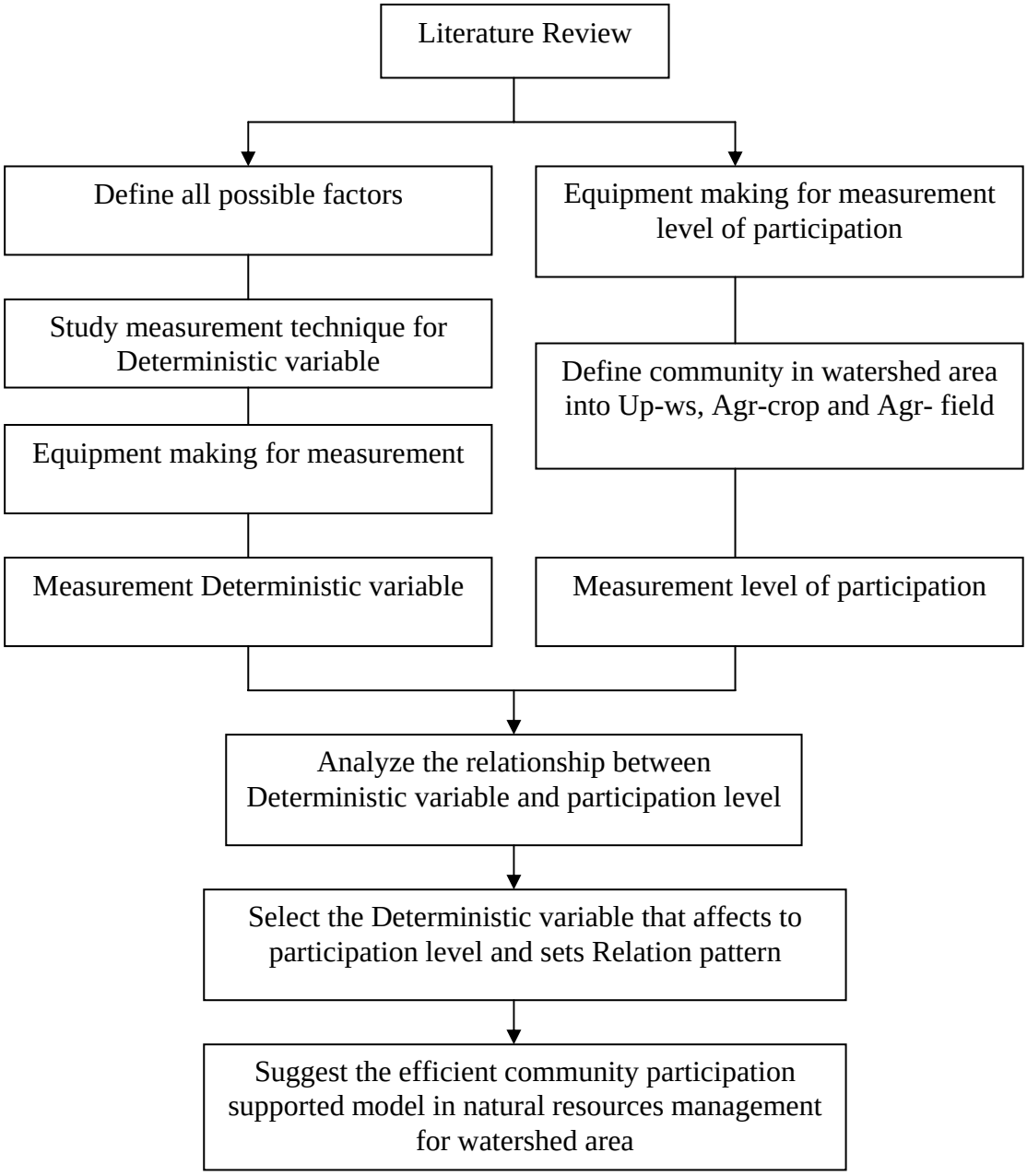


Figure 5 Framework of research

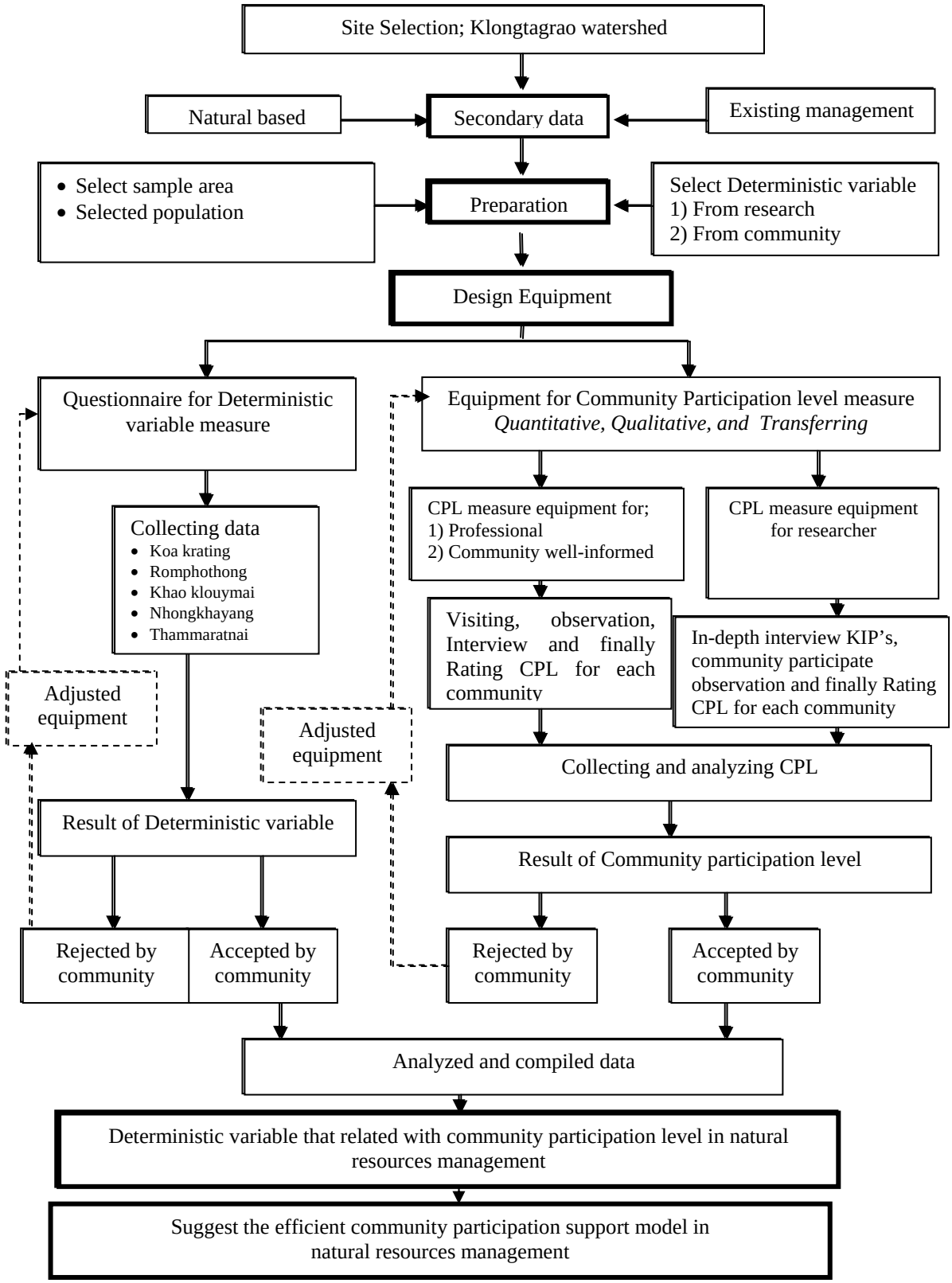


Figure 6 Methodology framework

2. The step of research design

2.1 Tools for research

Tools for research in this study, the researcher used Interview, Semi-structured in-depth interview and Participatory Observation by studying the natural resources management, participation and level of participation in the studied area.

Household questionnaire

Questionnaire was used for inquiring necessary data from sample population who lived in the studied area in order to find the level of participation and affect of Deterministic variable to level of participation. The questionnaire can be divided into 12 parts as follows;

Part 1 General data of sampling

Part 2 Period of time for the settlement and the relationship of the community

Part 3 Careers

Part 4 Incomes & Expense

Part 5 Relationship between example families with conservation officers

Part 6 Members data of the families

Part 7 Received data for management

Part 8 Benefit usage natural resources from the community forests

Part 9 Community leader potential

Part 10 Being persuaded & keeping ways of life

Part 11 Fertility of natural resource in the community areas

Part 12 Good attitude towards the importance of the natural community resources

Semi-structured in-depth interview

Semi-structured in-depth interview used for interviewing the community leader both official and unofficial in order to study the details of community such as history and development of community, culture, customs, believe, community regulation, network linkage with other communities, etc. The semi-structured in-depth interview can be divided into 2 parts;

Part 1 Community details

Part 2 State of community participation in natural resources conservation activities.

Observation form

The observation form was being used by researcher to record data concerning with natural resources management of the studied community. The researcher must notice all documents, notice boards, activities, customs, life support, resources utilization and participate with to community in any activities and customs. The observation form are divided into

Part 1 Setting and Environment

Part 2 Actions of stakeholders

Part 3 Activities of community

Part 4 Relationships between stakeholders/community

Part 5 Participation

Part 6 Meaning (Janwanich, 2004)

CPL evaluated form for specialist

Measuring in 3 dimensions; quantitative, qualitative, and transferring.

CPL evaluated form for community well-informed

Measuring in 3 dimensions; quantitative, qualitative and transferring.

CPL evaluated form for researcher

Measuring in 3 dimensions; quantitative, qualitative and transferring.

2.2 Tools checking

Tools trial

1) Set draft tools list that needed for the research and propose to research committee

2) 1st Revise tools list

3) Review tools list from step no. 2 and Pre-test with population in any local organization committee except in the studied area or similarly to the studied area.

4) Review tools list and propose to research committee

5) Final review

The determination of tool efficiency

1) Content accuracy and verification

To determine the content accuracy, the survey form needed to verify by specialist. If the specialist found that the survey form has completed contents and according with the purpose of research, the survey form is accurate (Kijpreedaborisut, 1991)

2) Content validity

To determine the content validity, the survey form required the agreement from specialist by bringing each question to verify the conformity of questioning with content/ purpose of research and deterministic factors. Another survey form must be created for at least 3 specialists for giving a point to make a decision as shown below (Pinyaanantapong, 1984)

Give +1	when confident that the question is conformed to content and purpose of research
Give 0	when not sure that the question is conformed to content and purpose of research
Give -1	when confident that the question is not conformed to content and purpose of research

From the decision making of specialist, IOC can be calculated by using the formula below;

Formula;

$$IOC = \frac{\sum R}{N}$$

When IOC is a conformity index of question with content from specialist's aspect

R	=	Total points from specialist
N	=	Specialist (person)

If IOC is near 1.0	means high conformity with research content
If IOC is near 0	means low conformity with research content
If IOC is near minus value	means no conformity with research content

3) Reliability checked (Kijpreedaborisut, 1999)

The question that can not given a point, it will be considered by checking the answer from each question whether it conform to the question or not. If all the answerer can be given the right answer, that question is reliability.

In this research, household questionnaire and CPL evaluated form resulted in score or mathematic number were used as collecting data tool. Internal consistency was chosen to evaluate the reliability of the tool. Variance analysis (method) was applied to determine the reliability of tools.

$$r_{tt} = \frac{MS_e}{MS_p}$$

When rtt = Reliability coefficient

MS_e = Mean square of residual

MS_p = Mean square of persons

3. The step for gathering primary information

The method for gathering primary information in this research used Interview, In-depth interview and non-participatory observation. The steps for gathering needed information are described below;

1) Interviews samples and record used questionnaire and semi-structured in depth interview forms.

2) Use non-participatory observation to record the community participation in natural resources management in that studied area

3) Community participation level measuring by specialist, each community well-informed and researcher; using visiting, interview and observation target community.

4. Data analysis

To analyze the Deterministic factor that affected to the participation level of community in natural resources management in Klongtagrao watershed, the data from interview, semi-structure in-depth interview and participatory observation were compiled by using Statistic computer programs.

RESULT AND DISCUSSION

Result

The study employed In-depth interview with key informant persons, interview family samples using questionnaire, non-participated observation, collecting data of plants and trees around the study area, and secondary data from document were also studied. The study process took around 1-year period, during November 2005 to October 2006 to complete the observation on annual community-forest activities.

The research, “Community Participation Level Model for Community forest Manangement in Khlongtakroa Watershed Area, Chachoengsao Province” can be divided in 5 parts as below.

1. The result of general data survey of Klongtagrao watershed area

    1.1 Community participation in Natural resources management
    1.2 Land use in Klongtagrao watershed area
    1.3 Status of Community forest

2. Result from in-depth interview together with non-participated observation on key informant persons

    2.1 The forest conservative officers
    2.2 Interview with Community leaders and community forest activists, and non-participated observation

3. Community participation levels (CPL)

4. Community deterministic factors (CDF)

4.1 Dwelling attachment

4.2 Population factor

4.3 Economics factors

4.4 Friendly relation between community and conservative officer factor

4.5 Conservative information receiving factor

4.6 Necessity to rely on natural resources factor

4.7 Community leader potential factors

4.8 Way of life preservation factors

4.9 Conservation trends factor

4.10 Abundance of natural resources factors

4.11 Good attitude towards conservative community forest factor

5. Relation model between Community Deterministic Factors and Community Participation Level

5.1 Appropriated regression model

5.2 Mental model

1. Survey result on general data of Klongtagrao watershed area

1.1 Community participation in Natural resources management

Interview with community leader of Klongtakroa watershed area together with previous document review the 4 areas of community forest, 1) Romphothong, 2) Khao kluaymai, 3) Nongkhayang and 4) Thammaratnai community forest.

Water and soil management had been in an initial step of operation, particular organic farming. Green lifestyles were promoted to the public through the concept of organic promotion of organic farming to reduce the use of chemical substances in agriculture.

Although there was a good water supply from Si-yad reservoir, the drought strikes over the studied-area in every year. The shortage of water supply results from unbalance between supply and demand. The Si-yad reservoir supplies water, not for only this area, but also for Chonburi province including the lower part of Chachoengsao province, particular Panomsarakam District and Industrial Park. Since January of each year, water level of the reservoir was relatively low leading to the depletion of water supply during summer. Most people were agriculturist, growing majority of farm plants. Their mass products were cassava, sugarcane and pineapple. Anyway, the expanded of rubber and eucalyptus plantations had been increasing over time due to higher market price. Modern machines, for example backhoes and tractors, were in widespread used for agriculture within the areas.

Some parts of Klongtagrao watershed consisted of a number of forest areas namely Kwae Rabom-siyad national reservation forests, forest garden, Klongtagrao plantation and 4 community forests (Thammaratnai, Nhongkhayang, Khao kluaymai and Romphothong community forest). Communities in Klongtagrao watershed were familiar with living adjacent to forest land and were well-acquainted with afforest.

1.2 Landuse of Klongtagrao watershed

Most of the areas are moderate slope with the average steepness of 8%, covered with forest and agriculture fields (farm crop, paddy field, rubber). Klongtakrao watershed area could be divided into 9 types according to land-usage; i.e. dry evergreen forest (50.00 %), agricultural areas (43.27%), mixed deciduous forest (4.20%), community area (0.82%), community forest (0.70%), secondary forest (0.66%), eucalyptus plantation (0.29%), water body (0.03%) and teak plantation (0.03%), respectively. The largest proportion of Klongtagrao watershed was dry everygreen forest occupied by Khao Ang Rue Nai Wildlife sanctuary in the southeast. It contained water area of 4.95 square kilometers or 1.33%. Land-use map was shown in table 4 and Figure 7.

Table 4 Land-use type of Klongtagrao watersed

Landuse type	Area		Percent
	Square kilometers	Rai	
Dry evergreen forest	185.63	116,018.75	50.00
Agricultural land	160.62	100,387.50	43.27
Mixed deciduous forest	15.61	9,756.25	4.20
Community area	3.05	1,906.25	0.82
Community forest	2.59	1,618.75	0.70
Secondary forest	2.45	1,531.25	0.66
Eucalyptus plantation	1.09	681.25	0.29
Water body	0.12	75.00	0.03
Teak plantation	0.11	68.75	0.03
Total	371.27	232,043.75	100.00

Source: Adapted from Royal Forest Department (2000)

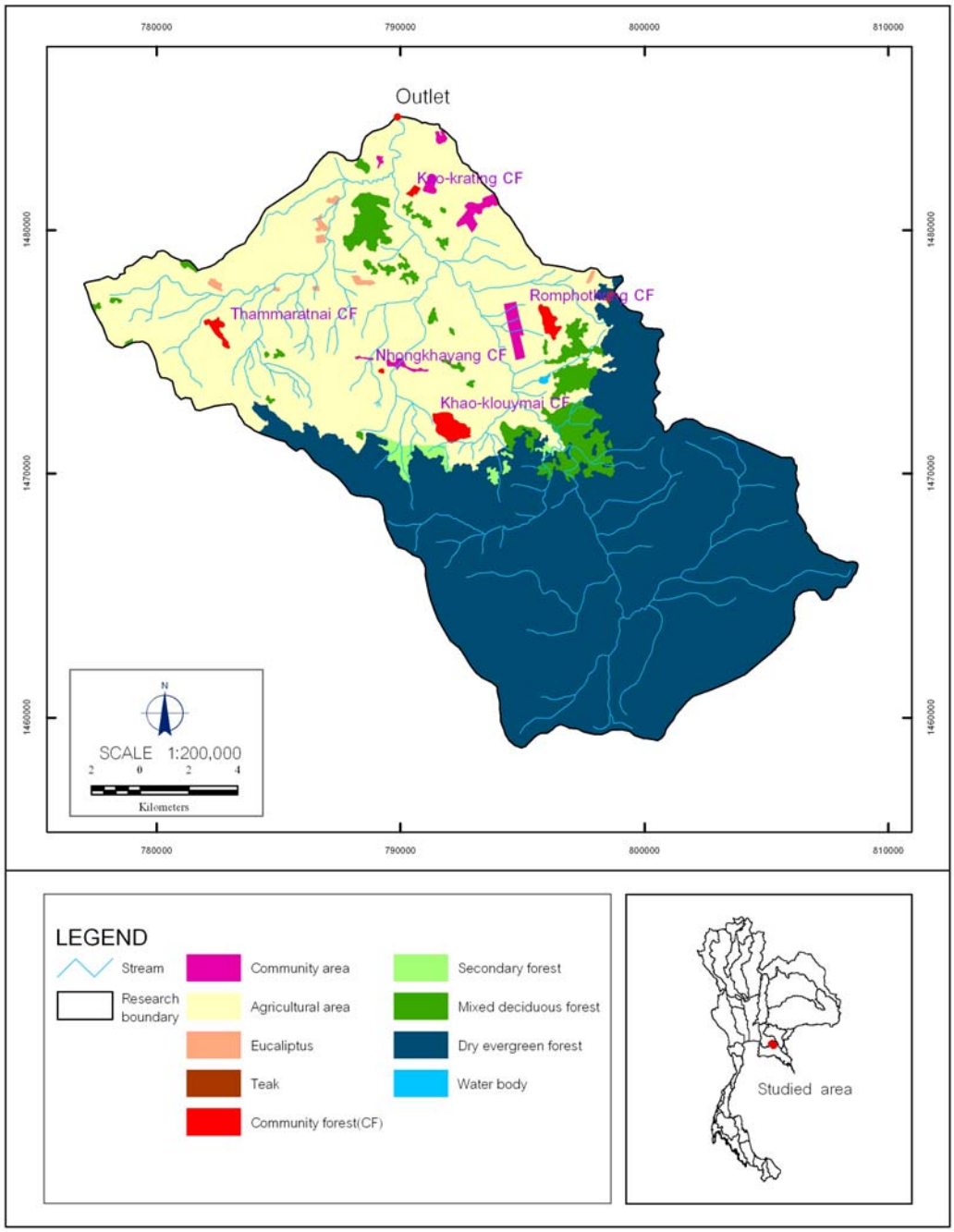


Figure 7 Land-use map of Klongtagrao watershed

Source: Adapted from Royal Forest Department (2000)

1.3 Community forest status

The survey of all 4 community forests were conducted using line plot system method with fixed-radius circular sample plot. Three overlapped circles were studied. The first circle was the biggest; radius 17.85 meters, area 0.1 hectare (or 0.625 rai), the second one; radius 12.62 meters, area 0.05 hectare (or 0.313 rai) and the third one; radius 5.64 meters, area 0.01 hectare (or 0.063 rai). Each community, the survey were conducted in 3 fields.

Community forest of Nhongkhayang was an exempted area. The survey could not be conducted due to the area was lately rehabilitated, not many big trees available. The details of the 4 community forest survey are as follows:

1.3.1 Romphothong community forest

In general, the area was rehabilitated forest, similar to mixed deciduous forest. The community forest is located on a land of 240 hectares (or around 1,500 rais).

Fifteen species of trees were found in 3 sampling plots. The density of the tree was 506.66 trees/hectare, 5 species of poles with 420 poles/ hectare, 4 species of sapling with high density (2,266.67 saplings/hectare). Only 3 species were found in every size, those were *Lepisanthes rubiginosa* Lench., *Strebus asper* Lour. and *Muraya paniculata***,** which can be implied that long-term changes in forest structure and species composition might occur. (detail were shown in table below). Besides, *Pterocarpus macrocarpus* Kurz. was found outside the sampling plots. General character of Romphothong community forest was shown in figure 8.

Table 5 Species of trees, poles and saplings in Romphothong community forest

	Species	Amount		
		Trees (0.3 hectare)	Poles (0.15 hectare)	Saplings (0.03 hectare)
1	*Lagerstroemia floribunda* Jack.	39	-	-
2	*Erythrina subumbrans* (Hassk.)Merr.	19	-	-
3	*Lagerstroemia macrocarpa* Wall.	6	-	-
4	*Ficus racemosa* Linn.	3	4	-
5	*Irvingia malayana* Oliv. ex A. Ben	3	-	-
6	*Diospyros ultrat* Roxb.	17	-	24
7	*Lepisanthes rubiginosa* Lench.	3	3	12
8	*Strebus asper* Lour.	8	22	24
9	*Murraya paniculata* (L.) Jack.	5	13	8
10	*Bombax valetonii Hochr.*	7	-	-
11	*Bauhinia purpurea* Linn.	4	-	-
12	*Combretum quadrangulare* Lurz.	3	-	-
13	*Afzelia xylocarpa* (Kurz.) Craib.	2	-	-
14	*Melodorum fruticosum* Lour.	1	-	-
15	*Diospyros rhodocalyx* Kurz.	-	4	-
	unknown	32	17	-
	Total	152	63	68
	Density (trees/hectare)	506.66	420.00	2,266.67

Figure 8 General state of Romphothong community forest

1.3.2 Khao klouymai community forest

Khao klouymai community forest was set up in 1998, supported by Royal Forest Department, areas 128 hectares (800 rais), it was dense forest and more abundant than the others ones in Klongtagrao watershed.

After surveying 3 plots, community forest of Khao klouymai was generally rehabilitated forest which was similar to mixed deciduous forest of Romphothong community forest. Not many big trees were found in this area. An appearance of *Imperata cylindrical* (L.) P.Beaur. in some areas showed a sign of forest fire risk. Fifteen species of trees from 3 sampling plots. The density of trees equal to 540 trees / hectare. Five species of poles with the density equal to 513.33 poles/hectare. And 2 species of saplings of 566.67 saplings/hectare.**.** *Bauhinia*

purpurea Linn. was the only species found in every size suggested of changes of forest structure and species composition in a long term period. (detail were shown in table below). General character of Khao klouymai community forest was shown in figure 9.

Table 6 Species of trees, poles and saplings in Khao klouymai community forest

	Species	Amount		
		Trees (0.3 hectare)	Poles (0.15 hectare)	Saplings (0.03 hectare)
1	*Pterocarpus macrocarpus* Kurz.	67	-	-
2	*Bauhinia purpurea* Linn.	26	28	5
3	*Lagerstroemia floribunda* Jack.	24	6	-
4	*Croton oblongifolius* Roxb.	16	33	-
5	*Canarium subulatum* Guilaumin.	16	-	-
6	*Terminalia belerica* Roxb.	3	-	-
7	*Bombax valetonii* Hochr.	3	-	-
8	*Wrightia tomentosa* Roem. & Schult.	2	-	-
9	*Senna garrettrana* (Craib) & Barneby	1	-	-
10	*Albizia odoratissima* Benth.	1	-	-
11	*Acacia mangium* Wild.	1	-	-
12	*Butea monosperma* (Lamk.) Taub.	1	-	-
13	*Vitex pinnata* L.	1	-	-
14	*Lepisanthes rubiginosa* Lecnh	-	7	12
15	*Bombax valetonii* Hochr	-	1	-
	Total	162	77	17
	Density (trees/hectare)	540	513.33	566.67

Figure 9 General state of Khoa klouymai community forest

1.3.3 Thamaratnai community forest

Thamaratnai Community forest was located on approximate 96 hectares (600 rais) in the area of Thammaratnai community. One-third of the forest (around 200 rais) was quite abundance, in the other hand, other two-third (around 400 rais) was not fertile, covered with cogon grass meadow.

After surveying the 3 sampling plots, we divided the community forest into 2 types; one was the front area of the hill that was mixed deciduous forest which was about to change to dry evergreen forest. The other type was the forest at the backside of the hill. This area was similar to the pasture. Plant species appeared around this area was *Imperata cylindrica* (L) P. Beaur**..** Twenty-three trees species found in 3 sampling plot, the density equal to 540.00 trees/hectare. Five species of

poles with 373.33 poles/hectare and 1 species of sapling with a high density, 1,066.67 sapling/hectare. No species was found in every size suggested to the changes of forest structure and species composition in the future. (detail were shown in table 7). General character of Thammaratnai community forest was shown in figure 10.

Figure 10 General state of Thammaratnai community forest

Table 7 Species of trees, poles and saplings in Thamaratnai community forest

	Species	Amount		
		Trees (0.3 hectare)	Poles (0.15 hectare)	Saplings (0.03 hectare)
1	*Pterocarpus macrocarpus* Kurz.	12	-	-
2	*Melodorum fruticosum* Lour.	11	-	-
3	*Lagerstroemia floribunda* Jack.	9	-	-
4	*Justicia gendarussa* Linn.	8	11	-
5	*Nephelium hypoleucum* Kurz.	8	18	-
6	*Artocarpus lakoocha* Roxb.	8	-	-
7	*Artocarpus lanceifolius* Roxb.	7	-	-
8	*Bauhinia purpurea* Linn.	7	-	-
9	*Baccaurea ramiflora* Lour.	6	-	-
10	*Irvingia malayana* Oliv. ex A. Benn.	6	-	-
11	*Wrightia tomentosa* Roem. & Schult.	4	-	-
12	*Drypetes roxburgii* (Wall.) Hurasawa	4	-	-
13	*Amoora polystachya* Parker	4	-	-
14	*Cyathostemma micranthum* Sincl.	3	6	-
15	*Zolling dongnaiensis* Pierre	3	-	-
16	*Cratoxylum formosum* (Jack) Dyer.	2	-	-
17	*Spondias pinnata* (L.f.) Kurz.	2	-	-
18	*Acacia mangium* Wild.	1	-	-
19	*Adenanthera pavonina* L.	1	-	-
20	*Diospyros castanea* Fletch.	1	-	-
21	*Dialium cochinchinense* Pierre.	1	-	-
22	*Bombax valetonii* Hochr.	1	-	-
23	*Cordia cochinchinensis* Gagnep.	1	-	-
24	*Lepisanthes rubiginosa* Lecnh.	-	5	-
25	*Artabotrys siamensis* Miq.	-	2	-
26	*Cleidion spiciforum* (Burm.f.) Merr	-	-	18
	unknown	22	14	24
	Total	162	56	32
	Density (trees/hectare)	540.00	373.33	1,066.67

1.3.4 Nhongkhayang community forest

From the survey, we found that this community forest was at the beginning of the establishment as the scenery showed of treeless hill with only *Imperata cylindrica* (L.) P. Beauv. growing. There were some ‘community marks’ indicating that the land was previously used. Old big trees from the past barely existed. From preliminary survey, we found only *Xylia xylocarpa* (Roxb. Taub. and *Pterocarpus macrocarpus* Kurz. Most of trees were replanting species for example *Sindora siamensis* Teijsm & Miq, *Alstonia scholaris* (L.) R. Br., *Pterocarpus macrocarpus* Kurz., *Acacia mangium* Wild., *Cassia siamea* Britf., *Xylia xylocarpa* (Roxb.) Taub., *Lepisanthes rubiginosa* Lecnh., *Peltophorum daisyrhachis* (Miq) Kurz. Furthermore, cassava fields were also found in this community forest. General character of Nhongkhayang community forest was shown in figure 11.

Figure 11 General state of Nhongkhayang community forest

1.3.5 Koa krating community

Koa krating village did not have any management for community forest due to the fact that most area in Kao krating community was adjacent to Si-yad reservoir. The member of the community had been moved up from Si-yad reservoir. Tree species in the forest were conserved on the land of approximately 40 rais, of which belonged to Kao krating temple. Thus, forest management in the temple area depended upon the decision of the temple. The community did not have any direct duty in conservation management. Most of the trees on the temple land were rehabilitated in various species. General character of Kao krating community forest was shown in figure 12.

Figure 12 General state of Koa krating community forest

2. Result from in-depth interview together with non-participated observation on key informant persons

2.1 The forest conservative officers

2.1.1 The forest fire control station, Chachoengsao

The station was responsible for prevent, detect and suppress forest fires over Chachoengsao area. It was located on Klongtagrao watershed area. There were 3 groups of officials on duty for providing rapid response.

From the officer, forest fire often occurred in national reservation forest and FPT forest. However, the fire was always controlled very quickly before serious destruction. In case of severe forest fire, the station joined hands with other organizations such as the preventive people section, sub-district administration organization and lastly asked from the community for help.

The main cause of forest fire was agricultural burning (deliberate fires lit to burn wild vegetation in order to prepare fields for cultivation). To prevent forest fire from this activity, the station asked to the communities for collaboration, for not burn their fields. If they still persisted to choose burning option to prepare the cultivation, the station should be informed in advance. Anyway, the station had not always received good cooperation because the farmer could not wait for the appointment.

Forest fires in community forests were rarely occurred. The station had never been called for help to extinguish the forest fires. Thus, forest fire control by its own community seems to be an effective way.

2.1.2 Khao Ang Rue Nai Wildlife Sanctuary office

Infer from the interview with the preservative sections in the areas, there were several problems in Romphothong community. Besides internal confliction among the people, there were problems involving in forest resource management.

Although Romphothong village received 'the green globe' award in 2005, people had illegally cut down trees, hunt animals either from community forests or Khao Ang Rue Nai Wildlife Sanctuary area. Around 10 hunters were community members. However; the violence of the problems continue to gradually decline relative to approach strategies of the officers. In some cases, lawbreakers were warned so that hunting activity was not pass on to the younger generation. Finally, the hunting would be lessen or even disappear in the future.

Presently, Khao klouymai community forest were on crisis. The initial impeller for community forest was older, unhealthy and he lacked of any coordinators. Anyway this community had no problems of illegal cutting and there was only one hunter which was under observation of the officers to convince him to stop his hunting career.

Success method for conservation

1) Initially, law enforcement should be used for classification, zoning and apportionment of land for designated uses.

2) Establish collaborative relationships with the community members for management of forest reserve area, since number of officers responsible for the duty were sufficient.

3) Work flexibly and creatively for the goal of "permanent and sustainable conservation" instead of strict arrest.

