

Integrated water resources management of Mae Rim sub watershed
Chiang Mai province^{*}

การบริหารจัดการทรัพยากรน้ำแบบบูรณาการลุ่มน้ำสาขาแมริม จังหวัดเชียงใหม่

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Abstract

The study of Integrated water resources management of Mae Rim sub watershed in Chiang Mai province aimed to develop integrated water resources management with the participation of stakeholders in the watershed, to strengthen the communities in the watershed and to achieve the sustainable use of water resources and other resources involved. The 80 samples from 6 groups including of community representatives, local government, related government organization, education institutions, religion institutions, and representatives from the business sectors in the watershed. The data were collected by using observation, questionnaire, interview, seminar and focus group methods. The collected data were analyzed according to qualitative techniques, and the presentation of the result was done in a form of descriptive report.

The study found that the problems of water resources management in Mae Rim Sub watershed originated from inefficient management process and lack of correct integration process. Regarding solutions to the problem, the stakeholders in the watershed are working together to develop the water resources management and integration process. The findings have proposed the establishment of water resources management organization at a local level to promote participation of stakeholders in the area. In addition, the communities should realize the value of resources, the existing of water resources, problems, the respectation of themselves and pride in the wisdom of their ancestors. The communities have the opportunity to fully develop their potential to solve the problems by themselves, and to change the top-down management process, that the government sets policy and guidelines for the local communities to follow, to an acceptable bottom-up process that is determined by the community prior to presenting the management plan to the government. Then, the process of negotiation between local communities and government to form Mae Rim sub watershed

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agreement/commitment can be set up to achieve a true integration of water resources management.

บทคัดย่อ

การวิจัยครั้งนี้มีจุดมุ่งหมายเพื่อพัฒนากระบวนการบริหารจัดการทรัพยากรน้ำแบบบูรณาการในพื้นที่ลุ่มน้ำสาขาแม่มิมโดยกระบวนการมีส่วนร่วมของผู้มีส่วนได้เสียจากการใช้ทรัพยากรน้ำในพื้นที่ลุ่มน้ำ เพื่อสร้างความเข้มแข็งแก่ชุมชนในพื้นที่ลุ่มน้ำและเพื่อให้เกิดความยั่งยืนในการใช้ทรัพยากรน้ำและทรัพยากรอื่นๆที่เกี่ยวข้อง โดยผู้วิจัยได้กำหนดกลุ่มตัวอย่างเพื่อสร้างกระบวนการมีส่วนร่วมในพื้นที่จำนวน 6 กลุ่ม ได้แก่ ตัวแทนชุมชน ตัวแทนหน่วยงานองค์กรปกครองส่วนท้องถิ่น ตัวแทนหน่วยงานภารกิจ ตัวแทนสถาบันการศึกษา ตัวแทนสถาบันศาสนาและตัวแทนภาคธุรกิจ รวมจำนวน 80 คน การวิจัยครั้งนี้เป็นการวิจัยเชิงคุณภาพซึ่งผู้วิจัยได้ใช้กระบวนการมีส่วนร่วม การศึกษาเอกสารงานวิจัยที่เกี่ยวข้องประกอบกับการสังเกตแบบมีส่วนร่วมและไม่มีส่วนร่วม การสอบถาม การสัมภาษณ์ การสนทนากลุ่มย่อยและการประชุมระดับลุ่มน้ำ เพื่อให้สามารถตอบวัตถุประสงค์การวิจัยในครั้งนี้

