

# Chapter 12

## Participatory Wetland Management: A Case Study of Xe Champhone Wetland, Lao PDR

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**Abstract** In most of the developing countries, wetlands are one of the important fundamental sources as they play out a scope of ecological capacities and give various financial advantages to nearby communities and an extensive populace. However, wetlands are among the most threatened of all environmental resources. It was stated that most of the earth's wetlands have been disappeared through transformation to industrial, farming, and urban developments. The livelihood of most of the people who are living in Laos relies on its rich wetland biodiversity. Unfortunately, several wetlands in Laos remain under threat from overuse of natural resources. In addition, there has been little research and a lack of data and information about wetlands in Lao PDR, which is the major obstacle in wetland management. In addition, management of wetlands is generally done in a top-down manner, where local communities were not involved in the decision-making process. This study aimed to identify problems related to wetland management by incorporating concerns of all stakeholders into consideration as well as to develop participatory wetland management action plan. The stakeholder's analysis in the utilization of wetland resources and the management of Xe Champhone Wetland were accomplished by using strengths, weakness, and threats (SWOT) analysis and a TWOS matrix. Once the consultation with stakeholders was done, strategies and management activities were designed and a participatory wetland management action plan was developed.

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## 1 Introduction

One of the most important ecosystems on earth is wetlands. Wetlands have been defined as “the kidneys of the landscape” as well as “supermarkets of biology,” in view of the capacities they perform in the hydrological and synthetic cycles, and in light of the broad nourishment networks and rich biodiversity, they sustain respectively (Barbier et al. 1997). Furthermore, wetlands remove pollutants and suspended particles from flowing water, shield delicate coastlines from erosion and storms and it also provides habitat for vital species of wildlife (Wang et al. 2008). However, 50% of earth’s wetlands are lost and the remaining wetlands are in need of immediate actions to prevent additional degradation of wetland due to increasing activities held by individuals (Myers et al. 2013). The main causes for losses of wetland in most worldwide are due to human populace development and financial thought processes, for example, development of urban zones or agribusiness (Kozich and Halvorsen 2012). The services provided by the wetland cannot be measured in market price, many studies were carried out using various methods to estimate the non-market valuation of wetlands and the estimated results were remarkable (Woodward and Wui 2001).

Lao PDR is abundant with wetland biodiversity, and it contributes valuable services to society of Lao individuals who lives in the wetland-rich Mekong basin (Sopha 2013). Most of the people in Laos completely depend upon on wetlands for their everyday living. Nonetheless, there are numerous challenges that undermine the sustainable utilization and management of wetlands in Laos such as government approaches, socioeconomic, and population changes result in the demand for higher growth in agricultural production, construction of roads and buildings for industries, and private settlement. It is not common in Lao PDR to find natural lowland wetlands, and this shows that most wetlands are in some shape of exceedingly changed, without a doubt a growing example toward modification. (Timmins 2014). Notwithstanding the significance of wetlands in supporting for the long haul, there are additional worries over the manageability of use and upkeep of wetland advantages. This is the motivation behind why as of late much consideration has been centered on sustainable management strategies for wetlands.

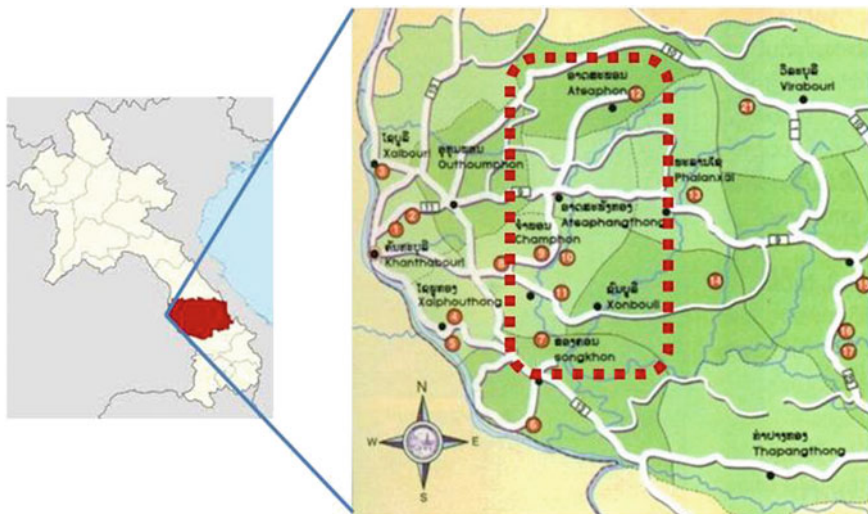
The Ramsar Convention on Wetlands was established to improve the preservation of wetlands and their careful utilization and management (Barbier et al. 1997). The Ramsar Convention on Wetlands came into force for Lao PDR on September 28, 2010 (Duckworth and Timmins 2014). At present, there are two Ramsar sites in Lao PDR and both the sites are in the southern provinces of Laos. Beung Kiat Ngong Wetlands is in Champasak Province and Xe Champhone Wetlands is in Savannakhet Province. Xe Champhone is a vital region for various species of reptiles like Siamese crocodile (*Crocodylus siamensis*), snakes (*Ramphotyphlops braminus*), python (*Python reticulatus*), lizard (*Draco* spp.), and turtle (*Cuora* spp.) (Geiser and Nagel 2013). Savannakhet Province is extremely influenced by flood every year, and it has unfavorably influenced the cultivation of fish, production of agricultural, and destruction of infrastructures (Hazarika et al. 2008).

