Technical Guidelines

on

Local Ecological Knowledge and Benefit Sharing Approaches for Small-island Fishery/Tourism Management on Lipe Island, Andaman Sea, Thailand

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Preface

The concept for this technical guidelines emerged from a meeting with Dr Magnus Torell, Southeast Asian Fisheries Development Center or SEAFDEC at Faculty of Natural Resources, Prince of Songkla University, Hat Yai, Thailand in early 2013. We agreed that there was the need for technical guidelines to assist researchers, plan and policy implementing agencies, donor organizations and others to conduct studies on socio-economic assessments with ecosystem and cultural aspects focusing on fishery/tourism activities of small islands. The guidelines are specific in their primary target and parallel survey to support the research project entitled, “Local Ecological Knowledge and Benefit Sharing Approaches for Small-island Fishery/tourism management in Lipe Island, Andaman Sea, Thailand.” It may be adapted to fit with other studies in similar lines of interest and approaches.

The technical guidelines were developed by Ms Pilaiwan Prapruit and Associate Professor Dr Ayut Nissapa upon consultation with Dr Magnus Torell, Associate Professor Dr Buncha Somboonsuke, Ms Pattaratjit Kaewnuratchadasorn. Valuable comments were from the Urak Lawoi community, to name a few, Ms Sangsom Hantalae, Ms. Janram Hantalae, Mr. Niwat Lheekung, Mr. Anan Talaelug, and many local government organizations. The research project was financially supported by the SEAFDEC.
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1. Introduction

Lipe island is undergoing rapid changes in terms of socio-economic impacts on livelihoods of local indigenous Urak Lawoi due to tourism development and its related activities. These have both positive and negative impacts to individual Urak Lawoi and their community in various aspects, especially on their local knowledge, for example knowledge on fishery management, cultural identity and general daily life.

Fishery and tourism are two main concerns for the management of small islands as they can supplement or compete with each other depending upon how the stakeholders are able to manage their co-existence. The Urak Lawoi are used to carrying on with their fishery-based livelihoods relying on their inherited knowledge that has been transferred for generations. When tourism is flourishing on the island, their traditional ways of livelihoods are affected. Their ability to manage this traditional knowledge along with changes brought in with the tourism business is still questionable. Therefore the primary purpose of this technical guideline is to propose ways to conduct research in order to understand socio-economic context of the Urak Lawoi and their strive in maintaining their traditional knowledge of fishery/tourism management.

1.1 Backgrounds

This technical guideline originated from a meeting of SEAFDEC and Prince of Songkla University Staff while forming a research team at Faculty of Natural Resources. We found out that there are similar small islands with similar socio-economic settings in the SEA region that are facing with tourism challenges, while local and indigenous people are most affected and local knowledge has been faded by these tourism-related activities. Thailand example of small island management can be a good case study of management with both desirable and undesirable consequences. This technical guideline is expected to provide some useful insights for similar research study and endeavors to encourage justified benefit sharing management for the indigenous and most often marginalized people like the Urak Lawoi. This guideline is important because:

- researchers and other end-users recognize the benefits from understanding local ecological knowledge of these indigenous people to formulate proper plan and strategies for its effective implementation.
- there are numerous ways to conduct research that a specific one to the interested issue yet flexible in methodology is hard to find.
- it provides easy step to consider for similar or slightly deviated research.
1.2 Approach

This technical guideline adopted a well known Integrated Coastal Zone Management (ICZM) framework put forward by Olsen (1998) and the Socioeconomic Manual for Coral Reef Management by Bunce et al. (2000).

1.3 Objective of this Technical Guidelines

The objectives of this technical guideline are as follow.

1) to systematically list steps of conducting the research on, “Local Ecological Knowledge and Benefit Sharing Approaches for Small-island Fishery/tourism Management in Lipe Island, Andaman Sea, Thailand.”
2) to present how socio-economic methodologies was adopted and adjusted in the above research topic, and
3) to propose this methodology for further adoption and adjustment in other similar research on small island management.

1.4 Structure of this Technical Guideline

This technical guideline is present in a structure adopted from the ICZM framework and Socioeconomic Manual of Bunce et al. (2000). There are five chapters briefly described as follow.

- Chapter 1 is an introduction comprising of background of the technical guideline, approaches adopted as framework, its objectives and the arrangement of the guideline presentation.
- Chapter 2 comprises of identification of Lipe island ecosystems and stakeholders.
- Chapter 3 presents preparatory activities including collection of secondary data and analysis, preliminary survey of the study site, consultation with stakeholders, preparation of research tools or questionnaires.
- Chapter 4 is field data collection with random household sampling and non-random sampling as its components.
- Chapter 5 is data analysis. It presents how the collected data are processed and analyzed in both quantitative and qualitative nature.

2. Identification of Ecosystems and Stakeholders

Issue identification is the most important step in the research cycle. Keeping in mind the project background and objectives, relevant issues and Urak Lawoi’s indigenous knowledge scoping are identified. There are
• Capture fisheries for (i) subsistent household consumption and (ii) market orientation. Socio-economic question *inter alia* are; How the Urak Lawoi management the two purposes of capture fisheries to maximize their utility? How they use their indigenous knowledge to catch fish to serve the tow purposes? What are their strategies to cope with foreign fishing boats? How do they find their catch to cope with foreign fishing boat? and How do they find their catch and maintain its level for sustainability?

• Tourism. The invasion of tourism and its related activities has both positive and negatives impacts on socio-economic and cultural ways of Urak Lawoi’s life. The following are examples of question in the survey; What are their cultural integrity and tradition? How do they integrated tourism in their traditional livelihoods? How do they maintain their cultures and traditions? How do they make the most use of them, while maintaining their cultural and tradition integrity? What are tourism scenarios that the Urak Lawoi would like to have?

• Institutions arrangements. The Urak Lawoi are marginalized by their economic opportunity. They need well-considerate and justified institutions to pay attention to. Important issue questions are; What are factors that marginalize them? Are existing institutions acknowledging and providing them their rights and dignity? What other rights needed? Do they complying with existing rules? What are their customary rules counterbalancing or supplementing formal rules and regulation?

• Management arrangements. The above issues lead to an identification of management arrangements. Important issues are; How to integrate local and viable indigenous knowledge to empower the Urak Lawoi? What are success contributions to effective management arrangements? How they are incorporated in formal institutional arrangements?

### 2.1 Identification of Ecosystems

Before an intensive investigation of fishery management, an identification of different ecosystems supporting fish and fishery is a prerequisite. The procedure to identify the fishery ecosystem is presented below.

- Consultation with key local and indigenous informants using the focus group discussion technique
- Prior identification of the ecosystems based on fishing gears and different fishing methods is presented to these key informants for a discussion to obtain their verification and other suggestion.

