Dammed protected area's impact on nature and local livelihoods

Ang Trapeang Thmor, Cambodia

SLUSE - ILUNRM 2009 Field Report

Authors: Aaron Wan (ENV08008), Astrid Wodschow (EMS08024), Dominic Taku (EMS08012), Dragana Stojković (EMS08016) & Kasper Møller (ADK08017)

Copenhagen University

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Abstract

Ang Trapeang Thmor (ATT) is a protected area whose history dates back to the late 1970s with the creation of a huge reservoir for rice irrigation during the Khmer Rouge reign. The designation of ATT as a crane sanctuary in 2000 led to changes in the use and management of resources around the area.

This study sets to explore how the management of the resources in and around ATT is affecting local livelihoods and the conflicts this generates. Furthermore, it was explored how the local livelihoods and the management is affecting the natural resources, their perception, participation and understanding of the need for conservation of the cranes. Finally, the additional opportunities present in the area that can be beneficial to the villagers in Pongro and Sambuor was examined.

The findings reveal that the general perception of the villagers on ATT is negative probably because they passively participate in the management of it and due to the lack of understanding of the aim of the conservation project. There are conflicts between Pongro and Sambuor opposed to the villages south of the main gate of the reservoir over water levels on the reservoir. Water levels and recent increases in cassava prices have led to illegal encroachment into a state forest East of ATT. However the conservation of ATT and the surrounding natural resources still present opportunities in connection to tourism and community forestry that can be beneficial to the villagers of Pongro and Sambuor.

Keywords: Conservation, Ang Trapeang Thmor, conflicts, livelihoods, natural resources, community participation, Sarus crane (*Grus antigone*).

Preface

This report was completed as partial requirement for the completion of the Interdisciplinary Land-use and Natural Resource Management (ILUNRM 2009) course. After three days of preparation in Phnom Penh at the Royal Agriculture University, data collection was carried out over the course of ten days in the field. In total, 21 days were spent in Cambodia by a group of five master students from the University of Copenhagen in collaboration with three Cambodian master students. The project gave the group an opportunity to apply theory of qualitative and quantitative research methods into practice in a real life situation in an international context. All five undersigned students participated equally in the field work and writing of this report.

Aaron Wan

Astrid Wodschow

Dominic Taku

Dragana Stojković

Kasper Møller

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Table of Acronyms

- ATT Ang Trapeang Thmor
- CBNRM Community Based Natural Resource Management
- ECOSORN Economic and Social Relaunch of Northwest Provinces in Cambodia
- EU European Union
- FGD Focus Group Discussion
- GPS Global Positioning System
- ICDP Integrated Conservation and Development Projects
- ICF International Crane Foundation
- ILUNRM Interdisciplinary Land-use and Natural Resource Management
- NGO Non Governmental Organisation
- NTFP Non Timber Forest Products
- PA Protected Area
- PDWRM Provincial Department of Water Resources and Meteorology
- PRA Participatory Rural Appraisal
- QS Questionnaire Surveys
- SRI System of Rice Intensification
- TW Transect Walks
- WCS World Conservation Society

Introduction

This part will give an introduction to the area in which the study is conducted, the preliminary history leading up to the study and the background for the study. Furthermore the justification of the study, the methods and the research question will be presented. A map of the area with marked points of interest to the study can be viewed below. It will be referred to points marked on this map throughout the report.





0 0,5 1 2 Kilometers Trapeang Thma - CBNRM Landsta TM 2000

Figure 1 - Map of study area

103°15'0"E

History of the study area

According to information gathered from history trends drawn by villagers of Pongro and Paoy Ta Ong, the history of the Ang Trapeang Thmor (ATT) can be traced as far back as 1976/1977 during the Khmer Rouge reign with the establishment of ATT by the construction of three dams. Historical account indicates that thousands of villagers were enrolled to provide forced labour in this titanic project of elevating causeways into a dam for the creation of a large reservoir aimed at providing irrigation and water storage for rice cultivation south of the dam (Cambodian Bird news, 2004).

