

Questions: Can we explore in the study:

1. village governance structure?
2. measure of success?
3. implications to lentic water management?
4. prevention of erosion and other watershed degradations
5. implications to forest management
6. upstream downstream issues (upstream downstream exchange, sympathy)
7. effective knowledge transfer mechanisms
8. reasonable exist strategies
9. implications to the management of the entire river/lake basins
10. comparison to other cases (e.g., Mono Lake case?)

PROJECT OUTLINE

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Title of Project:

Participatory on Aquatic Environmental Education Program for School, Local and Tribal Communities in Some Watershed Areas of Chiang Rai and Mae Hongson Provinces, Northern Thailand

Period of Research: 3 years (2008-2010)

Purposes:

1. To promote the exchange of knowledge on effective learning and create synergetic partnerships in the caring of local rivers, stakeholders of a network of primary and junior-high schools and communities in Mae Lao and Mae Kham watersheds in Chiang Rai Province and Mae Yuam watersheds in Mae Hongson, Thailand.
2. To improve students and citizens awareness and behaviors focused on streams water quality and Quantity.
3. To train students, school teachers and community leaders on the topics of aquatic environment and water quality monitoring.
4. To improve the local life quality by participatory action activities and could be transferred to the other area.

Project overview

The project will provide the co-operation (field study) and collaboration (Knowledge management) between university staff and local community members. The data collecting in field and discussion along corporate members will make an exchange between both sides, such as students, community members and hill tribe communities may reveal the environmental

protection by their community spirits or the living behavior. On the other hands, the university staff will inform the method of environment protection to members of the other side. Finally, the knowledge will issued by combination between researcher (university staff) and communities. The students and local community members will know about the serious factors which effect to their environment especially, the water for household consumption and agricultural activities. They will learn about protection of stream, the important of water for daily life used. However, the emotions or behavioral may not improved clearly in the short duration. But they will be better in the future. They will be assigned to protect and monitor water quality. One of the key-point results will be shown that the decreasing of patient or illness in the operation area. The water quality monitoring activities will be continued for water quality investigation and protection. Furthermore, the participants who concern the knowledge can provide or show these activities to the other groups. The long-term and sustainable activities are the final aim of this project. However, the other indirect succeed is the emotion and inspiration to protect the environment in the participants especially, the students who will be grown up and will be importance part of their communities in the future.

Plans and Methods:

The procedure of the project will be followed the tentative schedule as Table 1. The steps consist of target area survey, workshop/training, field study, data analysis, evaluation and guidebook production. The first and second year activities will be the same steps but different in communities. Whilst, the third year activities will be community visit, meeting among all project members and the evaluation of the overall project. The detail of first and second year activities is as followed.

1. Location survey

The area surveying was done following the map of Mae Lao and Mae Kham watersheds which located in Chiang Rai Province and Mae Yuam watersheds in Mae Hongson Province, Northern Thailand. These areas are occupied by 4-5 different hill tribes living with local communities. Two main conditions as location and potentiality of each schools/community would be considered. The schools/communities would better be located close to the streams and distributed around different rivers or areas of Mae Lao, Mae Kham and Mae Yuam Watersheds. The number of school and communities of main streams/rivers would be, 10 schools/communities in Mae Lao watershed, 10 schools/communities in Mae Kham watershed and 10 schools/communities Mae Yuam watershed. The schools/communities would be visited. In addition, the agreement would be provided by both sites.

2. Training

The participants selected from schools and local communities, would participate the 2 days training course. The training course aim to give the idea and to make understanding about aquatic environment, the importance of water quality, the relationship between physical, chemical and biological components in streams/rivers and certainly, to create awareness of keeping water clean. The training course would be divided into 2 parts as lecture and practical work.