Table below is the prior identification of the fishery ecosystem presented to the key informant during the focus group discussion.
### Table 1: Proposed a priori fishery ecosystems

<table>
<thead>
<tr>
<th>Fishing gears</th>
<th>harvesting methods</th>
<th>Sub-ecosystems for fishing</th>
<th>Harvesting period</th>
<th>Species captured</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>______</td>
<td>________________________</td>
<td>___________</td>
<td>__________</td>
</tr>
<tr>
<td>2</td>
<td>______</td>
<td>________________________</td>
<td>___________</td>
<td>__________</td>
</tr>
</tbody>
</table>

#### 2.2 Identification of Stakeholders

This step has an objective to identify all stakeholders involved in relation to the issue identified in the earlier step. All possible stakeholders should be found without any biases or personal favors. The research team conducted a meeting after the analysis of issues, alongside with results from the pilot survey and synthesis of secondary information. Venn diagram tool and stakeholder tabulation technique were jointly employed with the purpose to plan for primary data collection, and to identify all involved stakeholders of the research issue. This step has three sub-steps explained below.

1) Identification of stakeholder related with the research project.
2) Clarification of project mission and scope, and stakeholders mapping of their influences and obtained benefits.
3) Analysis of stakeholders relationships in terms of communication networks, alongside with contacts with the most dominant stakeholders to evaluate their responses that facilitate project activities for an achievement of the project’s purpose. An example of Venn Diagram as shown in Figure 1 and an example of stakeholder tabulation as shown in Table 2.
Stakeholder analysis is done by organizing and synthesizing data and information in order to classify the stakeholders into two groups, namely inside and outside of the islands. This classification enables the researchers to conduct dialogues and provides supports for the following steps.
3. Preparation Activities

Before the research is conducted on the study site, there are several preparatory activities that have to be completed beforehand. They are presented in the following section.

3.1 Collection of secondary data and analysis

Secondary data and information is essential prior to conducting field surveys. There are government statistics published regularly at both provincial and national levels. Examples of statistic publications are;

- Fisheries Statistics by Department of Fisheries
- Tourist Statistics by Tourism Authority of Thailand
- Basic Household Statistics by Ministry of Interior
- Natural Resources and Environmental Status by Ministry of Natural Resources and Environment
- Public Health Statistics by Lipe Public Health Center
- Other formal and informal statistics

Lipe island is a small island. There is limited published information available, so primary data collection is needed.

3.2 Primary survey of the study site

Primary survey has an objective to familiarize the team with the study site as well as collect general information of the study area, internal news and situations, livelihoods and daily living conditions, and problems and difficulties faced by the Urak Lawoi. It helps to facilitate the team with the Urak lawoi and form linkages with others relevant stakeholders on the island. Key informants who are able to provide the team with in-depth information can be identified at this primary survey. Walk transect and participation in activities offered by the key stakeholders is significantly enhance better co-operations afterwards.

3.3 Consultation with stakeholders

After the primary survey of the study site, the relevant stakeholders and key informants are identified. These stakeholders and key informants are later contacted for focus group discussion and in-depth interviews. Different types of required data are best obtained from different and more specific stakeholders. The data must be sufficient to perform triangulation and cover all breadths of the island. Examples of type of data, obtained from different groups of key informants and techniques for data collection are presented in Table 3.
Table 3: Examples of type of data required, key informants and data collection techniques

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Key informant</th>
<th>Data collection techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community history</td>
<td>Elders, religious leader, indigenous Urak Lawoi, experienced people</td>
<td>timeline</td>
</tr>
<tr>
<td>Internal relationships</td>
<td>Community groups, Community leaders</td>
<td>Community mapping</td>
</tr>
<tr>
<td>Livelihoods</td>
<td>Urak Lawoi fishers, entrepreneurs</td>
<td>Seasonal calendar</td>
</tr>
</tbody>
</table>

At this stage, in-depth interviews are performed to understand past and present changes in the island situations. It is entirely qualitative nature of research involving discussion with elderly Urak Lawoi and other stakeholders, people with specific occupations and interests such as the Urak lawoi in fishery and Urak Lawoi in tourism businesses.

3.4 Preparation of Questionnaires

Questionnaires are tools for data collections. Different types of questionnaires are prepared such as semi-structured questionnaire aiming for qualitative data and information and structured questionnaires for household survey and statistical analyses.

3.4.1 Semi-structured questionnaire

The semi-structured questionnaire is used to collect data and information with Urak lawoi elders, government officers, business owners and fishery middle persons. The design of the questions is simple and usually open-ended but the initiation for the interview is uncontrollable as it is based on the reactions of each stakeholder. It is advisable to prepare vast topics to questions before the real interview. This task is beneficial because;

1) It helps to ensure consistency and completeness in carrying out the interviews.
2) It helps making efficient division of tasks to each team members to perform in the interviews.
3) It contains check-list and record for the wide breadths of the interviews.

Examples of questions list and synthesis of the data and information obtained from the interview is shown in Table 4.
Table 4: Examples of question list and synthesis of obtained data and information

<table>
<thead>
<tr>
<th>Question list</th>
<th>Synthesis of data and information</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Roles and responsibilities in the Tarutao Marine Park</td>
<td>Fisheries around Lipe island has become commercially less dominant. On the contrary, island tourism has increasingly played important roles in Lipe island’s economy. However fisheries are still lifeline of the Urak Lawoi as family food sources.</td>
</tr>
<tr>
<td>- Illegal fishing in the Tarutao Marine Park, Enforcement of laws, Negotiation with Urak Lawoi, Development projects on the Lipe island.</td>
<td>Department of Fisheries attempts to maintain fishing activities through an enrichment of fish stocks, enforcement of rules and regulations and fishery resource management. There are problems with insufficient staff to implement these programs compared with vast sea area around the island. There should be a personnel restructuring to provide sufficient forces in line with the responsible sea boundary. Because of the above problem, Lipe island inhabitants give more importance to private organizations than those from the government.</td>
</tr>
<tr>
<td>- Data and information on illegal fishing around Lipe island, Other statistics relevant to the study</td>
<td></td>
</tr>
<tr>
<td>- Fishing gears, Quantity of catch over time</td>
<td></td>
</tr>
</tbody>
</table>

For the data on Urak Lawoi’s indigenous knowledge, the research team performed in-depth interviews. This task required complete preparation of questions, prior knowledge of the Urak Lawoi and study site, skills in comprehensive qualitative interviews. Several reminders of the in-depth interview are as follow.

- Friendliness and sincerity of the team interviewers are important to create trust between the two parties.
- The interview should not be rushing for answers and piles of questions should be avoided.
- Mutual respects are the basis for the interviews.
- Avoid the interview time that interferes with routine life of the stakeholders.

The results of the in-depth interview of Urak Lawoi’s indigenous knowledge are classified into 3 sets

1) Indigenous Knowledge on Capture Fisheries. Indigenous knowledge on capture fisheries is classified in line with types of fishing gears which is further related with different ecosystems. Interview questions are types of fishing gears, production of these gears, ways to use them, fishing grounds for these fishing gears, frequencies of use, varieties and amount of fish caught, necessary skills for the use of these fishing gears, transfer of fishing knowledge to younger generations, etc.
2) Indigenous Knowledge on Nature Observation and Aquatic Life Habitats. Urak Lawoi are heavily dependent on fishery resources and effective selection of fishing gears and methods. Their knowledge on climatic conditions supports the amount of fish caught. There are considerable deviations in this knowledge of each Urak Lawoi, which has been transferred to his/her descendants. This indigenous knowledge is best summarized as follows.