During the 1990s, there was a high influx of refugees from other provinces and Thailand moved into the area to settle.

In 1999, villagers of Pongro sold their land south of the lake to the villagers downstream, since the land prices were high at that time (1500-2500 baht per ha) and also because they needed money for medical supplies to alleviate the pressure of a dengue fever epidemic at the time.

In 2000 ATT was declared a protected area by Royal Degree no. 0200/110 of 22nd of February 2000 establishing a Sarus Crane Conservation Area following the discovery of a significant non-breeding congregation of Eastern Sarus Cranes by Sam Veasna in 1998 (Chamman & Goes, 2001).

In 2003, demonstrations by the villagers of Pongro and Sambuor in relation to reduction in cultivated lands within the designated PA, led to a re-negotiation of the various zones of ATT with the International Crane Foundation (ICF) and the villages.

In 2005, reconstruction works on the main water gate ended. Conflicts as a result of high water level and flooded rice fields within ATT started. These conflicts are still present today. In the same year, the ICF handed the management of ATT to the World Conservation Society (WCS).

In 2007, WCS opened its office in the area. In the same year, the reconstruction of canals used to irrigate fields south of ATT started.

In 2007/08, The villagers of Pongro started to grow cassava in the forest on old farmland and each farmer occupied 0,5 to 1 ha farmland in the forest.

In 2008, the project with 20 households on dry season rice cultivation and system of rice intensification (SRI) on fields south of ATT started. This project is run by the Economic and Social Relaunch of Northwest Provinces in Cambodia (ECOSORN), which is funded by the European Union (EU).

The timeline below (figure 2) summarizes all the important dates mentioned above as well as a few more, between 1975 and now.



Timeline

Figure 2 - Timeline showing important events in relation to the study from 1975 and up to present day

Description of the study area

ATT is located in the Paoy Char Commune, Phnom Srok district, Banteay Meanchey province of Cambodia (13°47'N 103°18'E). ATT covers about 12,650 ha consisting of a large lake, lowlands and forest (WCS, 2007). ATT is bordered by vast treeless paddy field landscape to the South and by a series of villages lined behind a dam to the East (further facts are explained in Box 1.). Two of these villages are Pongro (13°48'46.78"N 103°19'33.52"E) and Sambuor (13°49'17.62"N 103°19'43.94"E). These two villages lie a little more to the

Box 1 - Facts revealed from interview from WCS coordinator about ATT

- Surface of the lake during dry season: 784ha
- Surface of lake during rainy season: 949 ha
- Volume of lake in the rainy season: 100 million m³
- The maximum capacity of the lake: 170 million m³
- Forest covers : 1152ha
- Grass land: 2516ha
- Rice fields: 2439ha
- Rice fields in bamboo forest : 165ha
- Rice fields in forest : 5770ha
- Agro biodiversity conservation area: 6712ha
- 18 species of birds are considered globally threatened

north than six other villages that are located east of the main water gate (13°47'3.88"N

103°18'12.57"E).

The area was designated a protected area (PA) because the lake serves as a habitat

for a significant number of the endangered Eastern Sarus cranes and other bird species. According to Article 7, Chapter III in Protected Area Law, 2005 (Box 2 - PAs Law, 2005, Article 7.), ATT is categorized in Wildlife Sanctuary category.

Box 2 - PAs Law, 2005, Article 7.

PAs are categorized as follows:

provided in an annex of this law.