4) Indicate the community to realize the authentic usefulness of forests conservation beyond the idea of 'conserve for our descendants'.

5) Keep younger generation away from hunting career and suppress the present hunters including convince them to change their jobs.

Viewpoints toward successful management of community forest

1) The community oneself was able to set up and manage the forest community by his inner potential.

2) Good forest community belongs to everyone, not be restricted to specific individuals.

3) The community requires to establish the forest community himself. Realize the usefulness and rational exploitation of the forest community.

4) External factors such as budget, policy, needs, or academic matter, are able to push forward the community forest establishment. But without internal co-operation, it is not possible for a community forest to be sustainable and permanent.

Worried topics

1) The organization for forest resource management was established by the community itself. Improper or over exploitation especially cutting or hunting might happen.

2) There was no law to control the exploitation from the community forest. Depends only on the decision of the community organization, they can cut down trees, regardless of the fact that the community forest was conservative area. And the officials have no right to prohibit their activities.

3) Sometimes wild animals from wildlife sanctuary leave their territories to find food in the community forest or agriculture fields for example:

3.1) Bisons entered to eat bamboo shoots in Khao klouymai community forest.

3.2) Some wildlife are not in the protected list. If they went out of the wildlife sanctuary and get hunted or hurt, they will receive no protection from laws.

Hunting in the community forest still continuously happens among Romphothong, Khao klouymai, Nhongkhayang and Thammaratnai.

2.2 Community leaders and community forest activists' interview result and non-participated observation

The study used non-participated observation from November 2005 to October 2006 and in-depth interviewed key information persons and conservative section officers in the study area. It was found different activities in quality, quantity, transfer and success as follows:

2.2.1 Koa krating community

Koa krating community was a quiet and calm place. Here, there were no such forest conservative activities because of none conservative forest in the areas. This area appeared plentiful and abundant of aquatic animal from Si-yad reservoir.

2.2.2 Romphothong community

According to Rompoethong community, exploitation rate of natural resources was higher compared with other communities. People understood the term 'conservation' as a 'sustainable exploitation' not 'untouchable'. They preserved some areas for wildlife breeding habitat which was the way to preserve wildlife meat as well.

There was an efficient community fund to administrate the community forests. Present community was set up around 1992, people moved from

Khao Ang rue nai wildlife sanctuary since 1990 and set up here. Each family received 0.16 hectare (1 rai) for dwelling and 2.24 hectares (14 rais) for earning (agriculture). Most of villagers came from various places especially various provinces of Northeastern, so some people called this village as “Sahakote village”.

A conservative activity was to establish Romphothong community forests management. The community forest located on a land of 240 hectares or around 1,500 rais (figure 9).

The community forest was initially managed in 1995. The establishment was mainly supported by outside organization (Regional Community Forest Traning Center for Asia and the Pacific; RECOFT). They receive a Green Globe prize in 2005 from the community forest management. The land was reforested with various plants such as Pradu, Chinedang bamboos etc. Strong forest management committees composed of formal, informal leader and also get good collaboration from Romphothong School and monks.

Routine activities were creating fire line, fire monitoring, and reforestation. Now the community got many benefits from the forests such as gathering forest products, recreation areas, wood for public used and the most benefit was water resource to fill-up their reservoir through out the year. In every year, the risky period of forest fire was during January till April but the highest risky time was in March and April because harvest time was during January and February, thus many villagers were working near the forest and they could help monitoring the forest fire.

With eighteen people chosen to be committees, strict rules for forest management including the utilization were issued. The meeting among the community forest committee was held on 4^{th} or 5^{th} of every month. Because of the meeting always held after district conference, it allowed “Good Corporation” between community members and government section as well.

2.2.3 Khoa klouymai community

Khao klouymai had large community forest areas with highly abundant forest resources, but people faced the most severe drought. They used very little benefits from the forest, thus forest activities were less. From reasons affected almost villagers not interested to participate forest conservative activities. The conservative activities were mainly based on forest prevention i.e. to build fire line or to prevent outsiders to exploit their forest resource.

Khao klouymai village was the deepest areas of Tha takiab sub district. People emigrated from many areas. No one know when the first group arrived in this land, but the last group moved in around 1992-1993. Households settlement were scattered and were occupied and used forests lengths by spending Land tax 5 (Por Bor Tor 5) or Land right on reserved forest (Sor Tor Kor) and it was developing to new plan forest village.

Khao klouymai community forest was set up in 1998, supported by Royal Forest Department, areas 128 hectares (800 rais), it was dense forest and higher than the others ones in Klongtagrao watershed.

In the past, forest committee was strong which was supporting a well-running management. Many activities were conducted for example the deteriorate areas were developed and reforested, fire lines were built. The boundaries between forest area and earning area (agriculture area) were clearly identified. Community members were also exploit the forest resources such as gathering forest prodicts for their food (i.e. Phak wan, bamboo shoots, cogon grass and many mushroom species). In addition, there was a rule that people had to register and clarified themselves with the forest committee before they taking any advantages from the forest.

Nowadays, forest community management was problematic as the following list:

1) Most of community committees resigned, the rest 4 committees composed of 2 ex-officio (village headman and his assistant), the initial community forest builder and a new registered member, so they could not push up community forest activities.

2) The conservative activities were not cooperative because every management needed budget such as forest fire monitoring, fire line building or planting forest.

3) Due to less job with low money paid for community forest activities, people did not take the job. They explained that they could earn better income from other jobs compare to community forest activities.

4) Although government arranges some budget for such forest activities, it was too low to attract any employees. (Employment for nursing seedling, they were paid 2 baht each (total 30,000 seedlings)); building fire brake lines or rehabilitated trees treatment paid 130 baht/day.

5) Nowadays, tractor was used to build forest fire brake lines and the tractor was lent from the owner. As to the areas the tractors couldn't enter, forest fire brake did not made.

6) No progress on Bison watching activity, because the community barely paid attention to.

2.2.4 Nhongkhayang community

This community tried to push conservative trend but not success. Most of the community members pay more attention in their own family economics. Management had to rely on state stimulation or outsider section especially budget management.

Most of them came from northeastern and set up more than 30 years ago. Areas for earning were scattered around the village, there was full public service more than other 4 communities such as electricity system, pipe water, telephone, perfect asphalt street, public health station, and schools. Community economics was

rather strong, they mainly planted fields and used mechanical for help such as tractors, backhoes and etc.

As to conservative community forest, the community was set up a community forest at the backside of Nhongkhayang area. The community forest location was an apex of the hill, with large meadow. The problem for setting this community forest was that the land had never been 'forest' before. Thus, it took many years to rehabilitate the community forest. At present, people took part the activities only in important days. As to made fire brake line wasn't managed owing to no forest state.

2.2.5 Thammaratnai community

There was rehabilitated trend rather strong. A lot of official sections were interested in helping but it was the initial period and limited among the initial builder group. Anyway it needed more time, supportive management, and some budget from the state.

Interview with formal community leader, the headman of the village and the informal leader, 2 community committees, and general people, it was found that Thammaratnai community set up houses for groups and scattered to earn life. The whole house features were permanent and divided into 4 groups by area features i.e. Ban Khaoprik, Ban Klang, Ban Nerntaback and Ban Thammaratnai, the 4 ones had unique relationship, and most civilization was in Thammaratnai, they had school, public health station, and temples. Community forest located on approximate 96 hectares (600 rais) in the area of Thammaratnai community. One third of the forest (around 200 rais) was rather abundance, in the other hand, other two third (around 400 rais) was not fertile covered with cogon grass meadow. It was under rehabilitation and all areas were a national reserve forest.

Thammaratnai community was set up more than 30 years ago. They emigrated from the other places, but more than 70% were from Cholburi province, others came from northeastern part especially Nakornratchasrima. So their lifestyles were rather similar to those of middle region. They cut down all trees in their areas to made agricultural land as field crops, rubbers, and eucalyptuses. In some areas they grew rice in rainy season.

For history of the community forest in Thammaratnai village, it was set up in 1998, supported by Royal Forest Department. The first step of forest establishment was well-running. Anyway, the activities related to community forest were gradually reduced, and even disappeared (during 2001-2002). After 2004, Thammaratnai village had a new headman who interested in forest conservation. Since then, community forest committees was establish and many activities relate to the forest conservation had been refreshed. Many activities appeared for the village members to join such as forest fire brake line building, fire monitoring, reforestation, wildlife conservation, or providing water for wildlife. Continuously, people and young generation had been educated to realize the important of forest conservation.

Now, they used benefits from the community forests such as bloom weed flowers, herbs, cogon grass, Phak wan etc. Besides, it became learning centre, rules of the community forests were declared in March 2006.

The initial step of other natural resources management began with planting trees in the public area and used organic fertilizer instead of chemicals. This village was drought area in every year.

3. Community participation levels (CPL)

Community participation level was surveyed using evaluated form in quantitative data (itemized rating scales). Measurement level was order scale and ratio scale to calculate correlation. Analyzed reliability of the whole evaluated form, it was found the r_{tt} was 0.96 and r_{tt}^2 was 0.93 (Details of reliability calculation were shown in Appendix C). Evaluated form was divided into 4 parts as follows:

1) Quantitative dimension part
2) Qualitative dimension part
3) Transferred dimension part
4) Success in conservation management part
   (CPL evaluated form shown in Appendix A)

3.1 Community participation level in community forest conservation

Points result in Klongtagrao watershed was given by members in the community who had known conservative community forests very well 5 people. Points result of 5 communities shown in table 8.

Table 8 Points of community participation level measured by the communities in quantitative, qualitative, transferred and success (%)

	Community				
	Kkt	Rpt	Kkm	Nky	Trn
Qualitative measurement	22.4	39.3	29.0	20.0	39.7
1) Families took part in conservative activities	20.0	70.0	57.9	25.0	70.0
2) Frequency of conservative activities	39.3	80.0	73.0	44.0	90.0
3) Management areas covered conservative area	12.3	58.0	20.0	6.7	23.4
4) Budget permanence for activity management	23.5	61.8	45.0	23.9	55.8
Average	**22.4**	**39.3**	**29.0**	**20.0**	**39.7**
Qualitative measurement					
1) Various types of conservative activities	18.7	60.0	58.4	23.4	66.7
2) Amateur for co-operation	33.4	53.4	45.0	36.6	50.9
3) Difficulty of conservative activities	20.0	42.5	53.0	28.2	43.4
4) Conservative activities affected resources	22.3	59.2	46.5	31.7	55.0
5) Conservative co-operation from with the state	22.5	48.4	55.0	28.5	33.4
6) Conservative push-up groups of the communities	30.0	76.5	50.0	25.0	66.7
Average	**24.5**	**56.7**	**51.3**	**28.9**	**52.7**
Transferring measurement					
1) Able to send ideas, knowledge, attitude to community members	11.8	40.0	40.0	10.0	40.0
2) Able to send ideas, knowledge, attitude to adolescence of the community	21.7	52.5	30.0	12.5	60.0
3) Opportunities to increase members to take part conservative activities	20.0	72.5	60.0	28.2	70.0
4) Opportunities adolescence got about conservative activities	23.9	72.5	52.5	35.0	70.0
5) Member features took part from every group of the communities	27.5	65.0	38.4	34.3	56.7
6) Member features took part from every ages of the communities	33.3	87.5	56.7	60.0	83.4
Average	**23.1**	**65.0**	**46.3**	**30.0**	**63.4**

Table 8 (Continued)

	Community				
	Kkt	Rpt	Kkm	Nky	Trn
Successful measurement					
1) Percent of rehabilitated forest resource success compared with time	26.1	46.5	45.7	11.7	56.7
2) Percent of conservative wildlife success compared with time	17.1	62.2	44.3	11.7	30.0
3) Percent of rehabilitated natural food resource compared with time	13.0	52.2	44.3	13.4	30.0
4) Percent of rehabilttated resources for usage compared with time	16.8	42.9	44.3	15.0	33.3
5) Percent of enhancing conscious community conservative success compared with time	17.5	43.0	34.0	12.5	30.0
6) Percent of community strength construction success	20.0	54.0	38.0	15.0	50.0
Average	**18.5**	**50.1**	**41.8**	**13.2**	**38.4**

3.2 Community participation level points from non-participated observation

The study used non-participated observation from November 2005 to October 2006 and in-depth interviewed key information persons and conservative section officers in the study area. It was found different activities in quality, quantity, transfer and success. Community participation level points from various dimensions observation KLT1, KLT2, KLT3, KLT4 and KLT5, were shown in table 9.

Table 9 Points of community participation level measured by the interview and non-participation observation in quantitative, qualitative, transferred and successful (%)

	Community				
	Kkt	Rpt	Kkm	Nky	Trn
Qualitative measurement					
1) Families took part in conservative activities	10	30	10	5	20
2) Frequency of conservative activities	15	70	30	10	70
3) Management areas covered conservative area	50	70	80	40	80
4) Budget permanence for activity management	30	80	40	20	65
Average	**26.3**	**62.5**	**40.0**	**18.8**	**58.8**
Qualitative measurement					
1) Various types of conservative activities	10	70	30	10	60
2) Amateur for co-operation	25	70	35	20	60
3) Difficulty of conservative activities	20	80	40	20	65
4) Conservative activities affected resources	40	80	60	20	80
5) Conservative co-operation from with the state	10	80	40	20	60
6) Conservative push-up groups of the communities	20	70	30	20	65
Average	**20.8**	**75.0**	**39.2**	**18.3**	**65.0**
Transferring measurement					
1) Able to send ideas, knowledge, attitude to community members	10	60	20	10	70
2) Able to send ideas, knowledge, attitude to adolescence of the community	40	70	40	50	70
3) Opportunities to increase members to take part conservative activities	20	80	40	20	75
4) Opportunities adolescence got about conservative activities	20	80	40	30	70
5) Member features took part from every group of the communities	30	60	20	20	50

Table 9 (Continued)

	Community				
	Kkt	Rpt	Kkm	Nky	Trn
6) Member features took part from every ages of the communities	30	100	60	40	100
Average	**25.0**	**75.0**	**36.7**	**28.3**	**72.5**
Successful measurement					
1) Percent of rehabilitated forest resource success compared with time	40	40	50	20	50
2) Percent of conservative wildlife success compared with time	30	70	50	20	50
3) Percent of rehabilitated natural food resource compared with time	30	60	50	10	50
4) Percent of rehabilttated resources for usage compared with time	30	50	50	30	60
5) Percent of enhancing conscious community conservative success compared with time	10	60	30	20	50
6) Percent of community strength construction success	10	70	20	10	60
Average	**25.0**	**58.3**	**41.7**	**18.3**	**53.3**

3.3 Community participation level points from experts

Visited the areas to give points level of 5 communities participations by 3 community participation specialists (Association professor Dr. Sithichai Tantanasarit), forestry professor specialist (Association professor Dr.Wicha Niyom), well-known participation specialist in Klongtagrao watershed (Dr.Kitichai Ratana), the tree ones gave the points. Details were shown in table 10 and figure 13.

Table 10 Points of community participation level measured by specialist site visited in quantitative, qualitative, transferred and successful (%)

	Community				
	Kkt	Rpt	Kkm	Nky	Trn
Qualitative measurement					
1) Families took part in conservative activities	23.3	83.3	66.7	28.3	85.3
2) Frequency of conservative activities	23.3	83.3	72.7	36.7	72.7
3) Management areas covered conservative area	63.3	93.3	76	13.3	82
4) Budget permanence for activity management	33.3	78.3	67.7	36.7	87.7
Average	**35.8**	**84.6**	**70.8**	**28.8**	**81.9**
Qualitative measurement					
1) Various types of conservative activities	23.3	87.7	70	30	71.7
2) Amateur for co-operation	33.3	83.3	68.3	23.3	80
3) Difficulty of conservative activities	23.3	76.7	64.3	33.3	65
4) Conservative activities affected resources	43.3	82.7	75	23.3	90
5) Conservative co-operation from with the state	23.3	88.3	55	23.3	84.3
6) Conservative push-up groups of the communities	25	82	53.3	23.3	76.7
Average	**28.6**	**83.5**	**64.3**	**26.1**	**78.0**

Table 10 (Continued)

	Community				
	Kkt	Rpt	Kkm	Nky	Trn
Transferring measurement					
1) Able to send ideas, knowledge, attitude to community members	40	81.7	63.3	28.3	79.3
2) Able to send ideas, knowledge, attitude to adolescence of the community	28.3	75.0	63.3	43.3	78.7
3) Opportunities to increase members to take part conservative activities	33.3	71	51.7	31.7	73.3
4) Opportunities adolescence got about conservative activities	36.7	66.7	55	46.7	70
5) Member features took part from every group of the communities	36.7	75	66.7	33.3	80
6) Member features took part from every ages of the communities	46.7	89.3	70	36.7	90
Average	**37.0**	**76.5**	**61.7**	**36.7**	**78.6**
Successful measurement					
1) Percent of rehabilitated forest resource success compared with time	53.3	92.7	78.3	21.7	88.3
2) Percent of conservative wildlife success compared with time	50	86.7	76.7	20	89.3
3) Percent of rehabilitated natural food resource compared with time	36.7	81	71.7	23.3	76.7
4) Percent of rehabilitated resources for usage compared with time	33.3	90	76.7	33.3	78.3
5) Percent of enhancing conscious community conservative success compared with time	35	91	81.7	33.3	86.7
6) Percent of community strength construction success	26.7	91	68.3	21.7	84.3
7) Conservative management compared with average time management	39.2	88.7	75.6	25.6	83.9
Average	**39.2**	**88.7**	**75.6**	**25.6**	**83.9**

Figure 13 Community forest site visited by specialist

3.4 Community participation level points

Brought community participation points in 3 dimensions given points by the community and non participation observation by researcher, outsider specialist and divided into average to analyze statistical data together with fixed factors. It was found, quantitative, qualitative, transferred, concluded 3 dimensions (quantitative × qualitative × transfer) and successful of Romphothong community had highest level, the first runner up was Thammaratnai community, Khoaklouymai respectively. Whereas Khaokrating community got the lowest among 3 dimensions as to Nhongkhayang community got the lowest in quantitative and successful ones. Calculated details were shown in table 11.

Table 11 Conclusion community participation points from three sources

	Communities				
	Kkt	Rpt	Kkm	Nky	Trn
Quantitative dimension					
Points from communities	23.5	61.8	45	23.9	55.8
Points from observation	26.3	62.5	40.0	18.8	58.8
Points from specialist	35.8	84.6	70.8	28.8	81.9
Average	**28.5**	**69.6**	**51.9**	**23.8**	**65.5**
Qualitative dimension					
Points from communities	24.5	56.6	51.3	28.9	52.6
Points from observation	20.8	75.0	39.2	18.3	65.0
Points from specialist	23.6	83.5	64.3	26.7	78
Average	**23.0**	**71.7**	**51.6**	**24.6**	**65.2**
Transferring dimension					
Points from communities	23.0	65.0	46.3	30.0	63.3
Points from observation	25.0	75.0	36.7	28.3	72.5
Points from specialist	37.0	76.5	61.7	36.7	78.6
Average	**28.3**	**72.2**	**48.2**	**31.7**	**71.5**
Community participation level; CPL 3 dimension (Quantity X Quality X Transferring)					
Points from communities	13,242.25	227,362.20	106,883.55	20,721.30	185,790.56
Points from observation	13,671.88	351,562.50	57,444.44	9,739.58	276,859.38
Points from specialist	31,218.32	539,731.27	280,634.67	28,146.25	501,946.28
Average	19,377.48	372,885.32	148,320.89	19,535.71	321,532.07
Percent (Average **X** 100)/10,000	1.94	37.29	14.83	1.95	32.15
Successful					
Points from communities	18.8	50.1	41.8	13.2	38.6
Points from observation	25.0	58.3	41.7	18.3	53.3
Points from specialist	39.2	88.7	75.6	25.6	83.9
Average	**27.7**	**65.7**	**53.0**	**19.0**	**58.6**

4. Community deterministic factors (CDF)

Survey on community data was conducted by using a questionnaire combination with an interview. A quantitative data was collected by interview and take notes. As to qualitative data employed graphic rating scale, the level of measurement was the interval scale and ratio scale in order to calculate correlation. The analysis of internal consistency reliability (Kijpreedaborisut, 1999) of the whole questionnaire showed reliability coefficient (r_{tt}) = 0.87 and Coefficient of determination (r^2_{tt}) was 0.76 (details of calculation was shown in APPENDIX D). The questionnaire was divided into 12 parts as follows:

Part 1 General information of sample families

Part 2 Period of time for the settlement and the relationship to the community

Part 3 Careers

Part 4 Incomes & Expense

Part 5 Relationship between sample families and conservation officers

Part 6 Family member information

Part 7 Receiving of management data

Part 8 Utilization of natural resources from the community forests

Part 9 The potential of community leader

Part 10 Being persuaded & keeping ways of life

Part 11 Fertility of natural resource in the community areas

Part 12 Positive attitude towards the importance of the natural community resources

Community deterministic factor (CDF) questionnaire was shown in APPENDIX B

Figure 14 Family interview

Survey result from 225 sample families from 5 villages by questionnaire interview, can identify the Community Deterministic Factors into 11 factors, namely Dwelling attachment, Population, Economics, Friendly relation between community and conservative officers, Conservative information receiving, Necessity to rely on natural resources, Community leader potential, Way of life preservation, Conservation trends factor, Abundance of natural resources and positive attitude towards conservative community forest factors of Nhongkhayang, Thammaratnai, Romphothong, Khao klouymai and Koa krating village. Details of survey were as follow: (detailed in index E)

4.1 Dwelling attachment

Study relation towards dwelling influenced to level of community participation. Average of each community settlement time had between 20.69 – 28.31 years. Almost populations from 5 villages were emigration from others places, they were born here only 0.0 - 12.5%. The dwelling attachment feeling were very high level between 93.1 – 97.5% compared with feeling love and be attached to this land as their hometown, lived here “till they died”, supreme love and care these dwelling.

Relationship towards average place attachment feeling and percentage of families that born here were very high, coefficient of determination (R^2) = 0.98 and P value = 0.001, linear regression equation is “Place attachment feeling = 0.338 (Born in this village) + 93”. It was shown in figure 15. For this reason, chose only average settlement period and average dwelling attachment feeling factor for study.

It was calculated correlation between dwelling relationship and qualitative, quantitative, transfer community participation and success of conservation factor using linear regression, found that no relation between factors; adjusted coefficient of deterministic (R^2_{adj}) = 0.00%, all linear regression equations were rejected at 95% confidence level. Details of community CDF and CPL points were shown in table 12, details of F value and p-value were shown in table 13.

Table 12 Place attachment feeling factor towards samples divided by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
1) Settlement period of community (Set_T; years)	20.69	24.6	20.84	28.31	23.56
2) Percentage of families that born here (%_B; %)	3.4	0	8.7	7.7	12.5
3) Dwelling attachment feeling (DWF; %)	93.25	94.25	95.75	93	95.75
3.1) Permanently of dwelling settlement (%)	99.25	91.75	98.25	99.25	100
3.2) Love and care these dwelling (%)	91	93.25	93.5	95.5	96.75
3.3) Love and be attached to this land like their hometown (%)	94.5	93.1	95.8	95.9	97.5
CPL in quantitative dimension (Quan; %)	23.8	65.5	69.6	28.5	51.9
CPL in qualitative dimension (Qual; %)	24.6	65.2	71.7	23.0	51.6
CPL in transferred dimension (Tran; %)	31.7	71.5	72.2	28.3	48.2
Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 13 Relation between love and worship towards dwelling and community participation level

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = 86.1 – 1.62 Set_T	5.9	0.0	0.19	0.694
	Quan = 0.09 %_B + 47.3	0.0	0.0	0.00	0.973
	Quan = 148 – 1.05 DWF	0.7	0.0	0.02	0.895
Qualitative	Qual = 106 – 2.50 Set_T	12.0	0.0	0.41	0.586
	Qual = 0.05 %_B + 46.9	0.0	0.0	0.00	0.987
	Qual = 171 – 1.29 DWF	0.9	0.0	0.03	0.880
Transferred	Tran = 104 – 2.26 Set_T	11.3	0.0	0.38	0.579
	Tran = 55.2 – 0.75 %_B	3.0	0.0	0.09	0.779
	Tran = 388 – 3.54 DWF	7.9	0.0	0.25	0.650
Community participation	CPL = 58.4 -1.73 Set_T	10.7	0.0	0.36	0.591
	CPL = 20.2 – 0.41 %_B	1.4	0.0	0.04	0.849
	CPL = 237 – 2.30 DWF	5.3	0.0	0.17	0.710

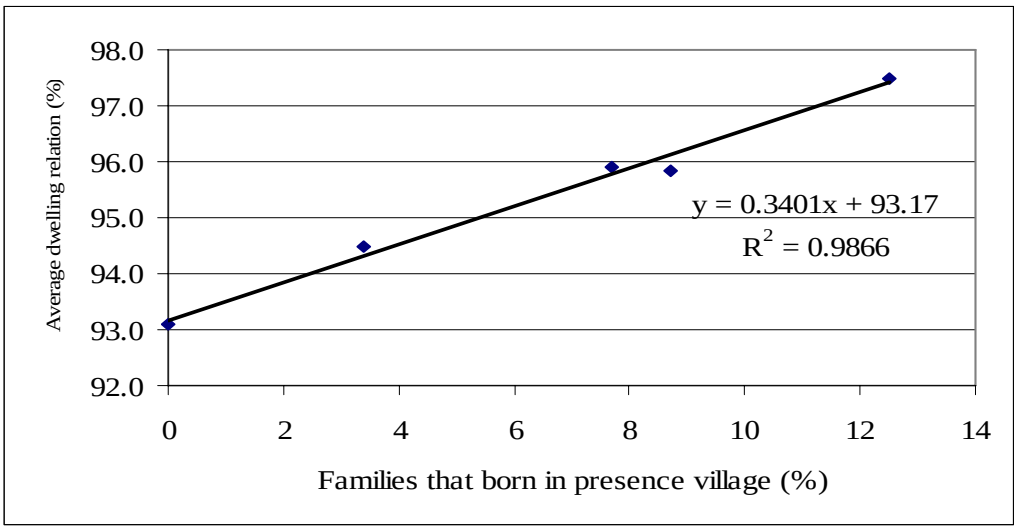


Figure 15 Relation between love and worship these lands toward percentage of families that born here

4.2 Population factor

In general, the village composed of single families, with members between 3.23-4.17 people/family. Sex ratio male : 100 females were variable from 79.4 – 108.5 people, this feature was abnormal rural community, and led to low stabilization of population pattern in these communities. According to most of the village members were new comer, and not enough land available, work-force-age had to find job outside. All of them respected Buddhism, thus religion was not a factor to decide activity participation. Details of some population factors were shown in table 14.

Brought some population's deterministic factors to find relation with level of quantitative, qualitative, transferred community participation, and success of conservation sex ratio factor had no effects to every linear regression equations and found adjusted coefficient of deterministic (R^2_{adj}) very low. The highest R^2_{adj} was only 9.00% of relation linear regression. All linear regression equations were rejected at 95% confidence level. It was found p-value might higher than 0.05. Details of equation, F value and p-value were shown in table 15.

Table 14 Some population factors of the samples separated by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
1) Religion	Buddhist	Buddhist	Buddhist	Buddhist	Buddhist
2) The amount member of the family (Mem_F; people)	3.34	3.23	4.17	3.44	4.10
3) Male : 100 Female ratio (M:100F; people)	107.45	79.4	108.5	91.1	104.04
CPL in quantitative dimension (Quan; %)	23.8	65.5	69.6	28.5	51.9
CPL in qualitative dimension (Qual; %)	24.6	65.2	71.7	23.0	51.6
CPL in transferred dimension (Tran; %)	31.7	71.5	72.2	28.3	48.2
Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 15 Relation between some population factors with community participation level

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = -32.0 + 21.8 Mem_f	21.5	0.0	0.82	0.432
	Quan = 74.2 – 0.269 M:100 F	2.6	0.0	0.08	0.796
Qualitative	Qual = -41.9 + 24.4 Mem_f	23.0	0.0	0.90	0.414
	Qual = 62 – 0.15 M:100 F	0.7	0.0	0.02	0.891
Transferred	Tran = -4.8 + 15.1 Mem_f	10.2	0.0	0.34	0.600
	Tran = 81.7 – 0.319 M:100 F	3.6	0.0	0.11	0.759
Community participation	CPL = -33.4 + 14.0 Mem_f	14.0	0.0	0.49	0.535
	CPL = 36.4 – 0.191 M:100 F	2.1	0.0	0.06	0.816

4.3 Economics factors

The major occupations were general employees and field crop farmers which was quite similar among all community. We could not clearly see any difference. As to average family income was in medium level between 6,489.6 ± 10,203.4 baht/month. Average income was a bit higher than expenditure, the ratio of income : expenditure was 1.13 -1.35. Details were shown in table 16.

Brought economics factors to find relation with level of quantitative, qualitative and transferred community participation, and success of conservation. It was found income : expenditure ratio had no effect in every dimensions of community participation as linear regression, R^2_{adj} were 0.0 in every equations. All regression equations were rejected at confidence level 95%, p-value were much higher than 0.05. Details of equations, F value and p-value were shown in table 17.

Table 16 Economic factors of the sampling families separated by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
1) Major occupation (Car_m)	employees, crops and farmer	employees, crops, trader	crops	employees	Crops, employee
2) Average family's monthly income (In; baht)	10,203.4	7,650.0	10,091.2	6,682.1	6,489.6
3) Average family's monthly expense (Ex; B)	8,515.3	6,766.7	7,970.6	4,956.4	5,532.6
4) Average specific family in debt (Debt; B)	192,419.4	48,083.3	89,375.0	43,736.8	35,878.8
5) Average specific family had savings money (Save; B)	191,272.7	29,308.3	16,415.3	18,464.6	7,884.6
6) Average ratio of family income : expense (In : Ex)	1.20	1.13	1.27	1.35	1.17
CPL in quantitative dimension (Quan; %)	23.8	65.5	69.6	28.5	51.9
CPL in qualitative dimension (Qual; %)	24.6	65.2	71.7	23.0	51.6
CPL in transferred dimension (Tran; %)	31.7	71.5	72.2	28.3	48.2
Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 17 Relation between economic factors with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = 44.3 + 0.00043 In	0.1	0	0.00	0.952
	Quan = 37.6 + 0.00152 Ex	1.2	0.0	0.04	0.859
	Quan = 157 – 90 In:Ex	9.1	0.0	0.30	0.623
Qualitative	Qual = 34.5 + 0.00155 In	1.5	0.0	0.05	0.842
	Qual = 26.7 + 0.00305	4.2	0.0	0.13	0.740
	Qual = 176 – 106 In:Ex	10.9	0.0	0.37	0.587
Transferred	Tran = 31.9 + 0.00225 In	3.8	0.0	0.12	0.755
	Tran = 24.1 + 0.00390 Ex	8.0	0.0	0.26	0.644
	Tran = 179 -106 In:Ex	12.6	0.0	0.43	0.558
Community participation	CPL = 1.1 + 0.00201 In	4.8	0.0	0.15	0.722
	CPL = -2.8 + 0.00302 Ex	7.7	0.0	0.25	0.650
	CPL = 87 – 57 In:Ex	5.9	0.0	0.19	0.695

4.4 Friendly relation between community and conservative officers factor

Friendly relation between the community and conservative officers was ‘neutral to good’ range between 59.75 – 68.25%. Thammaratnai community had the highest friendly relation, because at the studied time they had activities with Royal Forest Department officers. Anyway, there were reports of breaking the forest and wildlife law in 4 communities located closed to conservative forest. Some cases received only the warning, while some were arrested for prosecution. Koa krating community had never broken any forest and wildlife laws because this community was far from conservative forest. Koa krating’s community forest was under taking care of Koa krating temple. Details were shown in table 18. It was chosen only factor of friendly relationship between community and conservative officers for study.