ผลการวิจัย พบว่า ปัญหาจากการใช้ทรัพยากรน้ำในพื้นที่ลุ่มน้ำสาขาแม่มิมเกิดจากกระบวนการบริหารจัดการที่ขาดประสิทธิภาพ ขาดกระบวนการบูรณาการที่แท้จริง ดังนั้น เพื่อการแก้ปัญหาดังกล่าว ผู้มีส่วนได้เสียจากการใช้น้ำในพื้นที่จึงได้ร่วมกันพัฒนากระบวนการบริหารจัดการทรัพยากรน้ำแบบบูรณาการ ขึ้นโดยมีข้อสรุปว่า ควรทำการจัดตั้งองค์กรบริหารจัดการทรัพยากรน้ำในระดับท้องถิ่นเพื่อส่งเสริมกระบวนการมีส่วนร่วมของผู้มีส่วนได้เสียในพื้นที่ มุ่งเน้นให้ชุมชนได้ตระหนักในคุณค่าของทรัพยากรและปัญหาเกี่ยวกับทรัพยากรน้ำที่เกิดขึ้น รวมถึงตระหนักในคุณค่าของตนเอง มีความภูมิใจในภูมิปัญญาของบรรพบุรุษ เปิดโอกาสอย่างเต็มที่ให้ชุมชนได้พัฒนาศักยภาพของตนเองเพื่อนำมาใช้ในการแก้ปัญหาจากการใช้ทรัพยากรน้ำที่เกิดขึ้นในพื้นที่ลุ่มน้ำสาขาแม่มิมด้วยตนเอง ปรับเปลี่ยนแนวทางการบริหารจัดการของประเทศ จากรูปแบบ (Top-Down) ซึ่งเป็นกระบวนการที่ภาครัฐหรือผู้บริหารระดับสูงเป็นผู้กำหนดนโยบายและแนวทางการบริหารจัดการมายังระดับล่างให้ปฏิบัติตาม มาเป็นรูปแบบ (Bottom-Up) โดยชุมชนเป็นผู้กำหนดแนวทางการบริหารจัดการแล้วนำเสนอไปยังภาครัฐ และสร้างกระบวนการเจรจาต่อรองระหว่างชุมชนในพื้นที่ลุ่มน้ำกับภาครัฐเพื่อจัดทำข้อตกลง/พันธะสัญญาลุ่มน้ำสาขาแม่มิมเพื่อนำไปสู่การบริหารจัดการทรัพยากรน้ำแบบบูรณาการอย่างแท้จริง

INTRODUCTION

The Mae Rim sub watersheds is a sub watershed of Ping watershed, cover 3 districts of Chiang Mai; Mae Rim, Mae Taeng and Samerng. It is successful area on water management. Previously, although in Mae Rim watershed, there are several development projects of water use solution and development from involved authorities, both in local level and national level, including the receiving of enormous budget constantly, it is still found that all budget in the project cannot solve the problem of water use in the area sustainably. Additionally, there are many problems found in the area, for example the lack of water in drought season, damaged/ shallow water resource, flooding in rainy season, insufficient and unclean drinking water and tube water, especially tube water from mountain tube, and ineffective water

management of community because of knowledge lacking, fighting for water in drought season, lacking of water arrangement and lacking of academics who can manage on water management.

From current problems, it is likely that problem will increase in more severe level in the future for many aspects; agriculture, and consuming. As there is the expansion of inhabitant area, tourism and industrial area that needs more water. It leads to the fight for water both in the upstream area, in the middle and the end of the stream. This is because of the lack of good water management in each area, deforestation in some groups of people which cause upstream destroying. Because of severe tendency of the problems, including the failure of water management, it is necessary to have development of water management in Mae Rim sub watershed by depending on appropriate management that focus on participation of every group, water use analysis, analyze the factors leading to integrated water management to develop the water management process in Mae Rim area. The result of the study will lead to the findings of water management that harmonize in the area, solve the problem on water management, serving policy and strategy of national development that aims to have “ well living society, with morals, update knowledge, warm family, strong community, peaceful society, efficient economic, good environment and sustainable natural resource under good moral administration of democracy government system with the King as the leader, living with global community with dignity.”

The objectives of the study

1. To analyze the situation and problems of water management in Mae Rim sub watershed, Chiang Mai province
2. To analyze the factors leading to integrated water resource management in Mae Rim sub watershed, Chiang Mai province
3. To develop the process of integrated water resources management in Mae Rim sub watershed, Chiang Mai province

MATERIALS AND METHODS

This research is integrated study to see the whole look of the system by studying the sampling in local area and use variety of research tools for data collecting, in both quantitative and qualitative way. The qualitative data gained by participated observation and non-participated observation, and questionnaire of general state of watershed, the situation and problems or water management and factors involving community's water management in the area, additional suggestion on the integrated water management, interviewing on policy, project plan and method of water management of involving unit in the area, group

conversation on the situation and problem, on water management of people who gain and lost of water management to know the process of water management and other involved factors, and the meeting the watershed to develop the water management.

