Integrating Socio-Cultural With Economic And Environmental Issues In A River Basin: A Case Study Of The Upper Chao Phraya Headwaters, Northern Thailand

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Abstract This paper describes the socio-cultural research component of a three-year collaborative project, which will develop and apply an integrated approach to water resources assessment and management in the Ping River Basin in the Northern highlands of Thailand. The project will develop participatory and analytical approaches to assist the government and other stakeholders to identify and assess options for highland resource use.

The socio-cultural research team is responsible for developing a planning framework, identifying and working with stakeholders, and managing their participation in the project. Stakeholders visions will set the scope for the biophysical, economic and social information collected, and help to focus a set of development options to be chosen for detailed analysis. The participatory process will be used to encourage, and devise approaches for, stronger public participation in Thai environmental decision-making. As part of the assessment of options, the socio-cultural team will conduct social impact assessments. The team will also contribute to the development of a decision support system.

I. INTRODUCTION

This paper describes the sociocultural research component of a three-year collaborative project, starting in mid-1997, which will develop and apply an integrated approach to water resources assessment and management in the Ping River Basin in the northern highlands of Thailand. The project is a collaboration between the Royal Project Foundation of Thailand and the School of Resource Management and Environmental Science, Australian National University.

Our project will develop participatory and analytical approaches to assist the government and other stakeholders to identify and assess options for highland resource use, to provide more effectively for the sustainability of the inhabitants' natural and human resources. To achieve this objective, the project will examine the economic, environmental and socio-cultural implications of different levels and patterns of cultivation and other water use in two representative catchments within the Ping Basin.

The types of land and resource use taking place within the highlands of Northern Thailand have socio-cultural, environmental and economic impacts, both on-site and off-site (downstream). An important issue is the extent to which changes in land use in the highlands can contribute to downstream flood damage, sedimentation and the patterns of dry season flows. Another is the social impacts of measures adopted to curtail opium cultivation, swidden agriculture and deforestation. We hope that through

our project alternate scenarios of pattern and intensity of land use may be identified to provide for more sustainable development, by better promoting the inhabitants' socioeconomic and cultural welfare, and minimising impacts such as soil loss, flooding, drought and downstream water pollution.

The project is guided by an assessment framework, described below, which fosters the participation of stakeholders in presenting and comparing their visions for northern development, considering and evaluating options for future development, and generating participatory processes for implementation of those options. The research team - consisting of Thai and Australian scholars and Thai public servants – will undertake four research components. The socio-cultural, economic, and biophysical research components will conduct a participatory planning process, provide an interdisciplinary resource assessment, and assist in the generation and evaluation of options for future development. They will integrate their findings into an operational decision support system to assist the stakeholders in their future decision-making (the fourth research component - see papers by Wong and Mackey *et al.*).

2. THE PING BASIN

Like many parts of Asia, Thailand is currently facing a range of adverse impacts of conventional fragmented approaches to natural resource management. Over-exploitation of land and water resources has accompanied Thailand's rapid growth since World War II. Economic developments have in

many instances focussed on short term gains and neglected the potential social and environmental costs of production. Activities such as deforestation, irrigation, hydroelectricity generation and intensification of agriculture (including increased use of pesticide and fertilizer) have provided economic opportunities but have also placed pressures on the natural resources. The result has been adverse environmental effects on land capability (translating economically to a drop in productivity), river flow regimes, flooding and water quality, as well as negative social impacts on cultural traditions and values.

The Ping Basin (area 40 000 km^2), is one of the headwaters of the Chao Phraya River, the major drainage basin in Thailand. Like most basins in the north of Thailand, the Ping basin faces mounting human pressures on natural resources on the one hand, and several constraints to improving productivity and resource use efficiency on the other. There are increasing and highly publicised conflicts over water allocation, water quality and quantity. One of the main sources of conflict relates to the offsite impacts of deforestation in the highlands. From 1961 to 1986, forest cover in Thailand declined from 53% of the total land area to 29%, corresponding to the clearing of about 45% of Thailand's forest resources (Phantumvanit and Sathirathai 1988). This deforestation has been widely blamed by lowland people for exacerbating both flooding and drought problems, as well as for increasing erosion and hence turbidity and sedimentation problems in the Chao Phraya river system (TDRI, 1995). As a consequence, the extent to which changes in highland agricultural activity might minimise impacts such as soil loss, flooding and drought patterns and downstream water pollution has become a focal issue for national policy debate.