National Park Wildlife sanctuary Protected landscape Multiple use area Ramsar site Biosphere reserve Natural heritage site Marine park Provincial/municipal protected area The purpose of organizing or managing PAs by each category is More than 200 known species of other birds have been counted in the area of which 18 have been classified as globally threatened or globally near threatened. The area also serves as habitat to fish breeding grounds and the extremely rare Eld's Deer. The rich biological diversity of the area attracts international tourists especially during the dry season and makes it one of the prime bird watching sites in northwest Cambodia

(WCS, 2007). ATT is managed by an International NGO - World Conservation Society (WCS) which has a resident representative in the area and twelve facilitators. There are eight recognized villages bordering ATT among which are Sambuor and Pongro and large parts of ATT are under cultivation or partial grazing.

Background

Pongro and Sambuor are the focus in this study and they depend heavily on the resources of ATT and the surrounding forest for their livelihoods. ATT provides fishing grounds, a reserve for collection of non timber forest products (NTFP) and wetland products that supplement what they make from farming. Prior to the establishment of the PA, rice farming was common practice and after the protection of the area, this was banned all year, leaving the farmers with very few remaining rice fields. The forest to the east of Pongro and Sambuor provides NTFP and space for cassava, mango and sweet potato cultivation.

As indicated by West & Brechin (1999), conflicts often arise after the establishment of a PA. Also in this case, demonstrations by the villagers of Pongro and Sambuor in 2003 led to a rezoning in ATT thereby reducing the size of the strict no-use core zone to encompass the wetland habitat and excluding the majority of those areas which the communities have been using for rice production. Consequently, this allowed rice cultivation in the wet season. The cultivated areas now form part of an agro-biodiversity buffer

area (WCS, 2007). Though this move helped in improving the land-use situation, a number of natural resource management issues still remain. This includes among others illegal land holding and forest clearance in the Crane reserve, illegal hunting, burning of fields, overgrazing by domestic livestock, unsustainable and destructive fishing practices, unsustainable collection of forest and wetland products and use of pesticides (WCS, 2007).

From the complexity of these issues mentioned, Community Based Natural Resource Management (CBNRM) can represent a very appropriate form of resource management in this area. CBNRM is a form of resource management that distinguishes itself from the traditional top-down approach. It utilizes both sides of the fundamental paradox between using purely expert theoretical knowledge to manage a natural resource against the knowledge of the local community (Adhikari, 2001; Gamborg, 2008). But as indicated by Jackson (1989) in the Cambodian context, historically, there has been some conflict with the ruling government, and that may have caused some unease when the government wishes to collaborate with the local communities (Hansen, 2006). Due to this history, it is difficult for the local communities to move away from the vicious cycle of poverty and over-exploitation (Carson, 1998). According to Hansen (2006) power struggles are also present, as the government is unwilling to turn over power to the local communities. This conflict means that the implementations of all CBNRM principles are drastically slowed down.

Justification of the study

Over the last decades, many PA management efforts have attempted to address the problem of local economic development and conservation of biodiversity through Integrated Conservation and Development Projects (ICDP). Some critics of the ICDPs paradigms assert that development and conservation are incompatible. Proponents argue for the fostering local economic development and conservation and stress that unless local livelihood security concerns are addressed, conflicts between local communities and PAs will continue, social inequalities and injustices will increase and PAs will remain threatened (Siebert & Belsky, 2002). Conservation requires protection of threatened resources including wildlife, forest, pastures fisheries, all of which are resources that local communities rely on for their livelihoods thus putting pressure on the resources. As a result of these threats, there is a radical change in the thinking of the role of community participation (Agrawal & Gibson, 1999). To support this view, there is a broad consensus today that most PAs will have limited future prospects without the cooperation and support of local communities. The growing pressure on PAs from increasing populations, persistent poverty

and the expansion and penetration of the market economy have given room for changes in the management of reserves and parks with local communities taking an important role (Wells & McSchane, 2004). According to Oltheten (1995), people's participation is now a prerequisite to sustainable development but there are however many different interpretations of what "people participation" should, and do mean in practice. People's participation can range from *Manipulative Participation* to *Self Mobilization* (refer to Box 13).