Brought officer friendly relationship factors to find relation with level of quantitative, qualitative and transferred community participation, and success of conservation. It was found low relations in every dimensions of community participation as linear regression, R^2_{adj} between 30.6 – 44.6%. But all of regression

equations were reject at confidence level 95% or 90%, p-value higher than 0.05 or 0.10 in every equations. Details of regression equations, F value and p-value were shown in table 19.

Table 18 Friendly relationship between conservative officers' and community factors separated by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
1) Illegal conservative law families (Law; %)	10.2	10.0	4.3	-	4.3
2) Complained families by conservative officers (Comp; %)	10.2	3.3	2.9	-	4.3
3) Arrested families (Arre; %)	3.4	3.3	4.3	-	-
4) Friendly relationship between community and conservative officers (Fr_of; %)	59.75	68.25	63.5	62.25	62.5
CPL in quantitative dimension (Quan; %)	23.8	65.5	69.6	28.5	51.9
CPL in qualitative dimension (Qual; %)	24.6	65.2	71.7	23.0	51.6
CPL in transferred dimension (Tran; %)	31.7	71.5	72.2	28.3	48.2
Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 19 Relation between conservative officers relationship with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = -268 + 4.99 Fr_of	55.3	40.4	3.71	0.150
Qualitative	Qual = -272 + 5.05 Fr_of	48.5	31.3	2.83	0.191
Transferred	Tran = -275 +5.15 Fr_of	58.4	44.6	4.22	0.132
Community participation	CPL = -227 +3.86 Fr_of	52.9	37.2	3.37	0.164

4.5 Conservative information receiving factor

Receiving the conservative information was very important factor. It is the beginning of all the activities that need the community to participate. The potential of receiving information among studied communities was clearly different, range from 39.00% in Nhongkhayang community to the highest score in Thammaratnai community (78.25%). Details were shown in table 20. Three factors of information received might be co-related, so it might get each factor for apply equation to multicolination avoidance between fixed factors. Figure 16 shown relations within these factors.

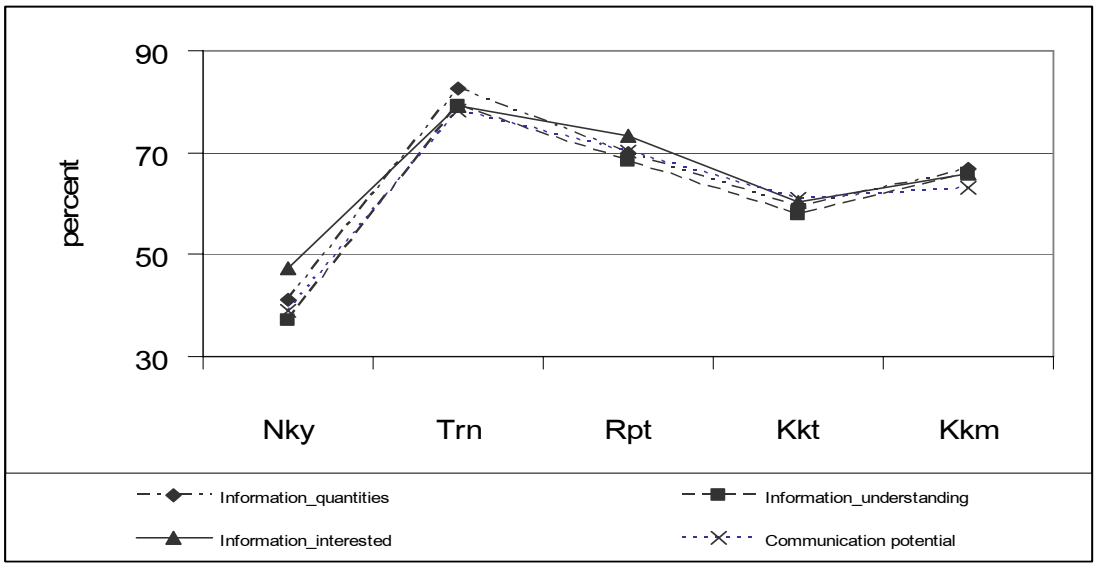


Figure 16 Relation between internal community communication potential with quantity, understood and interested in conservative information

Brought conservative information received factors to find relation with level of quantitative, qualitative and transferred community participation, and success of conservation. It was found that received information, understanding towards the conservative information, community interest, and potential to communicate had high effect towards each dimension level. It was calculated in linear regression found that R^2_{adj} between 49.1 – 80.0 and regression equations were accepted at confidence level

95%, Six regression equations had p-level lower than 0.05. Equation were as follows, (Table 21)

1) Community interest towards conservative information and CPL in quantitative dimension

2) Conservative information understanding and CPL in quantitative dimension

3) Community interest towards conservative data and CPL in transferred dimension

4) Community interest towards conservative information and Community participation level (CPL)

5) Community interest towards conservative information and successful conservation

6) Conservative information understanding and successful conservation

Besides, 12 regression equations had p-value lower 0.1 or equation acceptable at 90% confidence level. Details of adjusted coefficient of deterministic (R^2_{adj}), F value and p-value were shown in table 21.

Table 20 Conservative information received factors' of the sampling families separated by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
1) The quantity of transferred information to the community (Inf_q; %)	41.0	82.5	70.00	59.50	66.75
2) Conservative information understanding (Inf_u; %)	37.25	79.25	68.50	57.75	65.75
3) Community interest towards conservative information (Inf_i; %)	47.25	79.25	73.25	60.25	65.75
4) Communicated conservative data potential throughout the community (Inf_p; %)	39.0	78.25	70.25	61.0	63.0
CPL in quantitative dimension (Quan; %)	23.8	65.5	69.6	28.5	51.9
CPL in qualitative dimension (Qual; %)	24.6	65.2	71.7	23.0	51.6
CPL in transferred dimension (Tran; %)	31.7	71.5	72.2	28.3	48.2
Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 21 Relation between conservative information received with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = -27.9 +1.19 Inf_q	74.9	66.6	8.96	0.058
	Quan = -24.0 + 1.18 Inf_u	83.4	77.8	15.05	0.030
	Quan = -54.0 + 1.56 Inf_i	85.0	80.0	16.95	0.026
	Quan = -27.4 + 1.21 Inf_p	71.9	62.5	7.67	0.070
Qualitative	Qual = -29.4 +1.20 Inf_q	65.9	54.5	5.79	0.095
	Qual = -26.2 + 1.22 Inf_u	75.7	67.6	9.35	0.055
	Qual = -57.4 + 1.61 Inf_i	77.0	69.3	10.02	0.051
	Qual = -28.1 + 1.21 Inf_p	61.8	49.1	4.86	0.115
Transferred	Tran = -21.1 + 1.12 Inf_q	66.2	54.9	5.87	0.094
	Tran = -17.4 + 1.12 Inf_u	73.7	64.9	8.41	0.063
	Tran = -47.6 + 1.50 Inf_i	78.1	70.8	10.68	0.047
	Tran = -19.9 + 1.13 Inf_p	62.2	49.6	4.94	0.113
Community	CPL = -37.8 + 0.866 Inf_q	64.0	52.0	5.33	0.104
participation	CPL = -34.8 + 0.863 Inf_u	70.9	61.2	7.31	0.074
	CPL = -54.9 + 1.18 Inf_i	77.5	70.0	10.35	0.049
	CPL = -38.1 + 0.895 Inf_p	62.9	50.5	5.09	0.109

4.6 Necessity to rely on natural resources factor

Necessity to rely on natural resources was one cause of forest intrusion. Thus, this factor was very important for conservative management. Score of this factor gained from studied area was rather low. The highest needs point to forest products for food with rated in between 6.50 – 17.25% of the whole need. The other needs were forest products for use, wood products and wildlife meat. The necessity of indirect needs such as recreation, water resources, satisfactory was rated at 'medium-low' level, scored at 24.5 – 56.2%. Details were shown in table 22.

After calculated linear regression equations between necessity to rely on natural resources factor and community participation levels (Quantitative CPL,

Quality CPL, Transfer CPL and success of conservation). It was found coefficient of deterministic (R^2_{adj}) were low between 0.0 -24.5%. The all linear equations were rejected at confidence level 95% and 90% and p-values were higher than 0.05 or 0.10. Details of equations, F value and p-value were shown in table 23.

Table 22 Necessity factors rely on community forest separated by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
1) Necessity level of forest products for food (Nec_f; %)	17.25	14.25	12.75	6.5	10.5
2) Necessity level of forest products for use (Nec_u; %)	8.5	15.75	4.0	12.25	2.0
3) Necessity level of wood products (Nec_w; %)	3.75	0.0	6.5	1.25	1.0
4) Necessity level of wildlife meat for food (Nec_wm; %)	2.5	2.5	1.75	3.75	0.5
5) Necessity level of indirect forest used (Nec_ind; %)	24.50	39.25	41.25	36.5	56.2
CPL in quantitative dimension (Quan; %)	23.8	65.5	69.6	28.5	51.9
CPL in qualitative dimension (Qual; %)	24.6	65.2	71.7	23.0	51.6
CPL in transferred dimension (Tran; %)	31.7	71.5	72.2	28.3	48.2
Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 23 Relation between conservative information received with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = 42.2 + 0.46 Nec_f	0.8	0.0	0.02	0.887
	Quan = 52.4 – 0.53 Nec_u	2.1	0.0	0.06	0.817
	Quan = 45.1 + 1.12 Nec_w	2.0	0.0	0.06	0.822
	Quan = 66.7 – 8.56 Nec_wm	23.7	0.0	0.93	0.405
	Quan = 8.0 +1.01 Nec_ind	29.9	6.5	1.28	0.340
Qualitative	Qual = 34.7 + 1.02 Nec_c	3.3	0.0	0.10	0.769
	Qual = 53.7 – 0.77 Nec_u	3.7	0.0	0.12	0.756
	Qual = 42.8 + 1.75 Nec_w	4.2	0.0	0.13	0.742
	Qual = 69.5 – 10.1 Nec_wm	28.5	4.6	1.19	0.355
	Qual = 7.1 +1.01 Nec_ind	26.0	1.4	1.06	0.380
Transferred	Tran = 33.4 + 1.38 Nec_c	7.1	0.0	0.23	0.665
	Tran = 51.3 – 0.11 Nec_u	0.1	0.0	0.00	0.963
	Tran = 46.6 + 1.52 Nec_w	3.6	0.0	0.11	0.759
	Tran = 65.7 – 6.98 Nec_wm	15.7	0.0	0.56	0.509
	Tran = 24.1 +0.665 Nec_ind	12.9	0.0	0.45	0.552
Community	CPL = 7.2 + 0.85 Nec_c	4.3	0.0	0.14	0.738
participation	CPL = 19.2 – 0.18 Nec_u	0.4	0.0	0.01	0.919
	CPL = 13.4 + 1.69 Nec_w	7.1	0.0	0.11	0.759
	CPL = 28.8 + 5.07 Nec_wm	13.3	0.0	0.46	0.547
	CPL = -2.8 +0.516 Nec_ind	12.5	0.0	0.43	0.559

4.7 Community leader potential factors

Community leader was an important factor. He/she had influences to motivate many things in the community. There were 2 groups of leader formal and informal ones. From 5 studied communities, formal leader received potential scores ranged from 46.42 to 74.42%. In comparison, informal leader receive lower score rated by their villager, between 28.08 to 57.58%. Both potential of formal and informal leaders were 37.25 – 62.08%. It was shown in table 24.

After calculated relation between community leaders potential towards community forests conservations factor and community participation levels (Quantitative CPL, Quality CPL, Transfer CPL and success of conservation). It was found that motivated ability to take part in conservative activities, knowledge to manage natural resources correctly and efficiently, and eagerness of leader for management had effects towards community participation in every dimension clearly. Analyzed relation using linear regression found rather high level of adjusted coefficient of deterministic (R^2_{adj}) between 62.8 – 88.9%. Almost linear regression equations were accepted at 95% confidence level. Details of linear regression equations, F value and p-value were shown in table 25.

Besides, both formal and informal leaders were supported each other, so it should be selected whole leader potential to only variation of the representative of the community.

Table 24 Community leader potential factors separated by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
1) Formal leader potential as headman of a village, assistance headman, members of sub-district administration etc. (Lead_For; %)	**46.42**	**74.42**	**65.75**	**52.17**	**61.08**
1.1) Ability / Influence to motivate the villagers in conservative activities (%)	45.25	73.25	63.75	50.75	61.5
1.2) Interest / eagerness for conservative management (%)	47.0	75.75	66.00	53.75	62.5
1.3) Knowledge / correctly conservative understanding (%)	47.0	74.25	67.50	52.00	59.25
2) Informal leader potential such as local philosophers, teachers, monks, conservative leaders etc. (Lead_Inf; %)	**28.08**	**49.75**	**57.58**	**42.92**	**45.75**
2.1) Ability / Influence to motivate the villagers in conservative activities (%)	25.75	49.25	56.5	39.75	46.25
2.2) Interest / eagerness for conservative management (%)	28.75	51.75	58.75	43.50	46.75
2.3) Knowledge / correctly conservative understanding (%)	29.75	48.25	57.50	45.50	44.25
3) Average both of community leaders potential (Lead_pot; %)	**37.25**	**62.08**	**61.67**	**47.54**	**53.42**
CPL in quantitative dimension (Quan; %)	23.8	65.5	69.6	28.5	51.9
CPL in qualitative dimension (Qual; %)	24.6	65.2	71.7	23.0	51.6
CPL in transferred dimension (Tran; %)	31.7	71.5	72.2	28.3	48.2
Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 25 Relation between community leaders potential with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	*Quan = -58.1 + 1.77 Lead_For*	86.9	82.5	19.82	0.021
	Quan = -28.9 + 1.71 Lead_Inf	78.8	71.8	11.17	0.044
	Quan = -53.0 + 1.92 Lead_pot	91.6	88.9	32.89	0.011
Qualitative	*Qual = -63.6 + 1.85 Lead_For*	81.7	75.6	13.37	0.035
	Qual = -31.6 + 1.76 Lead_Inf	71.5	62.8	7.54	0.071
	Qual = -57.3 + 2.00 Lead_pot	84.7	79.6	16.62	0.027
Transferred	*Tran = -54.6 + 1.75 Lead_For*	84.8	79.8	16.76	0.026
	Tran = -19.4 +1.56 Lead_Inf	65.0	53.3	5.56	0.100
	Tran = -45.6 + 1.83 Lead_pot	82.6	76.8	14.22	0.033
Community	*CPL = -62.9 + 1.34 Lead_For*	80.2	73.6	12.14	0.040
participation	CPL = -40.5 + 1.30 Lead_Inf	72.4	63.2	7.86	0.068
	CPL = -58.9 + 1.46 Lead_pot	84.4	79.2	16.21	0.028

4.8 Way of life preservation factors

The needs to preserve original way of life might be a factor to drive for forest conservation. Villagers were used to live with forests, the binding between the samples and the community forests were medium level till higher 47.50 -74.50%. Way of life adaptive level, to living without forest were between adaptable to anxiously live 35.00 – 50.00%. And devotion level to keep way of life “human and forest” (Khon kab Pamai) were medium level or 50.83 – 68.08%. Brought these 3 factors to calculate average level found way of life preservation were medium level rather than high 50.83 – 68.08 percent. Details were shown in table 26.

After calculated linear regression equations between way of life preservation factor and community participation levels (Quantitative CPL, Quality CPL, Transfer CPL and success of conservation). It was found adjusted coefficient of deterministic (R^2_{adj}) were medium relation between 42.3 – 73.3%. Linear regression equation between dependent factor “way of life preservation” and independent factor “success of conservation” was accepted at confidence level 95%. Details of linear regression equations, F value and p-value were shown in table 27.

Table 26 Way of life preservation factors separated by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
Preservation needs towards Way of life “people and forest” (Way_li; %) = (Way_bi + Way_ad + Way_de)/3	50.83	69.42	63.58	54.92	68.08
1.1) Binding between community way and forest (Way_bi; %)	47.50	73.25	63.75	57.75	74.50
1.2) Adaptability of community way to living without forest (Way_ad; %)	50.00	35.00	36.50	45.50	37.00
1.3) Devotion to preserve way of life “people and forest” (Way_de; %)	55.00	70.00	63.50	52.50	66.75
CPL in quantitative dimension (Quan; %)	23.80	65.50	69.60	28.50	51.90
CPL in qualitative dimension (Qual; %)	24.60	65.20	71.70	23.00	51.60
CPL in transferred dimension (Tran; %)	31.70	71.50	72.20	28.30	48.20
Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 27 Relation between community leaders potential with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = -88.8 + 2.23 Way_li	75.6	67.5	9.32	0.055
Qualitative	Qual = -95.7 + 2.33 Way_li	71.1	61.5	7.39	0.073
Transferred	Tran = -74.2 +2.03 Way_li	62.5	50.0	5.00	0.111
Community participation	CPL = -76.0 + 1.53 Way_li	56.7	42.3	3.93	0.142

4.9 Conservation trends factor

Trend of conservation in the community induced sampling families to participated conservative activities in various average levels between 39.5 – 67.0%. It could be concluded that conservative trend of community or neighbors attract samples interest. Anyway participation needed more factors for encouragement. Details were shown in table 28.

Linear regression analyzed between dependent factors; conservative trends; and independent factors; CPL in quantity, CPL in quality and CPL in transferred, and success of conservation, found that adjusted coefficient of determinations (R^2_{adj}) were medium relation between 53.6 – 65.2%. All linear equation were rejected at confidence level 95% and p-value higher than 0.05. Details of linear equation, coefficient of determination, F value and p-value were shown in table 29.

Table 28 Conservation trends factors separated by community

Factor	Community				
	Nky	Trn	Rpt	Kkt	Kkm
1) Community participation level respond to conservative trend (trend; %)	38.50	65.75	67.0	55.25	52.5
2) CPL in quantitative dimension (Quan; %)	23.8	65.5	69.6	28.5	51.9
3) CPL in qualitative dimension (Qual; %)	24.6	65.2	71.7	23.0	51.6
4) CPL in transferred dimension (Tran; %)	31.7	71.5	72.2	28.3	48.2
5) Community participation level (CPL; %) (Quantity × Quality × Transfer)/10,000	1.95	32.15	37.29	1.94	14.83

Table 29 Relation between conservation trend with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = -39.1 + 1.56 Trend	73.9	65.2	8.49	0.062
Qualitative	Qual = -40.7 + 1.58 Trend	65.2	53.6	5.61	0.099
Transferred	Tran = -32.8 + 1.49 Trend	67.3	56.5	6.19	0.089
Community participation	CPL = -50.6 + 1.22 Trend	72.8	63.8	8.04	0.066

4.10 Abundance of natural resources factors

Abundance of natural resources was one of the factors effect natural conservation. Measured whole feeling of average sampling families; soil, water, forests, wildlife and biodiversity, resource for tourism, the 5 communities thought their natural resources in community forest were medium to high abundant 3.17-3.42 points (total points = 5 points). Details were shown in table 30. . The community ranking from high to low abundant of community forest were Romphothong, Koakrating, Thammarat, Khoakluamai and Nongkhayang, respectively.

Brought abundance of natural resources dependent factor to find relation with level of quantitative, qualitative and transferred community participation, and success of conservation. It was found wasn't relate in all dimension of CPL. Linear regression equation analyzed found coefficient of determination (R^2_{adj}) were 0.0% in every equations. All equations were rejected at confidence level 95% and p-value higher than 0.05. Details of linear equation, coefficient of determination, F value and p-value were shown in table 31.

Table 30 The opinion of sample family on the abundant of community forest

Topic of natural resources	Village (points)									
	NKY		TRN		RPT		KKT		KKM	
	Avg	sd	Avg	sd	Avg	sd	Avg	sd	Avg	sd
1) soil fertility (soil quality)	3.42	0.792	3.33	0.884	3.46	0.901	3.31	0.731	3.46	0.683
2) sufficient of land for using	3.29	0.852	2.8	0.761	3.25	0.914	3.10	0.852	2.83	0.907
3) soil erodibility	3.39	0.891	*2.87*	*0.973*	2.68	0.757	*3.05*	*0.647*	2.98	0.887
4) water quality	2.88	1.019	3.2	0.664	3.45	0.697	3.56	0.754	3.15	1.01
5) water quantity for consuming (eating)	2.61	1.051	3.4	0.855	3.42	0.775	3.79	0.656	2.81	1.315
6) water quantity for using	2.42	0.951	3.5	0.82	3.29	0.750	3.62	0.711	3.1	1.171
7) water quantity for agriculture	2.37	0.963	2.9	0.845	2.83	0.854	3.51	0.721	3.33	0.953
8) safety from flood/over flow	4.02	0.777	*3.83*	*0.913*	*3.50*	*1.100*	*3.44*	*1.071*	*3.54*	*1.148*
9) safety from drought	2.41	1.002	*3.0*	*1.365*	*2.78*	*1.110*	*3.31*	*0.977*	*3.54*	*0.771*
10) forest area in the village	3.85	0.519	3.47	0.73	3.75	0.847	3.26	1.069	3.64	0.735
11) forest things available for consuming	3.54	0.750	3.4	0.621	3.65	0.872	3.00	1.076	3.71	0.771
12) forest thing for using	3.53	0.817	3.27	0.828	3.72	0.983	3.08	0.984	3.69	0.719
13) abundance of wildlife in the areas	3.42	1.070	3.53	0.73	3.96	0.736	3.15	1.113	3.96	0.713
14) wildlife species diversity	3.42	1.004	3.63	0.669	3.84	0.851	3.08	1.133	3.94	0.665
15) abundance of aquatic animals	3.08	0.836	2.63	1.033	3.49	0.918	3.77	0.872	3.31	0.903

Table 30 (Continued)

Topic of natural resources	Village (points)									
	NKY		TRN		RPT		KKT		KKM	
	Avg	sd	Avg	sd	Avg	sd	Avg	sd	Avg	sd
16) aquatic animal species diversity	3.14	0.840	2.63	1.033	3.43	0.915	3.95	0.686	3.29	0.874
17) good scenic / view of the areas	3.25	0.801	3.57	0.504	3.59	0.764	3.51	0.914	3.56	0.796
Average	**3.17**	**0.493**	**3.23**	**0.364**	**3.42**	**0.331**	**3.38**	**0.292**	**3.40**	**0.348**

Note Natural resources abundance level: 1.00-1.79 points = very low abundance level, 1.81-2.60 = low, 2.61-3.40 = neutral, 3.41-4.20 = high and 4.21-5.00 = very high

Table 31 Relation between natural resources abundance with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = -172.4 + 66.3 N_Res	12.7	0.0	0.44	0.556
Qualitative	Qual = -199.1 + 74.3 N_Res	13.1	0.0	0.45	0.549
Transferred	Tran = -88.1 + 41.7 N_Res	4.8	0.0	0.17	0.723
Community participation	CPL = -130.0 + 44.51 N_Res	8.8	0.0	0.29	0.629

4.11 Good attitude towards conservative community forest factor

Attitude might have influence towards dependent factor, management in conservative community forests correctly, general/principles, community had good attitude towards conservation had tendency to high participation. Studied 5 communities had not the same level of conservation, the points level, good attitude towards conservation were good level 3.70-3.97 points (total points = 5). Details were shown in table 32. Thammarat village receive the highest score on this factor, follow by Khaokluaymai, Romphothong, Khoakrating and Nongkhayang. Remarkably, the answer that received the lowest score from 5 communities is about 'the best way to conserve the forest is not to utilize any kind of forest resources'.

From high score in positive attitude toward the conservation, it can conclude that villagers, who have long history of living and exploiting forest resources, have tendency to have a positive attitude on forest resource- and forest-conservation. Regarding to the similar score among 5 communities, the positive attitude might not affect the participation level in the study area.

Relation analyzed between dependent factors; good attitude towards conservative community forest and independent factors; CPL in quantity, CPL in quality and CPL in transferred, and success of conservation. Linear regression analyzed found low level of relation in every CPL dimensions, coefficient of determinations (R^2_{adj}) were between 21.8-50.4%. All linear equations were rejected at

Table 32 The attitude of sample family toward the community forest conservation

Attitude issues	Village (points)									
	NKY		TRN		RPT		KKT		KKM	
	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD
1) Forests were owned for everyone, no one should be occupied.	3.98	0.347	4.07	0.691	3.78	0.764	3.51	0.885	3.67	0.724
2) Intrusion, destruction the forests were severely illegal deed.	3.93	0.533	4.23	0.774	3.90	0.750	4.03	0.537	4.04	0.544
3) without the forest, might cause drought	3.9	0.607	4.10	0.481	4.03	0.618	3.85	0.630	3.94	0.522
4) Conservation the forest was your obligation.	3.75	0.544	4.03	0.556	3.83	0.727	3.82	0.601	3.81	0.532
5) Your community had duty to conserve the abundant community forests for good.	3.81	0.508	3.93	0.691	4.01	0.528	3.77	0.583	3.92	0.454
6) Community forest management was conservation for using together of people in the community.	3.85	0.485	3.93	0.450	3.86	0.648	3.79	0.570	4.02	0.565
7) Conservation community forests would increase the other natural resources better (eg. water quantity, air quality).	4.02	0.293	3.97	0.615	3.96	0.400	3.92	0.532	3.96	0.41
8) Community forests were important food sources of the community.	3.90	0.443	3.83	0.531	3.80	0.608	3.72	0.724	3.81	0.673
9) Community forests were essential natural resources for living of the people in the community (firewood, wood)	3.58	0.814	3.93	0.450	3.77	0.689	3.62	0.747	3.83	0.476
10) Community forests were important raw resources to make community products.	3.59	0.646	3.93	0.254	3.55	0.738	3.69	0.655	3.69	0.657
11) Community forests were important herbal resources of the community.	3.66	0.843	4.03	0.414	3.94	0.784	3.67	0.701	3.83	0.996

Table 32 (Continued)

Attitude issues	Village (points)									
	NKY		TRN		RPT		KKT		KKM	
	Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD
12) The best conservative community forest wasn't prohibition using benefit of the forests absolutely.	2.69	0.856	3.37	1.129	3.07	1.129	2.92	0.984	3.10	1.096
13) The community forests areas should not be divided anyone to occupy and took benefits.	3.53	0.817	3.93	0.980	3.52	1.208	3.62	0.782	3.69	0.748
14) Cutting wood from the community forests shouldn't be allowed freely.	3.90	0.515	4.03	0.765	3.86	0.974	3.51	0.823	3.85	0.684
15) Hunting wildlife for consuming shouldn't be allowed freely.	4.02	0.572	3.97	0.809	3.84	1.024	3.62	0.935	3.92	0.942
16) Hunting career shouldn't be allowed to continue in the community.	4.00	0.719	4.03	0.928	3.83	0.969	3.67	0.806	3.87	0.942
17) Wildlife were important natural resources of the community to conserve.	3.85	0.665	4.17	0.699	4.14	0.944	4.13	0.615	4.10	0.627
Average	**3.76**	**0.327**	**3.97**	**0.183**	**3.81**	**0.244**	**3.70**	**0.261**	**3.83**	**0.223**

Note: Attitude level: 1.00-1.79 points = very bad attitude, 1.81-2.60 = bad, 2.61-3.40 = neutral, 3.41-4.20 = good and 4.21-5.00 = very good

95% confident level, p-value much higher than 0.05. Details of linear equation, coefficient of determination, F value and p-value were shown in table 33.

Table 33 Relation between good attitude towards conservative community forests with level of community participation

Level of participation	Equation	R^2(%)	R^2_{adj}(%)	F	p
Quantitative	Quan = -539.1 + 153.89 Atti_g	54.7	39.6	3.53	0.153
Qualitative	Qual = -589.0 + 166.82 Atti_g	55.3	40.4	3.71	0.150
Transferred	Tran = -580.1 + 165.31 Atti_g	62.8	50.4	5.06	0.110
Community participation	CPL = -432.0 + 117.89 Atti_g	51.3	35.1	3.16	0.173

5. Relation equation and model between community deterministic factors and community participation level

5.1 Appropriated regression equations

5.1.1 Quantitative CPL dimension

Community participation of conservative natural resources in quantitative dimension i.e. percentage of participated families, frequency of participation, activity areas covered community forests, and budget stability. It differed from each factor of each community; especially the community forest in Klongtagrao watershed had 9 factors as follows;

1) The quantity of transferred conservative information to the community
2) Conservative information understanding
3) Community interest towards conservative information
4) Communicated conservative data potential throughout the community
5) Formal community leaders potential

6) Informal community leaders potential
7) Community leader potential
8) Preservation needs towards Way of life “people and forest”
9) Conservation trends

Details of linear equation, coefficient of determination, F value and p-value were shown in table 34.

Table 34 Equation of influence dependent factors towards CPL in quantitative level

Factor	Equation	R^2(%)	R^2_{adj}(%)	F	p
1) The quantity of transferred conservative information to the community	Quan = -27.9 +1.19 Inf_q	74.9	66.6	8.96	0.058
2) Conservative information understanding	*Quan = -24.0 + 1.18 Inf_u*	83.4	77.8	15.05	0.030
3) Community interest towards conservative information	*Quan = -54.0 + 1.56 Inf_i*	85.0	80.0	16.95	0.026
4) Communicated conservative data potential throughout the community	Quan = -27.4 + 1.21 Inf_p	71.9	62.5	7.67	0.070
5) Formal community leaders potential	*Quan = -58.1 + 1.77 Lead_for*	86.9	82.5	19.82	0.021
6) Informal community leaders potential	*Quan = -28.9 + 1.71 Lead_inf*	78.8	71.8	11.17	0.044
7) Community leader potential	*Quan = -53.0 + 1.92 Lead_pot*	91.6	88.9	32.89	0.011
8) Preservation needs towards Way of life “people and forest”	Quan = -88.8 + 2.23 Way_li	75.6	67.5	9.32	0.055
9) Conservation trends	Quan = -39.1 + 1.56 Trend	73.9	65.2	8.49	0.062

Remark: Choose only equations had p-value < 0.1

Brought 9 factors and sorted appropriate equation by stepwise, determine value of Alpha-to-Enter = 0.10 and Alpha-to-Remove = 0.10. It was selected only community leader factor to predict community participation level with high level adjusted coefficient of determination (R^2_{adj}) 88.9 percent. So this equation could predict quantitative community participation level 88.9 percent correctly. Linear equation as follow;

Quantitative CPL = -53.0 + 1.92 Leader potential; R^2_{adj} 88.9

Potential leaders were ability to persuade community to conservative activities, interested in conservation and conservative knowledge of leader.

As to the other influenced dependent factors towards level of quantitative CPL had correlation as follows;

1) Conservative information received by every family, easy to understand and interest for the community.

2) Preservation needs towards Way of life “Human and Forest” as long familiar history as forest destroyers, dwellers and conservancy.

3) Conservation trends in the community continuously to stimulate high level community participation.

Besides good friendly relation between community and conservative officers, attitude had medium relation with community participation level, but no significant. However enhancing good friendly relation with officers and good attitude might help better quantitative community conservation.

5.1.2 Qualitative CPL dimension

Qualitative community participation in natural resources conversation i.e. various of conservative activities, pleasure to participation, difficulty of activities, result of conservative activities toward natural resources, pattern of

participate to the state, and push-up group had difference from each factors of each community. Qualitative dimension participation of conservation in Klongtagrao watershed had 8 factors as follows:

1) The quantity of transferred conservative information to the community
2) Conservative information understanding
3) Community interest towards conservative information
4) Formal community leaders potential
5) Informal community leaders potential
6) Community leader potential
7) Preservation needs towards Way of life “Human and forest”
8) Conservation trends

Details of linear equation, coefficient of determination, F value and p-value were shown in table 35.