In spite of the fact that the land is not truly harmed by the severe flood occasion but it affects all products such as livestock, crops, and fish (e.g., the deep flood caused damages to rice and livestock production due to the strong Nock-Ten Typhoon in 2011 (Yen et al. 2015).

If there is no implementation on adaptation plans and mitigation, declining of ecosystem services is expected (Arias et al. 2014). This study aims to identify current issues and management gaps in the Xe Champhone Wetlands. This site was chosen mainly because of their high level of biodiversity and home to key threatened species. The study also attempted to examine the strengths and weaknesses of the stakeholders, as well as opportunities and threats from the external environment for Xe Champhone Wetland. The intention was to develop a strategic action plan for improving Xe Champhone Wetland planning through stakeholder-based SWOT analysis.

## 2 Study Site

The study area is Xe Champhone Wetlands, one of the two significant wetlands in Lao PDR which was designated as Ramsar Convention in 2010. The site covers an area of 12,400 hectares (ha) in Champhone, Xonbuly, Atsphone, and Atsaphanthong districts as shown in Fig. 1. The wetland in these districts plays an important role as source of income to the neighborhood individuals who live nearby area. In Laos, the largest paddy rice cultivation region is in Savannakhet Province



**Fig. 1** Map of Savannakhet Province; the location of the four districts where Xe Champhone Wetlands is located is circled on the map

which covers 21.48% or 194,157 ha of the nation's total area of paddy rice cultivation (Boulidam 2012). There are 20,000 people from more than 40 villages settled in Champhone District and rely mostly on wetland for livestock grazing, fishing, and agricultural activities (IUCN 2011). Xe Champhone Wetlands is not just important for people who are living in Savannakhet Province, it is similarly vital for different species such as turtles, winged creatures, and Siamese crocodiles that are likewise very reliant on this wetland.

This study focuses in Champhone District where the core area of Ramsar site can be found. The district is a flat area, 54 km northeast of Savannakhet municipality with a total area of 1,114 ha, 102 villages, 16,189 households, 18,549 families, and 109,040 population (Investment 2009).

### 3 Methodology

The data for this research were collected using two main methods; questionnaire survey and SWOT analysis. Application of SWOT analysis is a globally accepted method which aims to identify the strengths and weaknesses of an organization and the opportunities and threats in the environment (Dyson 2004) and (Houben et al. 1999). Thus, the method was selected to be used in this study. In order to perform SWOT analysis in this research, villages and stakeholders were identified and selected for questionnaire surveys and interviews to analyze an internal and external environment of the area. Once the interview with stakeholders and local people was done, management activities were designed by using TOWS matrix. The data collections were carried out from June 2011 to December 2012.

#### 3.1 *Questionnaire Surveys*

There were two sets of questionnaire surveys in this study. The first questionnaire was focused on socioeconomic benefits obtained from wetland, problems, and management gaps. It should be noted that the information discussed in this first questionnaire survey was only focused on the problems and management gaps. The second questionnaire was developed based on the solution of problems and management gaps that were identified. Respondents were asked to rate proposed management activities based on importance, impacts to wetland management, do-ability of the proposed options, and the urgency of each activity. Each criterion was rated on a score from 1 to 5, where 1 score means low importance, do-ability, impact, and not urgent, and 5 score means high in all criteria.