The initial focus of this study prior to the field work was to look at community participation in the planning and management of resources in ATT Protected Area in the light of a community based natural resource management project. However after administering questionnaires and some semi structured interviews, the reality proved different and so there is a slight change of focus from the initial idea expressed in the synopsis (Appendix I).

This study now focuses on the conservation and management of ATT and the surrounding areas and how it affects villagers in Pongro and Sambuor. Conflicts in the use and management of the resources of ATT and its surrounding areas are also examined. Furthermore, the study will look into local perception, participation and understanding of the need for conservation of natural resources (especially the cranes) among the villagers. Finally, an assessment of additional opportunities that ATT and the surrounding areas present for the livelihoods of the local villagers will be presented.

Research questions

The main research question for this study is:

How is the conservation of ATT and the management of the surrounding areas affecting villagers in Pongro and Sambuor and the natural resources in the area?

In order to answer this main research question, four sub-questions are put forward:

- How is the management of the natural resources of ATT and the surrounding areas affecting the local livelihoods of Pongro and Sambuor, and what conflicts does the management create?
- How is the management and the local livelihoods affecting the natural resources of ATT and the surrounding areas?

- What is the local perception, participation and understanding of the need for conservation of natural resources (particularly the cranes) among the villagers in Pongro and Sambuor?
- What other opportunities does ATT and the surrounding areas present for the livelihoods of the local villagers?

Methodology

An overview of applied methods for data collection is presented in Table 1 - An overview of applied methods.

Table 1 - An overview of applied methods

SSI - Semi structured interviews (11)	SSI with the village chief in Pongro
	SSI with the village chief in Sambuor
	SSI with the village chief in Trapeang Thmor Kandal
	SSI with the village chief of Poay Ta Ong
	SSI with the village chief of Kon Khlaeng
	SSI with the head of conservation from WCS
	SSI with the facilitator from WCS
	SSI with forest administration
	SSI with Provincial Department of Water Resources and Meteorology
	SSI with the secretary of Primary School in Pongro
	SSI with the teacher from Primary School in Pongro
TW – Transect walks (5)	TW around Pongro and Sambuor
	TW in ATT with facilitator
	TW in Srah Chik, crane habitat area
	TW in the forest east of Pongro and Sambuor
	TW around Kon Khlaeng and Yeang Otdam
PRA – Participatory Rural Appraisal (6)	Drawing exercise with school children
	History trend with villagers from Pongro
	History trend with villagers from Poay Ta Ong
	Focus group discussion with villagers from Pongro
	Focus group discussion with villagers from Poay Ta Ong
	Focus group discussion with villagers from Yeang Otdam
QS – Questionnaire Surveys (25)	QS in Sambuor (9)
	QS in Pongro (16)
GPS Mapping	Northern Villages

Southern Villages
Eastern Villages
Western protected area Boundary lines
Southern Bird breeding area
Eastern Forest transect

Semi structured interviews

As a first step during field work, the SSI with the village chiefs of Pongro and Sambuor were conducted. The purpose of these interviews was to provide the study with background information on the basic history and status of the villages. However, these interviews revealed other points of interest; such as water resources conflicts. In order to assess these conflicts from both sides, the interviews with the chiefs of Trapeang Thmor Kandal and Poay Ta Ong were conducted. Finally, the interview conducted in Sisophon with a representative from the Provincial Department of Water Resources and Meteorology (PDWRM) explained an official governmental position in managing water conflicts.

Interviews with the head of conservation and one staff member from WCS were conducted prior to practicing other methods in ATT. These interviews provided the data from various reports such as water measurement, and Sarus crane population assessment. The figures and numbers describing the lake, zones, rules and regulations, conservation and extension activities were given. However, this information was oral, and some of the statements were not possible to triangulate.

In order to assess the management of natural resources, particularly water and forests, the interviews with the Forest Administration (FA) and the village chief of Kon Khlaeng were performed.