Brought all 8 factors and sorted appropriate equation by stepwise analysis, determine value of Alpha-to-Enter = 0.10 and Alpha-to-Remove = 0.10. It was selected only community leader factor to predict community participation level with high level adjusted coefficient of determination (R^2_{adj}) 79.62 percent. So this equation could predict qualitative community participation level 79.62 percent correctly. Linear equation as follow;

Qualitative CPL = -57.35 + 2.00 Leader potential; R^2 (adj) 79.62

As to the other dependent influence factors towards level of qualitative had correlation as follows;

1) Conservative information received the whole families easy to understand and interest for the community.

Table 35 Equation of influence dependent factors towards CPL in qualitative level

Factor	Equation	R^2(%)	R^2_{adj}(%)	F	p
1) The quantity of transferred conservative information to the community	Qual = -29.4 +1.20 Inf_q	65.9	54.5	5.79	0.095
2) Conservative information understanding	Qual = -26.2 + 1.22 Inf_u	75.7	67.6	9.35	0.055
3) Community interest towards conservative information	Qual = -57.4 + 1.61 Inf_i	77.0	69.3	10.02	0.051
4) Formal community leaders potential	*Qual = -63.6 + 1.85 Lead_for*	*81.7*	*75.6*	*13.37*	*0.035*
5) Informal community leaders potential	Qual = -31.6 + 1.76 Lead_Inf	71.5	62.8	7.54	0.071
6) Community leader potential	*Qual = -57.3 + 2.00 Lead_Pot*	*84.7*	*79.6*	*16.62*	*0.027*
7) Preservation needs towards Way of life “people and forest”	Qual = -95.7 + 2.33 Way_Li	71.1	61.5	7.39	0.073
8) Conservation trends	Qual = -40.7 + 1.58 Trend	65.2	53.6	5.61	0.99

Remark: Choose only equations had p-value < 0.1

2) Preservation needs towards Way of life “Human and Forest”, as long familiar history as destroyers, dwellers, and conservers.

3) Conservative trend in the community continuously to stimulate good conservation.

Besides good friendly relation between community and conservative officers and good attitude had correlation with qualitative CPL but non significant;

however enhancing good friendly relation and good attitude might help better qualitative community conservation.

5.1.3 Transferred CPL dimension

It was passing ideas to the members of the community or adolescence, took ideas to practice, participation by various groups and periods of hood. The transferred CPL had difference level of each community. In Klongtagrao watershed had 7 CDF affected transferred CPL as follows;

1) The quantity of transferred conservative information to the community
2) Conservative information understanding
3) Community interest towards conservative information
4) Formal community leaders potential
5) Informal community leaders potential
6) Community leader potential
7) Conservation trends

Details of linear equation, coefficient of determination, F value and p-value were shown in table 36.

Table 36 Equation of influence dependent factors towards CPL in Transferred level

Factor	Equation	R^2(%)	R^2_{adj}(%)	F	p
1) The quantity of transferred conservative information to the community	Tran = -21.1 + 1.12 Inf_q	66.2	54.9	5.87	0.094
2) Conservative information understanding	Tran = -17.4 + 1.12 Inf_u	73.7	64.9	8.41	0.063
3) Community interest towards conservative information	*Tran = -47.6 + 1.50 Inf_i*	*78.1*	*70.8*	*10.68*	*0.047*
4) Formal community leaders potential	*Tran = -54.6 + 1.75 Lead_for*	*84.8*	*79.8*	*16.76*	*0.026*
5) Informal community leaders potential	Tran = -19.4 +1.56 Lead_inf	65.0	53.3	5.56	0.100
6) Community leader potential	*Tran = -45.6 + 1.83 Lead_Pot*	*82.6*	*76.8*	*14.22*	*0.033*
7) Conservation trends	Tran = -32.8 + 1.49 Trend	67.3	56.5	6.19	0.089

Remark: Choose only equations had p-value < 0.1

Brought 7 factors and sorted appropriate equation by stepwise analysis, determine value of Alpha-to-Enter = 0.10 and Alpha-to-Remove = 0.10. It was selected only community leader factor to predict community participation level with high level adjusted coefficient of determination (R^2_{adj}) 79.80 percent. So this equation could predict transferred community participation level 79.80 percent correctly. Linear equation as follow;

Transferring CPL = -54.6 + 1.75 Formal Leader potential; R^2 (adj) 79.80

As to the other dependent factors that influenced to promote transferred community participation level as follows;

1) Conservative information distributed to every family, easy to understand, interest to the community.

2) Conservative trend took place in the community had effect to participate conservation and might be good result in the future.

3) Informal community leaders had role to enhance official leader potential.

Besides good friendly relation between community and conservative officers and good attitude had correlation with transferred CPL but non significant; however enhancing good friendly relation and good attitude might help better community conservation transferring.

5.1.4 Three dimensions of community participation level model (CPL model)

The wholelistic views of three dimensions CPL were quantitative, qualitative and transferred ones. Brought participation to consider the points separately on Klongtagroa watershed has 6 important factors as follows;

1) Conservative information understanding
2) Community interest towards conservative information
3) Formal community leaders potential
4) Informal community leaders potential
5) Community leader potential
6) Conservation trends

Details of linear equation, coefficient of determination, adjusted coefficient of determination, F value and p-value were shown in table 37.

Table 37 Equation of influence dependent factors towards Community participation level (CPL)

Factor	Equation	R^2(%)	R^2_{adj}(%)	F	p
1) Conservative information understanding	CPL = -34.8 + 0.863 Inf_u	70.9	61.2	7.31	0.074
2) Community interest towards conservative information	*CPL = -54.9 + 1.18 Inf_i*	*77.5*	*70.0*	*10.35*	*0.049*
3) Formal community leaders potential	*CPL = -62.9 + 1.34 Lead_For*	*80.2*	*73.6*	*12.14*	*0.040*
4) Informal community leaders potential	CPL = -40.5 + 1.30 Lead_Inf	72.4	63.2	7.86	0.068
5) Community leader potential	*CPL = -58.9 + 1.46 Lead_Pot*	*84.4*	*79.2*	*16.21*	*0.028*
6) Conservation trends	CPL = -50.6 + 1.22 Trend	72.8	63.8	8.04	0.066

Remark: Choose only equations had p-value < 0.1

Brought 6 factors and sorted appropriate equation by stepwise analysis, determine value of Alpha-to-Enter = 0.10 and Alpha-to-Remove = 0.10. It was selected only community leader factor to predict community participation level with high level adjusted coefficient of determination (R^2_{adj}) 79.17 percent. So this equation could predict community participation level 79.17 percent correctly. Linear equation as follow;

CPL = -58.91 + 1.46 Leader potential; R^2 (adj) 79.17

As to the other dependent factors that influenced to promote transferred community participation level as follows;

1) Conservative information distributed to every family, easy to understand, interest to the community.

2) Conservative trend took place in the community had effect to participate conservation and might be good result in the future.

Besides preservation needs towards Way of life “Human and Forest”, the quantity of transferred conservative information to the community, potential to communicate inside the community, friendly relation between community and conservative officers, and good attitude towards level of participation. It had correlation with Community participation level (CPL) but non significant; however enhancing these supported factors might send good result to lift up level of participation for wholelistic community forest conservation.

5.2 Mental model

The relation between deterministic factor and participation level of community on community forest was studied. We found that management structure of Klongtagrao community was systematic character. Although the community continued developing the participation level more than 10 years, the level of participation in each community was extremely different. There was community with high-level participation. On the other hand, there was also a community with tendency to conflict.

By in-depth interview with non-participated observation, quantitative relationship between deterministic factor and community participation level were studied. The result of the study revealed that there were 2 factors significantly influencing the community participation level as the following:

1) Leader potential. This leader potential composed of knowledge, interest in conservation and ability to motivate members in community to join those activities. From the study, potential from formal leader influence the participation level in higher manner than that of informal leader. The reason is that, the formal leader himself is highly accepted by Klongtagrao community. In other words, this formal leader is also informal leader who has high influence on the community.

2) Conservative information. This factor clearly influence the participation level as to leader potential. The interest on conservative information has highest influence, followed by the understanding and quantity of information

received. In social psychology, information is important factor as it affects the community attitude then lead to behavior change. In Klongtagrao case study, leader plays role as a source of message for the community. He is the one who decide forms and frequency of the message to distribute. It is found that the leader is a suitable channel for transferring those messages to the audiences as he knows the community attitude, background and also their way of life.

Other factors that influence the participation are including conservation trends, 'People and Forest' ways of life and the relation between the officers and the community.

Relationships between related factors and participation level can be explained using systematic flowchart model as following:

1) Developed leader potential establishes a lifting participation of community.

2) Increasing conservative information establishes a lifting participation of community

3) Stronger trend in conservation, better relationships between the officers and community and also requirement of community to conserve the old way of living in harmony with forest, all these increasing the participation level.

4) Lifting participation level conduces to more conservative activities, both in quantity, quality and also passing on the information.

5) Greater number of conservative activities contributes 2 obviously changes

5.1)The change of right for freely forest resources exploitation (promptly activated)

5.2)Productivity of the community forest is increasing after conservation activities (delay or prolong the timing)

6) The change of right for forest resources exploitation, lead to community conflict. The important conflict are as follow

6.1) Leader role conflict. This is the most important conflict. Successful community in forest conservation derives from support collaboration and cooperation between formal- and informal- leaders. On the other hand, the conflict between formal- and informal- leader for example informal leader take over the function of formal leader in conservation or formal leader ignores conservative activities, can be found in the community with lower success in forest conservation.

6.2) Conflict over land possession and forest resource exploitation. This conflict can be found in every community, but it is not a strong impediment as compared to the conflict over leaderships. Some community members who disagreeing with the project, raise against the forest conservation by disjoin the activities or launch a verbal attack. Anyway, the reaction of disagreeing is not such a drastic action, it can be handling by the community.

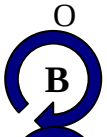
7) Increasing productivity of forest-community lead to even more benefit and sustainable resources among community members.

8) Increasing of benefit from community forest bring into an increasing of positive attitude over forest conservation and encouraging the conservative mind. These result in 2 important things as follow

8.1) Positive attitude bring into an interest to receiving conservative information and understanding the detail of it. The effective of information gain, thus, subsequently support the participation level.

8.2) In long term, positive attitude of community members allow a better social capital, especially building ‘trust’ among members, encouraging the community way of sustainable living in harmony with forest, building community forest rules and strengthen the leaderships of community members.

9) A better social capital lead to overall potential of community leader. This will turn back to the lifting of participation level in forest conservative as in the following flowchart.

Where as;	S	mean	Same way
	O	mean	Opposite way
		mean	Backward loop
		mean	Reinforcing loop

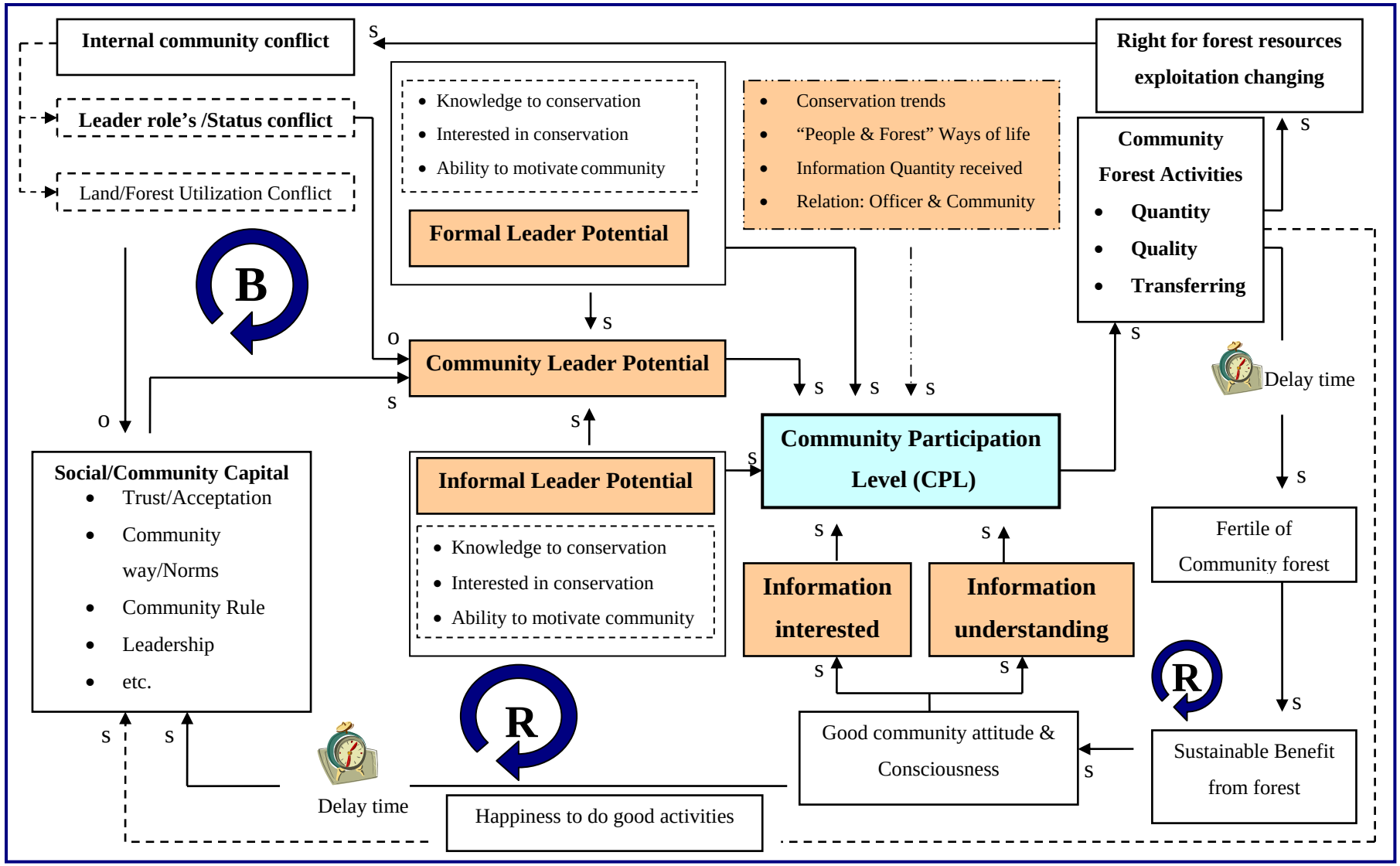


Figure 17 Mental model of community participation level in Klongtagrao watershed, Chachoengsao province

Discussion

1. Measuring CPL by 3 sources

1.1 Quantitative points

A one-way analysis of variance (ANOVA) was used to examine quantitative community participation level across communities. Score points were collected from community members (as participant observation), researchers and community specialist (as non-participant observation). It was found most of various point came from vary of communities points difference. Measuring community quantitative participation level from 3 sources was not difference at 95% confident level and found p-value was 0.314 (p-value > 0.05). Details were shown in table 38 and 39. Figure 18 were demonstrated familiar trend of community participation level from 3 sources.

Table 38 Quantitative CPL points from 3 sources

	Point from 3 sources			average
	community	observation	specialist	
Koa krating	23.5	26.3	35.8	28.5
Romphothong	61.8	62.5	84.6	69.6
Khao klouymai	45.0	40.0	70.8	51.9
Nhongkhayang	23.9	18.8	28.8	23.8
Thammaratnai	55.8	58.8	81.9	65.5

Table 39 Analysis of variances (ANOVA) of quantitative CPL points

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F critical*
Between Groups	1171.921	2	585.961	1.276	0.314	3.885
Within Groups	5509.736	12	459.145			
Total	6681.657	14				

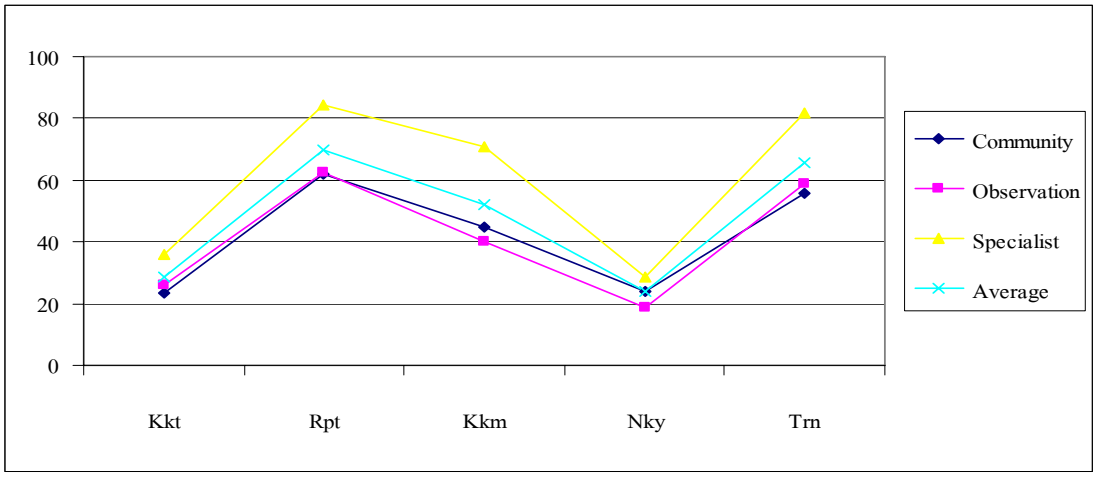


Figure 18 Quantitative CPL points from community, observation and specialist sources

1.2 Qualitative points

A one-way analysis of variance (ANOVA) was used to examine qualitative community participation level across communities. Score points were collected from community members (as participant observation), researchers and community specialist (as non-participant observation). It was found most of various point came from vary of communities points difference. Measuring qualitative community participation level from 3 sources was not difference at 95% confident level and found p-value was 0.660 (p-value > 0.05). Details were shown in table 40 and 41. Figure 19 were demonstrated familiar trend of community participation level from 3 sources.

Table 40 Qualitative CPL points from 3 sources

	Point from 3 sources			average
	community	observation	specialist	
Koa krating	24.5	20.8	23.6	23.0
Romphothong	56.6	75.0	83.5	71.7
Khao klouymai	51.3	39.2	64.3	51.6
Nhongkhayang	28.9	18.3	26.7	24.6
Thammaratnai	52.6	65.0	78.0	65.2

Table 41 Analysis of variances (ANOVA) of qualitative CPL points

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F critical*
Between Groups	481.936	2	240.968	0.430	0.660	3.885
Within Groups	6724.368	12	560.364			
Total	7206.304	14				

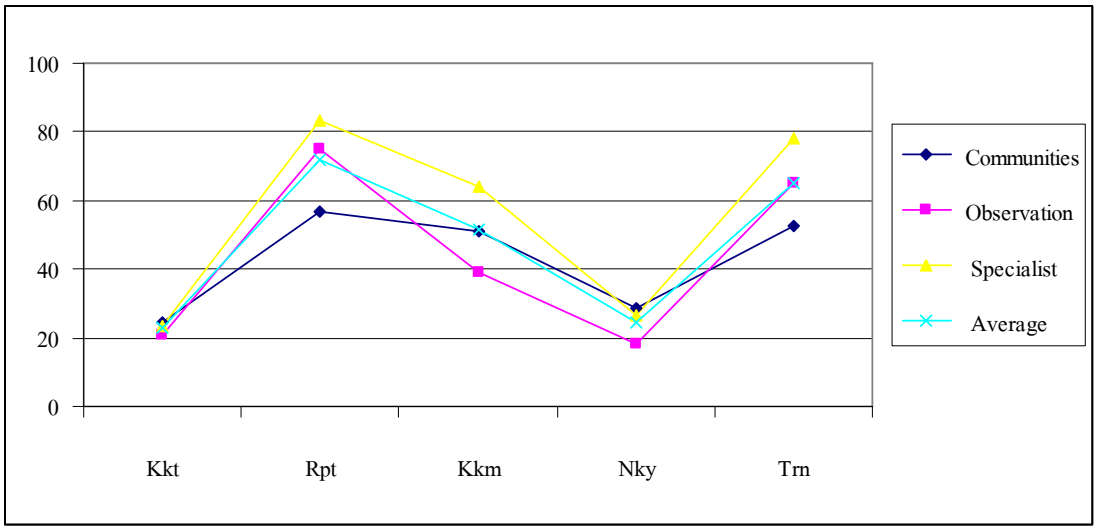


Figure 19 Qualitative CPL points from community, observation and specialist sources

1.3 Transferring points

A one-way analysis of variance (ANOVA) was used to examine transferring community participation level across communities. Score points were collected from community members (as participant observation), researchers and community specialist (as non-participant observation). It was found most of various point came from vary of communities points difference. Measuring transferring community participation level from 3 sources was not difference at 95% confident level and found p-value was 0.619 (p-value > 0.05). Details were shown in table 42 and 43. Figure 20 were demonstrated familiar trend of community participation level from3 sources.

Table 42 Transferring CPL points from 3 sources

	Point from 3 sources			average
	community	observation	specialist	
Koa krating	23.0	25.0	37.0	28.3
Romphothong	65.0	75.0	76.5	72.2
Khao klouymai	46.3	36.7	61.7	48.2
Nhongkhayang	30.0	28.3	36.7	31.7
Thammaratnai	63.3	72.5	78.6	71.5

Table 43 Analysis of variances (ANOVA) of Transferring CPL points

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F critical*
Between Groups	457.561	2	228.781	0.500	0.619	3.885
Within Groups	5491.948	12	457.662			
Total	5949.509	14				

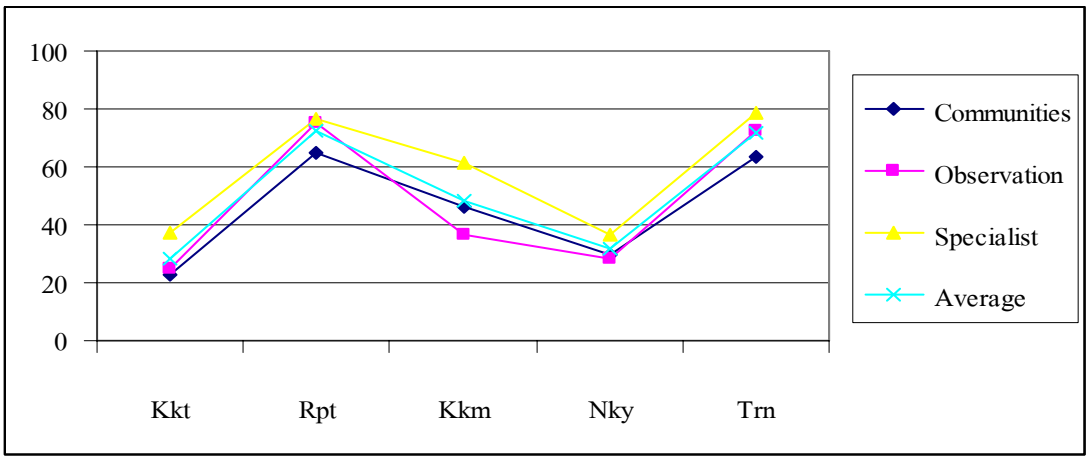


Figure 20 Transferring CPL points from community, observation and specialist sources

1.4 Successful points

A one-way analysis of variance (ANOVA) was used to examine quantitative points across communities. Score points were collected from community members (as participant observation), researchers and community specialist (as non-participant observation). It was found most of various point came from vary of communities points difference. Measuring successful in community forest conservation from 3 sources was not difference at 95% confident level and found p-value was 0.619 (p-value > 0.05). Details were shown in table 44 and 45. Figure 21 were demonstrated familiar trend of successful point from3 sources.

Table 44 Successful CPL points from 3 sources

	Point from 3 sources			average
	community	observation	specialist	
Koa krating	18.8	25	39.2	27.7
Romphothong	50.1	58.3	88.7	65.7
Khao klouymai	41.8	41.7	75.6	53
Nhongkhayang	13.2	18.3	25.6	19
Thammaratnai	38.6	53.3	83.9	58.6

Table 45 Analysis of variances (ANOVA) of Successful CPL points

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F critical*
Between Groups	2490.801	2	1245.401	2.756	0.104	3.885
Within Groups	5422.348	12	451.862			
Total	7913.149	14				

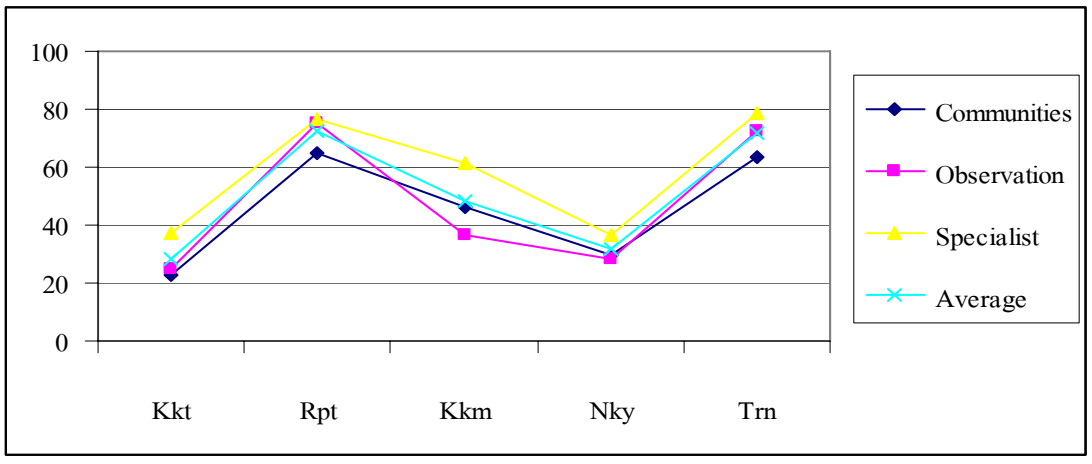


Figure 21 Successful points from community, observation and specialist sources

2. Relation among quantitative CPL dimension with others dimensions

Quantitative CPL measure was the easiest dimension and it was mathematic number or fully scales measuring, so quantitative measuring had high reliability than others dimensions. In this research found quantitative could explain qualitative, transferring dimension and CPL through linear equation, it was found high relation at coefficient of determination (R^2) were 0.988, 0.951 and 0.952 respectively, adjusted coefficient of determination (R^2adj) were 0.984, 0.935 and 0.936 respectively, equations were accept at 95% confident level p-value were 0.001, 0.005 and 0.005 chronologically. Details were shown in figure 22, 23 and 24, equation were show below;

Qualitative CPL	=	1.0721 Quantitative CPL – 4.0089
Transferring CPL	=	0.9779 Quantitative CPL + 3.5784
CPL	=	0.7716 Quantitative CPL – 19.297

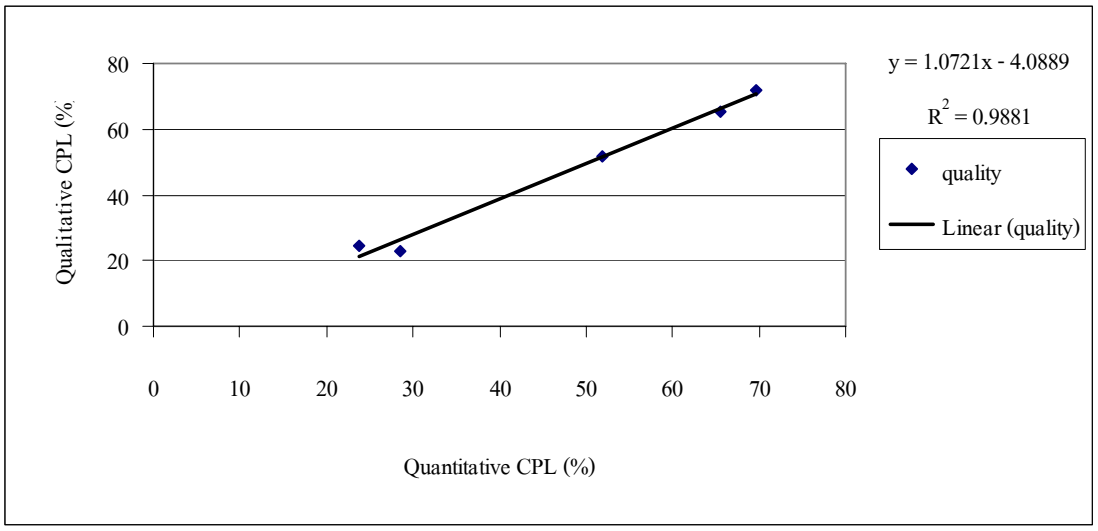


Figure 22 Relation between Quantitative CPL and Quantitative CPL

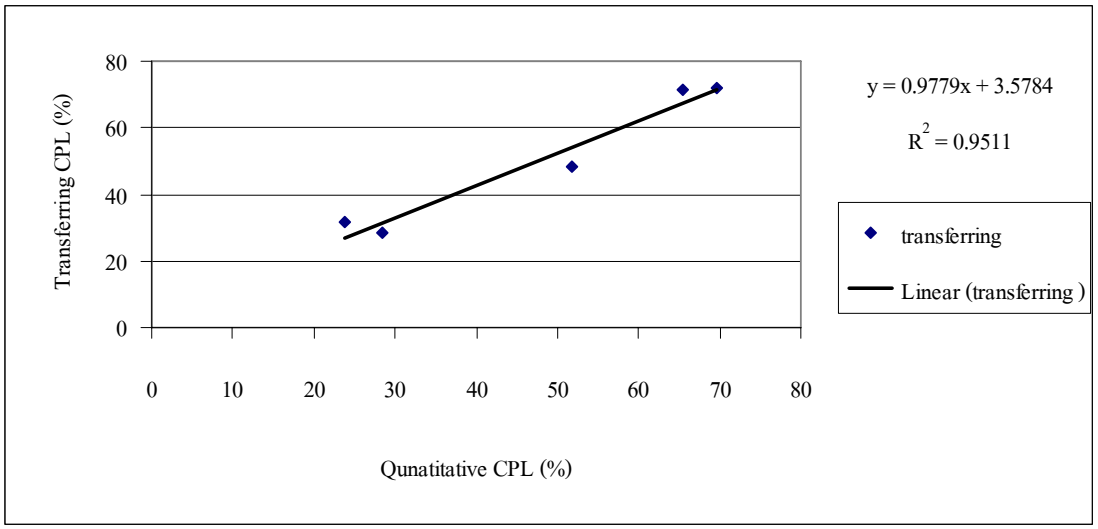


Figure 23 Relation between Quantitative CPL and Transferring CPL

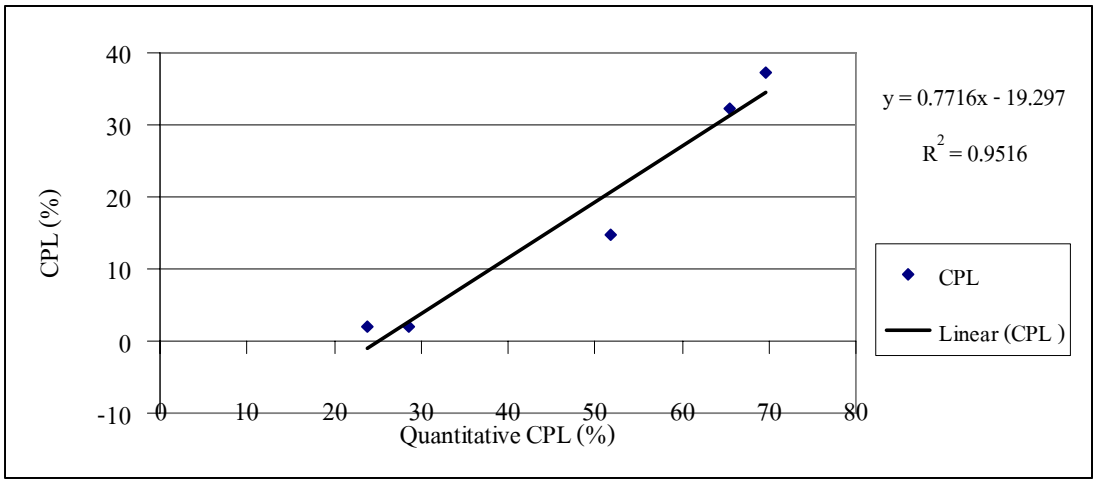


Figure 24 Relation between Quantitative CPL and CPL

CONCLUSION AND RECOMMENDATIONS

Conclusion

1. Community participation levels (CPL)

Five communities with community forest activities which were selected Klongtagrao watershed for the study, namely Romphothong (Rpt), Khao-klouymai (Kkm), Nhongkhayang (Nky), Thammaratnai (Trn) and Koa krating (Kkt) village. Each community has different community participation levels from others and differs between dimensions, Romphothong has the highest level in every dimensions and the second was Thammaratnai. Detail of CPL level as showed in table 46.