**Table 1** Selected villages and a number of the sample for each village

No.	Villages	Group	Population	Households	At least 18% of households for questionnaire survey
1	Dong Mueang	Tourism (T)	788	120	22
2	Tha Mouang		188	122	22
3	Nong Lamchan		1903	424	76
4	Hua Mueang	Rural (R)	664	112	20
5	Xe		625	95	17
6	Tha Mueang		1142	135	24
7	Xakhuen Nuea		1710	290	52
8	Lamthen		553	92	17
9	Kengkok Nuea	Urban (U)	1880	372	67
10	Kengkok Kang		1748	292	53
Total					370

### 3.2 Identification of Respondents for Questionnaire Survey

Around Xe Champhone wetlands, there are 45 villages. Among these, 20 villages are located within 1 km from the wetland. Out of 20 villages, 10 were selected for a questionnaire survey (Table 1). In order to find a sample size, we use the formula of Taro Yamane (Taro 1973) at a confident level of 95%. The formula is shown as follows:

$$n = N/1 + Ne^2 \quad (1)$$

where

$n$  Sample size

$N$  Population size

$e$  The error of Sampling

Therefore, the sample size for our study is as follows:

$$n = 2054/6.135 = 335.$$

The sample size is set to 335. However, to ensure that the number of respondent was close to the calculation result, out of the total households in each village at least 18% of households were randomly selected. Therefore, the total number of sampling size of the respondents for this study was 370. In addition, these ten villages were categorized into three groups (tourism area, rural area, and urban area) based on their social economic activities.

### ***3.3 Stakeholders Identification for SWOT Analysis***

In this study, the stakeholders were divided into three main groups as follows:

- Local communities: Local people, head of each village
- Governmental offices: Ministry of Natural Resources and Environment, Provincial Water Resources Office, Provincial Agriculture and Forestry Office, District Investment Promotion and Management Office, District Tourism Office, District Water Resources and Environment Office, District Agricultural and Forestry Office, District Land Management Office, etc.
- Non-Governmental Organizations: International Union Conservation of Nature Laos (IUCN), Mekong River Commission—Laos (MRC), World Conservation Society—Laos (WCS).

### ***3.4 SWOT Analysis***

The strengths, weaknesses, opportunities, and threats (SWOT analysis) were compiled from participatory meeting and interview with the stakeholders. Interviews with the respondents focused on the following issues: the changing situation of the Xe Champhone River and their community from the past to present, concerns, and future plan.

After SWOT was listed and analyzed, TOWS matrix or management strategies were drafted to identify preferred management activities. TOWS matrix was developed based on the four strategies:

- Maxi-Maxi Strategies (S-O)—Use strengths, to capitalize on opportunities.
- Maxi-Mini Strategies (S-T)—Use strengths, to avoid threats.
- Mini-Maxi Strategies (W-O)—Improve weaknesses, by using opportunities.
- Mini-Mini Strategies (W-T)—Avoid threats, and minimize weaknesses.

Wetland management activities were drafted from each strategy in the TOWS matrix step. All possible activities were listed based on the strategic plan and were used in the second questionnaire.

### ***3.5 Prioritizing of Management Activities and Action Plan***

Targeted villages were categorized into three main groups: tourism group (travel places in the village area), urban group (villages which are located in a municipal area), and rural group (villages which are located in a rural area). This has been done in order to prioritize the management activities from the second questionnaire, based on specific needs in different areas. In order to avoid some errors that could

occur from the differences between the highest and the lowest score of each activity; the average of four criteria: importance, impact, possibility, urgency, and the range of standard deviation (SD) of each activity from each village were calculated. The ranges of SD were used to reflect the variation in opinion of local people in each village. For example, if the range of SD is low or medium, this means that local people have the same opinion for that particular activity while a high range of the standard deviation means that people in the same village think differently for that activity. By using SD value, it can be seen in the graph whether the activity is reliable or not. Hence, the activity with a high score of every criterion with low SD range was considered as the first activity to do for those villages or those groups. If the activity got a high score of every criterion and the SD range was also high, this activity was not considered as the first activity to do for those villages or those groups since there were some differences of opinion from the same community.

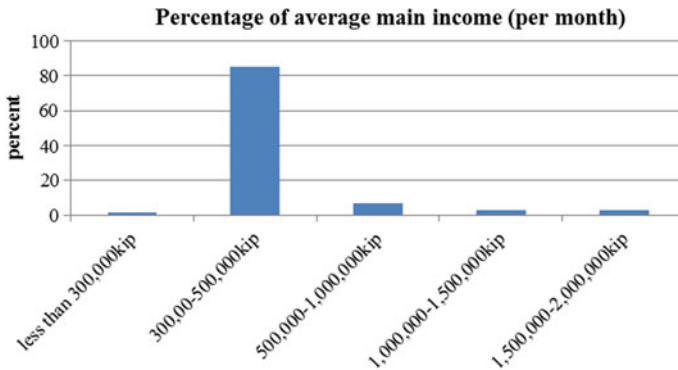
## **4 Result of the Study**

### ***4.1 Socioeconomic Benefit***

Through questionnaire survey in various communities has confirmed that almost 97% of the populace depends upon on wetlands for agricultural purposes and the remaining 3% of the populace are involved in other sectors like business and government services. The major source of income for the local people in Champhone District is from crop farming, particularly rice production. In addition, raising domesticated animals, for example, chickens, ducks, buffalos, and cows are the second most essential agricultural activity for neighborhood individuals. Villagers also plant some organic products for their own consumption and sell some products to acquire extra wages. This turns into a principle alternate occupation in the community.