2.1) Aquatic life habitats. Urak Lawoi observe the aquatic life habitats by some incidents below.

2.2) Observing fisheries environments. Indigenous knowledge on fisheries environment consists of following aspects.

2.3) Natural Calamity Observation. There are several knowledge indicated below.

3) Indigenous Knowledge on Cultures and Tradition. The Urak Lawoi’s cultures and tradition are best shown by their ceremonial boat floating (Plajak) festival, marriage ceremony and the funeral. The interview adopts these two techniques described below.

3.1) In-depth interview to record data and information from the key informants. Data and information collected from this technique are types of cultural activities and tradition, their process from the beginning until the end, as well as the local beliefs along the process, reasons why the activities in the process were conducted, and problems to adjust at the present time.

3.2) Participation in the cultural events is important to cross check with the information obtained during the in-depth interviews, and to have an opportunity to observe and record the real significance of the events, also to show respect and sincerity to the Urak Lawoi. Trust between the team members and the stakeholders can be further established at this stage.

3.4.2 Structured Questionnaires

The structured questionnaire is used to perform household survey for statistical analysis. It is the survey of all stakeholders involved in fishery/tourism management. The questions are repeated to all selected samples using the same structure of questions.
1) Questionnaire design

The question should be precise and concise, simple to ask and understand by the interviewees, straightforward, and relevant to the analysis and objectives of the research. There are several steps as follow:

- Drafting of questions. The questions should be drafted and edited to reflect the research problem and objectives. Time length of the interview is a key consideration to set number of questions.
- Variables. Each question contains a variable or a group of variables. These variables must be relevant to the objective of the research. The selection of variable can be from literature review of previously similar works.
- First draft of questionnaire. When the designs of questions and variables are completed, they are compiled and formed a structured questionnaire. These questions should be grouped into sections following closely with the objectives of the research.
- Editing. This questionnaire should be edited by the team members and undergone the following tests.

2) Content validity test using the Item Objective Congruence or IOC

The questionnaire (Appendix) must undergo some necessary tests such as content validity using the Item Objective Congruence or IOC. It tests if the designed questionnaire covers every contents of the research, i.e., it is able to get data to satisfy all objectives. There should be at least three to five...
experts in the field of the research to assign score to each question. Score of 1, 0 and -1 indicate that the question is valid, indifferent and invalid to the research objectives, respectively. The scores obtained from all experts for each question are calculated using this formula.

\[
IOC = \frac{\sum R}{n}
\]

when \(R\) is score of each expert for each question

\(n\) is total number of experts.

If the IOC is less than 0.5 for a question, then this question is to be deleted. Only the IOC score more than 0.5, the question is considered valid for further implementation.

3) Pre-testing. The questionnaire that passes the IOC test can be used for a pre-testing. The pre-test is done to other group of respondents who have similar socio-economic settings as the stakeholders in the study site. This study conducted the pre-testing with Urak Lawoi on Lanta island in Krabi province. They are considered to have livelihood and socio-economic and cultural backgrounds closely resemblance with those on Lipe island. The purpose of this pre-testing is to check if the questions are easily understood by the respondents and if there are still unattended questions important to the research.

4) Reliability test. This test is performed to check if the questions measured in an interval scale are consistent with other questions and all of the questions. It is an internal consistency test. The test parameter is the Cronbach’s alpha coefficient measuring degree of reliability of these interval scaled questions. The higher the Cronbach’s alpha coefficient, the more reliable the question is. The criteria to decide it the questions are reliable is the Cronbach’s alpha coefficient at least 0.70. If the coefficient is less than 0.7, then an individual question is considered deleted, or it depends on the team to consider which question is less relevant in comparison with other questions.

4. Field Data collection

Field data collection is generally done after the prior stages, i.e., ecosystem and stakeholder identification and preparatory activities are completed. The ecosystems of the study site as the basis for local livelihoods are extensively listed, and people or stakeholders depending on these ecosystems and their interactions are clearly identified.

The following stage of field data collection has objectives to:

- Understand general socio-economics characteristics of these stakeholders,
- Scrutinize intensive interactions of these stakeholders and their ecosystems,
- Relate their livelihoods with changing fishery/tourism activities, and
- Schedule positive and negative impacts from fishery/tourism activities on the stakeholders’ livelihoods.

Important technical guidelines for field data collection are categorized into two main techniques, i.e., random household sampling and non-random sampling. But first, several important guiding principles essential for the field data collection are presented as follow.
1) The research team must present their purposes of data collection, their responsible organizations (preamble of the questionnaire in Appendix), and benefits that both the team and the stakeholders could obtain from the research project.

2) Field data collection depends on knowledge, skills and attributes of the team and on the relationship they establish with the stakeholders.

3) Field data collection needs the team’s best efforts and dedication to counter with many difficulties such as 1) finding respondents’ houses, 2) identifying household members who are able to assist in tedious and sometimes disturbing interviews, 3) misunderstanding of the interviewer’s presence and close contact which might lead to jealousy and quarrels, and 4) discouragement and discomfort when the respondents show their lower attentive reactions.

4) Field data collection must show complete respect to the stakeholders and their communities. Personal opinions and criticisms of the stakeholders and their communities’ must be avoided.

5) Field data collection should minimize disruption of family and community’s daily lives by choosing interview and meeting times that are convenient to the respondents. The general time rule for an interview should be less than 2 two hours.

6) Data and information obtained must be kept confidential. Only results from the analyses can be revealed.

7) The team should make efforts to involve all stakeholders in the data collection process. These stakeholders have a rapport with other stakeholders and more likely to have access to accurate information and dynamism of the communities.

8) The team should be aware of several biases that might occur during the field data collection. These biases can be in the forms of different perceptions between the respondents and the team, the environment where the interview or meeting is taken place, gender, economic backgrounds, rural and urban settings, language, etc.

9) The team must take notes from the respondent visual and verbal reactions as they can be particularly powerful in showing the true nature of the respondents.

10) The team must immediately edit the questionnaire using the principle of triangulation in which data are compared from at least three different sources, three different team interviewers and from three different data collection methods.

4.1 Random household sampling

The team should develop random sampling method when household data are needed for statistical analysis. The random household sampling method is appropriate for both surveys with semi-structured and structured questionnaires. It has an advantage that the data are statistically representative of the stakeholder groups. But the random sampling techniques are relatively expensive, time-consuming, quite complicated, and requiring a well-defined population and samples. It needs a full name list of all stakeholder groups.

The household survey requires essentially the random sampling as statistical representation and hypothesis testing are necessary for the summary of the results. A random sample refers to the respondents are selected without bias – the probability of each respondent being selected is equal. The
research team assesses a statistically representative sample of the stakeholder group, and the data are statistically representative of the whole group.

In using the random sampling, the team must follow these steps.