Lastly, the assessment of environmental education and awareness was made with the assistance of the interviews with secretary and teacher of the Primary School in Pongro.

All SSI were done with the aid of an interview guide. (Appendixes from II to XI).

Transect walks

In order to be familiarized with the study area, the transect walk (TW) around Pongro and Sambuor village was performed on the first day during field work, as well as the TW in ATT with the special emphasis on water gates.

Apart from ATT, for a purpose of biodiversity assessment, the TW in Srah Chik was performed. This area located ten kilometers south from ATT and is now the cranes' habitat.

Due to the widening of natural resource assessment to areas surrounding ATT, TW in the forest east of Pongro and Sambuor was performed, during which the shifting cultivation and cassava cultivation were revealed.

As a concluding point at the end of field work, a TW around Kon Khlaeng and Yeang Otdam village north of ATT was performed. During field work, numerous issues regarding this area were brought up in informal interviews; such as population pressure, overexploitation of forests, and absence of official village status. Therefore, interviews were conducted to explore these issues. Additionally, it was important for biodiversity assessment.

All transect walks were conducted with assistance of facilitator from WCS staff. (Appendix XII)

Participatory Rural Appraisal (PRA)

A drawing exercise with school children assist in obtaining the data on environmental education in school, and as well the children's perceptions and awareness on ATT, nature and cranes (Appendix XVIII).

Furthermore, similar group of PRA methods were conducted with two groups of villagers separately. The first group was from Pongro, representing of north villages. Second group was from Poay Ta Ong, representing villages on south. Identical history trend guides were used to gather information on main events in the area since the establishment of water reservoir during Khmer Rouge reign.

Lastly, a focus group discussion (FGD) in Yeang Otdam was conducted during the visit north of ATT. It has started unplanned. During the informal interview with one female resident of the village, other villagers joined. It should be noted that under spontaneous circumstances the friendly and comfortable atmosphere was created, encouraging the villagers to discuss openly. As a result, useful data were gathered. (Appendix XIII to XVI).

Questionnaire Surveys

The QS consisted of four parts: household profile; questions about household activities; questions about ATT, WCS and questions on the villager's participation; and open ended questions on perception about ATT and understanding of conservation.

GPS Mapping

A GPS was brought along in all activities; hence the points of interests, interviewed households and tracks were marked and mapped.

Informal interviews

The opportunity to get the additional information through informal conversation was used in many occasions and often simultaneously with other methods such as transect walks. In this way, important data from WCS staff was added to the SSI. Additionally, informal interviews with Pel Sokha, professor from Royal University of Agriculture assist in understanding of Cambodian legislation on water resources, PA, environment and forests.

Informal interviews were carried out with the rice farmers, vendors near the main water gate, and other villagers, as well as with tourist and bird watchers.

Participant Observation

Throughout the study, observations were constantly made. Observations of interests were noted down, and if these observations were static, GPS points were marked down as well.

Conflicts in connection with ATT

All the resources in the area are by law owned by the state. The management of natural resources around ATT is primarily managed by an NGO and provincial government institutions. The WCS is responsible for the management of ATT. The water resources in ATT are managed by the PDWRM and the forest area east of ATT is under the management of the District FA.

The aim of these different administrations and organizations is to conserve the state of the natural environment and/or rice cultivation. The management however has a major impact on the livelihoods of the nearby villagers. Conflicts over the following issues do thus exist: land ownership, water resource management, birds, cassava cultivation and land law. All of these will be analysed in the following part.

Land ownership

The Cambodian cadastral system is such that land ownership for agricultural purposes is possible (Article 40

Box 3- Question 1.4 of the questionnaire on title deeds					
Do you have a title deed to your land?					
97% - owned	3% Occupied				

of Law on Forestry, 2002), and land ownership can be applied for, if it can be proven that the individual has occupied the piece of land for over 15 years. However, the multiple levels of administrative bureaucracy, and

the whole process might never go through properly without monetary incentives (Mom, 2009).