Aside from rice cultivating, another source of income is from seasonal crops production such as corn, cowpea, chilly, and tobacco. Villagers also engaged in fish farming activities where they have small-scale fish farms, especially Tilapia, Catfish, and Snakehead and mostly used for their own consumption in a family and to sell some of it for a good wage. As per the study carried out in ten target towns along Xe Champhone River, more than 90% of household units take part in fishing and by and depending on how much time they have spent on fishing, household units can harvest about 20 kg per month as an average.

On an average, the main income in the target villages is between the ranges of 300,000–500,000 kip per month (Fig. 2) or 37.5–62.5 USD per month (at exchange rate 800,000 kip per 100 USD in December 2012). As mentioned above, this amount of earnings is mainly through commercial farming activities like planting agriculture and horticulture, crop and livestock farming.



**Fig. 2** Percentage of average main income

Therefore, the wetland for those who are staying nearby Xe Champhone is like a valuable land to uncover gold from it.

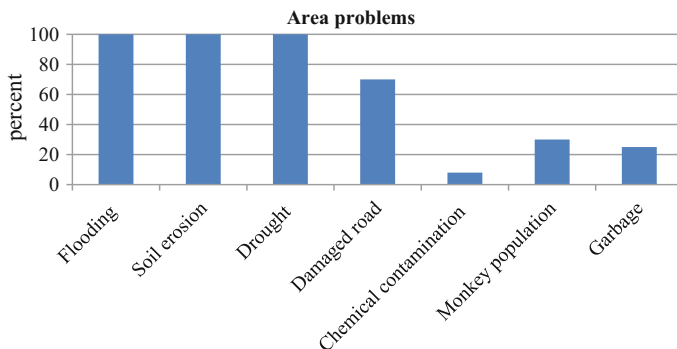
Respondents additionally included that they can get high production in the dry season which has a shorter growing period compared to the wet season. Development of irrigation, use of fertilizers and insecticides, building ponds for fish cultivation or aquaculture add to the expansion of production as well as increase in market prices of product in Champhone District.

## 4.2 *Problems and Management Gaps*

Local people in ten surveyed villages cited numerous problems, particularly flooding, soil erosion, drought, damaged road, chemical contamination, monkey population, and garbage. Figure 3 shows that flooding, soil erosion, and drought are the most common problems in the areas. One hundred percent of the respondents mentioned those problems as their major problems. This is due to the structure of the bank of the Xe Champhone, which is made of fine sand. This makes it unstable and easily eroded when flooded. The river has become shallower and wider with a loss of deep pools; therefore, it cannot store water in the dry season.

Besides, 74% of the respondents mentioned that transportation is another problem in the area, especially in the wet season because most of the roads have been damaged due to flooding. Some additional problems are based on village locations such as chemical contamination in Nong Lamchan village since this village is located close to the area where sugar cane was planted to support a sugar factory. People in this village mentioned that three years ago, there was pesticide contamination in the soil and water in the area, which caused the death of their livestock and illnesses of people. Local people still believe that chemical contamination in the soil and water still exists since there has not been any monitoring of water and soil quality in the area.





**Fig. 3** Problems encountered by local residents

In addition to the results of the questionnaire survey, in-depth interviews were carried out with stakeholders to find their concerns based on activities carried out for the management of wetlands as summarized in Table 2.

### 4.3 SWOT Analysis

The results of the interviews based on strengths, weaknesses, opportunities, and threats in Champhone District as well as Xe Champhone management are summarized as follows.

#### 4.3.1 Strengths

Champhone District is rich in natural resources such as land, rivers, lakes, ponds, and forest (especially bamboo forest). The area also has high biodiversity of fish and wildlife. Additionally, it contains cultural resources such as old temples, sacred places, and objects. The ethnic groups in the area include Makong and Katang. By this, customary laws and beliefs are still useful and effectively protect some wildlife species. Moreover, local people have some folk wisdom in handicrafts. Most of the people in this area are all educated at least up to primary school level. Besides, the area has a systematic infrastructure as the main road in the district connects village to village. There are additionally some roads connected to surrounding districts.