1) Clearly define stakeholder groups such as Urak Lawoi household engaged in fishery, Urak Lawoi households engaged in tourism, Urak Lawoi engaged in both fishery and tourism, local business people, government officers, domestic tourists, foreign tourists, etc.
2) Obtain list of names and house numbers (if applicable for the random sampling, i.e., sufficient number for statistical analysis and test, registered names and house numbers)
3) Calculate stakeholder groups sizes using acceptable methods for statistical analysis such as formula designed by Yamane (1967), Rea and Parkers, 1997) or other methods wherever appropriate with the survey conditions and research objectives. The larger the sample size, the greater the level of accuracy and the more certain for statistical conclusions.
4) Determine who are the respondents for the interviews. There are most commonly used methods such as the simple random sampling and systematic random sampling. In the simple random sampling approach, the names and house numbers of households are recorded and written on the small cards. These cards are put in a bowl and pull one at a time out of the bowl. The name and house number is recorded as a sample. Then the card is placed back in the same bowl for the next drawing (sample with replacement) so as to maintain the probability of choosing any card for each draw. This selection process is repeated until the desired number of samples is reached.
5) Arrange date and time for the interviews (if possible).
6) Find the selected samples from the appointment list and make sure that nearby selected names and houses are appointed for the interviews in the same day so as to save cost and time. If no one is in the house, then the general is to choose an adjacent house as the second best sample to facilitate the data collection process.
7) Make contact and explain the objective of the survey.
8) Carry on with the interview (should not be more than two hours for an interview).
9) Present a gift as a token to show an appreciation (depends on the allocated research budget but the general rule is on the basis of minimum daily wage rate).

4.2 Non-random sampling

Data collection from the non-random sampling required high participation of the stakeholders. The team must possess communication skills and sufficient time for better acquaintances with the stakeholders. In addition, clarification of interview objectives, consequences and benefit accruing to the stakeholder must be explained. Some suggestions are;

- Aggressive questions and careless asking of questions should be avoided.
- Sensitive questions such as personal relationships in the Urak Lawoi community and criticism of their lifestyles should not be asked or commented on.

Data collection within this category can be divided into two types.
4.2.1 Community History

Data on community history can be collected and assembled from focus group discussion, informal meeting and in-depth interview. These techniques do not focus on number of attendants, but on the complete strata of the stakeholders such as

- Formal community leaders such as village head, religious leaders and government-nominated leaders.
- Informal community leaders such as elders, persons of assigned importance, NGO workers, business tycoon, trade middle persons and local mafia.
- Indigenous Urak Lawoi who know their history and cultural inheritance. They can be elders or anyone who have great interest and does some research on these topics.

Examples of four techniques to collect data and information on community history are

1) Communication mapping. This technique firstly selects a dominant community leader or influential persons and the using a snowball method for selecting other stakeholders. These selected samples are asked questions about persons, other than their own family; they communicate or consult with when they face some uncomfortable issues. The cobweb of communication linkages is used to analyze community relationships, and to separate these stakeholders into various groups. The results are used to design plan for further data collection that is directing to correct stakeholders. An example of the communication mapping is shown in Figure 3.

![Figure 3: Communication mapping of stakeholders on Lipe island](image-url)
Figure 3 shows the relationships in terms of communication among stakeholders. The relationships can be competing and supplementary. It can include issues of conflicts and supplementation. This results from this communication mapping lead to more effective data collection.

2) Community timelines. Community timelines are a technique to study history of the community, to observe changes through time due to several internal and external influences. The key informants are mostly elderly Urak Lawoi who has lived to witness those changes. Local entrepreneurs have observed changes in their businesses in relation with tourism, while the Urak Lawoi have observed changes in fishery resources. Local leaders have observed changes in power changing hands, and social characteristics. Religious leaders have observed changes and adaptation in cultural events, and beliefs. The community timelines are powerful tools and intensive ways to observed the above changes in the Urak Lawoi community. To design these timelines, focus group discussion with as many stakeholder groups as possible is a must. Examples of the historical timeline with matrix representation exhibit time of changes and their related issues as shown in Table 5.

### Table 5: Historical timeline with matrix representation

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Social structure</td>
<td>Urak Lawoi established their community</td>
<td>Entering Tao Kae fishery system</td>
<td>No public electricity</td>
<td>First public generator</td>
</tr>
<tr>
<td></td>
<td>Simple wooden houses</td>
<td>Entering loan system</td>
<td>Electricity was generated using</td>
<td>Road construction and</td>
</tr>
<tr>
<td></td>
<td>Big clan family</td>
<td>Externally influenced housing styles</td>
<td>battery charged at Tao Kae’s</td>
<td>telecommunication transmitting pole</td>
</tr>
<tr>
<td></td>
<td>Animism</td>
<td></td>
<td>house</td>
<td>Phone antenna</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More nuclear families</td>
<td>Public water supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>First resort constructed</td>
<td>Walking streets and shops</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>First opening of tourist boat operation</td>
<td></td>
</tr>
</tbody>
</table>

3) Community seasonal calendar. Fishery and tourism are dependent on season. Changes that occur in a year and their relationships with other entities can be observed by this seasonal calendar. The technique to draw seasonal calendar is from interviews with the Urak Lawoi stakeholders, especially fishers and those involved in tourism. In addition, seasonal calendar can be used to relate activities such as fishing and tourism activities with climatic conditions. Varieties and amount of fish caught depend on seasonal variation as well. An example of seasonal calendar is shown in Figure 4.
4) Manual and GIS mapping

Drawing community maps such as land and water uses map over-layered with their related activities, communication mapping and seasonal calendar provide much detailed and interesting information. Maps provide useful baseline information and are usually developed at the start and middle of the data collection to establish the location of particular features, activities or resources. They may also be developed at the end of the field data collection as a decision-making tool to assess impacts of various management strategies. The combined mapping was done at two levels as follow:

1) Manual mapping such as transect-walk and transect-boat and drafting of sighted activities and physical entities (Figure 5). This mapping process engages participation of community’s representatives and cross-checks with the identified stakeholders who are also key informants identified during the focus group meeting and in-depth interviews.
2) GIS mapping. This step employs a GIS team to perform a more precise map and link the information with other activities. The GIS is a check of data obtained from the manual mapping to exhibit quantitatively contexts of the study area, their position and precise boundary.
4.2.2 Participatory techniques

The participatory techniques are more comprehensive techniques than the focus group meeting and in-depth interviews. The team participates or ask the stakeholders to participate in all research-related activities. The application of these techniques aims at studying sensitive issues such as unexplainable pressures pressing the key informants. The participation is beneficial to the research in two aspects.

1) Deep understanding of pressing issues, their causes and effects, and reasons explaining responded by the affected Urak Lawoi.
2) Building trust between the team and stakeholders. The stakeholders can observe the team’s attempt to mix with them and to understand their real pressures. The participatory techniques result is outcomes similar to those obtained from the focus group meeting and in-depth interviews in a sense that vast data and information flow out from the tasks that enable the team to better understand the situations. Triangulation is automatically performed.