This study collects the data from 2 sources;

Primary Data; from participate observation and non-participate observation, questionnaire, interviewing, group conversation, and the meeting in the sub watershed area level.

Secondary data; data collecting from document analysis, text book, article, journal, study report, method involving water management, including policy and plans involving water management of concerned units in Mae Rim area both in the past and the future.

The study analyze primary and secondary data to develop the process of integrated water management in Mae Rim watershed area completely and correctly. The analysis is taken by data interpreting, expanding and summarizing by data and present study result in analyzed description from in order to answer the objectives completely.

RESULTS

Mae Rim sub watershed is a sub watershed of Ping watershed that is a main river of Thailand. It covers 513.65 kg. in total or 321, 031.25 rai, covering the area in 3 districts of Chiang Mai province ; Mae Taeng, Mae Rim and Samerng. For Mae Taeng district covers area of 5 Tambon; Pa Pae, Sob Perng, Mung Gai, SanPayang and Kee Lek. Mae Rim district covers the area of 5 Tambon, Saluang, Huay Sai, Rim Nue, Mae Ram and Rim Tai. Samerng district covers 3 Tambon, Sanmerng Nue, Mae Sarb, and Yang Mern. The area of Mae Rim watershed mostly is mountain and some parts are plain area and hill. The forest area is $\frac{3}{4}$ of the whole area and it is an important headwater of several rivers in the area which is divided to be 4 small watershed: the Upper Mae Rim watershed, the lower Mae Rim watershed, Mae Hao watershed, and Mae Ram watershed.

Because of its prosperity, Mae Rim sub watershed has been developed quickly in every aspect and the coming of various business, the increasing of infrastructure. makes the area becomes an industry source, manufacturing, service and tourism industries. The numbers of immigration and setting up in the area from both local Thai and hill tribe people (Karen, Hmong, Lue and Lisu) that cause diversity of hilltribe, language, religion, belief and culture. In Mae Rim sub watershed, there are 49,175 residents; 24,396 men and 24,779 women with 19,538 households. Most of the population is in working age, 20-60 years. The hill tribe people

who are living in the area are mostly Buddhists, and some are Christian. On the education, most population graduates compulsory education level which is primary school.

The main occupation of the people in the area are agriculturist, ranch, general employee, industry workers and some are civil servants. The main fields are rice, fruits such as Lychee, mango, orange, northern vegetable- chilies, cauliflower, carrots, beetroot, winter flower – Lily. On the ranch, there are cow, dairy farm, buffalo, pig, chicken and duck. Part time job or supplementary job of the residents are products of women's skill development group, house-wife group, elephants camp management, cow farming to serve as cow cart for tourism, etc.



Figure 1 : General context of Mae Rim sub watershed

Situation and problems on water use in Mae Rim sub watershed.

(The analysis of data from the interviews, focus group and survey observations of a representative sample of stakeholders in the area)

1) Lacking of water in draught season, river that flow water to agriculture area has no water and the water from irrigation is not enough canal in each area is draught canal does not meet standard and cannot deliver water of agriculture area. In water canal, there is sediments so much that it cannot conserve enough water.

2) Problems of drinking water and tube water found is that when wellhead becomes draught and tube water is not clean, especially mountain water tube which is muddy and red in rainy season and cannot be used. Water is not enough to use in draught season.

3) Problems of water resources are damaged or shallow. Reservoir and dam are shallow so the water cannot flow smoothly. Also sediments blown during flooding season are piled up and leads to shallow water resource. The draining is blocked in dense communities. Some water resources are ruined and left over without any maintenance, also problems of polluted canals.

4) Problems of water management communities that is inefficient because of the lack of correct understanding and knowledge on water management in communities. There is fighting for water in draught season. Also there is the lack of water arrangement and experts on water management who can cooperate with local communities to solve the problems.

5) Problems of flood in flooding season because there is not enough water storage reservoir. The existing water resources are in problems from piling up of sediments. Villager's dam and canals are too damaged and shallow to keep rainwater. Water barrier is scoured until they are damaged and left without maintenance.

6) Problem of deforesting, especially in the headwater area, in most of the area, forests are destroyed to make agricultural land and motivating plantation, including the invading of capitalist and tyrants to plant several economic plants and implant tourism business, especially in the headwater.