#### 4.3.2 Weaknesses

According to the geography, Champhone District is located in a flat area, surrounded by the Xe Champhone River, with many lakes and oxbows. Hence, all the

Table 2 Stakeholders' concerns

Group/status		Activities	Concerns
Local community	Local people	<ul style="list-style-type: none"> <li>Customary use of the wetland involves allocation of use rights for paddies, fishing, etc., to villagers, as well as customary protection of sacred sites</li> </ul>	<ul style="list-style-type: none"> <li>Flooding and soil erosion every year affect their crops products</li> <li>Fish and wildlife have decreased</li> <li>Need better wetland management</li> <li>Need better wildlife management</li> <li>Need better land and forest management</li> <li>Some people still infringe the regulations, using a destructive way to catch fish or encroaching on the conserved forest or lake to catch wildlife</li> </ul>
	Head of each village	<ul style="list-style-type: none"> <li>Currently implementing local customary protection</li> <li>Key partner of any development of local wetlands management regulations, plans, or arrangements</li> <li>Coordinate with IUCN in preparation for joining Ramsar Convention</li> </ul>	
Governmental offices	Ministry of Natural Resources and Environment	<ul style="list-style-type: none"> <li>Responsible for agriculture, irrigation, forests and fisheries at the local level</li> <li>Technically responsible for water resources management</li> </ul>	<ul style="list-style-type: none"> <li>Lack of the financial support to do wetland management</li> <li>Still need to revise some laws or draft some laws or regulations to protect wetlands</li> <li>Due to frequent flooding and drought almost twice a year in the area, people in Champhone District have lost a lot of crops and livestock production. These organizations try to help people by providing new breeds of crops which can resist the flood and drought; however, the quantity of seeds supplied still is not enough for every household</li> <li>Xe Champhone has become shallower every year because of soil erosion. Therefore, it cannot store enough water for agriculture in the area. Irrigation can partly help, but the number of pumps is still not enough for some villages</li> </ul>
	Provincial Agriculture and Forestry Office		
	District Agricultural and Forestry Office		
	Provincial Water Resources Office		
	District Water Resources and Environment Office		

(continued)

Table 2 (continued)

Group/status	Activities	Concerns
District Tourism Office	<ul style="list-style-type: none"> <li>• Planning for promoting wetland and developing wetland to be travel places</li> </ul>	<ul style="list-style-type: none"> <li>• Still lacking the promotion of services for tourists</li> <li>• Some travel places are still difficult to access due to poor infrastructure</li> <li>• Lack of staff, such as local guide and on-site information</li> </ul>
District Investment Promotion and Management Office	<ul style="list-style-type: none"> <li>• Responsible for ensuring the investment and concession regulation are properly implemented and monitored</li> </ul>	<ul style="list-style-type: none"> <li>• Still have some problem with land concession with local people</li> <li>• District office for land management could not identify clearly the boundary of local</li> </ul>
Non-governmental offices	<ul style="list-style-type: none"> <li>• Wetland management plan</li> </ul>	<ul style="list-style-type: none"> <li>• Because of the financial problem, they could not continue the step of drafting a comprehensive wetland management plan in Xe Champhone</li> </ul>
Mekong River Commission (MRC)	<ul style="list-style-type: none"> <li>• “Lower Mekong basin for basin adaption planning” project on climate change impact on wetland in Xe Champhone since 2011</li> </ul>	<ul style="list-style-type: none"> <li>• No more project after 2011</li> </ul>
World Conservation Society (WCS)	<ul style="list-style-type: none"> <li>• Crocodile conservation project in Xe Champhone</li> </ul>	<ul style="list-style-type: none"> <li>• Most of their concerns are crocodile related such as encroachment to the hatching areas of local people to steal the crocodile’s eggs</li> </ul>

time Champhone District has been affected by natural disasters such as flooding, drought, and soil erosion. Since local income generation is mainly based on agriculture, local livelihood is affected a lot. Planting, farming, transportation, and infrastructure are affected by flooding in the wet season and/or drought in the dry season.

Despite a living style of the local people that is still based on natural resources, wildlife management in the area still has some problems such as over-hunting and illegal encroachment. In addition, the number of monkeys in Monkey Forest has increased each year in which it interrupts farming and agricultural activities nearby villages. Moreover, the area still lacks the promotion, awareness rising, and implementation of laws, regulations, and discipline for land use, chemical use, environmental, and investment for local people and investors. Additionally, support from governmental sectors is still inadequate, both in terms of human capital and financial resources.