The environmental issues in Thailand's highlands are inter-related with relationships among stakeholders. The public construction of the environmental issues is very much a 'top-down' one on the part of government, and an ethnocentric one on the part of the majority population of ethnic Thais. Impoverished local farmers, many of them members of hill-dwelling ethnic minorities, are widely blamed for destruction of forests and soil erosion, though the causes of the current environmental problems are complex. Other causes, such as the effects of commercial logging prior to 1989, and the effects of new commercial activities in the highlands, receive less popular attention. Villagers can equally be construed as responsible and effective environmental managers, doing their best under conditions of reduced land availability (Rerkasem and Rerkasem 1994, Narintarangkul na Ayuthaya, 1997, Ganjanapan, 1997).

One of the challenges of northern development is to improve the economic welfare of the highland communities while maintaining their cultural traditions and minimising negative environmental impacts. In addition to the ethnic Thai villages, around 700,000 hill people with nine distinct cultures inhabit the highlands. While various highland development projects have raised the standard of hill village infrastructure, the hill peoples still have more limited access to educational and health services, and tend to earn lower incomes than other sectors of the Thai population. Through its National Policy on Hill Tribes the Thai government has an official commitment to integrate the hill peoples into the Thai state, to raise their economic standing and to assist them to maintain their unique cultural heritage. However, many still lack formal citizenship status.

Over the past two decades, the system of agricultural production and other land and water uses in the Ping Basin have undergone a dramatic transformation. This has been assisted by a number of factors. Firstly, the number of stakeholders competing for highland resources has increased: private sector interest and investment in highland resorts and restaurants have grown; populations of established highland communities have risen significantly; and there has been a marked increase in immigration by lowland people seeking potential high returns from highland cash crops. Secondly, public concern that deforestation was exacerbating drought and flooding problems has influenced the state to increase protected areas (watershed areas, wildlife sanctuaries, national parks) in the highlands. Thirdly, greater contact with lowland Thai people has gradually altered the traditional highland communities' perceptions of living standards and motivation for income improvement. Policy and aid measures to substitute heroin growing with other cash crops, have affected forest cover, land use and water quality, and proved problematic in terms of the distribution of economic development aid.

For the highland communities, the impact of these factors has been an increasing scarcity of arable land, and pressure for expanding agricultural output. As the feasibility of agricultural expansion has diminished, agricultural intensification has become widespread throughout the highlands as a means of increasing income and providing continued food security. While intensification of highland agriculture "can effectively reduce land requirement, by raising land productivity, thus allowing degraded forests to regenerate" (TDRI 1994 p128), it has also been associated with a range of adverse environmental effects. Reducing fallow periods and cultivation of marginal land may exacerbate onsite soil erosion. In turn, increased soil erosion may contribute to increased turbidity and sedimentation downstream. Pesticide and fertiliser use

may be washed off and hence affect the toxicity levels of the soils and the nutrient loading of streams, further restricting the potential uses of already polluted waters of the Northern streams. Enters (1995) points out however that the assumed hydrological impacts of land use change are based on limited scientific understanding, and do not show up clearly under current monitoring processes.

There is therefore a need to develop approaches that take into account the complex nature of the problem, as well as provide flexibility in identifying options that best reflect the capabilities of the natural resources and the environment, wishes of the local people and the nation's desire to maximise the net long term economic prosperity.

Given the complex nature of the problem, its widespread implications and the range of stakeholders affected by the resolution of the problem, lately the Thai government has begun to take an interest in more participatory approaches. The government's commitment to participation is reinforced in the Eighth National Economic and Social Development Plan (NESDB 1996), which commenced in 1997. In Northern Thailand, this interest in participation reflects growing recognition of the pivotal role played by the ground-level resource managers, the local farmers and villagers who take day-to-day decisions in land and water management. Over the past decade, various government initiated or supported projects involving rural development or resource conservation in the highlands have tried to encourage community participation. However, active participation in these projects has remained limited. Meanwhile, non-government organisations, academics and local people have pursued a variety of participatory and community development approaches with villagers (Narintarangkul na Ayuthaya 1997, Quinn, 1997). Our project intends to evaluate the effectiveness of participatory initiatives historically or currently used in the highlands and develop with key stakeholders a more effective participatory resource management process.