Figure 2 : Situation and problems on water use in Mae Rim sub watershed

Problems on water resources management in Mae Rim sub watershed

(The analysis of data from the interviews, focus group and survey observations of a representative sample of stakeholders in the area)

1) Problems on communities. There is the change of attitude, belief and original way of life in the communities on water use, the significance of natural resource and water resource has been changed. The communities lacks of preparation to encounter problems of water resource that may occur and integrated self-dependence process and water management and solution. The community is separated in several groups and not in harmonies. There is conflict and the understandings do not match water management and solution of units in the area because of different knowledge and understandings between authorities units and community.

2) Problems on water organizations management (Community organization/ watershed) Organization or group that established are not supported constantly. There is no clear objectives and direction, which leads to the lacking of work's direction and activity development to achieve objectives. The work of organization of water administration existing are only temporally institute for the issue from times to times but not constant and not clear in structure, role, authority and administration. So, there is no motive for the work and the lack of budget for activities and co-ordination with organizations and network, also the lack of following and monitoring leading to the weak in organizations.

3) Problems of administration model. The problem emerged from lacking of participation from people in community on water management, lacking of discussion stage opening involving people in the area to exchange and propose their opinions. The water management solution of involved authorities do not serve the real requirement of the community. There is no integrated management together among stakeholders in the area and no basic data involving water resource. That is systematical and update.

4) Problem on morality and the mind of water management. Local people lack of themed on natural resource using. They do not take care of water resource in their own area and that causes damaged canal. People also lack of Lord Buddha's preach to stay away lust, greed and selfishness, especially on exploiting natural resource in the area. The involving authorities also ignore problems and do not pay attention on solving problems.

5) Problems on providing education, training for the correct understanding. In the present, most education institutes in the area and some groups of academics focus only on score of examination, not morality and the mind of natural resource conservation.

6) Problems on state's policy and involved laws. Previously, Thailand has not had an efficient water manage enough, the solutions on water problems are just extempore treatment and the works are separating works, there is no integration, some water management laws do not cover every activity, Some laws involve water directly but some do

not concern on water much. In the present, there are a few laws that involve with water resource but most of them do not contain entire content on water, they are complicate, are not united and above all, the country's governing is from top-down or setting up the policy from the top to leads the country and neglect the significance of local communities.

Integrated strategy of water management in Mae Rim sub watershed by stakeholders

Community aspect

- Promote and support communities in Mae Rim sub watershed to recover culture and indigenous strategy on water management

Water management organization aspect

- Appoint a main host on water management in Mae Rim sub watershed area
- Promote to group of all stakeholders in the area to set up network of each group to administrate water resource in the area and create integrate work on water management for straighten every network group
- Develop work process of existing water management organization such as committee in every levels involving the area of Mae Rim sub watershed, both in main river basin level (Ping watershed) and sub watershed level (Mae Rim watershed) by appointing the role and position of the work committee and step of work to be clearer and more strictly.

Administration aspect

- Give opportunity to communities in Mae Rim sub watershed to participate in consideration and making decision of administration and problem solving on using water resource in the communities.
- Every involving authority, both local unit and the mission unit in the area of Mae Rim sub watershed should coordinate on planning water management together so that water management of several units are in the same direction as intergradations form.
- Morality and mindfulness on natural resource use
- Promote and support communities in the area to have mindfulness on using and taking advantage from environment and natural resource.
- Promote and support communities in Mae Rim sub watershed to have water management following Royal idea of the King. For example sufficient economic method and the new agriculture method.
- Add content of natural resource and environmental conservation harmonize with religion activities, merit festival, tradition ceremonies of communities in the watershed.

Education management aspect and understanding making

- Cooperate to establish the process or several activities to pass on correct knowledge on natural resources, ecology and the use of natural resource to create sustainability to people in the area so they know, understand and realize of natural resource 's value.
- Develop curriculum and teaching process of educational institutes in the area to promote natural resource conservation and environment more.

State policy and involving laws aspect

- Use the solution that starting from community base in every process of watershed management, both in the main watershed and sub watershed and have opportunity to express their opinion and make decision on direction of solution to meet the problem and the real requirement of communities in the area.
- Consider of necessary additional law and follow the law strictly to fix the criteria and standard to control problems occurred and catch up current situation.