### **4.3.3 Opportunities**

Champhone District has a very high potential to develop as an ecotourism district according to natural resources and cultural resources. Also, local people are able to create at least one product (or one village one product) by using their folk wisdom and support from governmental offices or NGOs. With the support from related organizations, communities will be able to generate more income not only from agriculture, but also from trading local products. Besides, the city has a potential to get more investment from other countries since the 9B road, a road from Thailand through Laos to Vietnam, is in construction.

### **4.3.4 Threats**

Flooding and drought contributes to soil erosion every year. Soil erosion continues to destroy local houses and cultural places located close to the river bank and affects crops and livestock production. The increasing temperature and rainfall can facilitate crop pests, potentially increasing production costs due to more use of chemical insecticides. In addition, crop production, particularly wet season rice, will continue to be affected by flooding, which is expected to worsen with increased flows in the Xe Champhone River. Consequently, to compensate the lost of production during wet season, production of rice during dry season has increased, thus increasing the need for irrigation infrastructure and the use of chemical fertilizers and pesticides that led to further degradation natural resources in the area.

Some other problems still need to be addressed since Xe Champhone has not had a comprehensive management plan yet. Furthermore, financing is a major part of activities. Therefore, this study will propose some management activities so managers can easily decide which management action to do. At the same time, it will additionally respond to the needs of the wetland users.

#### 4.4 TWOS Matrix

After conducting SWOT analysis, strategic options were drafted by using a TWOS matrix (Table 3). There are 10 strategies, and 36 activities identified for the sustainable management of Xe Champhone Wetland, based on the needs of stakeholders in the area.

From each strategic option, this study has proposed management activities based on importance, impacts to wetland management, do-ability of the proposed activities, and the urgency of each activity.

We can also gather ideas of wetland management from local wetland users and wetland managers from local and central offices and Non-Governmental Organizations. Table 4 shows selected activities proposed after analyzing the first questionnaire survey and interviews with stakeholders. In total, there were 36 activities identified.

**Table 3** Strategic options for the management of Xe Champhone Wetland

TWOS		External			
		Opportunities		Threats	
Internal	Strengths	S-O (maxi-maxi) strategies		S-T (maxi-mini) strategies	
		SO1	Support ecotourism in the area and conserve the traditional culture of each ethnic group	ST1	Support the customary laws in the area and also improve and implement wildlife management
		SO2	Support indigenous knowledge on handicraft to create one village one product or one district one product	ST2	Promote and educate local people about the benefit of ecotourism as well as awareness people about environmental protection
		SO3	Support investment in the area	ST3	Develop transportation as well as infrastructure in the district
	Weaknesses	W-O (mini-maxi) strategies		W-T (mini-mini) strategies	
		WO1	Improve biodiversity management	WT1	Prepare an environmental protection plan
		WO2	Improve education and public health services in the city	WT2	Prepare an adaptation plan to cope with natural disasters in the area

**Table 4** Selected management activities proposed, based on each strategy identified by the TWOS matrix

Strategic option		Item	Activity
1	SO1—support ecotourism in the area and conserve the traditional culture of each ethnic group	A1	Develop and renovate some existing travel places
		A2	Provide maps and information about travel places
2	SO2—support indigenous knowledge on handicrafts to create one village one product or one district one product	B1	Organize a handicraft union
3	SO3—support investment in the area	C1	Establish an investment fund for local people to encourage local people to do service businesses such as restaurants and guesthouses to support tourism development and international investment
4	ST1—support customary laws in the area and improve and implement wildlife management	D1	Post signboards around the area with information about the wetlands conservation and the site regulations
5	ST2—promote and educate local people about the benefits of ecotourism as well as environmental protection	E1	Create some environmental activities, such as study tours in communities
6	ST3—develop transportation as well as infrastructure in the district	F1	Improve the transportation to the travel places
7	WO1—improve biodiversity management	G1	Promote breeding and releasing native fish back into the river, lakes, and ponds, in order to maintain wild fish population and sustain local livelihood
8	WO2—improve education and public health services in the city	H1	Expand schools and increase the number of educated people with higher degrees in the area, support these people to be educational resources for their hometown
9	WT1—prepare an environmental protection plan	I1	Prepare educational materials on: sustainable resources use, Ramsar Convention, organic/minimal chemical use, agriculture, environment, and socially responsible tourism
10	WT2—prepare an adaptation plan to cope with natural disasters in the area	J1	Replant trees along the river bank to prevent erosion

### 4.5 Prioritizing of Activities and Action Plan

#### 4.5.1 Group-Wise Prioritizing

The study shows that the stakeholders in each group have specific needs according to the resources and potential in those particular areas. This can be clearly seen when compared between importance and urgency of various activities such as A1 (Develop and renovate existing travel places), C1 (Establish investment fund for local people), J1 (Replanting along the banks of Xe Champhone), G1, and H1. Some of these activities were discussed here in order to gain better understanding of specific needs for each group.