Policy options based on appraisals of hill tribe and lowlander resource use have been explored by recent academic studies. Rerkasem and Rerkasem (1994) examine patterns of resource use by highland communities, and discuss the impacts of a variety of government policies on local communities and their shifting agriculture. Their study shows that hill communities are adapting their agricultural practices creatively, intensifying their land use (reducing the extent of swidden cultivation) and increasing their involvement in the market economy. One of the constraints propelling hill peoples towards intensification of agriculture is the declaration of much of their customary lands as forest under the administration of the Royal Forestry Department

(Vandergeest 1996). Further influences are population increase, and policies to substitute other lucrative crops for opium. Dearden et al. (1996) examine the impacts of different hill peoples on Doi Inthanon National Park, concluding that their different impacts on biodiversity need to be considered in a sophisticated policy response. Tungittiplakorn (1995) documents a famous conflict between Hmong and lowland people which was alleged to be based on water resource impacts, and analyses the moral and practical feasibility of one of the solutions proposed; moving the villages to the lowlands. Narintarangkul na Ayuthaya (1997) describes the formation of a "community forest network" to foster community based conservation efforts and facilitate negotiation with government over approaches to resource management. These studies reflect on the need to broaden the scope of highland development planning to include all stakeholders in an effective participatory process, and to explore underlying issues associated with popular statements of environmental issues and their solutions.

3. FRAMEWORK

The procedural framework for this study is adapted from a framework for Sustainable Development Planning for Aboriginal Communities (Young and Ross 1993) with influence from a framework for Integrated Local Area Management (Brown 1997). It contains four iterative dimensions as shown in Figure 1: Visions, Resources, Options and Practice.
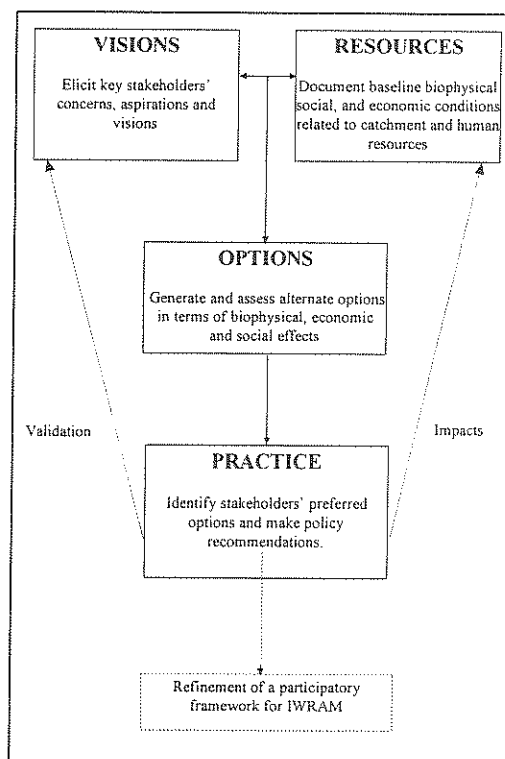

VISIONS
Elicit key stakeholders' concerns, aspirations and visions

RESOURCES
Document baseline biophysical, social, and economic conditions related to catchment and human resources

OPTIONS
Generate and assess alternate options in terms of biophysical, economic and social effects

Validation

Impacts

PRACTICE
Identify stakeholders' preferred options and make policy recommendations.

Refinement of a participatory framework for IWRAM

Figure 1: Procedural framework.

The framework is designed for use with stakeholder analysis. The concept of 'stakeholder' is an analytical category, used to identify parties or interests which affect, or are affected by, an issue (such as the use of a resource or a region). The concept can be used at various scales, from individuals to large aggregations of people. A 'stakeholder' is not necessarily a formal group - the category can include generalisations such as 'farmers'. In our project, the major stakeholder categories are government departments and local people, although business interests are also relevant.

Following the framework, the *visions* of all the key stakeholders regarding development and resource use in the highlands will be matched to the known natural and human *resources* in order to generate alternate development *options* for the region. The different options will then be evaluated in terms of their biophysical, economic and sociocultural effects. A participatory process will be developed to enable the preferred options to be put into *practice*. These steps are described further below.