The participatory techniques can be applied in the following activities:

1) Fishery activity participation. Fishery participation is done by requesting the Urak Lawoi for accompanying in their fishing activities, emphasizing on traditional fishing methods. The local knowledge on Urak Lawoi’s traditional fishing can be crossed checked by the
team’s close observation. More personal insights into the thoughts, attitude and hope of the fishers can also be noted. The usual process of triangulation is additional performed.

2) Cultural activity participation. In terms of cultural activity, the participation techniques yields more interesting and insightful data and information. The participation in cultural activities is the easiest task as the team can join the event as tourists. Moreover, the Urak Lawoi are most happy to have outsiders interested in their cultures and traditions. But the team must be careful and show their respect sincerely. The cultures and traditions of the Urak Lawoi are conducted by the religious leader or Toh Moh. It is more convenient if the team contact the Toh Moh beforehand to ask for permission and guidance. More insightful information can be obtained and the triangulation process can also be done.

3) Tourism activity and key informant interviews. The participation techniques in the tourism activity are by residing with them, or rent out their resort rooms as a base for the research. Usually the resort owners are one of the key informants. Comprehensive results from this close participation contact can be easily obtained. This is the most important starting point for qualitative data collection.

5. Data Analysis

The analysis of data involves finding key learning from the respondents and preparing a useful report and presentation for the end users. The key learning is essential to the objectives of the research and is key ingredients for the understanding of the issues specified in the research.

There are two main types of analytical methods in this research, qualitative and quantitative analyses. The qualitative analysis is more descriptive types of the ecosystems and socio-economic characteristics of the Urak Lawoi on Lipe island. The quantitative analysis focuses on significance of the analytical results and statistical inferences. The quantitative results should be discussed, compared and dissimilated with the qualitative results to come up with synthesized key learning.

Basic principles for both qualitative and quantitative analyses are presented below.

1) Data analysis must involve all team members so as to discuss the results and compare with the team’s experiences while conducting field data collection if the results are consistent with them. The deviations can be further discussed and recheck for comprehensive understanding of the key learning.

2) The team must utilize the data to the fullest. All data collected must be analyzed to make full use of them. The data obtained have their value as there is a significant cost involved with them. Left-out data means loss of key learning and less efficient use of the research expenditure.

3) The results from the analysis must be reported for learning purposes, not for the end-users’ satisfaction. It is often that the end-users have certain expectation of the upcoming results in mind. If the findings deviate, the team must maintain the integrity of the results.

4) There is no need to perform complicated analytical methods if the simple ones could provide significant insights of the stakeholders.
5.1 Quantitative analysis

The quantitative data can be analyzed using relatively simple calculations. But first, the team must be aware of the scale of measurement of the collected data. These data measurement scale are;

1) Nominal scale. The data present only symbolic representation of the variables. The data are completely qualitative and have no quantitative meaning. The analytical methods are limited to frequency distribution, percentages and mode. The test statistics are the Chi-square test and other non-parametric tests.

2) Ordinal scale. The data have more quantitative meaning than the nominal scale as they present order. But they are still considered as qualitative. The methods of data analysis include the ones in the nominal scale, plus median, quartile and percentile, and Spearman’s rank correlation. The test statistics are those of the nominal scale.

3) Interval scale. The data have all quantitative meaning but they do not represent true zero and the difference between numbers is unequal. The methods of data analysis include those of the ordinal scale, plus means, standard deviation, Pearson’s correlation and special types of regression analysis. The test statistics are both non-parametric and parametric tests.

4) Ratio scale. The data in this last category have complete quantitative meaning. The methods of analysis include all of the interval scale, plus regular regression analysis. The test statistics are both non-parametric and parametric tests.

Some frequently used methods of quantitative analysis are provided below.

1) Frequencies and percentages. These methods of analysis are applicable to all scales of data measurement, but mostly they are used with nominal data scale. Variables such as gender, occupation, religious beliefs, marital status and other similar variables are best described by these methods.

2) Arithmetic mean. Interval and ratio data measurement scales are suitable for the analysis using arithmetic mean, most commonly used to measure central tendency of the variables. Variables such as age, income, expenditure, opinion scores of impacts are examples that the arithmetic mean calculation can be applied.

3) Other analytical methods such as correlation, regression can also be applied to appropriate data so as to come up with key learning that satisfy the research objectives.

5.2 Qualitative analysis

Qualitative analysis is the analysis from qualitative data collected from qualitative research tools and techniques described in the earlier sections. Analytical techniques with the qualitative procedures are;

1) Typology and Taxonomy. These techniques attempt to arrange the data in a systematic manner i.e., local ecological knowledge of the Urak Lawoi as shown in Figure 7.
Figure 7: Indigenous Knowledge of Urak Lawoi arranged in typological manner

2) Analytic induction. This technique utilizes all data obtained and analyzed their commonality of the interested subjects.

3) Constant comparison. This technique compares the data with other close resemblance events to find similarity and difference such as the comparison of consequences after time changes of the interested activities. An example of the constant comparison technique is the timeline analysis.

4) Componential analysis. This technique divides the data into several components such as the an ecosystem has many sub-ecosystems. These sub-ecosystems are compared as exhibited as an example in Table 6.
### Table 6: Fishing Sub-ecosystem around the Island

<table>
<thead>
<tr>
<th>Fishing gears</th>
<th>harvesting methods</th>
<th>Sub-ecosystems for fishing</th>
<th>Harvesting period</th>
<th>Species captured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small fishing trap</td>
<td>Using boat to place the cages</td>
<td>Shallow water around the island coast</td>
<td>5-7 days</td>
<td>Rainbow runner, Long fin cavalla, Snake skin gourami</td>
</tr>
<tr>
<td>Large fishing trap</td>
<td>Using boat to place the cages</td>
<td>Around rock formation in the sea</td>
<td>2 weeks</td>
<td>Orange spotted grouper, Tiger grouper, Rainbow runner, Spadefish, Parrotfish, True eel</td>
</tr>
<tr>
<td>Indo hook and line</td>
<td>Long line hooks</td>
<td>Water surface around the island</td>
<td>Morning-evening</td>
<td>Hardtail scad, Indo-pacific Spanish mackerel, Striped large-eye bream, and Indian mackerel</td>
</tr>
<tr>
<td>Simple fishing Hook</td>
<td>Fishing boat using hook and lure</td>
<td>Deep water far from island coast</td>
<td>Morning-evening</td>
<td>Spanish mackerel, Leopard grouper</td>
</tr>
<tr>
<td>Spear gun</td>
<td>Diving to spear or spearing on the boat</td>
<td>Deep sea about 5-7 meters from surface</td>
<td>At time of clear water</td>
<td>Sea cucumber, Green shrimp (coral shrimp), King Kong shrimp, Gamat, Holothuria scabra, Black sea cucumber</td>
</tr>
<tr>
<td>Purse seine</td>
<td>Releasing purse seine while operating boat, harvesting after complete the round</td>
<td>During dark-moon night</td>
<td></td>
<td>Spanish mackerel, Longtail tuna, Hardtail scad</td>
</tr>
<tr>
<td>Long spear</td>
<td>Popular in the past, difficult to use because of its long handle, good for spearing fish residing inside reef cliffs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamite fishing</td>
<td>In the past, dynamite fishing was use to exchange necessary items from middlemen or financial returns. They used fertilizers and some chemicals for mixtures, catch amount was about 1,000 – 10,000 kg.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The data from each sub-ecosystem encourage more in-depth interview for further analysis using the analytic induction technique. Examples of this type of analytical technique and an interpretation of the results are as follow.