Factors leading to integrated water management in Mae Rim sub watershed; 10 main factors as followings

1. Main integrated organization
2. The participation of stakeholders
3. The efficiency of water management by community
4. Efficient data base system.
5. Education and understanding /knowledge system
6. Integrated water resources management plan
7. Strategy (measure and incentive) of water management
8. Law enforcement, several regulation that harmonized with the whole area of watershed
9. The agreement/ commitment of the sub watershed
10. The morality and good governance

Integrated water resources management process of Mae Rim sub watershed consist of 5 important process:

1st process specify group of all stakeholders in Mae Rim sub watershed that can be classified to 6 groups:

- Community in the area
- Local authorities

- Mission unit from government
- Educational institutes
- Religion institute
- Business enterprise

2nd process specify work structure of local organization that participated by all groups of stakeholders in the area to show the real requirement of communities in Mae Rim sub watershed to government, by establishing integrated water resource management organization (Integrated water resources management center : IWRM Center) in every local authorities in Mae Rim sub watershed to be the main host of water resources management for integrated of working factors, involving factors, as well as coordinating position from all stakeholders in the area.

The process of establishing water resource management organization as followings:

1. Prescribe the vision, mission, objective and policy of the organization
2. Design the administration structure of the organization
3. Specify the role, position and participation of the working team(stakeholders in 6 groups; community, local authorities, mission unit from government, educational institute, religion institute and business)
4. Schedule and step of work process
5. Specify the administration resources
6. Prepare efficient data base system
7. Arrange the integrated water resource management plan
(local level, sub watershed level, watershed level)
8. Making Mae Rim sub watershed agreement or memorandum of understanding

3rd process Present the Mae Rim sub watershed agreement or memorandum of understanding to the government in order to move into the negotiation process.

4th process Operation step by

- Establishing the Integrated Water Resources Management Center (IWRM CENTER) in every local authorities (13 places) in Mae Rim sub watershed
- Making Mae Rim sub watershed Memorandum of Understanding : MS MOU)