This research framework has been selected because of its simplicity, flexibility, efficiency, and compatibility with Thailand's Eighth National Economic and Social Development Plan. Unlike most planning systems, it consists of only a few stages. It is easily adaptable to different application contexts. The visions, or what people want for the long-term future, are an efficient way of focussing people's attention on management goals. The holistic approach to development and the focus on public participation will support the new directions intended in national planning, and help develop regional capacity towards achieving sustainable development.

Most importantly, the framework is an equitable one, designed to assist *all* stakeholders to become involved in the management of the areas and resources which affect them and for which they are responsible. It is designed to transcend 'top-down' (government) and 'bottom-up' (community-based) typologies of management, by emphasising the point that both communities and government have vital roles in environmental management. By comparing the visions of all stakeholders, promoting mutual recognition of their varying interests, and engaging stakeholders together in the generation and analysis of options, it can help to highlight then resolve sources of conflict. Indeed, the techniques for comparing visions are derived from conflict mapping methods (Cornelius and Faire, 1989). Our ultimate hope is that the stakeholders will recognise their shared basis for needing sustainable development of the highlands, and progress towards common visions for achieving sustainability.

4. RESEARCH OBJECTIVES

The aims of the social research component are to:

- design and test an analytical and management framework suitable for integrated water resources assessment and management (IWRAM) in Northern Thailand and elsewhere

- identify and analyse key stakeholders' aspirations, issues and visions for highland development, and reassess them at regular stages during the project

- generate alternate land and water use options with key stakeholders

- assess social and cultural impacts of different water and land use management options

- evaluate the effectiveness of participatory initiatives used in the highlands and develop an appropriate participatory decision-making process for the highlands

- contribute social and cultural information to the assessment of resources and design of a decision support system.

The socio-cultural team will be working interactively with the economic and biophysical research teams, and sharing in the construction of a decision support system.

5. CASE STUDY CATCHMENTS

The economic and sociocultural teams will concentrate on two large and representative sub-catchments of the Ping basin, the Mae Chaem and Mae Taeng[1]. These catchments were chosen because a relatively large amount of literature and data are available on these areas from previous studies, and they encompass three common highland social issues which influence the policy problem to be studied in this project. Firstly, the government's proclaimed protected watershed areas overlap with community settlements; secondly, the promotion of intensive cash cropping under contract farming systems has led to severe natural resources degradation; and thirdly, trekking tour operations have had extensive social impacts. These catchments also offer opportunities to evaluate previous approaches to public participation. The catchments have residents from a variety of ethic backgrounds, with villages in highland, upland and lowland parts of the basins.

In addition, the Mae Taeng watershed is important in terms of rural-urban water allocation conflict as it feeds water to the major Northern city, Chiang Mai. The Mae Chaem features conflict between private sector industry (a mining company) and local communities which have formed an organisation aimed at protecting the forest resources. While quite a deal of basic data is available for these catchments, a

socioeconomic survey will be necessary to generate information for the analysis of land use options.

6. RESEARCH METHOD

6.1 Participatory Approach

Fundamental to the project is a participatory approach to research which encourages active involvement by the stakeholders in the research process itself. For example, where possible the collection, presentation and analysis of information by the stakeholders (including both rural people and government) will be encouraged. A participatory approach will facilitate a greater degree of ownership by the end users of the processes and methods to be developed during the proposed project. This in turn supports the implementation and further development of these processes and methods beyond the life of the project.

The sociocultural research component has responsibility for identifying and involving stakeholders, eliciting the visions which are the focus of the participatory assessment and management framework, and for arranging stakeholder participation in the design and analysis of proposed options. This component will refer assessment tasks to the other components, and integrate social and cultural information with the economic and biophysical analyses in a decision support system and through other modes of presentation. It will give special priority to assisting local people to fulfil their aspirations through the project. For instance, one Karen village in the Mae Chaem catchment is already collecting ethnobotanical information on its own behalf, which could be represented in the decision support system. This village is also interested in mapping its own land uses and shifting cultivation pattern into a GIS, and in monitoring soil erosion in its permanent and shifting cultivation fields.

The sociocultural research component will also work with the decision support component to consult stakeholders on the functional features of the decision support system, and to incorporate social information in a way as representative as possible of the variety of stakeholders' viewpoints on the issues. (Fayen Wong is focusing on the challenge of minimising bias in DSS). Different stakeholders may have different perceptions on the use of the DSS (e.g. as a land use planning tool versus a conflict resolution tool). The practical range of possible functions, or flexibility of the DSS, needs to be identified along with inputs and outputs for each function.