Table 46 Quantitative, qualitative, transferring and CPL community participation level (%)

Dimensions	Participation level (%)				
	Kkt	Rpt	Kkm	Nky	Trn
Quantitative dimension	28.5	69.6	51.9	23.8	65.5
Qualitative dimension	23.0	71.7	51.6	24.6	65.2
Transferring dimension	28.3	72.2	48.2	31.7	71.5
CPL (Quan × Qual × Trans)/10,000	1.94	37.29	14.83	1.95	32.15

2. Community deterministic factor level (CDF)

Community deterministic factor levels were various in each other village and vary among factors. Detail of CDF levels were shown in table 47.

Table 47 Communities deterministic factor levels (CDF level)

Deterministic factors	Community				
	Kkt	**Rpt**	**Kkm**	**Nky**	**Trn**
1. Race	Thai	Thai	Thai	Thai	Thai
2. Religion	Buddh.	Buddh.	Buddh.	Buddh.	Buddh.
3. Main occupation	General employees	Crops farmer	Crops farmer, general employees	general employees, crops farmer, field farmer	General employees, crops, seller
4. Community's aged (years)	28.31	20.84	23.36	20.69	24.60
5. Family was born in community (%)	7.7	8.7	12.5	3.4	0.0
6. Relation to community place (%)	95.9	95.8	97.5	94.5	93.1
7. Average family size (persons)	3.44	4.17	4.10	3.34	3.23
8. Male : Female 100 person	91.10	108.50	104.04	107.45	79.40
9. Average monthly income (bath)	6,682.1	10,091.2	6,489.6	10,203.4	7,650.0
10. Average monthly expense (bath)	4,956.4	7,970.6	5,532.6	8,515.3	6,766.7
11. A specific average family in debt (bath)	43,736.8	89,375.0	35,878.8	192,419.4	48,083.3
12. A specific average saving family (bath)	18,464.6	16,415.3	7,884.6	191,272.7	29,308.3

Table 47 (Continued)

Deterministic factors	Community				
	Kkt	**Rpt**	**Kkm**	**Nky**	**Trn**
13. A good level relation between community and conservative officials (%)	62.25	63.50	62.50	59.75	68.25
14. The amount of conservative data information transferred to family community (%)	59.50	70.00	66.75	41.00	82.50
15. Community can understand the theme of data information (%)	57.75	68.50	65.75	37.25	79.25
16. The level of interest towards community conservation (%)	60.25	73.25	65.75	47.25	79.25
17. The potential to communicate data information about community conservation thoroughly (%)	61.00	70.25	63.00	39.00	78.25
18. The level necessity of the community depended on the forests for consumption (%)	6.50	12.75	10.50	17.25	14.25
19. The level necessity of the community depended on the forests for use (%)	12.25	4.00	2.00	8.50	15.75
20. The level necessity of the community depended on some wood from the forests (%)	1.25	6.50	1.00	3.75	0.00
21. The level necessity of the community depended on wild animal's meat for consumption (%)	3.75	1.75	0.50	2.50	2.50
22. The level necessity or indirect needs towards the natural resource of the community forest (%)	36.50	41.25	56.20	24.50	39.25
23. The formal leaders potential	**52.17**	**65.75**	**61.08**	**46.42**	**74.42**
• The ability / influence to motivate members in the community to participate conservative activities (%)	50.75	63.75	61.50	45.25	73.25
• Interest / enthusiasm towards conservation management activities (%)	53.75	66.00	62.50	47.00	75.75
• Knowledge, understanding towards conservation correctly (%)	52.00	67.50	59.25	47.00	74.25

Table 47 (Continued)

Deterministic factors	Community				
	Kkt	**Rpt**	**Kkm**	**Nky**	**Trn**
24. The informal leaders potential	**42.92**	**57.58**	**45.75**	**28.08**	**49.75**
• The ability / influence to motivate members in the community to participate conservative activities (%)	39.75	56.50	46.25	25.75	49.25
• Interest / enthusiasm towards conservation management activities (%)	43.50	58.75	46.75	28.75	51.75
• Knowledge, understanding towards conservation correctly (%)	45.50	57.50	44.25	29.75	48.25
25. Conservation trend of the members in the community depended on participation of the whole activities (%)	55.25	67.00	52.50	38.50	65.75
26. The level of relation between the community and forests (%)	57.75	63.75	74.50	47.50	73.25
27. The ability of adaptation to separate ways of life from the forests (%)	45.50	36.50	37.00	50.00	35.00
28. The level of devotion to reserve ways of life “Man and Forest” (%)	52.50	63.50	66.75	55.00	70.00
29. The points of feeling to the abundance of the natural resources in the community area (points, total = 5 points)	3.17	3.23	3.42	3.38	3.40
30. Good opinion / attitude towards the conservation of the community forest resource (points, total = 5 points)	3.76	3.97	3.81	3.70	3.83

3. Community participatory level equation

Equation of deterministic factors towards the community participation level was determined by employing regression analysis community participation level and community deterministic factor level. The equations had high $R^2_{(adj)}$ and significance with p-value lower than 0.05 were chosen.

3.1 Quantitative community participation level model in (Quantitative CPL)

The participation of the community towards natural resource conservation in quantitative dimension is in term of: percent of the participated families, frequency of the participation, size/area of doing activity and budget use which was differed from the factors of each community. It was found the influenced factors towards the level of the participation natural resource conservation for quantitative dimension specific community forests in the Klongtagrao watershed had all of deterministic factors, they are information understanding, information interested, formal leader potential, informal leader potential, and leader potential. Details were shown in table 48.

Table 48 Equation of the deterministic factors which having influenced on the participation in quantitative dimension

Deterministic factors	equation	R^2	$R^2_{(adj)}$	F	p
Information understanding	Quan = -24.0 + 1.18 Inf_u	0.83	0.78	15.05	0.03
Information interested	Quan = -54.0 + 1.56 Inf_i	0.85	0.80	16.95	0.03
Formal leader potential	Quan = -58.1 + 1.77 Lead_for	0.87	0.83	19.82	0.02
Informal leader potential	Quan = -28.9 + 1.71 Lead_inf	0.79	0.72	11.17	0.04
Leader potential	Quan = -53.0 + 1.92 Lead_pot	0.92	0.89	32.89	0.01

The equation of the participation of the community in conservation community factors by stepwise analysis; Alpha-to-enter/remove = 0.10 as follow:

Quantitative CPL = -53.00 + 1.92 Leader potential; $R^2_{(adj)}$ 0.89

3.2 Qualitative community participation level model in (Qualitative CPL)

The participation of the community towards natural resources conservation in qualitative dimension was variation of the activities, good participation, difficulty and case of activities, results of the activities against the conservation, forms of the conservation with the state and push-forward groups. The factors of each community are difference from others. There were 2 factors had influenced in natural resource conservation in quantitative dimension at Klong tagroa watershed namely formal leader potential and leader potential. Significance equations were shown in table 49.

Table 49 Equation of the deterministic factors which having influenced on the participation in quantitative dimension

Deterministic factors	equation	R^2	$R^2_{(adj)}$	F	p
Formal leader potential	Qual = -63.6 + 1.85 Lead_for	0.82	0.76	13.37	0.04
Leader potential	Qual = -57.3 + 2.00 Lead_pot	0.85	0.80	16.62	0.03

Equation of the community participation in qualitative dimension towards natural resource conservation by stepwise analysis; alpha-to-enter/remove = 0.10 is

Qualitative CPL = -57.35 + 2.00 Leader potential; $R^2_{(adj)}$ 0.80

3.3 Transferring community participation level model in (Transferring CPL)

Community participation helped natural resource conservation in transferring dimension as follows: transferred ideas to the whole member of the community or to the young to practice, variation of participated groups, ages and factors of each community. It was found 3 factors had influenced in transferring dimension as follow; information interested, formal leader potential and leader potential. Significance equations were shown in table 50.

Table 50 Equation of the deterministic factors which having influenced on the participation in transferring dimension

Deterministic factors	equation	R^2	$R^2_{(adj)}$	F	p
Information interested	Tran = -47.6 + 1.50 Inf_i	0.78	0.71	10.68	0.05
Formal leader potential	Tran = -54.6 + 1.75 Lead_For	0.85	0.80	16.76	0.03
Leader potential	Tran = -45.6 + 1.83 Lead_Pot	0.83	0.77	14.22	0.03

Equation of the community participation in transferring dimension towards natural resource conservation by stepwise analysis; alpha-to-enter/remove = 0.10 is

Transferring CPL = -54.60 + 1.75 Formal Leader potential; $R^2_{(adj)}$ 0.80

3.4 Community participation level model in (CPL)

Community participation helped natural resource conservation in the whole tri-dimensions including; quantitative, qualitative and transferring dimensions. The points of each one were calculated. It was found 3 important factors which having the influence namely information interested, formal leader potential and leader potential. Significance equations were shown in table 51.

Table 51 Equations of the deterministic factors which having influenced on the community participation level

Deterministic factors	equation	R^2	$R^2_{(adj)}$	F	p
Information interested	CPL = -54.9 + 1.18 Inf_i	0.78	0.70	10.35	0.05
Formal leader potential	CPL = -62.9 + 1.34 Lead_For	0.80	0.74	12.14	0.04
Leader potential	CPL = -58.9 + 1.46 Lead_Pot	0.84	0.79	16.21	0.03

Equation of the community participation towards natural resource conservation by stepwise analysis; alpha-to-enter/remove = 0.10 is

Community participatory level (CPL) = -58.91 + 1.46 Leader potential;
$R^2_{(adj)}$ 0.79

5. Correlation between deterministic factors and community participatory levels

There were five deterministic factors had correlation with the community participation level. Five factors were in quantitative dimension. 2 and 3 ones were in qualitative and transferring dimensions respectively, and consider about CPL including 3 dimensions had 3 factors. It was found leader potential of the community had the highest significance level of the correlation with every dimension. Moreover, the understanding conserved informations, interested in conserve informations, formal leader potential and informal leader potential trend had varied correlation with the level of the participation in each dimension. The details were shown in table 52.

Table 52 Correlation between community's deterministic factors and community participatory levels

Community's deterministic factors	Correlation between CDF and CPL (R^2_{adj})			
	Quantity	Quality	Transferring	3 dimension
Information understanding	0.78	-	-	-
Information interested	0.80	-	0.71	0.70
Formal leader potential	0.83	0.76	0.80	0.74
Informal leader potential	0.72	-	-	-
Leader potential	0.89	0.80	0.77	0.79

In community forest's conservation, 'Leader potential' was significantly related to Community participation level for at least 0.80 in all dimensions. Therefore, 'Leader potential' was selected as 'the community deterministic factor' (CDF) in the equation for predicting CPL model. Using a variety of factors might slightly increase the correlation value, but diminish the degree of freedom. Equation of community participation level towards natural resources reservation in tri-dimensions as follows;

Recommendations

From the study in Klongtagrao watersged leader potential and conservative information obtaining, are crucial factors that apparently influence over the participation level of the community members to conservative cooperation. It is also underline the important of leader potential of formal leader with conservative knowledge, interest in conservative activities and skill to motivate other members to take part in the conservation. Over 20 years since community establishment, the historic and continuing development of conservation has been identified from generation to generation. Thus, if the government needs forest conservative activities to be driven by the community, it should focus on the way to develop those leaders and appoint them to be change-agents on conservation for their own community.

Caution according to the participation of the communities over forest conservation activities consist of 2 portions as following

Internal conflict among the community members from activities performed. Such internal conflict are including forest-resources exploitation and the conflict between formal- and informal- leader on their leading role. In particularly, we found that the community, where formal leader is not a principal person in forest conservation, definitely confronted the problems such as low number of participants and discontinuous participation. Thus the government should not consider only informal leader who interested in establishment of forest conservation. Because the conservative activity without encouragement from formal leader cannot be a sustainable conservation. In long term, the community might encounter the internal conflict within their own community leading to weakening community and unsuccessful conservation.

Result of internal conflict occurs before the fruitful from forest community conservation appeared. Community-based reforestation takes many years before the community-members realize that supplies of forest products are more plentiful. On

the other side, conservative activities and forestland protection can create conflicts within a much shorter time. Thus, it is necessary to prepare the community for forest conservation, point out the negative effect that might occur and long-term benefit that they have to wait for. To generate such well understanding, it needs a leader who earn accurate knowledge in forest management and who can see beyond the great benefit of community-based forest conservation. These are the way of ensuring sustainable forest conservation.

Receiving of conservative information is one of an important factor. Quantity of the information, attention of the community on the information and also the understanding of information received, all of these influence the participation level. Attention and understanding are 2 factors that more influence over the participation level when compared to 'amount' of information distributed. Hence, proper process to transfer information is a factor that should not be overlooked. Efficient information transfer aids the community of building positive attitude and behavior. The 4 things that should be aware over information transferring are as following

1) Source of information: Source of information must be reliable and trusted by the community.

2) Message: frequency information, no matter what format it is, refer to the outcome of behavior change.

3) Audience: Use the information that suitable for the receiver (or audience) regarding the rate of difficulty, experience and interest.

4) Channel: The more information is available, the more effective distribution achieve. The information can be communicated by many channel such as communication between person and person, through broadcasting or through demonstration

There for, to support and provide the channel for conservative information is one of a role of government to facilitating the flow of information among the community. And even better, if we can develop a community leader to be such an announcer which can help elevate the community participation in natural resources

conservation either the one that belong to their own community or larger issue as our nation’s.

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APPENDICES

Appendix A

CPL evaluation form

แบบให้คะแนนเชิงปริมาณ ระดับการมีส่วนร่วมของชุมชนในการอนุรักษ์ทรัพยากรป่าชุมชน

1) เปอร์เซ็นต์ของครัวเรือนที่เข้าร่วมกิจกรรมด้านการอนุรักษ์ (โดยเฉพาะป่าชุมชน)
ไม่มีครัวเรือนเข้าร่วม ครัวเรือนเข้าร่วมทั้งหมด

0% 20% 40% 60% 80% 100%

2) ความถี่ของการดำเนินกิจกรรมด้านการอนุรักษ์ที่จัดขึ้นในชุมชน (ประชุม จนถึงการปฏิบัติ)
ไม่มีเลย นานๆ ตามการผลักดัน ตามความจำเป็น ประจำ ส่วนหนึ่งของวิถีชุมชน

0% 20% 40% 60% 80% 100%

3) ขนาดของการดำเนินกิจกรรมด้านการอนุรักษ์ ครอบคลุมพื้นที่สำหรับการอนุรักษ์หรือไม่
บางส่วน/สัญลักษณ์ ในพื้นที่วิกฤตที่ต้องได้รับการควบคุม/ฟื้นฟู ทั่วทั้งพื้นที่

0% 20% 40% 60% 80% 100%

4) การดำเนินกิจการต้องพึ่งพางบประมาณในการดำเนินการจากแหล่งใด
งบภายนอกเป็นหลัก งบ อปท. เพียงพอโดยการบริจาคในชุมชน มีกองทุนมั่นคง

0% 20% 40% 60% 80% 100%

5) ในรอบปีที่ผ่านมาดำเนินกิจกรรมอะไรบ้าง

5.1) กิจกรรม ..... จำนวน .....ครั้ง

5.2) กิจกรรม ..... จำนวน ..... ครั้ง

5.3) กิจกรรม ..... จำนวน ..... ครั้ง

5.4) กิจกรรม ..... จำนวน ..... ครั้ง

5.5) กิจกรรม ..... จำนวน ..... ครั้ง

แบบให้คะแนนเชิงการถ่ายทอด ระดับการมีส่วนร่วมของชุมชนในการอนุรักษ์ทรัพยากรป่าชุมชน

1) สามารถส่งต่อแนวความคิด ความรู้ ทัศนคติ ไปยังสมาชิกชุมชน ยกเว้นวัยเยาวชน

ไม่ได้เลย ทั่วชุมชน

0% 20% 40% 60% 80% 100%

2) สามารถส่งต่อแนวความคิด ความรู้ ทัศนคติไปยังเยาวชนของชุมชน

ไม่ได้เลย ทั้งหมด

0% 20% 40% 60% 80% 100%

3) จากสภาพการณ์ในปัจจุบัน โอกาสที่จะเพิ่มจำนวนสมาชิกในการทำกิจกรรมด้านการอนุรักษ์

ไม่มี ต่ำมาก ต่ำ ปานกลาง สูง สูงมาก ทั้งชุมชน

0% 20% 40% 60% 80% 100%

4) จากสภาพการณ์ในปัจจุบัน โอกาสที่เยาวชนจะรับเอาแนวคิดในการทำกิจกรรมด้านการอนุรักษ์ไปปฏิบัติต่ออย่างยั่งยืน

ไม่มี ต่ำมาก ต่ำ ปานกลาง สูง สูงมาก ทั้งชุมชน

0% 20% 40% 60% 80% 100%

5) สมาชิกที่เข้าร่วมกิจกรรมด้านการอนุรักษ์ประกอบด้วยสมาชิกกลุ่มใดบ้าง

ไม่มี กลุ่มเดียว (กรรมการ) ทุกกลุ่มเข้าร่วม

0% 20% 40% 60% 80% 100%

6) สมาชิกที่เข้าร่วมกิจกรรมอนุรักษ์ประกอบด้วยวัยใด (ยุวชน เยาวชน หนุ่มสาว กลางคน สูงอายุ)

ไม่มี วัยเดียว มีหลายวัยเข้าร่วม ทุกวัยเข้าร่วม

0% 20% 40% 60% 80% 100%

แบบให้คะแนนเชิงคุณภาพระดับการมีส่วนร่วมของชุมชนในการอนุรักษ์ทรัพยากรป่าชุมชน

1) ความหลากหลายของประเภทการทำกิจกรรมด้านการอนุรักษ์ป่าชุมชนสูงหรือต่ำอย่างไร

ไม่มีกิจกรรม กิจกรรมเดียว ความหลากหลายสูงมาก

0% 20% 40% 60% 80% 100%

2) ในภาพรวมชุมชนการเข้าร่วมกิจกรรมของสมาชิกเกิดจากความสมัครใจในระดับใด

ไม่มีผู้เข้าร่วม บังคับ ต้องชักชวน เกรงใจ สมัครใจ เสนอตัว เสนอตัว+ทุ่มเท

0% 20% 40% 60% 80% 100%

3) ในภาพรวมชุมชนของท่านสามารถเข้าร่วมกิจกรรมด้านอนุรักษ์ที่ยากหรือง่ายในระดับใด

ไม่มีกิจกรรม ง่าย/เสร็จในครั้งเดียว ปานกลาง/ใช้เวลาพอสมควร ยาก/ต้องใช้เวลามาก

0% 20% 40% 60% 80% 100%

4) กิจกรรมด้านการอนุรักษ์ที่ชุมชนทำมีผลต่อทรัพยากรอย่างไร

ไม่มีผล สัญลักษณ์/สร้างจิตสำนึก ควบคุม/ป้องกันความเสียหาย ฟื้นฟูพื้นที่สู่ความสมบูรณ์

0% 20% 40% 60% 80% 100%

5) การมีส่วนร่วมกับภาครัฐในการดำเนินกิจกรรมด้านการอนุรักษ์ของชุมชนท่านอยู่ในรูปแบบใด

ไม่มี รัฐเป็นแกนชุมชนเข้าร่วม เสมอภาคดำเนินการร่วมกัน ชุมชนเป็นแกนรัฐเข้าร่วม

0% 20% 40% 60% 80% 100%

6) ในภาพรวมการดำเนินกิจกรรมด้านการอนุรักษ์กลุ่มใดเป็นผู้ผลักดัน หรือดำเนินการหลัก

ไม่มี ผู้นำ คณะกรรมการ ทุกคนร่วมกันผลักดัน

0% 20% 40% 60% 80% 100%

แบบให้คะแนนระดับความสำเร็จ ในการอนุรักษ์ทรัพยากรป่าชุมชน

1) เปอร์เซ็นต์ความสำเร็จในการฟื้นฟูทรัพยากรป่าไม้ เมื่อเทียบกับเวลาที่ได้ดำเนินการมา

ไม่สำเร็จเลย ป่าไม้สมบูรณ์ตามคาด สมบูรณ์เกินคาด

0% 20% 40% 60% 80% 100%

2) เปอร์เซนต์ความสำเร็จในการอนุรักษ์สัตว์ป่า เมื่อเทียบกับเวลาที่ได้ดำเนินการมา

ไม่สำเร็จเลย สัตว์ป่าสมบูรณ์ตามคาด สมบูรณ์เกินคาด

0% 20% 40% 60% 80% 100%

3) เปอร์เซ็นต์ความสำเร็จในการฟื้นฟูทรัพยากรอาหารธรรมชาติ เทียบกับเวลาที่ดำเนินการมา

ไม่สำเร็จเลย อาหารธรรมชาติสมบูรณ์ตามคาด สมบูรณ์เกินคาด

0% 20% 40% 60% 80% 100%

4) เปอร์เซ็นต์ความสำเร็จในการฟื้นฟูทรัพยากรเพื่อการใช้สอย เทียบกับเวลาที่ดำเนินการมา

ไม่สำเร็จเลย ทรัพยากรเพื่อการใช้สอยจากป่าสมบูรณ์ตามคาด สมบูรณ์เกินคาด

0% 20% 40% 60% 80% 100%

5) เปอร์เซ็นต์ความสำเร็จในการสร้างจิตสำนึกที่ดีของชุมชนในการอนุรักษ์ทรัพยากรธรรมชาติ เทียบกับเวลาที่ดำเนินการมา

ไม่สำเร็จเลย จิตสำนึกของชุมชนดีขึ้นตามคาด ดีขึ้นเกินคาด

0% 20% 40% 60% 80% 100%

6) เปอร์เซ็นต์ความสำเร็จในการสร้างให้ชุมชนดำเนินการอนุรักษ์ทรัพยากรธรรมชาติ (ป่าชุมชน) เทียบกับเวลาที่ดำเนินการมา

ไม่สำเร็จเลย ต้องกระตุ้นตลอด ต้องกระตุ้นบ้าง ดำเนินการเอง (อัตโนมัติ)

0% 20% 40% 60% 80% 100%

Appendix B

Household questionnaire

แบบสอบถามประกอบการสัมภาษณ์

การศึกษาปัจจัยที่มีอิทธิพลกำหนดระดับความมีส่วนร่วมของชุมชนในการอนุรักษ์
ทรัพยากรธรรมชาติ ของพื้นที่ลุ่มน้ำคลองตะเกรา

ชื่อผู้ให้สัมภาษณ์ (นาย/นาง/นางสาว)…….....
บ้านเลขที่……..ชื่อหมู่บ้าน……หมู่ที่……ตำบล……
อำเภอ ..... จังหวัด .....
สัมภาษณ์และตรวจทานแบบสอบถามโดย……

ตอนที่ 1 ข้อมูลทั่วไปของผู้ตอบแบบสอบถาม

1. เพศ

( ) 1. ชาย ( ) 2. หญิง

2. อายุ ในปัจจุบัน .....ปี

3. ศาสนา

( ) 1. พุทธ ( ) 2. คริสต์ ( ) 3. อิสลาม

( ) 4. นับถือผี ( ) 5. อื่นๆ (ระบุ) .....

4. สถานภาพการสมรส

( ) 1. สมรสและอยู่ด้วยกัน ( ) 2. สมรสแต่แยกกันอยู่ ( ) 3. โสด

( ) 4. หย่า/ม่าย ( ) 5. อื่นๆ (ระบุ) .....

5. สถานภาพในครัวเรือน

( ) 1. หัวหน้าครัวเรือน ( ) 2. คู่สมรสของหัวหน้าครัวเรือน

( ) 3. สมาชิกในครัวเรือน

6. ระดับการศึกษาสูงสุดของท่าน

( ) 1. ไม่ได้ศึกษา ( ) 2. ประถมศึกษา

( ) 3. มัธยมศึกษาตอนต้น ( ) 4. มัธยมศึกษาตอนปลาย/ปวช.

( ) 5. อนุปริญญา/ปวส. ( ) 6. ปริญญาตรี

( ) 7. สูงกว่าปริญญาตรีขึ้นไป

7. ลักษณะบ้านเรือน (ผู้สัมภาษณ์เป็นผู้ประเมินจากการสังเกต หรือสัมภาษณ์)

( ) 1. ชั่วคราว (สภาพบ้านไม่มั่นคง, ใช้วัสดุไม่ถาวรเช่น ไม้ไผ่ มุงหญ้าคา)

( ) 2. กึ่งถาวร (สภาพบ้านมีความมั่นคง แต่มีการก่อสร้างที่ยังไม่เสร็จสมบูรณ์)

( ) 3. ถาวร (สภาพบ้านมั่นคง ใช้วัสดุที่ถาวร การก่อสร้างสมบูรณ์)

ตอนที่ 2 ระยะเวลาในการตั้งถิ่นฐาน และความผูกพันกับท้องถิ่น

1. ระยะเวลาที่อาศัยในหมู่บ้านนี้ ……..ปี

2. ภูมิลำเนาเดิมของท่าน

( ) เป็นคนที่หมู่บ้านนี้มาแต่กำเนิด (ข้ามไปทำข้อ 11)

( ) อพยพย้ายมาจากที่อื่น (โปรดระบุ….)

( ) หมู่บ้านอื่นๆ ในตำบลนี้ ( ) ตำบลอื่นๆ ในอำเภอนี้

( ) อำเภออื่นๆ ในจังหวัดนี้

( ) จังหวัดอื่นๆ ในภาคตะวันออก

( ) จังหวัดอื่นๆ ในภาคกลาง ( ) จังหวัดอื่นๆ ในภาคเหนือ

( ) จังหวัดอื่นๆ ในภาคอีสาน ( ) จังหวัดอื่นๆ ในภาคใต้

( ) ต่างประเทศ ( ) อื่นๆ (ระบุ)……

3. สาเหตุของการการอพยพได้แก่

( ) 1. ต้องการจับจองที่ดินทำกินใหม่ ( ) 2. มาซื้อที่ดินทำกินในหมู่บ้าน

( ) 3. แต่งงานกับคนในหมู่บ้านนี้ ( ) 4. ญาติพี่น้องหรือเพื่อนบ้านชวนมา

( ) 5. การคมนาคมสะดวกขึ้น ( ) 6. ใกล้สถานที่ทำงาน

( ) 7. อยู่ที่เดิมขัดแย้งกับคนอื่น ( ) 8. อื่นๆ (ระบุ) ……..

4. ความรู้สึก เป็นส่วนหนึ่งของชุมชน ความผูกพัน และความรักถิ่นฐานของท่านหรือครอบครัวท่าน

4.1) รู้สึกเหมือนที่นี่เป็นบ้านเกิด ——————— เป็นคนของที่อื่น

100% 50% 0%

4.2) ตั้งถิ่นฐานมั่นคงจนตายที่นี่ ——————— ไม่อยากอยู่ที่นี่เลย

100% 50% 0%

4.3) รัก/ผูกพันที่นี่มากที่สุด ——————— ไม่รู้สึกรัก/ผูกพันเลย

100% 50% 0%

<u>ตอนที่ 3</u> การประกอบอาชีพ

1) อาชีพหลักของครัวเรือนของท่าน

( ) 1. รับราชการ/รัฐวิสาหกิจ ( ) 2. พนักงานในบริษัทเอกชน

( ) 3. ธุรกิจส่วนตัว ( ) 4. ค้าขาย ( ) 5. ให้บริการด้านการท่องเที่ยว

( ) 6. ทำนา ( ) 7. ทำไร่ ( ) 8. ทำสวน

( ) 9. เลี้ยงสัตว์ ( ) 10.เพาะเลี้ยงสัตว์น้ำ ( ) 11. ประมง

( ) 12. เก็บหาของป่า ( ) 13. ล่าสัตว์ป่า ( ) 14. รับจ้างทั่วไป

( ) 15. รับจ้างในโรงงานอุตสาหกรรม ( ) 16. ลูกจ้างของหน่วยงานราชการ

( ) 17. ลูกจ้างหน่วยงานอนุรักษ์ (เขตรักษาพันธุ์ฯ/ป่าสงวนฯ/ไฟป่า)

( ) 18. อื่นๆ (ระบุ)……

2) อาชีพรองหรืออาชีพเสริมของครัวเรือนของท่าน (ตอบได้มากกว่า 1 ข้อ)

( ) *ไม่มีอาชีพรอง*

( ) 1. รับราชการ/รัฐวิสาหกิจ ( ) 2. พนักงานในบริษัทเอกชน

( ) 3. ธุรกิจส่วนตัว ( ) 4. ค้าขาย ( ) 5. ให้บริการด้านการท่องเที่ยว

( ) 6. ทำนา ( ) 7. ทำไร่ ( ) 8. ทำสวน

( ) 9. เลี้ยงสัตว์ ( ) 10.เพาะเลี้ยงสัตว์น้ำ ( ) 11. ประมง

( ) 12. เก็บหาของป่า ( ) 13. ล่าสัตว์ป่า ( ) 14. รับจ้างทั่วไป

( ) 15. รับจ้างในโรงงานอุตสาหกรรม ( ) 16. ลูกจ้างของหน่วยงานราชการ

( ) 17. ลูกจ้างหน่วยงานอนุรักษ์ (เขตรักษาพันธุ์ฯ/ป่าสงวนฯ/ไฟป่า)

( ) 18. อื่นๆ (ระบุ).....

<u>ตอนที่ 4</u> รายได้ และรายจ่าย

รายได้รายเฉลี่ยเดือนของทั้งครัวเรือน ..... บาท/เดือน

รายจ่ายเฉลี่ยรายเดือนของทั้งครัวเรือน ..... บาท/เดือน

ครัวเรือนของท่านมีหนี้สิน เป็นจำนวน..... บาท

ครัวเรือนของท่านมีเงินออม เป็นจำนวน ..... บาท

ครัวเรือนของท่านมีรายได้เพียงพอกับรายจ่ายหรือไม่

( ) เพียงพอเหลือเก็บ ( ) รายจ่ายรายได้พอดีกัน ( ) ไม่พอเพียง

อัตราส่วนรายได้ : รายจ่ายรายเดือน	= .....
อัตรส่วนเงินออม : รายได้	= .....
อัตราส่วนหนี้สิน : รายได้	= .....