2.1 Lecture topics would be simply defined as

- General ecology and aquatic environment
- Physical properties of aquatic ecosystem
- Chemical properties of aquatic ecosystem
- Biological composition of aquatic ecosystem
- Human impacts
- The use of Hill Tribe Participatory Evaluation Index

2.2 The practical works would be headed to

- Sampling techniques
- Physico-chemical parameter measurement: water temperature, colour, odor, width, depth, water velocity, pH, DO, BOD etc.
- How to use Hill Tribe Participatory Evaluation Index
- Macroalgae sampling technique
- Aquatic macroinvertebrate sampling technique
- Bacteria sampling technique
- Identification techniques

* The equipment for measurement and collecting will be distributed to each schools/communities

3. School Student Practical works

After the training course, trained participants would start their own projects. The target groups would be effective members of communities and final year of primary school students and second and third year junior high school students. The trained participants would be expected to transfer the knowledge and techniques to the target groups. Along this process, staff team will visit the school as often as possible. Target students would be set for group working in each area or village. Each group will be assigned to do the practical works. These practical works is divided into 2 parts as basic physical-chemical team and biological team. Each group would be assigned to collect the field data at least once a month, 12 months in total. The data including physical-chemical and biological data will be collected from the stream and/or river close to their area. The physical-chemical data are water colour, water odor, stream width, depth, water velocity, water temperature and pH of water. The data would be recorded in provided data sheet by students. For biological data, the aquatic macroinvertebrates including aquatic insects, bivalve mollusk, gastropod (snail) and oligochaete worms and macroalgae would be simply collected from different micro-habitat of stream/river. Then, the organisms would be identified in field by using provided illustrated key books.

Both of the group will collect and measure the samples together. The responsibility of work will be switch between each group within their area. When practical work is done in each collecting times, they will make a briefly discussion. The data will be prepared as a spreadsheet and send to the university staff directly via the local coordinators.

4. Data analysis

Hill Tribe Participatory Evaluation Index

Hill Tribe Participatory Evaluation Index is an index that combines the factors related to the water quality and quantity, riparian activities and the feeling to the water. Aims of the determination of the index are to establish the utilization of running water for combination of water used and to express different graduates. The Hill Tribe Participatory Evaluation Index is one of many indices used as a tool to classify and reveal the situation of water quality. To calculate Hill Tribe Participatory Evaluation Index, measurements of some physical and chemical properties and riparian condition are needed. Those physical and chemical properties are water temperature, pH, DO, BOD, water volume and velocity and some nutrition. The riparian condition are also including in the Index. The riparian activities are the riparian plants, the feeling of people that related to the water. The data from each factor will be process by 5 axial gradients. Each gradient will combine together for compare the situation of each sector and category. The Hill Tribe Participatory Evaluation Index of the investigation activities in each time can keep as the previous data base for net investigation. The changing of the sector and category in each investigation time can revel the better of worse water quality in the stream.

5. Network meeting

The meeting along staff team and participants will be located at the selected villages every 3 months after field study started. The meeting aim to discuss the problems and the progress of each school. Participants would be expected to present the progress and result of the project.

Table 1 Schedule of the project (1st and 2nd year project)

| Month Program | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|
| Planning | ↔ | | | | | | | | | | | |
| School survey | ↔ | ↔ | | | | | | | | | | |
| Document preparation | | ↔ | ↔ | | | | | | | | | |
| Workshop/ Training | | | | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | | | |
| Field study and data analysis | | | | | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | |
| Network meeting | | | | | | | ↔ | | | | | |
| Evaluation | | | | | | | | | | | | ↔ |

6. Budget plan (for 2008)

The budget will be including the schools/communities supports, workshop and equipments.

6.1 General

- The transference staff (3 x 60,000 Baht) 180,000 Baht
(Two members will come to Japan and one will visit Thailand.)
- The schools/communities support
(20 schools/communities x 3,000 Baht) 60,000 Baht
- The fee for coordinator in each watershed
(3 x 4,000 Bath) 12,000 Baht

6.2 workshops

- 2 Days workshop* (2 times in Mae Lao Watershed,
2 times in Mae Khum watershed and 1 time in Mae
Yuam Watershed) in total 5 times x 22,000 Baht 110,000 Baht
- School Visit and meeting* (5 times x 10,000 Baht) 50,000 Baht

* including transportation, accommodation and help of university students

6.3 Equipments

- Equipment for school collecting and measurement
(15 schools/communities x 4,000 Baht) 60,000 Baht
- Equipment for researchers 20,000 Baht

Total 492,000 Baht
(Four hundred and ninety-two thousand Baht)

* **Remarks:** For 2009 and 2010, the budget of almost the same amount will be necessary to perform the plans.