There are at least 5 identified sub-ecosystems. Similar fishing gears are used in a same sub-ecosystem. To make the relationships clearer, fishing gears are classified in terms of their uses in two areas, shallow water around the island and deep water farther from the coast as show in Figures 8.

**Figure 8: Fishing in a sub-ecosystem**

Species of fish caught using different fishing gears are presented in Figure 9.
After obtaining information on fish species caught using different fishing gears, more detailed data on prices of fish and their marketing channels were investigated using snow-ball interview techniques. The results are shown in Table 7.
### Table 7: Prices of fish and their marketing channels

<table>
<thead>
<tr>
<th>Species of fish</th>
<th>Present</th>
<th>Past</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Buying Price (Bath/kg.)</td>
<td>Selling Price (Bath/kg.)</td>
</tr>
<tr>
<td></td>
<td>Employee</td>
<td>Not employee</td>
</tr>
<tr>
<td>Rainbow runner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Large size</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>• Medium-small size</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Grouper</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Spanish mackerel</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>(price is lower than present approximately 50 Baht/kg.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parrotfish</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Snake skin gourami</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Large size</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>• Small size</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Longfin cavalla</td>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td>Hardtail scad</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Indo-Pacific Spanish mackerel</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Spiny lobster</td>
<td>1000</td>
<td>1500</td>
</tr>
<tr>
<td>Green shrimp</td>
<td>600</td>
<td>1000</td>
</tr>
<tr>
<td>King Kong shrimp</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>Gamat</td>
<td>1,800-2,200</td>
<td></td>
</tr>
<tr>
<td>Holothuria scabra</td>
<td>1,200</td>
<td></td>
</tr>
<tr>
<td>Black sea cucumber</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>Nile top shell</td>
<td>100-120</td>
<td></td>
</tr>
<tr>
<td>Scally giant clam</td>
<td>300-400</td>
<td></td>
</tr>
<tr>
<td>(Baht/individual)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearl shell</td>
<td>3,000</td>
<td></td>
</tr>
</tbody>
</table>
An important caution in qualitative analysis is the researcher him/herself because the qualitative analysis is highly flexible. The researcher is the most important data collector, the reliability of the data depends heavily on how the researcher collect, analyze and interpret the data. Data consistency checking through the triangulation procedures are notably significant in the qualitative research process. The triangulation procedures include;

1) Temporal checking if the data collected from different time periods are consistent.
2) Stakeholder checking if the data of the same issue collected from different stakeholders are consistent.
3) Researcher checking if the data of the same issue collected by different researchers are consistent.

In addition, the data obtained from using different data collection techniques such as behavioral observation, focus group discussion or in-depth interview can also be consistency checked.

Reference
Appendix: Questionnaire

Questionnaire

Explanation and Objective of the Questionnaire

This questionnaire is a data collection tool in a project entitled, “Local Ecological Knowledge and Benefit Sharing Approaches for Small-island Fishery/Tourism Management in Lipe Island, Andaman Sea, Thailand”. The questionnaire survey has objectives (1) to investigate economic aspects of tourism on the management of marine protected areas, and (2) to analyze factors affecting the social changes of Urak Lawoi people, its baseline social changes and resilience. The research project is under the responsibility of Department of Agriculture Development, Faculty of Natural Resources, Prince of Songkla University. Information contained in the questionnaire is strictly confidential.

1. Interviewee’s information
   1.1 Name ............................................................................................................................
   1.2 Relationship with head of the family ..............................................................................

2. Family member
   2.1. Total family members? ______ (including all members who reside in the same house or members who happen to work far from the family but return home or send money back home at least every 6 months)

<table>
<thead>
<tr>
<th>No.</th>
<th>Name (Nickname)</th>
<th>Age (if less than one year old, denote as 0)</th>
<th>Relationship with head of the family</th>
<th>Marital status</th>
<th>Sex</th>
<th>Education</th>
<th>Main occupation (codes below)</th>
<th>Miner occupation (codes below)</th>
<th>Member of a group, association in the community</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0. none</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1. compulsory level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. secondary school level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. high school level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. vocational school level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. graduate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. post graduate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7. others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8. none</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9. compulsory level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10. secondary school level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11. high school level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12. vocational school level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13. graduate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.11 Type of family

☐ 1. Cluster families
☐ 2. Nucleus family

2.12 Native family

☐ 1. Native to Lipe island
☐ 2. Immigration from Province

2.13 Any member of your family working out site the Lipe island.

☐ 1. Yes  member .......... person working at ........................................

working at........................................

working at........................................

☐ 2. No

2.14 Do you think about migratory to live out site the Lipe island.

☐ 1. No because .................................................................

☐ 2. Yes because .................................................................

3. Occupation

3.1. What is the two most important occupation of your family? (see occupation codes below)

First ☐ Second ☐

3.2. Before tourism development, What is your family main occupation and supplementary occupation. (see occupation codes below)

main occupation ☐ supplementary occupation ☐

3.3. Any member of your family have to change occupation within this 5 years.

☐ 1. Yes
☐ 2. No
If yes please explain from what occupation to what occupation (see occupation codes below)

1. Previous occupation ___ New occupation ___
2. Previous occupation ___ New occupation ___

3.4. If occupation changes please explain.

___ 1. Better income
___ 2. Working less hours
___ 3. Less manual work
___ 4. Others (specify)...................................................

3.5. Total monthly income of your family from main occupation and supplementary occupation before the tourism development arrived.

___ 1. Less than 5,000 Baht ___ 2. 5,001-10,000 Baht
___ 3. 10,001-15,000 Baht ___ 4. 15,001-20,000 Baht
___ 5. 20,001-25,000 Baht ___ 6. 25,001-30,000 Baht
___ 7. 30,001-35,000 Baht ___ 8. More than 35,000 Baht

3.6. At present how much your family monthly income from main and supplementary occupation after the flourishing to tourism business on the island

___ 1. Less than 5,000 Baht ___ 2. 5,001-10,000 Baht
___ 3. 10,001-15,000 Baht ___ 4. 15,001-20,000 Baht
___ 5. 20,001-25,000 Baht ___ 6. 25,001-30,000 Baht
___ 7. 30,001-35,000 Baht ___ 8. More than 35,000 Baht
3.7. Main income of your family.

1. Fisherman
2. Employee of Tao Kae fishery
3. Tourism Business owner
4. Employee in tourism Business
5. General laborers
5. Others............................................