<u>ตอนที่ 5</u> ความสัมพันธ์ระหว่างท่านหรือสมาชิกในครัวเรือน กับเจ้าหน้าที่อนุรักษ์

1) ท่านเคยกระทำผิดกฎหมายเพื่อการอนุรักษ์ทรัพยากรป่าไม้ และสัตว์ป่าหรือไม่

( ) ไม่เคย ( ) นานๆ ครั้ง ( ) บ่อยครั้ง ( ) เป็นประจำ

2) ท่านเคยถูกเจ้าหน้าที่ด้านการอนุรักษ์ ว่ากล่าวตักเตือนเรื่องการทำผิดกฎหมายหรือไม่

( ) ไม่เคย ( ) นานๆ ครั้ง ( ) บ่อยครั้ง ( ) เป็นประจำ

3) ท่านเคยถูกจับกุม ดำเนินคดีในการทำผิดกฎหมายด้านการอนุรักษ์หรือไม่

( ) ไม่เคย ( ) เคย

4) ความสัมพันธ์ระหว่างท่าน/ครัวเรือนของท่านกับเจ้าหน้าที่ด้านการอนุรักษ์อยู่ในระดับใด

ดีมาก (เสนอตัวร่วมงาน) ดี (ยินดีร่วมมือ) ธรรมดา ไม่ดี (ไม่คบค้า) ไม่ดีมาก (เกลียด)

100% **50%** **0%**

<u>ตอนที่ 6</u> ข้อมูลสมาชิกในครัวเรือน (นับเฉพาะสมาชิกที่อาศัยอยู่กับครัวเรือนมากกว่า 6 เดือน/ปี)

จำนวนสมาชิกในครัวเรือนท่าน ..... คน (รวมตัวผู้ให้สัมภาษณ์) เป็นชาย ..... คน หญิง ..... คน

เพศชาย

คนที่	อายุ	สถานภาพทั่วไป (√)				สถานภาพทางสังคมโดยเฉพาะด้านการอนุรักษ์ (√)							การเข้าร่วมกิจกรรมอนุรักษ์ทรัพยากรฯ (√)				
		ศึกษา*	เกษตร	รับจ้างทั่วไป	งานประจำ	ผู้นำชุมชน	ผู้นำกลุ่มอนุรักษ์	ผู้นำความคิด	นักการเมือง	หน่วยงานอนุรักษ์	สมาชิกกลุ่มอนุฯ	สมาชิกชุมชน	ประจำ	บ่อยๆ	ปานกลาง	บางครั้ง	ไม่ร่วม
1																	
2																	
3																	
4																	
5																	
6																	

เพศหญิง

คนที่	อายุ	สถานภาพทั่วไป (√)				สถานภาพทางสังคมโดยเฉพาะด้านการอนุรักษ์ (√)							การเข้าร่วมกิจกรรมอนุรักษ์ทรัพยากรฯ (√)				
		ศึกษา*	เกษตร	รับจ้างทั่วไป	งานประจำ	ผู้นำชุมชน	ผู้นำกลุ่มอนุรักษ์	ผู้นำความคิด	นักการเมือง	หน่วยงานอนุรักษ์	สมาชิกกลุ่มอนุฯ	สมาชิกชุมชน	ประจำ	บ่อยๆ	ปานกลาง	บางครั้ง	ไม่ร่วม
1																	
2																	
3																	
4																	
5																	
6																	

<u>หมายเหตุ</u> *ให้ใส่รหัสระดับการศึกษาของสมาชิกทุกคนในช่องศึกษาด้วย

1; ไม่ได้ศึกษา 2; ประถมศึกษา 3; มัธยมต้น 4; มัธยมปลาย/ปวช 5; อนุปริญญา/ปวส. 6; ปริญญาตรี 7; สูงกว่าปริญญาตรี

ตอนที่ 7 การได้รับข่าวสารในการจัดการ

1) ท่านเคยได้รับข้อมูลข่าวสารเกี่ยวกับการอนุรักษ์ทรัพยากรธรรมชาติต่างๆ ในพื้นที่ของชุมชน หรือพื้นที่ใกล้เคียงหรือไม่

( ) 1. ไม่เคย

( ) 2. เคย จากแหล่งใด (ตอบได้มากกว่า 1 ข้อ)

( ) 2.1โทรทัศน์ ( ) 2.2 หนังสือพิมพ์ ( ) 2.3 วิทยุ

( ) 2.4 จากเอกสารเผยแพร่/แผ่นพับ ( ) 2.5 องค์กรเอกชน

( ) 2.6 จากการประชุมหรือทำกิจกรรมร่วมกับภาครัฐ

( ) 2.7 จากการแจ้ง/บอกเล่าจากเจ้าหน้าที่อุทยานฯ/เขตรักษาพันธุ์สัตว์ป่า

( ) 2.8 จากการบอกกล่าวของเพื่อนบ้าน/สมาชิกในครัวเรือน

( ) 2.9 จากผู้นำชุมชน

( ) 2.10 อื่นๆ (ระบุ).....

2) ครัวเรือนของท่านได้รับข่าวสารด้านการอนุรักษ์ทรัพยากรธรรมชาติโดยชุมชนของท่านบ่อยครั้งแค่ไหน

ได้รับทุกครั้ง ——————————— ไม่ได้รับเลย

100% 50% 0%

3) ครัวเรือนของท่านเข้าใจข้อมูลข่าวสารด้านการอนุรักษ์ทรัพยากรธรรมชาติโดยชุมชนของท่านหรือไม่

เข้าใจชัดเจนทุกประเด็น ——————————— ไม่เข้าใจเลย

100% 50% 0%

4) ครัวเรือนของท่านสนใจข่าวสารเกี่ยวกับการอนุรักษ์ทรัพยากรธรรมชาติต่างๆ โดยชุมชนของท่านหรือไม่

สนใจมาก/ขวนขวาย สนใจเฉพาะที่มีคนมาบอก ไม่สนใจเลย

——————————

100% 50% 0%

5) ท่านคิดว่าการสื่อสารภายในชุมชนของท่านมีประสิทธิภาพในการกระจายข้อมูลข่าวสาร และความรู้ให้กับสมาชิกในชุมชนได้มากน้อยเพียงใด

ประสิทธิภาพสูงมาก กระจายข่าวอย่างทั่วถึง ครบถ้วนและชัดเจนไปยังทุกครัวเรือน ——————————— ไม่มีประสิทธิภาพเลย / ไม่สามารถสื่อสารข้อมูลภายในชุมชนได้เลย

100% 50% 0%

<u>ตอนที่ 8</u> การใช้ประโยชน์จากทรัพยากรธรรมชาติ ของป่าชุมชน หรือพื้นที่ใกล้เคียง

1) ท่านหรือครัวเรือนของท่านได้ใช้ประโยชน์ “ของป่าจากป่าชุมชนเพื่อการบริโภค” ในระดับใด

เก็บหาเพื่อขายเป็นรายได้อย่างเป็นกอบเป็นกำ	ใช้เป็นอาหารในครัวเรือนประจำ/บ่อยครั้ง	เก็บหาบ้างนานๆ ครั้ง	ไม่ได้ใช้ประโยชน์เลย
100%	50%		0%

ชนิดของป่าที่เก็บหา (ระบุ) .....

2) ท่านหรือครัวเรือนของท่านได้ใช้ประโยชน์ “ของป่าจากป่าชุมชนเพื่อการใช้สอย ในระดับใด

เก็บหาเพื่อขายเป็นรายได้อย่างเป็นกอบเป็นกำ	เป็นวัสดุหลักในการใช้สอยในครัวเรือน/ใช้ประจำ	นานๆ จะใช้สักครั้ง	ไม่ได้ใช้ประโยชน์เลย
100%	50%		0%

ชนิดของป่าที่เก็บหามาใช้สอย (ระบุ) .....

3) ท่านหรือครัวเรือนของท่านได้ใช้ประโยชน์ “เนื้อไม้จากป่าชุมชนเพื่อการก่อสร้าง” ในระดับใด

ขายเป็นรายได้อย่างเป็นกอบเป็นกำ	เป็นวัสดุหลักในการก่อสร้างของครัวเรือน	นานๆ จะใช้สักครั้ง	ไม่ได้ใช้ประโยชน์เลย
100%	50%		0%

ใช้ประโยชน์เพื่อ (ระบุ) .....

4) ท่านหรือครัวเรือนของท่านได้ใช้ประโยชน์จากเนื้อสัตว์ป่าเพื่อการบริโภค ในระดับใด

ขายเป็นรายได้อย่างเป็นกอบเป็นกำ	บริโภคในครัวเรือนเป็นประจำ	นานๆ จะบริโภคสักครั้ง	ไม่ได้บริโภคหรือใช้ประโยชน์ใดๆ เลย
100%	50%		0%

เนื้อสัตว์ป่าที่บริโภค/ใช้ประโยชน์ (ระบุ) .....

5) ท่านหรือครัวเรือนของท่านได้ใช้ประโยชน์จากทรัพยากรสัตว์น้ำจากแหล่งน้ำธรรมชาติ ในระดับใด

ขายเป็นรายได้อย่างเป็นกอบเป็นกำ	บริโภคเป็นประจำ	นานๆ จะบริโภคสักครั้ง	ไม่ได้ใช้ประโยชน์เลย
100%	50%		0%

สัตว์น้ำที่บริโภค/ใช้ประโยชน์ (ระบุ) .....

6) ท่านหรือครัวเรือนของท่านได้รับประโยชน์จากการท่องเที่ยวในแหล่งท่องเที่ยวธรรมชาติที่เกี่ยวเนื่องกับทรัพยากรป่าไม้/ป่าชุมชน หรือไม่ระดับใด

เป็นอาชีพหลัก/รายได้หลักของครัวเรือน	เป็นอาชีพรอง/รายได้เสริมที่สำคัญของครัวเรือน	มีส่วนเพิ่มรายได้ให้บ้างเป็น	ไม่ได้รับประโยชน์เลย
100%	50%		0%

แหล่งท่องเที่ยวที่ให้ประโยชน์ คือ .....

7) ท่าน/ครัวเรือนของท่านได้รับ<u>ประโยชน์ทางอ้อม</u>จากการจัดการป่าชุมชนให้กลับเป็นป่าเพื่อการใช้สอยที่สมบูรณ์ หรือไม่ (เช่น มีทรัพยากรน้ำเพิ่มขึ้น คุณภาพอากาศดีขึ้น ทัศนียภาพ/วิว ความสุขใจ ฯลฯ)

ได้รับอย่างชัดเจนเต็มที่	ได้รับพอสมควร	ได้รับบ้างแต่ไม่ชัดเจนนัก	ไม่ได้รับประโยชน์เลย
100%	50%		0%

8) โดยสรุปครัวเรือนของท่านได้รับประโยชน์ หรือ<u>ต้องการพึ่งพิง</u>ทรัพยากรจากป่าชุมชน ในระดับใด

ต้องการมาก/ขาดป่าชุมชนไม่ได้	ต้องการพอสมควร/ช่วยให้คุณภาพชีวิตดีขึ้น/ลดรายจ่ายของครัวเรือนอย่างชัดเจน	ต้องการบ้างแต่ไม่จำเป็นต้องพึ่งพิง	ไม่ต้องการ/ไม่พึ่งพิงเลย
100%	50%		0%

ตอนที่ 9 ศักยภาพผู้นำ

1) ท่านคิดว่าผู้นำที่เป็นทางการ เช่น ผู้ใหญ่บ้าน สมาชิก อบต. มีอิทธิพล/ความสามารถในการชักจูงหรือโน้มน้าวใจให้สมาชิกในชุมชนเข้าร่วมอนุรักษ์ป่าชุมชน ในระดับใด

มีสูงมาก/ชักชนคนทั้งชุมชนให้เข้าร่วมอนุรักษ์ได้	มีมาก	ปานกลาง	มีน้อย	ไม่มีเลย/ชักจูงใคร
100%		50%		0%

2) ท่านคิดว่าผู้นำที่เป็นทางการ มีความสนใจในการอนุรักษ์ป่าชุมชน ในระดับใด

มีสูงมาก/กระตือรือร้น/สนใจงานด้านป่าชุมชนมาก	สนใจมาก	ปานกลาง	สนใจน้อย	ไม่สนใจเลย/ไม่ทำ/ไม่ส่งเสริม
100%		50%		0%

3) ท่านคิดว่าผู้นำที่เป็นทางการ มีความสามารถ ความรู้ ความเข้าใจ หรือศักยภาพในการอนุรักษ์/บริหารจัดการป่าชุมชนอย่างถูกต้อง ในระดับใด

มีสูงมาก/มีความเชี่ยวชาญเข้าใจอย่างถ่องแท้	มีมาก	ปานกลาง	มีบ้าง	ไม่มีเลย
100%		50%		0%

4) ท่านคิดว่าผู้นำที่ไม่เป็นทางการ เช่น ผู้นำทางความคิด ปราชญ์ชาวบ้าน มีอิทธิพลในการชักจูงให้สมาชิกในชุมชนเข้าร่วมอนุรักษ์ทรัพยากรธรรมชาติ หรือป่าชุมชนในระดับใด

มีสูงมาก/ชักชนคนทั้งชุมชนให้เข้าร่วมอนุรักษ์ได้	มีมาก	ปานกลาง	มีน้อย	ไม่มีเลย/ชักจูงใครไม่ได้เลย
100%		50%		0%

5) ผู้นำที่ไม่เป็นทางการ <u>มีความสนใจ</u>ในการอนุรักษ์ทรัพยากรธรรมชาติ หรือป่าชุมชนในระดับใด

มีสูงมาก/กระตือรือร้น และสนใจงานด้านป่าชุมชนมาก	สนใจมาก	ปานกลาง	สนใจน้อย	ไม่สนใจเลย/ไม่ทำ/ไม่ส่งเสริม
100%		50%		0%

6) ผู้นำที่ไม่เป็นทางการ <u>มีความสามารถ ความรู้ ความเข้าใจ หรือศักยภาพ</u>ในการอนุรักษ์ทรัพยากรธรรมชาติ หรือป่าชุมชนในระดับใด

มีสูงมาก/มีความเชี่ยวชาญเข้าใจอย่างถ่องแท้	มีมาก	ปานกลาง	มีบ้าง	ไม่มีเลย
100%		50%		0%

<u>ตอนที่ 10</u> การถูกชักชวน และวิถีชีวิต

1) การที่ท่านเห็นสมาชิกในชุมชนของท่านเข้าร่วมทำกิจกรรมด้านการอนุรักษ์ป่าชุมชนมีผลให้ท่านอยากเข้าร่วมกิจกรรมด้านการอนุรักษ์ร่วมกับชุมชนหรือไม่

มีผลทำให้อยากเข้าร่วมโดยไม่ลังเลใจ — ไม่มีผลเลย

100% — 50% — 0%

2) ท่านหรือครัวเรือนของท่านเคยถูกชักชวนให้เข้าร่วมทำกิจกรรมด้านการอนุรักษ์ป่าชุมชน หรือทรัพยากรของชุมชนหรือไม่

( ) ไม่เคยถูกชักชวน

( ) เคยถูกชักชวน โดย (ตอบได้มากกว่า 1 คำตอบ)

( ) ผู้ใหญ่บ้าน/กำนัน ( ) นักการเมืองท้องถิ่น ( ) เพื่อนบ้านใกล้เคียง

( ) ผู้นำไม่เป็นทางการ (ผู้นำทางความคิด ปราชญ์ชาวบ้าน ผู้ใหญ่ที่นับถือ)

( ) สมาชิกในชุมชน ( ) กรรมการป่าชุมชน ( ) เจ้าหน้าที่ด้านอนุรักษ์

( ) กรรมการกลุ่มองค์กรอนุรักษ์ในชุมชน ( ) นักวิชาการ

( ) หน่วยราชการอื่นๆ ( ) องค์กรพัฒนาเอกชน ( ) อื่นๆ .....

3) วิถีชีวิตของท่าน/ครัวเรือนท่านมีความผูกพันกับป่า ในระดับใด

ป่าเป็นส่วนสำคัญของวิถีชีวิต — ป่าเป็นส่วนหนึ่งของวิถีชีวิตปกติของท่าน — ไม่ผูกพันเลย

100% — 50% — 0%

4) หากวิถีชีวิตของท่าน/ครัวเรือนของท่าน ต้องเปลี่ยนไปจากคนที่ใช้ชีวิตผูกพันกับป่าไปเป็นรูปแบบที่ถูกแยกขาดออกจากป่า ท่านคิดว่าครัวเรือนของท่านจะสามารถปรับตัวได้ดีหรือไม่

อยู่ไม่ได้ — อยู่ได้แต่ไม่มีความสุข — สามารถทนได้ — ต้องมีการปรับตัว — ปรับเปลี่ยนได้ดีมาก/เฉยๆ

100% — 50% — 0%

5) ท่าน/ครอบครัวของท่านจะทุ่มเทในระดับใดเพื่อการรักษาวิถีชีวิตของคนที่ผูกพันกับป่าในปัจจุบัน (เช่น ทรัพย์สิน การต่อสู้ หรือแม้แต่ชีวิต)

ทุ่มเทหมดทุกอย่าง — ทุ่มเทมาก — ทุ่มเทเท่าที่ไม่เดือดร้อนกับตนเอง — ทุ่มเทบ้าง — ไม่ทุ่มเทเลย/เพิกเฉย/ไม่เกี่ยว

100% — 50% — 0%

<u>ตอนที่ 11</u> ความสมบูรณ์ของลุ่มน้ำ หรือ ความสมบูรณ์ของทรัพยากร

ท่านคิดว่าทรัพยกรธรรมชาติของชุมชนที่ท่านอาศัยอยู่มีความสมบูรณ์หรือไม่ระดับใด (√ ระดับที่ต้องการ)

ประเด็นทรัพยากร	ความสมบูรณ์/พอเพียง/เกณฑ์ดี				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	น้อยที่สุด (1)
1) คุณภาพดิน					
2) ปริมาณที่ดิน					
3) การชะล้างของหน้าดิน/ตะกอนในแหล่งน้ำ					
4) คุณภาพน้ำในแหล่งน้ำที่นำมาใช้ประโยชน์					
5) ปริมาณน้ำเพื่อการบริโภค					
6) ปริมาณน้ำเพื่อการอุปโภค					
7) ปริมาณน้ำเพื่อการเกษตร					
6) น้ำหลาก/น้ำท่วม					
7) ภัยแล้ง					
8) ความสมบูรณ์ของป่าไม้					
9) ของป่าที่สามารถเก็บหาเพื่อการบริโภค (ผัก เห็ด หน่อไม้ น้ำผึ้ง ไข่มดแดง ฯลฯ)					
10) ของป่าที่เก็บมาเพื่อการใช้สอย (ไม้เพื่อการก่อสร้าง ไม้ฟืน ไม้ไผ่ ชัน ยาง ฯลฯ)					
11) ความชุกชุมของสัตว์ป่า					
12) ความหลากหลายทางชนิดพันธุ์สัตว์ป่า					
13) ความชุกชุมของสัตว์น้ำ					
14) ความหลากหลายทางชนิดพันธุ์สัตว์น้ำ					
15) ความสวยงาม/ทัศนียภาพ/แหล่งท่องเที่ยวหรือพักผ่อนหย่อนใจ					
17) <u>โดยสรุปท่านคิดว่าทรัพยากรในชุมชนของท่านมีความสมบูรณ์หรือไม่</u>					
16) ทรัพยากรอื่นๆ					

หมายเหตุ ตัวอักษรปกติ เป็นข้อความเชิงบวก *ตัวหนังสือเอนเป็นข้อความเชิงลบ*

<u>ตอนที่ 12</u> ทัศนคติต่อความสำคัญของทรัพยากรป่าชุมชน

ประเด็นทัศนคติ	ความคิดเห็น				
	เห็นด้วยมาก (5)	เห็นด้วย (4)	เฉย ๆ (3)	ไม่เห็นด้วย (2)	ไม่เห็นด้วยมาก (1)
1) ป่าไม้เป็นทรัพยากรของทุกคน ไม่ควรมีใครยึดครอง					
2) การบุกรุกทำลายป่าไม้ เป็นความผิดที่ร้ายแรง					
3) ถ้าหากไม่มีป่าไม้แล้วจะทำให้เกิดสภาพแห้งแล้ง					
4) การอนุรักษ์ทรัพยากรป่าไม้เป็นหน้าที่ของท่านด้วย					
5) ชุมชนของท่านมีหน้าที่ต้องดูแลป่าไม้ในบริเวณชุมชนให้คงความอุดมสมบูรณ์ตลอดไป					
6) การอนุรักษ์ป่าชุมชนเพื่อการใช้ประโยชน์ร่วมกันของคนในชุมชน					
7) การอนุรักษ์ป่าชุมชนจะทำให้ทรัพยากรต่าง ๆ ดีตามไปด้วย (เช่น ปริมาณน้ำ คุณภาพอากาศ)					
8) ป่าชุมชนเป็นแหล่งอาหารที่<u>สำคัญ</u>ของชุมชน					
9) ป่าชุมชนเป็นแหล่งทรัพยากรที่สำคัญสำหรับการดำรงชีวิตของคนในชุมชน (ไม้ฟืน เนื้อไม้)					
10) ป่าชุมชนเป็นแหล่งวัตถุดิบที่สำคัญในการสร้างผลิตภัณฑ์ของชุมชน					
11) ป่าชุมชนเป็นแหล่งสมุนไพรที่สำคัญของชุมชน					
12) การอนุรักษ์ป่าชุมชนที่ดีที่สุดคือการห้ามใช้ประโยชน์โดยเด็ดขาด					
13) พื้นที่ของป่าชุมชนควรจัดสรรให้คนในชุมชนเข้าจับจองและทำประโยชน์ได้					
14) การตัดไม้จากป่าชุมชน คนในชุมชนสามารถกระทำได้โดยเสรี					
15) การล่าสัตว์ป่าเพื่อการบริโภคสามารถกระทำได้					
16) อาชีพพรานล่าสัตว์ เป็นอาชีพที่ต้องดำรงไว้คู่กับชุมชน					
17) สัตว์ป่าเป็นทรัพยากรที่สำคัญที่ชุมชนต้องร่วมอนุรักษ์					

หมายเหตุ ตัวอักษรปกติ เป็นข้อความเชิงบวก *ตัวหนังสือเอนเป็นข้อความเชิงลบ*

Appendix C

Reliability analysis of CPL evaluated form

Reliability analysis for Community Participation Level evaluated form

Internal consistency was chosen to evaluate the reliability (r_{tt}) of this tool. Variance analysis (Hoyt, 1941 method) was applied to determine the reliability of tools (Kijpreedaborisut, 1999).

Equation :

$$r_{tt} = \frac{MS_e}{MS_p}$$

When rtt = Reliability coefficient

MS_e = Mean square of residual

MS_p = Mean square of persons

Source of variance	Degree of freedom	SS	MS
Between item (i)	21	21,009	1,000.41
Between person (p)	29	322,891	11,134.17
Error (e)	609	92,471	151.84
Total	659	436,371	

Reliability of CPL evaluated form = 1 – (151.84/11,134.17)

r_{tt} = 0.986

r_{tt}^2 = 0.073

Details of score points as follow;

Appendix Table C1 Points from 30 CPL evaluated forms

CPL evaluated form	Items																					
	Quantitative				Qualitative						Transferring						Successful					
	1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
1	20	25	65	40	30	30	25	50	20	25	40	25	50	50	35	50	60	50	30	25	40	20
2	25	20	55	25	20	30	20	40	25	25	50	30	20	30	35	50	50	60	30	40	35	30
3	25	25	70	35	20	40	25	40	25	25	30	30	30	30	40	40	50	40	50	35	30	30
4	25	40	20	30	30	25	35	25	25	30	30	45	30	50	40	50	20	20	25	40	30	20
5	30	40	10	40	30	25	35	20	20	20	25	45	30	50	30	30	25	20	25	30	30	20
6	30	30	10	40	30	20	30	25	25	20	30	40	35	40	30	30	20	20	20	30	40	25
7	90	80	80	80	80	80	80	90	80	70	90	80	75	60	80	85	80	80	85	85	80	80
8	88	88	88	88	85	85	70	85	85	80	80	88	50	80	85	85	85	88	85	85	85	88
9	78	50	78	95	50	75	45	95	88	80	68	68	95	70	75	100	100	100	60	65	95	85
10	80	80	90	75	80	70	90	70	60	70	70	60	60	60	70	80	70	70	70	70	70	70
11	60	78	78	78	70	70	68	70	65	65	60	70	40	50	70	60	75	70	65	60	80	60
12	60	60	60	50	60	65	35	85	40	25	60	60	55	55	60	70	90	90	80	100	95	75
13	90	90	90	50	90	90	80	80	80	80	90	80	55	70	80	90	90	85	80	85	85	85
14	80	80	100	85	95	70	65	68	85	88	80	70	68	55	65	78	88	75	68	85	88	88
15	80	80	90	100	78	90	85	100	100	78	75	75	90	75	80	100	100	100	95	100	100	100
16	25	20	40	10	15	30	20	20	20	20	10	20	20	20	30	30	25	10	13	10	10	10
17	20	20	39	15	22	37	20	25	25	40	14	23	20	28	25	37	27	24	13	24	25	30
18	40	80	70	60	60	60	20	65	60	90	40	50	60	70	70	90	50	70	50	40	50	60
19	39	60	90	56	60	47	65	53	36.7	63	40	55	85	75	60	85	43	54	54	46	36	48
20	35	70	90	20	70	50	50	40	80	60	20	40	70	60	50	70	60	60	60	60	40	40
21	23	46	56	20	47	40	56	53	30	40	60	20	50	45	27	43	31	29	29	29	28	36
22	20	20	40	0	0	40	20	40	20	20	0	0	20	20	35	60	0	0	0	0	0	0
23	20	30	48	13	47	33	36	23	37	30	20	25	36	50	34	60	23	23	27	30	25	30
24	53	80	100	20	73	47	47	80	27	73	47	80	73	73	67	100	87	33	33	33	33	60
25	26	60	80	27	60	55	40	30	40	60	33	40	67	67	47	67	27	27	27	33	27	40
26	10	15	50	30	10	25	20	40	10	20	10	40	20	20	30	30	40	30	30	30	10	10

Appendix Table C1 Points from 30 CPL evaluated forms

CPL evaluated form	Items																					
	Quantitative				Qualitative						Transferring						Successful					
	1	2	3	4	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
27	30	70	70	80	70	70	80	80	80	70	60	70	80	80	60	100	40	70	60	50	60	70
28	10	30	80	40	30	35	40	60	40	30	20	40	40	40	20	60	50	50	50	50	30	20
29	5	10	40	20	10	20	20	20	20	20	10	50	20	30	20	40	20	20	10	30	20	10
30	20	70	80	65	60	60	65	80	60	65	70	70	75	70	50	100	50	50	50	60	50	60

Appendix D

Reliability analysis of CDF Household questionnaire

Reliability analysis for Community Deterministic Factor (CDF) Household questionnaire

Internal consistency was chosen to evaluate the reliability (r_{tt}) of this tool. Variance analysis (Hoyt, 1941 method) was applied to determine the reliability of tools (Kijpreedaborisut, 1999).

Equation :

$$r_{tt} = \frac{MS_e}{MS_p}$$

When rtt = Reliability coefficient

MS_e = Mean square of residual

MS_p = Mean square of persons

Source of variance	Degree of freedom	SS	MS
Between item (i)	37	764,864	20,672
Between person (p)	29	112,958	3,895.1
Error (e)	1,073	534,083	488.4
Total	1,139		

Reliability of CPL evaluated form = 1 – (488.4/3895.1)

r_{tt} = 0.875

r_{tt}^2 = 0.765

Details of score points as follow;

Appendix Table D1 Point from 30 CDF forms

CDF Questionnaires	Items																		
Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	0	0	0	0	50	0	0	50	50	50	50	25	25	25	50	50	50	50	100
2	50	25	25	25	0	0	0	0	25	25	0	25	25	25	0	0	0	100	100
3	25	25	25	25	25	50	0	25	25	50	25	50	25	25	25	25	25	100	100
4	25	0	0	0	0	0	0	0	0	0	0	25	25	25	25	25	25	100	100
5	0	0	0	0	0	0	0	0	0	0	0	50	25	25	50	50	50	50	100
6	50	50	50	50	0	0	0	0	0	0	0	50	75	75	0	0	0	100	100
7	75	75	75	75	25	25	0	25	75	75	25	75	75	75	25	25	25	100	100
8	100	100	100	100	0	0	0	0	0	0	0	75	75	75	0	0	0	75	100
9	50	50	50	50	0	0	0	0	0	0	0	75	75	75	75	75	75	100	75
10	75	75	75	75	0	0	0	0	0	0	0	75	75	75	25	25	25	100	75
11	75	75	75	75	25	25	0	0	75	75	0	75	75	75	25	25	25	100	100
12	75	75	75	75	0	0	0	0	50	50	0	75	75	75	25	25	25	100	100
13	25	25	0	25	25	0	50	0	50	50	0	25	50	50	0	0	0	100	50
14	75	75	75	75	25	0	0	0	75	75	0	75	75	75	25	25	25	100	100
15	100	100	100	100	50	0	0	0	0	0	0	75	75	75	75	75	75	100	100
16	0	0	0	0	25	0	0	0	0	25	0	0	0	25	25	0	0	100	100
17	75	75	75	75	0	0	0	0	50	75	0	50	75	50	50	75	75	100	100
18	75	75	75	75	25	0	0	0	25	25	0	75	75	75	75	75	75	100	100
19	75	75	75	75	0	0	0	50	0	50	50	75	75	75	100	50	50	100	100
20	100	100	75	75	0	0	0	25	75	75	25	75	75	75	0	0	0	75	75
21	100	75	75	75	0	0	0	0	75	50	0	75	75	75	0	25	25	100	100
22	100	75	100	75	50	0	0	50	50	75	50	75	75	50	75	75	75	100	100
23	75	75	100	100	50	50	0	0	0	75	0	75	75	75	50	50	50	75	100
24	100	75	75	50	0	0	0	25	50	25	25	75	75	75	0	0	0	100	100
25	100	75	100	50	0	0	0	0	50	50	0	75	75	75	0	0	0	100	100
26	100	100	100	50	0	0	0	0	75	50	0	75	75	75	75	75	50	100	100
27	100	50	75	75	0	0	0	50	50	50	50	75	75	75	75	75	75	100	100
28	100	100	100	75	0	0	0	0	25	25	0	75	75	75	25	50	50	100	100
29	100	100	100	75	0	0	0	0	25	25	0	75	75	75	25	50	75	100	100
30	100	100	100	100	0	0	0	25	25	25	25	75	100	75	75	75	75	100	100

Appendix Table D1 (Continued)

CDF Questionnaires Number	Items																		
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
1	75	50	50	25	50	50	50	100	100	100	100	75	75	50	50	75	75	75	75
2	100	25	50	0	0	0	50	75	75	75	75	50	75	75	50	50	50	50	75
3	100	25	25	25	75	50	50	75	75	75	75	50	75	75	75	50	50	50	100
4	100	0	25	0	0	0	50	75	75	75	75	50	75	75	75	75	50	50	75
5	50	0	50	50	50	50	50	75	75	75	75	50	75	50	50	50	25	25	75
6	100	0	50	75	75	50	75	25	25	50	50	75	75	100	50	50	50	50	75
7	100	75	50	75	25	50	75	100	100	75	75	100	100	100	50	50	50	50	100
8	75	75	50	50	100	75	50	75	75	25	25	100	75	50	25	50	50	25	100
9	75	50	50	50	25	75	50	100	100	50	50	100	100	100	50	100	100	50	100
10	75	50	50	75	100	75	50	75	75	25	25	100	75	50	25	25	25	25	100
11	100	50	50	50	100	75	75	100	100	75	75	100	100	50	50	50	50	50	100
12	100	0	25	75	100	25	50	100	100	75	75	100	100	50	50	50	50	50	100
13	50	75	50	75	100	75	25	100	100	75	75	100	100	25	25	25	25	50	100
14	100	100	50	75	75	100	50	100	100	75	75	100	100	50	50	50	50	50	100
15	100	50	25	0	25	0	75	100	100	75	75	75	100	50	50	75	75	100	100
16	100	75	50	75	75	75	25	75	100	50	75	50	100	50	50	50	100	50	100
17	100	75	50	25	100	75	75	100	100	100	100	100	100	100	50	25	50	25	100
18	100	100	50	25	25	100	50	100	100	75	100	100	100	50	25	25	25	50	100
19	100	75	50	75	75	75	50	100	100	125	100	50	25	50	50	50	50	50	100
20	100	100	50	50	75	100	100	75	75	100	100	100	100	100	100	50	25	25	100
21	100	100	50	75	50	100	75	100	100	75	100	100	100	25	25	100	25	50	100
22	75	75	50	50	100	50	100	100	100	100	100	75	25	50	50	50	100	100	100
23	75	75	50	50	100	50	50	100	50	75	100	100	100	50	50	50	50	25	100
24	100	75	25	50	75	75	75	75	75	100	100	100	100	50	50	50	25	25	100
25	100	75	50	75	0	50	75	75	75	100	100	100	75	25	25	25	25	25	100
26	100	100	50	50	25	75	75	100	100	100	100	100	100	100	50	50	50	50	100
27	100	75	25	75	50	75	75	75	75	125	100	100	100	100	100	75	75	75	100
28	100	50	50	75	50	50	50	50	75	100	100	25	75	75	75	75	75	75	75
29	100	50	50	75	50	50	75	75	75	75	100	50	75	75	75	75	75	75	75
30	100	50	50	75	50	50	75	50	50	50	100	75	75	50	50	50	50	50	100

Appendix E

Individual community data

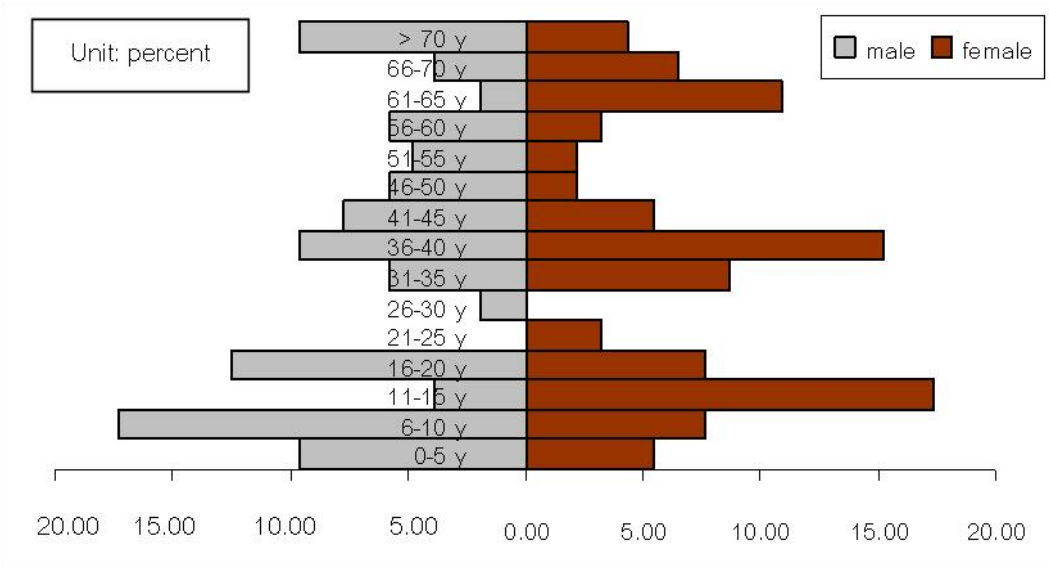
1. Nhongkhayang community (Moo 5)

Survey 59 sample families, it was found that women were answerer more than men 57.6% and 42.4% respectively, age between 18-72 or aged mean 47.5 $\pm$ 15.42 years, Most of them got married and lived together 69.4%, the rest were single, divorced / widowed 15.3%, separated 8.5% and married but not lived together 6.8%. Education, mostly finished primary school 77.9%, junior high school (M.3) 8.5%, post graduate degree 5.1%, senior high school/vocational 3.4%, bachelor degree 3.4%, no education 1.7%. All of them were Buddhists.