5th process Monitoring and assessment for improving the process

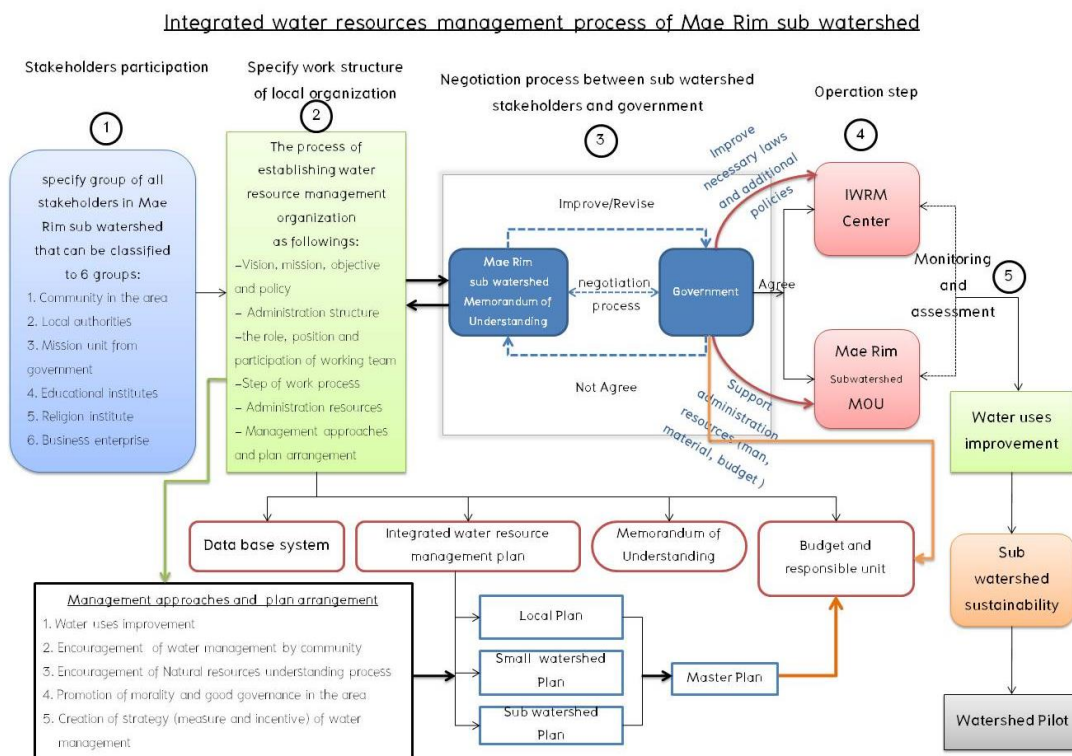


Figure 3 : Integrated water resources management process of Mae Rim sub watershed

CONCLUSION

According to the research finding, there are important issues to report as following:

The integrated water resources management in Mae Rim sub watershed area are in 2 approaches as following:

The first approach is the approach of water resources management by community self-management of all stakeholders in the watershed. This approach is on the controlled factors that including of cooperative factor, community self-management, data-base management, integrated water resources management and educational system. Previously, all stakeholders determine approach to manage the control factors starting from the existing problems, objectives, procedures, other essential resources (material, tools, equipments, staff, data, knowledge, skills, experiences, local wisdoms, academic knowledge, technology, budget and others involves) continuously evaluate the project to consistently improve and develop water resource management. Therefore, this approach needs restrict efforts among all stakeholders to find more effective resolution and management, enhance strength to all stakeholders, encourage negotiation power of stakeholders in Mae Rim sub watershed which finally leads to the integrated water resources management with government sector respectively.

The second approach is the approach of integrated water resources management in Mae Rim sub watershed. This management approach is on both of controlled and uncontrolled factors by using cooperative among all stakeholders in the watershed and government sector base on integrated process. For successful integrated management need to have participation of all stakeholders and resources management supporting by government for sustainable water resources management and the best solution in the watershed.

The process of integrated water resource management of Mae Rim sub watershed area is a process to promote all of stakeholders from the use of water resource in the area to participate in every step of the process indeed. The stakeholders from the use of water resource in Mae Rim sub watershed are community, local authorities, mission unit from government , educational institute, religion institute and business enterprise. The process of stakeholders participation should be starting from understanding the problem, finding solution and solve the problem by integrated process. The objective of this process aiming to enable community to have mindfulness in natural resources and problem occurred, realize in self-value and proud of ancestor's indigenous wisdom. It opens fully to let community show its potential to solve water resource management problem, in while of the government would be merely sponsors for necessary factors ; staffs, equipment, materials, information, knowledge, academics, technology and budget. This process indicates that community is the main factor in propelling solution process on water resource in the area and following Thailand's constitution on promoting community's participation in resources management of their own area and the transferring authority on water resources management to local community. Previously, although Thailand's constitution prescribe that local government organizations have authority on water resources management in their own area, the real operation is still accepting policy and demand from government. Thus, local community cannot operate on solving problem of water resource in the area concretely and clearly. Also, problems on work structure in administration and problems solution of water resource in the area is not clear, plus the lack of necessary administration resource such as staffs, equipment, material and budget which leads to inefficient water resource management that doesn't meet community's requirement. Therefore, integrated water resource management in Mae Rim sub watershed has adjusted the administration process from prescribing from government to be mainly worked by local community cooperated by stakeholders in Mae Rim sub watershed to set up the Integrated Water Resources Management Center : (IWRM CENTER) to solve the problems that meet community requirement and encourage local units to manage on water resource management concretely.

The conclusion of integrated water resource management in Mae Rim sub watershed has lead to the change of the country's administration. Previously, all of administration process and problem solving in national level, provincial level and local level are all in the form of Top - down that is the process that government or high executives make policy and strategy of administration to the lower level. But it is still shown that the strategy cannot solve problems efficiently and sustainably in every level of society. Therefore, the process derived from this research is concluded that the administration and problem solving on water resource in sustainable level needs to depend on community base, local community is the planner of administration and propose to government in the form of bottom – up in order to have the solution that meets the real community requirement. This process is made through negotiating process between the stakeholders in Mae Rim sub watershed who are the owner of the area and the government who is the country's administrators and the nation policy planner to find conclusion on water resource management process of Mae Rim sub watershed. Then there will be Mae Rim sub watershed Memorandum of Understanding : MS MOU which is accepted from every involvers. The negotiating process will provide opportunity for community to participate and show their potential and strength, following country's development policy that promote participating process for local community in every activity of the development. Empower for community-self management

The stakeholders in this area and government have equality in expressing their opinions. Communities will change their attitude from receiver only (weakness community) to be self-dependence community (Civil community) with negotiating ability. That means the equality of negotiating power between sub watershed community and government.