3.8. Is your family is a subordinate of the Tao Kae system.

1. Yes
2. No

3.9. At present is your family still a subordinate of the Tao Kae system

1. Yes
2. No

3.10. In the past 5 years, how many of your family member left the Lipe island to seek for work out site the island

Regular work = person  Seasonal work = person

4. Livelihoods

4.1. Please explain type physical characteristic of your house

1. Traditional Urak Lawoi Houses
2. Half lifted wooden house with tin or sheet roof
3. One-story semi-concrete and wooden house
4. Two-story wooden house
5. Modern style concrete house
6. Others (specify).................................................................

4.2. Problem of lifestyle nowadays (You can answer more than one chooses and pleases priority)

1. warren
2. Exclusion of housing rights
3. Exclusion of land and beach access
4. Exclusion of sea access
5. Electricity supply shortage
6. fresh water supply shortage
7. Others (specify).................................................................
4.3. What is diseases your family member in last 5 years

- 1. diarrhea
- 2. Decompression illness
- 3. fever
- 4. skin diseases
- 5. Others (specify) .................................................................

4.4. When the member of your family got sick, Where do you take than to cure?

- 1. Public Health Office
- 2. At the hospital on the mainland
- 3. Buying medicine from the drugstore
- 4. Local Urak Lawoi oarsmen
- 5. Others (specify) .................................................................

4.5. What are beliefs of you and your family? (can answer more than 1)

- 1. Ghost spirit and ancestor spirit
- 2. virtue/sin
- 3. Horoscope
- 4. black magic
- 5. Others (specify) .................................................................

4.6. You and your family member join the Urak Lawoi ceremonies below or not (check ✓) and why

<table>
<thead>
<tr>
<th>ceremonies</th>
<th>joined</th>
<th>not joined</th>
<th>reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ceremonial boat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Yapinyu tradition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Puya Lawoi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Tulabala tradition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Others (specify) 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.7. What are you properties do you owner? (Data Collector: every check need to answer)

<table>
<thead>
<tr>
<th>properties</th>
<th>Yes</th>
<th>No</th>
<th>properties</th>
<th>Yes</th>
<th>No</th>
<th>properties</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>palm leaf roof</td>
<td></td>
<td></td>
<td>loan credit</td>
<td></td>
<td></td>
<td>hook</td>
<td></td>
<td></td>
</tr>
<tr>
<td>concrete roof</td>
<td></td>
<td></td>
<td>television</td>
<td></td>
<td></td>
<td>Trap nets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tin sheet roof</td>
<td></td>
<td></td>
<td>mobile phone</td>
<td></td>
<td></td>
<td>Bottom nets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>wooden wall</td>
<td></td>
<td></td>
<td>refrigerator</td>
<td></td>
<td></td>
<td>spear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>concrete wall</td>
<td></td>
<td></td>
<td>computer</td>
<td></td>
<td></td>
<td>Wooden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>concrete floor</td>
<td></td>
<td></td>
<td>bicycle</td>
<td></td>
<td></td>
<td>Water tank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wooden floor</td>
<td></td>
<td></td>
<td>motorcycle</td>
<td></td>
<td></td>
<td>Water pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proper WC toilet</td>
<td></td>
<td></td>
<td>rowboat</td>
<td></td>
<td></td>
<td>electric</td>
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<td></td>
</tr>
<tr>
<td>open air toilet</td>
<td></td>
<td></td>
<td>motorboat</td>
<td></td>
<td></td>
<td>poultry</td>
<td></td>
<td></td>
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</tbody>
</table>
4.8. Please estimate your house and land value, How much? ___________ Bath

4.9. What is the type of your land rights ownership?

- 1. Sor Kor 1 *
- 2. Land certificate (Nor Sor 3/Nor Sor 3Kor)**
- 3. from ancestor
- 4. Occupied land
- 5. Have no land
- 6. Others (specify) ........................................

*1. Notification of land tenure, land is evidence that they exist **2. Testimonials competent ot serve the property

4.10. If there is someone want to by your land will you sell

- 1. Yes
- 2. No
- 3. not sure

4.11. Average household expenditure for the past 6 month and annual (check if the is expenditure)

<table>
<thead>
<tr>
<th>Item</th>
<th>last 6 month (amount)</th>
<th>Last year (✓)</th>
<th>Item</th>
<th>last 6 month (amount)</th>
<th>Last year (✓)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clothing</td>
<td></td>
<td></td>
<td>Investment in fisheries</td>
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<tr>
<td>Education for children</td>
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<td>Wage</td>
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<tr>
<td>Travel</td>
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<td>Investment in tourism</td>
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<td>business</td>
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<tr>
<td>Hospital/medicine</td>
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<td>Debt payment (cash)</td>
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<tr>
<td>Electricity</td>
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<td>Debt payment (non-cash)</td>
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<tr>
<td>Drinking water</td>
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<td>Religions-Donation-Beliefs</td>
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<tr>
<td>House build / repair</td>
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<td>Customary –Donation-Culture</td>
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<tr>
<td>Boat/Fishery repair</td>
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<td>Social consideration –</td>
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<td>Society</td>
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<tr>
<td>Livestock farming</td>
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<td>Others</td>
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</tbody>
</table>

________________________________________
4.12. Does your family income nowadays enough for the expenditure

- 1. enough but does not have saving
- 2. enough and have saving
- 3. not enough

4.13. If your income is not enough for the expenditure, What is the solution (answer More than 1)

- 1. Borrow from relative (no interest)
- 2. Mutual lending circle/money chain
- 3. Take valuable property to pawn shop
- 4. selling land
- 5. borrow money Tao Kae
- 6. loaning from non-bank system (with interest)
- 7. Buy goods with credit card
- 8. loaning from bank system
- 9. Others (specify) .................................................................

5. Change from tourist activity

5.1. What is the impact from tourism to you and your family

- 1. create income
- 2. create occupation
- 3. no impact
- 4. negative impact
- 5. Others (specify) .................................................................

5.2. What level change of tourism to your Urak Lawoi social

- 1. The most changes
- 2. Much changes
- 3. Medium changes
- 4. Less changes
- 5. No change

5.3. Does tourism development make the land high price? … Why?

- 1. Yes because ..............................................................................
- 2. No becuase .............................................................................

5.4. Before the tourism development do you have your owned land

- 1. Yes
- 2. No

5.5. At present do you have your owned land

- 1. Yes
- 2. No
5.6. When tourism development arrived, Did you sell your land?

[ ] 1. Yes  number................plot  Value at......................... Baht

land sold to [ ] local people  [ ] outsider

You use money from land sell for .................................................................