Most samples migrated from the other places 96.6%, born in the village only 3.4%, about half of migrated samples were from northeastern 50.9%, the middle region 19.3%, eastern 17.5%, the other district/amphur in Chachoengsao province 8.8%, and the other villages in Klongtagrao sub district 3.5%. The causes of migration were occupied the land 49.1%, bought the land in this village 24.6%, persuaded by their cousins 10.5%, the other reasons 15.8% as were moved to get married with the original villagers, near their offices etc.. The settlement periods in Nhongkhayang were between 10-35 years or mean 20.69 $\pm$ 7.86 years.

For the place attachment feeling among the samples towards dwelling in Nhongkhayang, it was found that they need to settle permanently in this land 93.25% (compare with live here till died; 100%), love and binding this lands 99.25% (compare with supreme love and binding this land; 100%), and love and be attached to this land as their hometown/birthplace 91.00% (full scored as 100%).

The size of the sample families; had the average members 3.34 ± 3.85 peoples, the average of males 1.73 ± 1.01 peoples, the average of females 1.61 ± 1.01, sex ratio between male and 100 females was 107.45. It was a single family, and had tendency to decrease the amount of the people from many causes as moving to find good jobs outside the village so population pattern (sex and age) was uncommon. It was shown in figure Appendix E-1.



Appendix Figure E1 Population pattern of Nhongkhayang community

The major occupations of the families were distributed as follows: general employees 28.8%, field crop farmers 25.4%, paddy field farmers 11.9%, civil servants and state enterprise officers 8.5%, gardeners 6.8%, employees in the factories 6.8%, trade 5.1% and other major occupations 6.8%. The minor occupations were civil servants and state enterprise officers 59.2%, general employees 13.6%, paddy field farmer 11.9%, field crop farmers 8.5%, and private business 6.8 %.

The monthly income widely distributed between 1,000 – 60,000 baths/family, average mean 10,203.39 ± 12,657.327 baths/family. The monthly expenditure widely distributed as well 1,000 – 50,000 baths/family, average mean 8,515.25 ± 9,824.825 baths/month, samples 52.24%, debt between 5,000 – 700,000 baths and average in debt of each family 192,419.35 ± 238,843.990 baths. Meanwhile the samples 18.64% have saving money 1,000 – 500,000 baths/family, mean for saving money was 191,272.73 ± 220,446.407 baths/family.

Almost all of the sample families of Nhongkhayang had never done illegally against forest or wildlife law 89.8% of whole samples. The samples 10.2% seldom

done illegally and all of them used to be warned. It was found 3.4% used to be punished by law.

The friendly relations between the samples families towards the conservative officer was neutral-good level, divided into worst feeling, neutral, good feeling (cooperated) and very good feeling (pleased to cooperate) 6.8%, 57.6%, 25.4% and 10.2%, respectively. It was calculated the relationship between the community and conservative officers 59.7% (compare with pleased to cooperate feeling; 100%).

The samples received all conservative information in a medium criterion with average 41.00% of the whole information and understood them 37.25%. They were interested in conservative information slightly low level (47.00%). They thought that the efficiency of conservative information transference in their community was rather low 39.00%.

Sample families receive conservative data from various sources. More than half of them were transferred through the community leader 62.5%, others sources were informed by their neighbors (14.58%), television (14.58%), the Royal forestry department officers or Department of national park wildlife and plant officers (4.17 %), and from conferences or activities done with other sections (4.17%).

The necessity to rely upon natural resources from community forest was low, as follows;

- harvest forest products for food was 17.5% of the whole necessities as forest vegetable, bamboo shoot and mushroom
- harvest forest products for use was 8.5% as bamboo and rattan
- wood products was 3.75%
- wildlife hunted for food was 2.5% as wild boar
- indirect necessarily towards the forests was low 24.5% of the highest need as happiness, scenery, pride, binding and etc.

The opinion of the sample families to formal leader potential, as low level points for potential to motivate/persuade the members in their community to take part in conservative natural resources 42.25%, the interested in conservative activities were low level 47.00%, and knowledge, understanding together with potential to manage conservative activities were medium level 47.00%.

As to an informal leaders potential of Nhongkhayang village, it was found they could not motivate/persuade the members of their community to take part of the conservative management, the motivate/persuade potential was low level 25.75%. They interested in conservative activities at low level 28.75% and in the same way the sample families realized that knowledge, understanding and potential for conservative management of informal leader was low level 29.75%.

The community conservative activities trend could induce the samples to participate at low level 38.50%. The samples had been persuaded to participated conservative activities 83.1%, almost of them were persuaded by headman of the village.

As to the binding between the sample families and the community forests, they had medium binding level 47.50%. And if way of life “human and forest” was changed and they was completely separated from the forests, they could stand and adapt their life with toleration at 50.00% (compare with extreme tolerance; 100%). As to devotion to save the way of life with the forests was medium level 55.00% (compare with devotion all of their life; 100%). That was concluded they were glad to keep human and forest way of life as they could, without a lot devotion and sacrifice.

For the sample families’ opinion towards abundance of natural resources, in conclusion they thought the abundance of the natural resources of the community and surrounding areas were medium abundance as 3.17 points. Seven topics of natural resources were high abundant level (3.41-4.20 points) i.e. safety from flood/over flow, abundance of forest, forest product for food, forest products for used, soil fertility,

abundance of wildlife in the areas and wildlife species diversity respectively. The details were shown in appendix table E-1

Appendix Table E1 The abundance of natural resources in Nhongkhayang community

Topic of natural resources	Percentage of abundance/quality level					Mean (points)	SD
	Very high (5)	High (4)	Medium (3)	Low (2)	Very low (1)		
1) soil fertility (soil quality)	3.4	50.8	30.5	15.3	0.0	3.42	0.792
2) sufficient of land for using	3.4	44.1	30.5	22.0	0.0	3.29	0.852
3) soil erodibility	16.9	15.3	57.6	10.2	0.0	3.39	0.891
4) water quality	3.4	23.7	42.4	18.6	11.9	2.88	1.019
5) water quantity for consuming (eating)	3.4	18.6	27.1	37.3	13.6	2.61	1.051
6) water quantity for using	3.4	8.5	28.8	45.8	13.6	2.42	0.951
7) water quantity for agriculture	3.4	10.2	20.3	52.5	13.6	2.37	0.963
8) safety from flood/over flow	30.5	40.7	28.8	0.0	0.0	4.02	0.777
9) safety from drought	8.5	0.0	27.1	52.5	11.9	2.41	1.002
10) forest area in the village	3.4	81.4	11.9	3.4	0.0	3.85	0.519
11) forest products for foods	0.0	69.5	15.3	15.3	0.0	3.54	0.750
12) forest product for using	0.0	72.9	6.8	20.3	0.0	3.53	0.817
13) abundance of wildlife in the areas	16.9	28.8	40.7	6.8	6.8	3.42	1.070
14) wildlife species diversity	10.2	42.4	33.9	6.8	6.8	3.42	1.004
15) abundance of aquatic animals	5.1	23.7	45.8	25.4	0.0	3.08	0.836
16) aquatic animal species diversity	5.1	27.1	44.1	23.7	0.0	3.14	0.840
17) good scenic / view of the areas	0.0	47.5	30.5	22.0	0.0	3.25	0.801
Average	**6.5**	**36.1**	**32.1**	**21.0**	**4.3**	**3.17**	**0.493**

Note: Natural resources abundance level: 1.00-1.79 points = very low abundance level, 1.81-2.60 = low, 2.61-3.40 = medium, 3.41-4.20 = high and 4.21-5.00 = very high

Attitude survey of the sample families towards conservative community forest for co-using together in the community, it was found that Nhongkhayang community had good attitude with total attitude score 3.76 points. They agreed to conserve abundant of CF., CF. conservation to keep better the other natural resources, wildlife hunting should not be allowed. In overview, their attitudes toward the community forest were good, except one topic that more than half of them agreed with the strictly prohibition of community forest utilization. The details were shown in table as follow

Appendix Table E2 Attitude of the Nhongkhayang samples toward conservative community forest (CF.)

Attitude topics	Percentage of opinion (%)					Mean	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagreed (2)	Absolutely disagreed (1)	(points)	
1) Forests were owned for everyone, no one should be occupied.	5.1	88.1	6.8	0.0	0.0	3.98	0.347
2) Intrusion, destruction the forests were severely illegal deed.	11.9	69.5	18.6	0.0	0.0	3.93	0.533
3) without the forest, might cause drought	8.5	77.9	8.5	5.1	0.0	3.9	0.607
4) Conservation the forest was your obligation.	5.1	64.4	30.5	0.0	0.0	3.75	0.544
5) Your community had duty to conserve the abundant of CF..	5.1	71.2	23.7	0.0	0.0	3.81	0.508
6) CF. conservation was management for use together of people in the community.	5.1	74.6	20.3	0.0	0.0	3.85	0.485
7) CF. conservation would increase the other natural resources (as water quantity, air quality).	5.1	91.5	3.4	0.0	0.0	4.02	0.293
8) CF. was important sources of local food for the community.	5.1	79.6	15.3	0.0	0.0	3.90	0.443
9) CF. had essential resources for living of the people in the community (firewood, wood)	5.1	62.7	16.9	15.3	0.0	3.58	0.814
10) Community forests were important raw resources to make community products.	5.1	52.5	39	3.4	0.0	3.59	0.646

Appendix Table E2 (Continued)

Attitude topics	Percentage of opinion (%)					Mean	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagreed (2)	Absolutely disagreed (1)	(points)	
11) CF. was important sources of herbs for community.	11.9	54.2	22	11.9	0.0	3.66	0.843
12) The best conservative CF. wasn't prohibition using benefit of the forests absolutely.	0.0	25.4	18.6	56	0.0	2.69	0.856
13) The CF. areas should not be divided anyone to occupy and took benefits.	3.4	62.8	16.9	16.9	0.0	3.53	0.817
14) Cutting wood from the CF. shouldn't be allowed freely.	8.5	72.9	18.6	0.0	0.0	3.90	0.515
15) Hunted wildlife for consuming shouldn't be allowed freely.	16.9	67.8	15.3	0.0	0.0	4.02	0.572
16) Hunter career shouldn't be allowed to continue in the community.	20.3	62.7	15.3	0.0	1.7	4.00	0.719
17) Wildlife was important natural resources of the community to conserve.	15.3	54.2	30.5	0.0	0.0	3.85	0.665
Average	**8.09**	**66.59**	**18.84**	**6.39**	**0.10**	**3.76**	**0.327**

Note: Attitude level: 1.00-1.79 points = very bad attitude, 1.81-2.60 = bad, 2.61-3.40 = neutral, 3.41-4.20 = good and 4.21-5.00 = very good

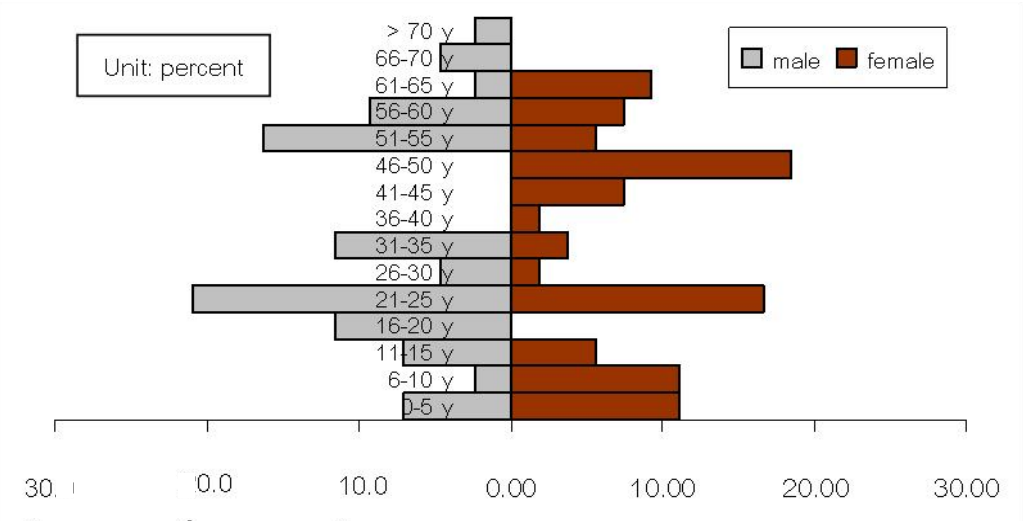
2. Thammaratnai community (Moo 6)

Survey 30 sample families, it was found that women were answerer than men 56.7 and 43.3%, respectively, aged between 28 – 74 years or mean 52.63 ± 10.074 years. Most of the samples got married and lived together 60.0%, the rest were divorced/widowed 36.7%, married but not lived together 3.3%. For the education, most of them finished primary school 76.7%, junior high school 3.3%, bachelor degree 3.3%, no education was as high as 16.7%. All of them were Buddhists.

They all migrated from the other places, in particular from eastern part of Thailand 70.0%, north-eastern 13.3%, the middle region 10.0% and other villages in Klongtagrao sub district 6.7%. The causes of migration were buying some land in this village 46.7%, occupied the land 26.7%, moved to marry 16.7%, cousins or friends persuasion 10.0 %. The settlement periods in Thammaratnai village was between 5 – 36 years or mean 24.6 ± 9.978 years.

For the place attachment feeling among the sample towards dwelling in Thammaratnai, it was found that they need to settle permanently in this land 94.25% (compare with “live here till died”; 100%), love and care this lands 91.75% (compare with supreme love and care this land; 100%), and and love and be attached to this land as their hometown/birthplace 93.25%.

The size of sample families had average member 3.23 ± 1.278 peoples, average males 1.43 ± 0.898 peoples/family, average females 1.80 ± 1.031 peoples/family, sex ratio between male and 100 females was 79.4. The family character of this village was a single family. The amount of the villagers tended to be decreased, due to many causes, especially emigration. The population pattern (sex and age) was uncommon (Appendix figure E2).



Appendix Figure E2 Population pattern of Thammaratnai community

The major occupations of the families were distributed as follow general employees 36.7%, field crop farmer 33.3%, trader 23.3%, civil servants and state enterprise officers 3.3%, and the other major occupation 3.3%. The minor occupations were civil servants and state enterprise officers 43.3%, field crop farmer 23.3%, general employees 16.7%, gardener 10.0%, employees of the Royal Forestry Department and Department of National park wildlife and plant 6.7%.

The monthly income distributed widely between 2,000 – 30,000 baths/family, average mean 7,650.00 ± 5,362.433 baths/family. The monthly expenditure distributed widely as well 2,000 – 27,000 baths/family, average mean 6,766.67 ± 4,816.876 baths/family. The 80.0% of the samples had debt between 5,000 – 500,000 baths and average mean in debt of each family 48,083.33 ± 108,139.570 baths. Meanwhile the samples 40.00% had saving money 1,000 – 300,000 baths/family, mean of saving money was 29,308.33 ± 85,351.013 baths/family.

Almost all of the Thammaratnai samples (90.0%) had never done anything against forest or wildlife law, only 10.0% occasionally did and 3.3% were warned and condemned.

The friendly relations between the samples towards the conservative officer was rather good, divided into bad feeling, neutral, good feeling (cooperated) and very good feeling (pleased to cooperate) 3.3%, 33.3%, 50.0% and 13.3% respectively. After calculation, the relationship between the community and conservative officers equaled to 68.25% (compare with pleased to cooperate feeling; 100%).

The samples received all conservative information in a good criterion with average 82.50% of the whole information and understood them 79.25%. They were interested in conservative information at high level (79.25%). They thought that the efficiency of conservative data transference in their community was rather good 78.25%.

About conservative data receiving, more than half of them were informed through the community leader (61.9%), through the Royal Forestry Department officers or Department of National Park Wildlife and Plant officers 11.9%, informed by their own neighbors 9.5%, radios 7.1%, television 4.8% and other documentaries 4.8%.

The necessity to rely upon natural resource from community forest was low, as follows;

- harvest forest products for food was 14.25% of the whole necessities as Pak kaew (edible vegetable), Phak wan (edible vegetable, *Phyllanthus geoffrayi* Beille in Lecomte) and herbs
- harvest forest products for use was 15.75% of the whole necessities as took bloom weed flowers (*Sida acuta*) and rattan to produce goods and sold to other places
- no need for timber wood from community forests
- wildlife hunted for food was 2.5% especially wild boar
- indirected needs toward the forest was low 39.25% of the highest need such as happiness, scenery, pride, relationship etc.

The samples opinion about formal leader potential, they gave rather high level points for potential to motivate/persuade the community members to take part in conservative natural resources (73.25%). The samples thought that their formal leader interested in conservative activities rather high (75.65%) from the whole ones. Besides they thought formal leader had knowledge, understanding including potential to manage conservative activities rather high level 74.25%.

As to an informal leader potential of Thammaratnai village, it was found the influential motivation to persuade the members to take part in the activities was medium level 49.25% and informal leaders interested in the community conservative activities in medium level 51.75%. In the same way, samples thought that knowledge, understanding and potential for conservative activities management of an informal leader had medium level 48.25%.

The community conservative activities trend could induce the samples to participate at medium level 65.75%. Interestingly, leader of the community was considerable for this job, since almost all of them (93.3%) were persuaded by headman of the village.

With regard to the binding between samples and community forests, we found that they had high binding level (73.25%). And if way of life “human and forest” was changed and they was completely separated from the forests, they could stand with toleration at 75.00% (compare with extreme tolerance; 100%). As to devotion to save way of life with the forest was high level 70.00% (compare with devotion all of their life; 100%).

For the opinion of the samples towards abundance of natural resources, in conclusion they thought the abundance of the natural resources of the community and surrounding areas were medium abundance as 3.23 points. Four topics of natural resources were high abundant level (3.41-4.20 points) i.e. safety from flood/over runoff, abundance of wildlife species, scenic and view, and abundance of wildlife

found in village area, respectively. Appendix table E3 provides the abundance of natural resources of Thammaratnai community in detail.

Appendix Table E3 The abundance of natural resources in Thammaratnai community

Topic of natural resources	Percentage of abundance/quality level					Mean (points)	SD
	Very high (5)	High (4)	Medium (3)	Low (2)	Very low (1)		
1) soil fertility (soil quality)	6.7	40.0	33.3	20.0	0.0	3.33	0.884
2) sufficient of land for using	0.0	20.0	40.0	40.0	0.0	2.8	0.761
3) soil erodibility	*6.7*	*13.3*	*46.6*	*26.7*	*6.7*	*2.87*	*0.973*
4) water quality	0.0	33.3	53.4	13.3	0.0	3.2	0.664
5) water quantity for consuming (eating)	6.7	43.3	33.3	16.7	0.0	3.4	0.855
6) water quantity for using	6.7	50.0	30.0	13.3	0.0	3.5	0.82
7) water quantity for agriculture	0.0	23.3	50.0	20.0	6.7	2.9	0.845
8) safety from flood/over flow	*26.7*	*36.6*	*30.0*	*6.7*	*0.0*	*3.83*	*0.913*
9) safety from drought	*13.3*	*30.0*	*20.0*	*16.7*	*20.0*	*3.0*	*1.365*
10) forest area in the village	0.0	60.0	26.7	13.3	0.0	3.47	0.73
11) forest products for foods	0.0	46.7	46.6	6.7	0.0	3.4	0.621
12) forest product for using	0.0	46.7	36.7	13.3	3.3	3.27	0.828
13) abundance of wildlife in the areas	0.0	66.7	20.0	13.3	0.0	3.53	0.73
14) wildlife species diversity	0.0	73.3	16.7	10.0	0.0	3.63	0.669
15) abundance of aquatic animals	0.0	16.7	53.3	6.7	23.3	2.63	1.033
16) aquatic animal species diversity	0.0	16.7	53.3	6.7	23.3	2.63	1.033
17) good scenic / view of the areas	0.0	56.7	43.3	0.0	0.0	3.57	0.504
Average	**4.0**	**39.6**	**37.2**	**14.3**	**4.9**	**3.23**	**0.364**

Note: Natural resources abundance level: 1.00-1.79 points = very low abundance level, 1.81-2.60 = low, 2.61-3.40 = neutral, 3.41-4.20 = high and 4.21-5.00 = very high

Attitude survey from samples towards conservative community forest for co-using together in the community, it was found that Thammaratnai community had good attitude with total attitude score 3.97 points. They had very good attitude in 1 topic as “instrusion, destruction the forests were severely illegal deed”. Details were shown in Appendix table E4.

Appendix Table E4 Attitude of the Thammaratnai samples toward conservative community forest (CF.)

Attitude topics	Percentage of opinion (%)					Mean (points)	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagreed (2)	Absolutely disagreed (1)		
1) Forests were owned for everyone, no one should be occupied.	20.0	73.3	0.0	6.7	0.0	4.07	0.691
2) Intrusion, destruction the forests were severely illegal deed.	36.7	56.6	0.0	6.7	0.0	4.23	0.774
3) without the forest, might cause drought	16.7	76.6	6.7	0.0	0.0	4.10	0.481
4) Conservation the forest was your obligation.	16.7	70.0	13.3	0.0	0.0	4.03	0.556
5) Your community had duty to conserve the abundant of CF..	13.3	73.3	6.7	6.7	0.0	3.93	0.691
6) CF. conservation was management for use together of people in the community.	6.7	80.0	13.3	0.0	0.0	3.93	0.450
7) CF. conservation would increase the other natural resources (as water quantity, air quality).	16.7	63.3	20.0	0.0	0.0	3.97	0.615
8) CF. was important sources of local food for the community.	6.7	70.0	23.3	0.0	0.0	3.83	0.531
9) CF. had essential resources for living of the people in the community (firewood, wood)	6.7	80.0	13.3	0.0	0.0	3.93	0.450
10) Community forests were important raw resources to make community products.	0.0	93.3	6.7	0.0	0.0	3.93	0.254
11) CF. was important sources of herbs for community.	10.0	83.3	6.7	0.0	0.0	4.03	0.414

Appendix Table E4 (Continued)

Attitude topics	Percentage of opinion (%)					Mean (points)	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagreed (2)	Absolutely disagreed (1)		
12) The best conservative CF. wasn't prohibition using benefit of the forests absolutely.	13.3	46.7	3.3	36.7	0.0	3.37	1.129
13) The CF. areas should not be divided anyone to occupy and took benefits.	26.7	56.6	0.0	16.7	0.0	3.93	0.980
14) Cutting wood from the CF. shouldn't be allowed freely.	23.3	63.3	6.7	6.7	0.0	4.03	0.765
15) Hunted wildlife for consuming shouldn't be allowed freely.	23.3	56.7	13.3	6.7	0.0	3.97	0.809
16) Hunter career shouldn't be allowed to continue in the community.	30.0	56.7	0.0	13.3	0.0	4.03	0.928
17) Wildlife was important natural resources of the community to conserve.	30.0	60.0	6.7	3.3	0.0	4.17	0.699
Average	**17.5**	**68.2**	**8.2**	**6.1**	**0.0**	**3.97**	**0.183**

Note: Attitude level: 1.00-1.79 points = very bad attitude, 1.81-2.60 = bad, 2.61-3.40 = neutral, 3.41-4.20 = good and 4.215.00 = very good

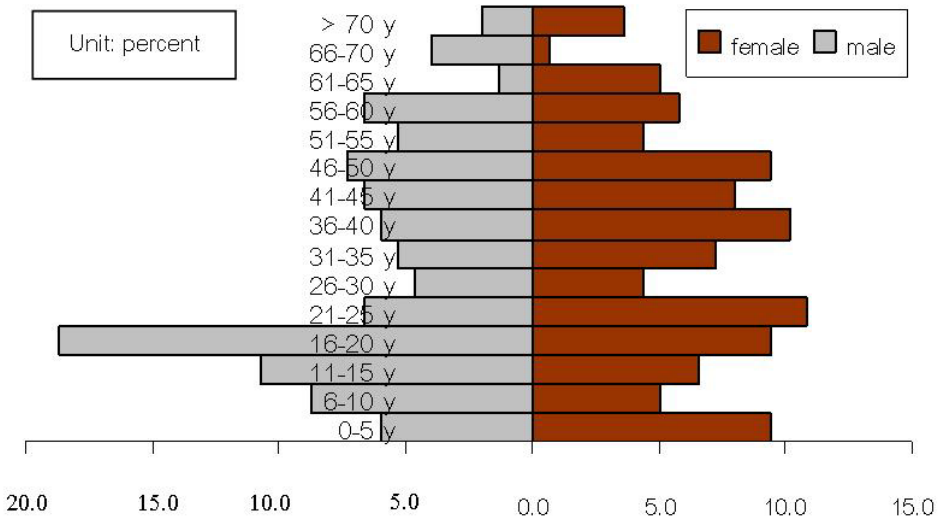
3. Romphothong community (Moo 7)

Survey 69 sample families, the answerers were women more than men (62.3% and 37.7%, respectively) aged between 21-78 years, average mean ages 48.8 ± 12.829 years. The couple lived together 85.5%, as to the rest were divorced/widowed, married but not living together and single. About education survey, more than half of them finished primary school (66.7%), remarkably uneducated were as high as 17.4%. All of them were Buddhists.

Some answerers born in this village (8.7%), in the other hand almost all of them immigrated into this area (91.3%); from northeastern 49.2%, eastern 28.6%, the other villages in Klongtagrao sub-district 12.7%, middle region 7.9% and the other sub-district in Tatakieb 1.4%. The reasons for immigration into this area were; occupied the land 57.1%, bought the land in this village 19.0%, persuaded by their cousins 12.7%, moved for marriage 3.2% and the other reasons 7.9%. The settlement periods in Romphothong village were between 1-45 years or average mean was equal to 20.84 ± 7.918 years.

For the place attachment feeling among the sample towards dwelling in Romphothong, it was found that they need to settle permanently in this land 95.75% (compare with “live here till died”; 100%), love and care this lands 98.25% (compare with supreme love and care this land; 100%), and love and be attached to this land as their hometown/birthplace 93.50%.

The size of sample families in Romphothong had average member 4.17 ± 1.443 peoples, average males 2.17 ± 1.553 peoples/family, average females 2.00 ± 0.907 peoples/family, sex ratio between male and 100 females was 108.5. . The result indicated that Romphothong village consisted of single-family character. The population pattern (sex and age) was uncommon (see Appendix figure E3).



Appendix Figure E3 Population pattern of Romphothong community

Major occupations of the families were distributed as follow; field crop farmer 60.9%, general employees 15.9%, paddy field farmer 8.7% and trader 7.2%. The other occupations with lesser frequency (total 7.3%) were gardeners, employees in forest conservative section and employees in other official sections. Minor occupations were general employees 29.4%, trader 20.7%, field crop farmer 13.8%, paddy field farmer 10.3% and other occupations 13.8% (private business, livestock farmer, gardener and employees in forest conservative section). And samples 13.8% had no minor occupations.

The monthly income distributed widely between 1,200-30,000 bath/family, average mean 10,092.18 ± 5,868.426 baths/family. The monthly expenditure distributed widely as from 1,000 to 30,000 baths/family, average mean 7,970.59 ± 4,547.332 baths/family. More than three fourth of samples (81.16%) were in debt range from 1,000 to 500,000 bath/family, which make average debt 89,375.00 ± 125,913.327 baths/family. On the other hand, 56.21% had saving money 500-150,000 bath/family, average mean 16,415.64 ± 25,464.471 bath/family.

Nearly all of them had never be against the laws of forestry and wildlife (95.7%), occasionally did 4.3%, used to be warned by the conservative officers 2.9%, and were prosecuted 4.3%.

The friendly relations between the samples towards the conservative officers were rather good. It was found that 2.9% of samples had bad feeling to conservative officers and did not want to be in contact with, neutral feeling 37.7%, good feeling (cooperate) 53.6% and very good feeling (please to cooperate) 5.8%. After calculation, the good relation between community and conservative officers was 65.50 (compare with pleased to cooperate feeling; 100%).

As to data perceiving, respondents received data form various sources and nearly half of the information (47.90%) was transferred from community leader, second source was neighbors (26.04%), be informed by conservative officers or by joining activities with the other government sections came with the equal percentage (7.29%). The rest of them received information from medias i.e. radios, television and newspapers.

The samples received all conservative information in a rather high criterion with average 70.00% of the whole information and understood them 68.50%. They were interested in conservative information rather high (73.25%). They thought that the efficiency of conservative data transference in their community was rather good 70.25%.