Above all, communities have mindfulness on problem, perceive and understand the problem that they cooperate to solve the problem by themselves. There is the emergence of self- dependence, encouragement of solving problems, harmony and strengthen community which leads to efficiency of water resource management and other involved resources for sustainability of natural resources, society and economy in Mae Rim sub watershed area.

The shift in management is not only for central or regional government sector but also encouraging community base who are committed to ensuring the sustainable use of water resources from previous top-down policy to bottom-up which allow the resource harvests to reflect their needs. The integrated alignment from both authorities and their relevant stakeholders can solve the problems, create effective management and response to actual people's need.

This Mae Rim integrated water resource management convinced people to aware of their problem, understand, join in community self-resolution, gain spirit in tackle their own problems, community harmony and strength which lead to effectiveness in water resource management and sustain natural resources, social and economic in Mae Rim sub watershed. This corresponding to the idea from water resources management in many countries that is “The best water resources management approach is the management by people or community in the watershed” Consistent with the concept of Chiang Mai self-management that is the concept for strengthen the local community to revive an important tool which is the basis of the community rules, the process of social self-understanding. Apply knowledge of self-management and adaptation. The power of the local community is not only provide information but it is the fulfillment of knowledge, understanding and self confidence that can make better changes and lead to self-solving problem of communities.

Therefore, solving the problem of water uses and water resources management in the watershed need the local authorities to be a major unit in the integration of all stakeholders and also promote the participation of the stakeholders in every process, support to effectively water resources management by the community, using a effectively database system, provide education and awareness process that encourages the proper watersheds management, integrated water resources management plan, create the measures and incentives in water management, necessary law enforcement, making the agreement/commitment of the watershed by stakeholders base on the principles of ethics and good governance in all sectors involved. Then, these are the factors that can lead to the true sustainability of natural resources, social and economic of communities in Mae Rim sub watershed.

SUGGESTION

GENERAL SUGGESTION

This research could possibly get integrated water resources management in Mae Rim sub watershed through participatory process from all stakeholders. The researcher would suggest another approaches for more effective management are include:

1. Promote public relation and create understanding among stakeholders in the watershed to make awareness and attention to their own watershed through various media such as radio station, television station (MRS channel), website (www.maerimsubwatershed.com) etc.
2. Create network group which could enhance community strength through modern social network such as facebook, Instagram etc.

3. Encourage community voluntary and active involvement of partners to preserve natural resources such as reforestation, making dike, dredging the canal and water drainage channel etc.

4. Determine procedure as a guideline to effective integrated water resources management including of process, resources management, budget, person and relevant service sector so that there could be concrete and actual field operation in the watershed such as factors in community water management, measurement motivation, educational system, understanding and moral development.

5. Closely evaluate each step for achieving determined objective in 2 active ways which are:

- Internal evaluation (self-evaluation by stakeholders)
- External evaluation (by Mae Rim sub watershed committee and Mae Ping watershed committee or others involve)

6. Government should support in term of budget and other essential infrastructure development which use in solving problems in watershed.

7. Enable factors to promote efficiency in cooperation from every partner.

8. All stakeholders should follow the strategies, support this reconstruction to actual application and consider this research finding as a demonstrable improvement in water uses efficiency to trial in the engaging area.

9. To gain efficient process of water resource management, needs to have cooperation from every involved both of government and the stakeholders in the watershed.

10. There should be monitoring and assessment constantly to improve and develop the integrated management process to be more efficiently.

SUGGESTION FOR FURTHER RESEARCH

1. There should be study of other resource management process or in other model to encourage and support for better integration.

2. There should be study of integrated water resource management in other sub watershed in order to have emergence of integrated water resource in the main watershed and the national watershed.

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