Qualitative and survey research with local people will be carried out by villagers who have been trained as field assistants under a program run by Chiangmai University's Centre for Ethnic Studies and Development.

6.2 Visions

In this project, the term "visions" is defined broadly to include ideas and aspirations for the future as well as the values that shape these aspirations. We expect discussion of current issues and concerns to be raised in the course of eliciting visions. The aim of activities under this part of the framework is to identify and analyse key stakeholders' visions or aspirations for highland development, and to explore their conceptualisations of development issues.

The key catchment stakeholders include highland and lowland farmers of all ethnicities, government policy makers and implementing agencies, industry, and downstream users of water (including other farmers, and urban centres). The method of eliciting their visions must suit each set of people's ways of meeting and communicating, so that they feel natural and comfortable. For example, meetings, or activities based on a meeting format, will feel familiar to government employees. The approach to handle discussion with (and within) village communities will need to be adapted depending on how each village usually meets to discuss an issue. Participation of both men and women will be sought and the process will be designed to encourage women to contribute equally with men. Supplementary information will come from cultural and environmental management literature on Northern Thailand. We will examine the stakeholders' visions in the context of history, culture and other factors, to gain and share insight into why these visions emerged. We will compare the visions of different stakeholders by documenting the compatibilities and tensions between the different visions, using an adaptation of conflict mapping techniques (Cornelius and Faire 1989). Participatory techniques will be used to assist stakeholders to recognise commonalities and differences in their visions, and the underlying needs represented in those visions.

6.3 Resources

The aim of our contribution to this part of the framework is to assess the human aspects of resources. Using literature and information gained during the course of eliciting visions, we will contribute cultural and qualitative information to a sociocultural profile of the highlands, uplands and lowlands (including urban regions) of the focal catchments. Information will include cultural information on traditional systems of water management (*muang fai*), and land use, human resource information on interests and skills. We will collaborate with the economics team in designing and carrying out an integrated socio-economic and land use survey, incorporating both quantitative and qualitative information, in the focal catchments. As members of the decision support component, we will

help to design the system, integrate demographic and other social information into the decision support databases, and contribute our understanding of social processes to models within the system.

6.4 Options

The next step is to generate and assess alternate land and water use options. The set of options will be generated by a combination of a participatory process with key stakeholders, and the research team's suggestions drawing on their analyses. Options currently being implemented by government departments or other stakeholders will be included alongside new options, invented by matching visions to resources. The options need to hold promise of achieving the visions of the stakeholders (preferably with considerable agreement among a number of stakeholders) and suit the biophysical, economic and sociocultural resource situations. Scoping, a procedure from Environmental Impact Assessment involving choosing the most important issues for study, will be used to identify those options which are most significant for detailed assessment. These may be promising options, or controversial ones which some stakeholders might favour against the wishes of others.

The set of options will then be evaluated by the research team. The sociocultural team will be responsible for assessing their social and cultural impacts, using participatory and analytical processes. The assessment will include impacts on the local economy, individuals and households, and village social relationships. In particular, emphasis will be given to the impact of different management strategies on access and control of resources, equity and distribution of benefits, land tenure and ownership, gender roles and responsibilities, and cultural dynamics. We are also interested in the ways in which different communities respond to impact situations. Information collected in the course of eliciting visions and assessing resources will also contribute to the social impact assessments. Concurrently with conducting our social impact assessments, we will be cooperating with other Thai academics to enhance social impact assessment theory and methods for Thai needs.

6.5 Practice

Since this is a three-year research project, few members of the research team have a continuing role in implementation. Adoption of favoured options, and procedures and methods of analysis developed during the course of the project, is in the hands of local and regional stakeholders. Some of these are currently involved in the project as partners, while others will be drawn into the participatory processes. The aim of activities under this section of the framework is to

provide a useful basis for implementation, by developing and setting in train an appropriate participatory decision-making process for the highlands. The process will be developed and tested as part of the process of eliciting visions and discussing options. As a foundation for this, the sociocultural team will evaluate the effectiveness of current participatory initiatives currently used in the highlands using key informant interviews and observations.