The necessity to rely upon natural resources form community forest was low, as follows;

- harvest forest products for foods was 12.75% of the whole necessities
- harvest forest products for use was 4.0%
- wood products was 6.5%
- wildlife hunted for foods 11.5%
- indirect needs towards forests was below medium (41.25%) example; happiness, scenic/view, pride of relationship and etc.

For samples opinion against formal leader potential, the samples gave higher medium level points for potential to motivate/persuade the community members to take part in conservative natural resources (63.75%), the interested in conservative activities were higher medium level (66.00%) from the whole ones. They thought their formal leaders had knowledge, understanding including potential to manage conservative activities higher medium level 67.50%.

Romphothong villagers lesser believed in their informal leader potential than the formal one. It was found the influential motivation to persuade the members to take part in the activities was medium level 56.50% and informal leaders interested in the community conservative activities in medium level 58.75%. In the same way, samples thought that knowledge, understanding and potential for conservative activities management of an informal leader had medium level 57.50%.

The community conservative activities trend could induce the samples to participate at higher medium level 67.00%.

As to the binding between the sample and the community forests, they had higher medium level 63.75%. And if way of life “human and forest” was changed and they was completely separated from the forests, they could adjust themselves to lived without forest with toleration 65.00% (compare with extreme tolerance; 100%). As to devotion to save the way of life with the forests was 63.50% (compare with devotion all of their life; 100%)

For the opinion of the samples towards abundance of natural resources, in conclusion they thought the abundance of the natural resources of the community and surrounding areas were high abundance as 3.42 points. Thirteen topics of natural resources were high abundant level (3.41-4.20 points), but four topics were medium abundance level (2.61-3.40 points) i.e. soil erodibility, safety from drought, water quantity for agriculture, sufficient of land for using and water quantity for using, respectively. Appendix table E5 provides the abundance of natural resources of Romphothong community in detail.

Appendix Table E5 The abundance of natural resources in Romphothong community

Topic of natural resources	Percentage of abundance/quality level (%)					Mean (points)	SD
	Very high (5)	High (4)	Medium (3)	Low (2)	Very low (1)		
1) soil fertility (soil quality)	7.2	50.8	24.7	15.9	1.4	3.46	0.901
2) sufficient of land for using	5.8	34.8	42.1	13.0	4.3	3.25	0.914
3) soil erodibility	0.0	14.5	42.0	40.6	2.9	2.68	0.757
4) water quality	0.0	55.2	36.2	7.2	1.4	3.45	0.697
5) water quantity for consuming (eating)	1.4	55.2	27.5	15.9	0.0	3.42	0.775
6) water quantity for using	0.0	46.4	36.2	17.4	0.0	3.29	0.750
7) water quantity for agriculture	1.4	21.7	39.2	33.4	4.3	2.83	0.854
8) safety from flood/over flow	*23.5*	*25.0*	*30.9*	*19.1*	*1.5*	*3.50*	*1.100*
9) safety from drought	*7.2*	*20.3*	*26.1*	*36.3*	*10.1*	*2.78*	*1.110*
10) forest area in the village	15.9	53.7	20.3	10.1	0.0	3.75	0.847
11) forest products for foods	17.4	39.1	34.8	8.7	0.0	3.65	0.872
12) forest product for using	23.2	40.6	21.7	14.5	0.0	3.72	0.983
13) abundance of wildlife in the areas	20.3	59.5	15.9	4.3	0.0	3.96	0.736
14) wildlife species diversity	17.4	60.9	10.1	11.6	0.0	3.84	0.851
15) abundance of aquatic animals	15.9	30.4	40.7	13.0	0.0	3.49	0.918
16) aquatic animal species diversity	8.7	43.5	33.3	11.6	2.9	3.43	0.915
17) good scenic / view of the areas	6.1	57.5	25.8	10.6	0.0	3.59	0.764
Average	**10.1**	**41.7**	**29.9**	**16.7**	**1.7**	**3.42**	**0.331**

Note: Natural resources abundance level: 1.00-1.79 points = very low abundance level, 1.81-2.60 = low, 2.61-3.40 = neutral, 3.41-4.20 = high and 4.21-5.00 = very high

Attitude survey from samples towards conservative community forest for co-using together in the community, it was found that Romphothong community had good attitude with total attitude score 3.81 points. Their attitude broadly distributed between neutral to good attitude or between 3.07-4.14 points. Details were shown in appendix table E6.

Appendix Table E6 Attitude of the Romphothong samples toward conservative community forest (CF.)

Attitude topics	Percentage of opinion (%)					Mean (points)	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagreed (2)	Absolutely disagreed (1)		
1) Forests were owned for everyone, no one should be occupied.	8.7	72.5	7.2	11.6	0.0	3.78	0.764
2) Intrusion, destruction the forests were severely illegal deed.	13.0	72.6	7.2	5.8	1.4	3.90	0.750
3) without the forest, might cause drought	17.4	71.0	8.7	2.9	0.0	4.03	0.618
4) Conservation the forest was your obligation.	11.6	66.7	14.5	7.2	0.0	3.83	0.727
5) Your community had duty to conserve the abundant of CF..	14.5	72.5	13.0	0.0	0.0	4.01	0.528
6) CF. conservation was management for use together of people in the community.	5.8	82.6	2.9	8.7	0.0	3.86	0.648
7) CF. conservation would increase the other natural resources (as water quantity, air quality).	5.8	84.1	10.1	0.0	0.0	3.96	0.400
8) CF. was important sources of local food for the community.	5.8	72.4	17.5	4.3	0.0	3.80	0.608
9) CF. had essential resources for living of the people in the community (firewood, wood)	5.8	73.9	11.6	8.7	0.0	3.77	0.689
10) Community forests were important raw resources to make community products.	1.4	65.3	20.3	13.0	0.0	3.55	0.738
11) CF. was important sources of herbs for community.	18.8	65.3	7.2	8.7	0.0	3.94	0.784

Appendix Table E6 (Continued)

Attitude topics	Percentage of opinion (%)					Mean (points)	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagreed (2)	Absolutely disagreed (1)		
12) The best conservative CF. wasn't prohibition using benefit of the forests absolutely.	8.7	36.2	13.0	37.8	4.3	3.07	1.129
13) The CF. areas should not be divided anyone to occupy and took benefits.	23.2	37.7	11.6	23.2	4.3	3.52	1.208
14) Cutting wood from the CF. shouldn't be allowed freely.	23.2	53.6	11.6	8.7	2.9	3.86	0.974
15) Hunted wildlife for consuming shouldn't be allowed freely.	24.6	52.2	8.7	11.6	2.9	3.84	1.024
16) Hunter career shouldn't be allowed to continue in the community.	20.3	58.0	8.7	10.1	2.9	3.83	0.969
17) Wildlife was important natural resources of the community to conserve.	39.1	46.5	7.2	4.3	2.9	4.14	0.944
Average	**14.57**	**63.71**	**10.65**	**9.80**	**1.27**	**3.81**	**0.244**

Note: Attitude level: 1.00-1.79 points = very bad attitude, 1.81-2.60 = bad, 2.61-3.40 = neutral, 3.41-4.20 = good and 4.21-5.00 = very good

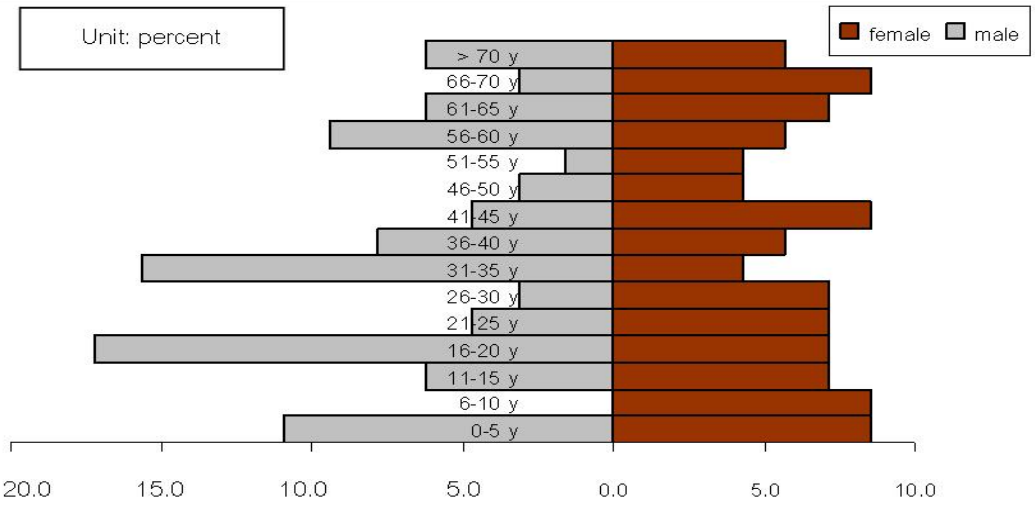
4. Koa krating community (moo 13)

Survey 39 samples, the answerer were women more than men (76.9 and 23.1%, respectively), aged between 29 – 74 years or average ages 51.67 ± 14.169 years. Most of them were married couples and lived together 89.7%, the rest were divorced/widowed 10.3%. The largest number of samples finished primary school 64.1%, junior high school (M3) 7.7%, senior high school (M6)/vocational education 5.1%. Interestingly, almost one fourth of them had no education 23.1%. Nearly all of them were Buddhist 97.4%, only 2.6% said that they respected in ghosts/spirits.

Only 7.7% of the answerers were born in this village, the rest majority (92.3%) immigrated into this land, that was from northeastern (87.1%), eastern (7.7%), northern (2.6%) and from other sub-district in Thatakiab district (2.6%). The reasons for immigration were to occupy the lands (56.4%), persuaded by cousins and friends (20.5%), to bought the lands in this village (17.9%), to move to get married (2.6%) and the other reasons (2.6%). The settlement period in Khoakrating village was between 28.31 $\pm$ 9.128 years

For the place attachment feeling among samples towards dwelling in Koa krating, it was found that they need to settle permanently in this land 93.00% (compare with “live here till died”; 100%), love and care this lands 99.25% (compare with supreme love and care this land; 100%), and love and be attached to this land as their hometown/birthplace 95.50%.

The size of the sample families was average 3.44 ± 1.429 people; average men 1.64 ± 0.78 people, average women 1.80 ± 0.894 people and the sex ratio between men per 100 female was 91.1. It was a single family. Number of population in the village tended to decrease from moving out to find job in other places. Population pattern (sex and age) was uncommon, shown in appendix figure E4.



Appendix Figure E4 Population pattern of Koa krating community

Major occupations, nearly half of the villagers were general employees (46.2%), the next below were trader (17.9%) field crop farmer (12.6%), and other occupations (23.3%); civil servants/state enterprise officers, field farmers, private business, livestock farmer etc. The minor occupations were employees in the state section (except RFD and DNP) (59.0%), field crop farmer (12.8%), private business (7.7), fisherman (7.7%) general employees (7.7%) and livestock farmers (5.1%).

Monthly income distributed widely between 1,500 – 33,000 baths/family, average mean was 6,682.05 ± 5,861.331 baths/family. The monthly expenditure distributed widely as well 1,500 - 15,000 baths/family, average mean was 4,956.41±3,071.027 baths/family. Almost half of samples (48.74%) were in debt between 1,000–200,000 baht/family, average mean 43,736.84± 50,589.406 baths/family. On the other hand, 35.90% of sampling families had savings money around 1,000–100,000 baht, average mean 18,464.64 ± 34,895.704 baths/family.

All of sampling families from Koa krating community had never done anything against forestry or wildlife laws.

The friendly relations between the samples towards the conservative officer was rather good, divided into neutral, good feeling (cooperated) and very good feeling (pleased to cooperate) 59.0%, 33.3% and 7.7% respectively. After calculation, the relationship between the community and conservative officers equaled to 62.25% (compare with pleased to cooperate feeling; 100%) indicating the good interactions which make them able to work together with pleasure.

About conservative data receiving, 82.1% of samples had received ones; more than half of them were informed through the community leader (59.25%), through the RFD officers or DNP officers 21.43%, through the meeting or joining activities with the other state sections 11.91%, informed by their own neighbors 7.14%.

The samples received all conservative information in slightly high criterion with average 59.50% of the whole information and understood them 57.75%. They were interested in conservative information at slightly high level (60.25%). They thought that the efficiency of conservative data transference in their community was slightly high 61.00%.

The necessity to rely upon natural resources form community forest was low, as follows;

- harvest forest products for foods was 6.50% of the whole necessities
- harvest forest products for use was 12.25%
- wood products was 1.25%
- wildlife hunted for foods 3.75%
- indirect needs towards forests was below medium (36.50%) example; happiness, scenic/view, pride of relationship and etc

The samples opinion about formal leader potential, they gave medium level points for potential to motivate/persuade the community members to take part in conservative natural resources (50.75%). The samples thought that their formal leader interested in conservative activities rather high (53.73%) from the whole ones.

Besides they thought formal leader had knowledge, understanding including potential to manage conservative activities rather high level 52.00%.

As to an informal leader potential of Koa krating village, it was found the influential motivation to persuade the members to take part in the activities was medium level 39.75% and informal leaders interested in the community conservative activities in medium level 43.50%. In the same way, samples thought that knowledge, understanding and potential for conservative activities management of an informal leader had medium level 45.50%.

The community conservative activities trend could induce the samples to participate at medium level 55.25%.

As to the binding between the sample and the community forests, they had medium level 57.75%. And if way of life “human and forest” was changed and they was completely separated from the forests, they could adapt themselves to new life without forest with toleration 54.50% (compare with extreme tolerance; 100%). As to devotion to save the way of life with the forests was 52.50% (compare with devotion all of their life; 100%) indicating that they could survive and keep going on without any serious trouble.

For the opinion of the samples towards abundance of natural resources, in conclusion they thought the abundance of the natural resources of the community and surrounding areas were high abundance as 3.38 points. Seven topics of natural resources were high abundant level (3.41-4.20 points) i.e. aquatic animal species diversity, water quantity for consuming (eating), abundance of aquatic animals, water quantity for using, water quality, water quantity for agriculture and good scenic / view of the areas, respectively. Appendix table E7 provides the abundance of natural resources of Romphothong community in detail.

Appendix Table E7 The abundance of natural resources in Koa krating community

Topic of natural resources	Percentage of abundance/quality level (%)					Mean (points)	SD
	Very high (5)	High (4)	Medium (3)	Low (2)	Very low (1)		
1) soil fertility (soil quality)	0.0	46.1	38.5	15.4	0.0	3.31	0.731
2) sufficient of land for using	2.6	33.3	35.9	28.2	0.0	3.10	0.852
3) soil erodibility	*0.0*	*23.1*	*59.0*	*17.9*	*0.0*	*3.05*	*0.647*
4) water quality	2.6	64.1	20.5	12.8	0.0	3.56	0.754
5) water quantity for consuming (eating)	5.1	76.9	10.3	7.7	0.0	3.79	0.656
6) water quantity for using	0.0	74.4	12.8	12.8	0.0	3.62	0.711
7) water quantity for agriculture	0.0	64.1	23.1	12.8	0.0	3.51	0.721
8) safety from flood/over flow	*7.7*	*59.0*	*7.7*	*20.5*	*5.1*	*3.44*	*1.071*
9) safety from drought	*7.7*	*41.0*	*28.2*	*20.5*	*2.6*	*3.31*	*0.977*
10) forest area in the village	5.1	51.4	12.8	25.6	5.1	3.26	1.069
11) forest products for foods	0.0	41.0	33.3	10.3	15.4	3.00	1.076
12) forest product for using	0.0	41.0	35.9	12.8	10.3	3.08	0.984
13) abundance of wildlife in the areas	5.1	43.6	23.1	17.9	10.3	3.15	1.113
14) wildlife species diversity	5.1	38.5	28.2	15.4	12.8	3.08	1.133
15) abundance of aquatic animals	20.5	43.6	28.2	7.7	0.0	3.77	0.872
16) aquatic animal species diversity	20.5	53.9	25.6	0.0	0.0	3.95	0.686
17) good scenic / view of the areas	7.7	51.3	30.8	5.1	5.1	3.51	0.914
Average	**5.3**	**49.8**	**26.7**	**14.3**	**3.9**	**3.38**	**0.292**

Note: Natural resources abundance level: 1.00-1.79 points = very low abundance level, 1.81-2.60 = low, 2.61-3.40 = neutral, 3.41-4.20 = high and 4.21-5.00 = very high

Attitude survey from samples towards conservative community forest for co-using together in the community, it was found that Koa krating community had good attitude with total attitude score 3.70 points. Almost their attitude topics had good level (3.41-4.20 points), except one topic (the best conservative CF. wasn't prohibition using benefit of the forests absolutely; 2.92 points) they had medium level. Details were shown in appendix table E8.

Appendix Table E8 Attitude of the Koa krating samples toward conservative community forest (CF.)

Attitude topics	Percentage of opinion (%)					Mean	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagree (2)	Absolutely disagreed (1)	(points)	
1) Forests were owned for everyone, no one should be occupied.	10.3	46.1	28.2	15.4	0.0	3.51	0.885
2) Intrusion, destruction the forests were severely illegal deed.	15.4	71.8	12.8	0.0	0.0	4.03	0.537
3) without the forest, might cause drought	10.3	66.6	20.5	2.6	0.0	3.85	0.630
4) Conservation the forest was your obligation.	10.3	61.5	28.2	0.0	0.0	3.82	0.601
5) Your community had duty to conserve the abundant of CF..	7.7	61.5	30.8	0.0	0.0	3.77	0.583
6) CF. conservation was management for use together of people in the community.	7.7	64.1	28.2	0.0	0.0	3.79	0.570
7) CF. conservation would increase the other natural resources (as water quantity, air quality).	10.3	71.8	17.9	0.0	0.0	3.92	0.532
8) CF. was important sources of local food for the community.	10.3	56.4	28.2	5.1	0.0	3.72	0.724
9) CF. had essential resources for living of the people in the community (firewood, wood)	7.7	53.8	30.8	7.7	0.0	3.62	0.747
10) Community forests were important raw resources to make community products.	7.7	56.4	33.3	2.6	0.0	3.69	0.655
11) CF. was important sources of herbs for community.	7.7	56.4	30.8	5.1	0.0	3.67	0.701

Appendix Table E8 (Continued)

Attitude topics	Percentage of opinion (%)					Mean (points)	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagree (2)	Absolutely disagreed (1)		
12) The best conservative CF. wasn't prohibition using benefit of the forests absolutely.	5.1	25.6	28.2	38.5	2.6	2.92	0.984
13) The CF. areas should not be divided anyone to occupy and took benefits.	7.7	56.4	25.6	10.3	0.0	3.62	0.782
14) Cutting wood from the CF. shouldn't be allowed freely.	5.1	56.4	23.1	15.4	0.0	3.51	0.823
15) Hunted wildlife for consuming shouldn't be allowed freely.	15.4	46.1	23.1	15.4	0.0	3.62	0.935
16) Hunter career shouldn't be allowed to continue in the community.	12.8	48.7	30.8	7.7	0.0	3.67	0.806
17) Wildlife was important natural resources of the community to conserve.	25.6	61.6	12.8	0.0	0.0	4.13	0.615
Average	**10.4**	**56.5**	**25.5**	**7.4**	**0.2**	**3.70**	**0.261**

Note: Attitude level: 1.00-1.79 points = very bad attitude, 1.81-2.60 = bad, 2.61-3.40 = neutral, 3.41-4.20 = good and 4.21-5.00 = very good

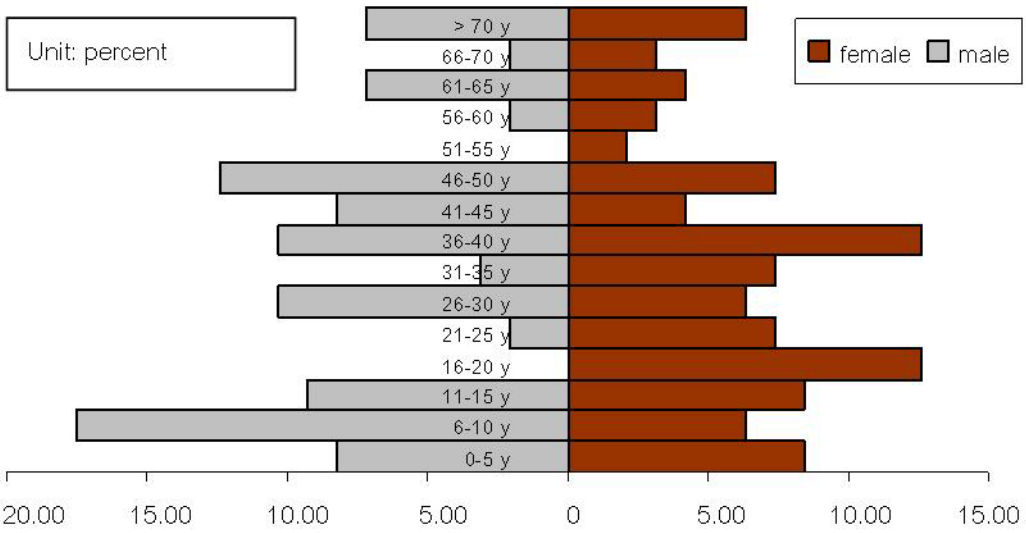
5. Khao kluaymai community (Moo 14)

Survey 48 samples, it was found that answerers were women more than men 66.7 and 33.3 %, respectively, ages between 21 – 77 years or mean 50.27 ± 15.645 years. Most of them got married and lived together 81.2%, the rest were married but not live together 8.3%, divorced/widowed 6.3% and single 4.2%. Most of them finished the primary school (77.1%), junior high school (4.2%) and no education (18.7%). All of them were Buddhists.

Only 12.5% were born in the village. Most of them emigrated from the other places (87.5%) i.e. northeastern (40.5%), eastern (28.5%), middle region (21.4%), the other district in Chachoengsao province (4.8%) and from other sub district in Thatakieb district (4.8%). The reasons of emigration were to occupy the lands 45.2%), to buy the land in this village (31.0%), to be persuaded by cousins or friends (23.8%), the settlement periods in Khoa klouymai were between 6 – 40 years or mean 23.56 ± 7.026 years.

For the place attachment feeling among samples towards dwelling in Khao klouymai, it was found that they need to settle permanently in this land 95.75% (compare with “live here till died”; 100%), love and care this lands 100.00% (compare with supreme love and care this land; 100%), and love and be attached to this land as their hometown/birthplace 96.75%.

The size of the sample families was average 4.04 ± 1.663 people; average men 2.06 ± 1.137 people, average women 1.98 ± 1.181 people and the sex ratio between men per 100 female was 104.04. It was a single family. Population pattern (sex and age) was uncommon, shown in appendix figure E5.



Appendix Figure E5 Population pattern of Khao klouymai community

Major occupations of the families were distributed as follow; field crop farmers 43.8%, general employees 35.4%, paddy field farmers 8.3%, traders 4.2% and other occupations 8.3%. Minor occupations were general employees 14.6%, civil servants/state enterprise officers 14.6%, gardeners 8.3%, field crop farmers 6.3%, paddy field farmers 4.2 and traders 4.2%. And almost half of the sampling families or 47.8% had no minor occupations.

Monthly income distributed widely between 2,000 – 30,000 baths/family, average mean was 6,489.58 ± 4,364.374 baths/family. The monthly expenditure distributed widely as well 2,000 - 25,000 baths/family, average mean was 5,532.61±3,847.558 baths/family. More than half of samples (68.75%) were in debt between 2,000–300,000 baths/family, average mean 35,878.79 ± 56,589.949 baths/family. On the other hand, 27.08% of sampling families had savings money around 2,000–20,000 baht, average mean 7,884.62 ± 6,522.889 baths/family.

Nearly all of samples had never be against the laws of forestry and wildlife (95.8%), occasionally did 4.3% and used to be warned by the conservative officers 4.3%. However, there was no history of arrest or prosecution.

The friendly relations between the samples towards the conservative officer was rather good, divided into neutral, good feeling (cooperated) and very good feeling (pleased to cooperate) 52.1%, 45.8% and 2.1% respectively. After calculation, the relationship between the community and conservative officers equaled to 62.50% (compare with pleased to cooperate feeling; 100%) indicating the good interactions which make them able to work together with pleasure.

As to conservative information receiving, 83.30% of samples had received ones; almost of them were informed through the community leader (80.0%), informed by their own neighbors12.5 and through the RFD officers or DNP officers 7.5%.

The samples received all conservative information in rather high criterion with average 66.75% of the whole information and understood them 65.75%. They were interested in conservative information at slightly high level (65.75%). They thought that the efficiency of conservative data transference in their community was slightly high 63.00%.

The necessity to rely upon natural resources form community forest was low, as follows;

- harvest forest products for foods was 10.50% of the whole necessities
- harvest forest products for use was 2.00%
- wood products was 1.00%
- wildlife hunted for foods 0.50%
- indirect needs towards forests was medium level (56.20%) example; happiness, scenic/view, pride of relationship and etc

The samples opinion about formal leader potential, they gave above medium level points for potential to motivate/persuade the community members to take part in conservative natural resources (61.50%). The samples thought that their formal leader interested in conservative activities rather high (62.50%) from the whole ones. Besides they thought formal leader had knowledge, understanding including potential to manage conservative activities rather high level 59.25%.

As to informal leaders potential of Koa krating village, it was found that leader potential to persuade members to take part in conservative activities was below medium level with 39.75%, their interested in conservation activities was also below medium level, scored at 43.50%. And in the same direction the villagers thought their unofficial leader had potential in knowledge, understanding for community forest conservation below than half (45.50%).

The community conservative activities trend could induce the samples to participate at medium level 52.50%.

As to the binding between the samples and the community forests, they had medium level 74.50%. And if way of life “human and forest” was changed and they was completely separated from the forests, they could stand but might not be happy with toleration 63.00% (compare with extreme tolerance; 100%). As to devotion to save the way of life with the forests was 66.75% (compare with devotion all of their

life; 100%) indicating that they could survive and keep going on without any serious trouble.

For the opinion of the samples towards abundance of natural resources, in conclusion they thought the abundance of the natural resources of the community and surrounding areas were high abundance as 3.40 points. Nine topics of natural resources were high abundant level (3.41-4.20 points) i.e. abundance of wildlife, wildlife species diversity, forest resources for eating, forest things for consuming, forest area, and scenic/view of the area, safety from flood/over flow, safety from drought and soil fertility (soil quality), respectively. Appendix table E9 provides the abundance of natural resources of Romphothong community in detail.

Appendix Table E9 The abundance of natural resources in Khoa klouymai community

Topic of natural resources	Percentage of abundance/quality level (%)					Mean (points)	SD
	Very high (5)	High (4)	Medium (3)	Low (2)	Very low (1)		
1) soil fertility (soil quality)	0.0	56.3	33.3	10.4	0.0	3.46	0.683
2) sufficient of land for using	0.0	22.9	47.9	18.8	10.4	2.83	0.907
3) soil erodibility	0.0	33.3	41.6	18.8	6.3	2.98	0.887
4) water quality	2.1	43.7	29.2	16.7	8.3	3.15	1.01
5) water quantity for consuming (eating)	4.2	39.5	14.6	16.7	25.0	2.81	1.315
6) water quantity for using	4.2	45.8	20.8	14.6	14.6	3.1	1.171
7) water quantity for agriculture	4.2	49.9	25.0	16.7	4.2	3.33	0.953
8) safety from flood/over flow	*0.0*	*4.2*	*58.3*	*25.0*	*12.5*	*3.54*	*1.148*
9) safety from drought	*4.2*	*58.3*	*25.0*	*12.5*	*0.0*	*3.54*	*0.771*
10) forest area in the village	8.5	53.2	31.9	6.4	0.0	3.64	0.735
11) forest products for foods	12.5	52.0	29.2	6.3	0.0	3.71	0.771
12) forest product for using	8.3	58.3	27.1	6.3	0.0	3.69	0.719
13) abundance of wildlife in the areas	16.7	68.7	8.3	6.3	0.0	3.96	0.713
14) wildlife species diversity	14.6	68.7	12.5	4.2	0.0	3.94	0.665
15) abundance of aquatic animals	2.1	54.1	16.7	27.1	0.0	3.31	0.903
16) aquatic animal species diversity	0.0	56.2	16.7	27.1	0.0	3.29	0.874
17) good scenic / view of the areas	4.2	58.2	31.3	2.1	4.2	3.56	0.796
Average	**5.0**	**48.4**	**27.6**	**13.9**	**5.0**	**3.40**	**0.348**

Note: Natural resources abundance level: 1.00-1.79 points = very low abundance level, 1.81-2.60 = low, 2.61-3.40 = neutral, 3.41-4.20 = high and 4.21-5.00 = very high

Attitude survey from samples towards conservative community forest for co-using together in the community, it was found that Khao klouymai community had good attitude with total attitude score 3.83 points. Almost their attitude topics had good level (3.41-4.20 points), except one topic (the best conservative CF. wasn't prohibition using benefit of the forests absolutely; 3.10 points) they had medium level. Details were shown in Appendix table E-10.

Appendix Table E10 Attitude of the Khoa klouymai samples toward conservative community forest (CF.)

Attitude topics	Percentage of opinion (%)					Mean (points)	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagreed (2)	Absolutely disagreed (1)		
1) Forests were owned for everyone, no one should be occupied.	4.2	68.7	16.7	10.4	0	3.67	0.724
2) Intrusion, destruction the forests were severely illegal deed.	16.7	70.8	12.5	0	0	4.04	0.544
3) without the forest, might cause drought	10.4	72.9	16.7	0	0	3.94	0.522
4) Conservation the forest was your obligation.	4.2	74.9	18.8	2.1	0	3.81	0.532
5) Your community had duty to conserve the abundant of CF..	6.3	79.1	14.6	0	0	3.92	0.454
6) CF. conservation was management for use together of people in the community.	14.6	75	8.3	2.1	0	4.02	0.565
7) CF. conservation would increase the other natural resources (as water quantity, air quality).	6.3	83.3	10.4	0	0	3.96	0.41
8) CF. was important sources of local food for the community.	6.3	77.1	8.3	8.3	0	3.81	0.673
9) CF. had essential resources for living of the people in the community (firewood, wood)	4.2	75	20.8	0	0	3.83	0.476
10) Community forests were important raw resources to make community products.	2.1	72.9	16.7	8.3	0	3.69	0.657
11) CF. was important sources of herbs for community.	16.7	66.7	8.3	0	8.3	3.83	0.996

Appendix Table E10 (Continued)

Attitude topics	Percentage of opinion (%)					Mean (points)	SD
	Absolutely agreed (point; 5)	Agreed (4)	Neutral (3)	Disagreed (2)	Absolutely disagreed (1)		
12) The best conservative CF. wasn't prohibition using benefit of the forests absolutely.	8.3	37.5	12.5	39.6	2.1	3.10	1.096
13) The CF. areas should not be divided anyone to occupy and took benefits.	4.2	72.9	10.4	12.5	0	3.69	0.748
14) Cutting wood from the CF. shouldn't be allowed freely.	6.2	81.2	6.3	4.2	2.1	3.85	0.684
15) Hunted wildlife for consuming shouldn't be allowed freely.	25	56.3	8.3	8.3	2.1	3.92	0.942
16) Hunter career shouldn't be allowed to continue in the community.	18.8	58.2	16.7	6.3	0	3.87	0.942
17) Wildlife was important natural resources of the community to conserve.	22.9	66.7	8.3	0	2.1	4.10	0.627
Average	**10.44**	**69.95**	**12.62**	**6.01**	**0.98**	**3.83**	**0.223**

Note: Attitude level: 1.00-1.79 points = very bad attitude, 1.81-2.60 = bad, 2.61-3.40 = neutral, 3.41-4.20 = good and 4.21-5.00 = very good

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