Result for activity A1 is shown in Fig. 4 where local people from tourism group rated a higher score in every criterion (importance, impact, possibility, and urgency). The averages score of tourism group related to tourism strategies are quite similar (4.5–4.6), since these villages have some travel places.

Note that the villages with letter “T” in front of the name of the villages are in the tourism group, letter “R” refers to the rural group, and “U” is for the urban group.

It also shows that among the rural group, there are two villages with some possibility to create travel places in the area with a probability score around 3.3–3.5. After surveying and interviewing with the local people in these two villages (Hua Mueang and Xe village), there are possible to be developed travel places like Buk (the second biggest reservoir of Champhone district) in Hua Mueang village and Bird Lake in Xe village. Therefore, responsible organization should concentrate on building up these ranges for tourism. Local people from the tourism group rated activity A1 with an average of importance of 4.6 and 4.5 for urgency score since these villages have some travel places in their area.

Local people in the urban group highly rated for the C1 activity for the establishment of investment to support business people as shown in Fig. 5. With an average of importance 4.6 and 2.9 for urgency score, this represents that people in

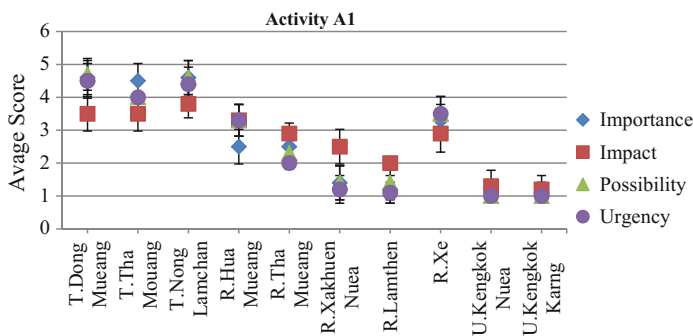


Fig. 4 Activity A1: develop and renovate existing travel places

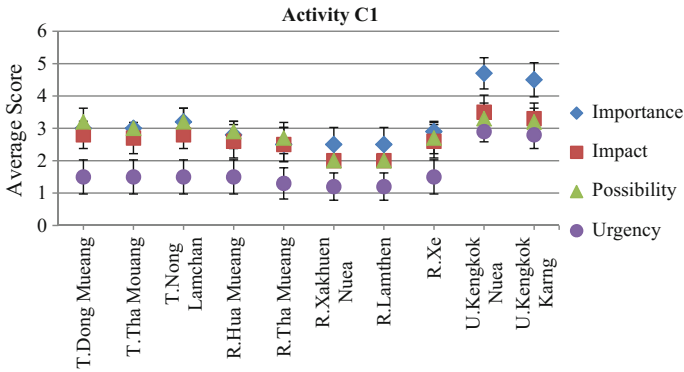


Fig. 5 Activity C1: establish investment fund for local people

the urban areas are mostly interested in business investment since their locations are more convenient to have businesses such as trading and services than other groups. However, urgency scores are still low in the C1 activity when it is compared with other activities.

Note that the villages with letter “T” in front of the name of the villages are in the tourism group, letter “R” refers to the rural group, and “U” is for the urban group.

The study shows that the three groups have the most concerns about environmental conservation and adaptation, as it can be seen in activity J2. Figure 6 shows J2 activity for replanting along the riverbank to prevent erosion. Local people gave the highest score (4.9) for impact, importance, urgency, and possibility in J2 activity when it is compared to other activities. One of the reasons for giving more importance in this activity is due to Monkey Forest which is close to Dong Mueang and Tha Mouang villages.