[ ] 2. No

5.7. Did you have confiscation of right to stay on land

[ ] 1. Yes  [ ] 2. No

5.8. Did you have land dispute/court case on land rights ownership?

[ ] 1. Yes  [ ] 2. No

5.9. What is forest product/timber product/fruit and vegetable from nature that you harvest?


[ ] 5. Rattan  [ ] 6. Others (specify)........................................................................
6. **Impact of Lipe island tourism to your family**

What is tourism on Lipe island impact to your family

5 = most  4 = Much  3 = Medium  2 = little  1 = least

<table>
<thead>
<tr>
<th>Impact on</th>
<th>No Impact</th>
<th>Level positive Impacts</th>
<th>Level negative Impacts</th>
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<tbody>
<tr>
<td></td>
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<td>5 4 3 2 1</td>
<td>5 4 3 2 1</td>
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<tr>
<td>1. House Conditions</td>
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<tr>
<td>Relocation of houses</td>
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<td>Land ownership</td>
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<tr>
<td>Recreation areas around houses</td>
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<tr>
<td>Changing housing materials (wood, concrete)</td>
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<td>Drug addiction among youths</td>
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<tr>
<td>Convenient commuting with mainland</td>
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<tr>
<td>Convenient commuting on the island</td>
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<tr>
<td>Convenient access to electricity</td>
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<tr>
<td>Private life of household members</td>
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<tr>
<td>Quality of life and other household facilities</td>
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<tr>
<td>Coastal erosion damaging houses</td>
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<tr>
<td>2. Household livelihoods</td>
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<tr>
<td>Opportunities for alternative occupations such as long-tail boat operators, employees in restaurants and resorts</td>
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<tr>
<td>Income increments</td>
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<tr>
<td>Fishery Tao Kae system</td>
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<td>Fish harvest</td>
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<td>Access to land on the island</td>
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<td>Access to sea grounds</td>
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<tr>
<td>Transfer of fishing intelligence knowledge</td>
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<tr>
<td>Agriculture on the island</td>
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<tr>
<td>Establishment of own business</td>
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<tr>
<td>Illegal fishing in marine park</td>
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<tr>
<td>Debt burden</td>
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<tr>
<td>3. Social Structure and Relationships</td>
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<tr>
<td>Relationship between Urak Lawoi family and relatives</td>
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<tr>
<td>Relationship between Urak Lawoi family and Urak Lawoi in community</td>
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<tr>
<td>Relationship between Urak Lawoi family and community leaders</td>
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<tr>
<td>Relationship between Urak Lawoi family and cultural</td>
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<tr>
<td>Impact on</td>
<td>No Impact</td>
<td>Level positive Impacts</td>
<td>Level negative Impacts</td>
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<tr>
<td>leaders</td>
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<td>5 4 3 2 1</td>
<td>5 4 3 2 1</td>
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<tr>
<td>Relationship between Urak Lawoi family and public health officers</td>
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<td>Relationship between Urak Lawoi family and teachers on the island</td>
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<td>Relationship between Urak Lawoi family and police/navy officers</td>
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<td>Relationship between Urak Lawoi family and local administrators</td>
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<tr>
<td>Relationship between Urak Lawoi family and fishery officers</td>
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<tr>
<td>Relationship between Urak Lawoi family and marine park officers</td>
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<tr>
<td>Relationship between Urak Lawoi family and foreigners</td>
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<tr>
<td>Relationship between Urak Lawoi family and Thai business people from mainland</td>
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<tr>
<td>Inter marriage between Urak Lawoi family and outsider</td>
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<tr>
<td>Emigration of member of Urak Lawoi family</td>
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<tr>
<td>Immigration of member of Urak Lawoi family</td>
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<tr>
<td>Trust among family members</td>
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</tbody>
</table>

4. Daily Life

Duty as a housewife
Duty as a husband
Duty as an elder’s of the family
Alcohol consumption
Mutual lending circle/Money chain
Stock market/Lottery gambling

5. Costumes

Costumes of female teenager in your family
Costumes of male teenager in your family
Costumes of mature female in your family
Costumes of mature male in your family
Costumes of mature elders in your family

6. Food Consumption Behaviors

Number of meals per day
Varies/types of food
<table>
<thead>
<tr>
<th>Impact on</th>
<th>No Impact</th>
<th>Level positive Impacts</th>
<th>Level negative Impacts</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>4</td>
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<tr>
<td>Home cooking</td>
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<tr>
<td>Traditional ways of cooking</td>
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<tr>
<td>Promotion of Urak Lawai food culture</td>
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<tr>
<td>Local food ingredients found around the island</td>
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<tr>
<td>Seafood processing/preserving</td>
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<td><strong>7. Language</strong></td>
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<tr>
<td>Speaking Urak Lawoi language in your family</td>
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<tr>
<td>Speaking Thai language in your family</td>
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<tr>
<td>Reading/writing Thai language in your family</td>
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<tr>
<td>Speaking English language in your family</td>
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<tr>
<td>Reading/writing English language in your family</td>
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<tr>
<td>Social value of using Urak Lawoi language for community communication</td>
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<td>Social value of using Thai language for community communication</td>
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<tr>
<td>Social value of using English language for community communication</td>
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<td><strong>8. Sanitation and Health</strong></td>
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<tr>
<td>Garbage and waste management on the island</td>
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<tr>
<td>Public and underground water supply</td>
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<td>Sanitary condition of Urak Lawai</td>
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<tr>
<td>Medication</td>
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<td><strong>9. Education</strong></td>
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<tr>
<td>Education of Urak Lawai offspring’s on the island</td>
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<tr>
<td>High level education of Urak Lawai offspring’s</td>
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<tr>
<td>Mainland education of Urak Lawai offspring’s</td>
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<tr>
<td>Trade-off between education and working in family fishery</td>
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<tr>
<td><strong>10. Cultures, Traditions and Beliefs</strong></td>
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<tr>
<td>Multi culture education</td>
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<td>Spread of Urak Lawai cultures</td>
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<tr>
<td>Uniqueness of Urak Lawai</td>
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<tr>
<td>Expression of Urak Lawai’s uniqueness</td>
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<tr>
<td>Traditional cultures and ceremonies such as ceremonial boat functions</td>
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<tr>
<td>Impact on</td>
<td>No Impact</td>
<td>Level positive Impacts</td>
<td>Level negative Impacts</td>
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<tr>
<td>Social values, traditional beliefs and lifestyles</td>
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<tr>
<td>Obedience and respect to elders</td>
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<tr>
<td>Social classes and inferiority of the Urak Lawoi</td>
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<tr>
<td>Morals and honesty</td>
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</tbody>
</table>

7. ways to reduce the social impact from tourism activity

7.1 What is the ways how to reduce the impact of land use/house condition from tourism activity

1. ........................................................................................................................................
2. ........................................................................................................................................
3. ........................................................................................................................................

7.2 What is the ways how to reduce the impact of household livelihood from tourism activity

1. ........................................................................................................................................
2. ........................................................................................................................................
3. ........................................................................................................................................

7.3 What is the ways how to reduce the impact of Urak Lawo relationship from tourism activity

1. ........................................................................................................................................
2. ........................................................................................................................................
3. ........................................................................................................................................

7.4 What is the ways how to reduce the impact of culture traditions and belief from tourism activity

1. ........................................................................................................................................
2. ........................................................................................................................................
3. ........................................................................................................................................

7.5 What is the other ways how to reduce the impact from tourism activity

1. ........................................................................................................................................
2. ........................................................................................................................................
3. ........................................................................................................................................