The other ways in which the project team will establish foundations for implementation are in providing a set of well documented options for highland development, with a strong basis of stakeholder endorsement for some of these. As well as contributing to the evaluation of options, the decision support system will provide stakeholders with capacity to explore the implications of changes to a number of economic, social and biophysical factors, and to evaluate variations and new options.

6.6 Research outputs

Expected outputs from the research framework may be summarised as:

Framework category	Output
Visions	a synthesis of key stakeholders interests, values and aspirations with respect to highland development, and identification of stakeholder needs for the decision support system.
Resources	a spatially distributed database of relevant social data which will provide an information infrastructure upon which ongoing resource management in the region can be based
Options	a range of alternate land use options and assessments of their potential social impacts. Methods of social impact assessment (SIA) suitable for developing-country contexts, and development of cross-cultural theory about how different communities respond to impact situations
Practice	an integrative, and participatory, assessment and management framework for catchments of the Ping Basin and Upper Chao Phraya Headwaters. The development of participatory methods suitable for Thailand's social and political context.

6.7 Revision of the Framework

Towards the completion of the project, the framework will be assessed both for its usefulness to these stakeholders and this application in northern Thailand,

and as a basis for future integrated water resources assessment and management in Asian river basins.

7. RESEARCH CHALLENGES

The project and its context present a number of unusual challenges.

7.1 Participation

Thailand is in the early stages of accepting an ethos of public participation in decision-making. While participation has strong endorsement in the Eighth National Economic and Social Development Plan (NESDB 1996), the political culture of Thailand remains one in which participation is difficult to foster (Nakata and Dhiravegin 1989, Ross 1997). Public service departments act relatively autonomously, with only a recent history of attempting inter-departmental coordination. The society is strongly hierarchical, so that those of lower social status than formal decision-makers are generally reluctant to venture opinions even if asked. Methods of public participation favoured in western countries cannot simply be transposed into a different political culture.

7.2 Equity

While the assessment and management approach is designed to improve equity in environmental decision-making and in the distribution of impacts, achieving equity is a major challenge. The logistics of participation differ greatly among the stakeholders, formal organisations (such as government departments) being better geared to engage in a process than members of the public generally are. We need to consider power relationships among the stakeholders, and within the stakeholder groups (such as power relationships among village residents and the different ethnic groups of the catchments). We need to consider gendered participation and effects across all of the stakeholder groups, and to ensure that our processes and analyses are gender sensitive. We are particularly conscious of the ways in which decision support systems can distort power relationships among stakeholders, both in access to the systems and through biases in their content (see paper by Wong). Dissemination of information arising from the stages of the study, essential to effective participation in further stages, is a challenge which needs to be handled in different ways for different stakeholders.

7.3 Integration

The IWRAM process has been designed to be integrative, across three disciplinary areas of research (social, economic and biophysical) and among the perspectives of different interests (stakeholders and their issues). For instance, management options generated by the regional and local stakeholders and

local participation processes undertaken in the socio-cultural component will be used as inputs to the biophysical land-use management simulations. Information from the biophysical component and the economic components will also provide feedback to the stakeholders on the benefits and costs of different visions and options for land use management. The models and data systems developed during the project will be integrated into the decision support system for simulations and policy analysis. From our collective experience with complex projects, team members are conscious of the intellectual and inter-personal challenges of interdisciplinary integration.

An unusual feature - and challenge - of this project as an interdisciplinary study is that of integrating the decision support system into an emerging participatory process. One of the crucial issues is to identify which types of decision require support, and to focus the system around the decision-making needs of the stakeholders.

8. CONCLUSION

Our framework and participatory methods strengthen and integrate a number of the approaches to integrated catchment management which are evolving internationally. Our approach combines social with biophysical information in situation analyses and modelling of 'what if...' scenarios (see paper by Jakeman *et al.*). It combines participatory with analytical approaches, involving all stakeholders. It focuses its management approach around visions-based planning. It also considers catchment management in terms of nested scales (region, catchment, subcatchment) reflected in the scales at which stakeholders form their policies and conduct their activities (region, local area). We are aware of many challenges in realising our aims, but are heartened by the readiness and enthusiasm of our participants for such an approach.

9. ACKNOWLEDGEMENT

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[1]The biophysical research team has commenced preliminary modelling of hydrological processes in ten small sub-catchments of the Ping basin, but will concentrate its modelling in the Mae Chaem sub-catchment in the immediate future.