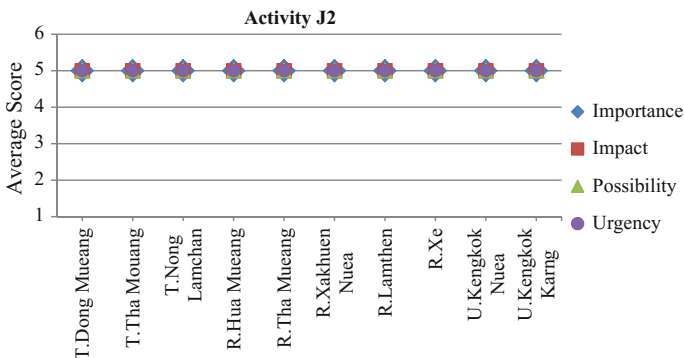


Fig. 6 Activity J2: replanting along the banks of Xe Champhone



**Table 5** Example of action plan for common activity

Common activity					
Management activities	Short term	Long term	Recommendation	Responsible organization	
J2	Replanting along the river bank to prevent erosion	x		<ul style="list-style-type: none"> <li>Some areas along the river bank have to be set as soil erosion control zones, for example, by planting Vetiver grass, Pangola grass, Bermuda grass, and Bahia grass</li> </ul>	DAEO, PWRED and MAF
I6	Identify clearly the boundaries of protected areas of the wetland (lakes, forest)	x		<ul style="list-style-type: none"> <li>Create meeting and participate local people to collect their idea and opinion and let them set the rules based on some existing regulations</li> </ul>	DAEO, PWRED and MAF and coordinate with IUCN
D2	Monitoring and patrolling, and set up of a Ramsar site office	x		<ul style="list-style-type: none"> <li>Responsible organizations should set up clearly the duties, and responsible people</li> <li>Select some volunteers to monitor and patrol work</li> </ul>	DAEO, PWRED and MAF and coordinate with IUCN
B2	Find the markets for products, both domestic and international		x	<ul style="list-style-type: none"> <li>Find markets from inside and outside the country</li> <li>Join exhibitions and promote products by using media such as television or internet</li> <li>Create handicraft competition in districts and join national and international competitions</li> </ul>	DTO and DTIO
E1	Create some environmental activities, such as study tours in communities	x		<ul style="list-style-type: none"> <li>Organize some events or activities which are related to environmental protection in or outside schools such as study tours</li> </ul>	DAEO and DTO

DAEO District Agriculture and Environmental Office; PWRED Provincial Water Resources and Environment Department; MAF Ministry of Agricultural and Forestry; DTO District Tourism Office; DTIO District Trading and Investment Office

However, increasing monkey populace is the real issue for villages and according to the customary law in this area, no monkey can be hurt by neighborhood individuals, therefore, nearby individuals in this area plant no yield in light of the fact that monkeys will destroy everything.

Note that the villages with letter “T” in front of the name of the villages are in the tourism group, letter “R” refers to the rural group, and “U” is for the urban group.

#### **4.5.2 Action Plan Development**

In order to be used as a guideline for Xe Champhone management in the future, the action plans, which cover all the needs of local people and are applicable to those particular areas, were created. There were three sets of action plan developed under this study: specific activity for groups, specific activity for villages, and common activity for all villages. Table 5 shows an example of an action plan for common activities where the recommendations as well as the responsible agencies are added.

## **5 Conclusion**

Generally, planning and decision-making are challenged by national interests: political sensitivities, lack of transparency, insufficient information on the linkages between development projects, ecosystems and livelihoods, and assessments that are biased due to economic motivations. Therefore, this study linked research to actual decision-making by showing that Xe Champhone wetlands provides important ecosystem services and is a home to key threatened and economic species. Local income is still based on natural resources from the Xe Champhone Wetlands. People still use the wetland resources for agricultural activities such as crop farming, raising livestock, and fisheries for household food consumption, and selling for additional income.

This study examines the wetland conservation framework of the national and international organizations. Therefore, management gaps and area problems were identified, which include a lack of clear and specific national wetlands policies and specific law for wetlands. Local people in some areas still lack understanding of wetlands values. Local people cannot use Xe Champhone effectively due to flooding, soil erosion, and drought, which are the common problems in the area. In order to manage the site in a sustainable way, a participatory action plan was created. The study uses SWOT analysis to examine advantages and disadvantages of the internal and external factors from the strengths, weaknesses, opportunities, and threats in the area while a TOWS matrix helps us to see the different dimensions by matching external opportunities and threats with internal strengths and weaknesses. For each combination of external and internal environmental factors,

strategic options and management activities can be created based on the need of stakeholders.

In conclusion, involving stakeholders in planning and management is a necessary condition for sustainable wetland management. Without understanding the environment, knowing how to conserve natural resources without community participation in the management will not be sustainable over time. SWOT analysis is a good tool to clarify strengths, and internal weaknesses and opportunities and threats from external factors. The combination of internal and external environmental factors in a TOWS matrix helps to get better understanding of the strategic choices and the options which could be pursued. As it can be seen from the results presented in this study, stakeholders with different socioeconomic backgrounds require different management approaches. The developed action plan for each area should be implemented accordingly. For example, a tourism group highly requires tourism support and an urban group requires investment support while a rural group mainly requires for environmental protection and an improvement of infrastructures. This is why bottom-up management practices can respond to the needs of the community while top-down management practices sometimes result in actions that local communities do not find necessary, and thus lead to poor cooperation.

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