Box 3- Question 1.4 of the questionnaire on title deeds shows that of the results obtained, almost all the land that the villagers live and farm on are owned. Two separate respondents in Pongro responded that their cassava field, and their farm was not owned, but considered occupied.

Occupied land is generally managed differently to owned lands. Villagers who own their own land are more likely to invest in long term planning, taking into consideration sustainability issues than those who do not own the land. The land tenure management can potentially cause the short term sustainability of the agricultural lands in the area to be compromised (Toulmin & Quan, 1999).

The question in the questionnaire regarding title deeds, were most likely misunderstood. One respondent mentioned that she owns the land, but does not own the title deed to that land. The villagers may have believed that the term title deed referred to a village acknowledgement that the land was rightfully theirs, and not a national system of land ownership. Also it was clarified in FGD in Pongro village; the villagers do not have a title deed for their wet season rice fields inside ATT. According to the law this land belongs to the state. Still it was revealed that the villagers can "sell" their land occupation and they trade the right to cultivate certain fields inside the communities. These sales are done over word of mouth, and not through the official administrative systems.

Water Resources

A major reconstruction of the big dam to the south of the reservoir funded by Japan, was finished in 2005.

Box 4 - Control of the main water gate in the southeastern part of the reservoir

According to the village chief of Poay Ta Ong the daily management of the dam is done by a farmer water user communities. This community is needed by law (Article 19 in Law on Water Resources Management of the Kingdom of Cambodia) and consists of farmers who use the irrigation system that is influenced by the big water gate. This means that only the villages on the south are allowed in the community, and Pongro and Sambuor are not allowed in as they do not own land in the south of the reservoir, which is what the water gate helps irrigate throughout the year. According to the chief representatives for the farmers are elected democratically to be present in the farmer water user community. According to Tim Narong of the PDWRM there are five communes involved in the management of the water gate.

Also according to the chief of Poay Ta Ong the ministries of water and meteorology, fisheries and agriculture are providing technical expertise and the district and province take over the management in the case that a big problem emerges.

Box 5 - Explanations for the high water level

According to the village chief and the villagers in Poay Ta Ong the water level is kept high so that the rice fields downstream from the dam can be irrigated during the wet season, even if the rain does not come. Also they say that last year the rainy season was prolonged and they therefore had to keep the gate shut, resulting in flooding of rice fields in the protected area, however the gate had to be opened in the end resulting in flooded rice fields to the south of the dam also. Now irrigation channels are being constructed in the land south of the water gate by heavy machinery, this could also be a reason to keep the gates shut. According to the PDWRM, the canals are being dug deeper to drain the reservoir without

flooding rice fields. Until now the existing canals have been blocked by farmers growing rice in these canals. Some of the villagers in Pongro think that the government keeps the gate locked to keep the rice farmers out of the protected area, or the WCS keep the water level high to favor more bird species. Also some believe that the automatic mechanism that opens the gate automatically between September and October if the water level exceeds 1.2 m at the gate is being destroyed by farmers with fields downstream of the gate. Or rich farmers with fields south of the water gate use tractors to force the doors shot after they are opened. There could not be found any other statements about these issues.

This dam is now the reason for a conflict between the Sambuor and Pongro villages and the six villages located right next to the big water gate in the southeastern part of the reservoir (villages south of ATT). In the questionnaire survey 88% of the respondents clearly stated a problem with flooded wet season rice fields inside the protected area from 2005 and onwards.



affected by the flooding of the protected area and all this is evidently against the intention of WCS and the core idea of the protected area.

According to the chief of Poay Ta Ong and the PDWRM, the conflict of the high water level is dealt with on commune level. Last year during the rainy season Pongro and Sambuor suggested opening the water gate for one week, but no agreement on this was reached.

The reason for this conflict lies also in the fact that the villagers in Pongro and Sambuor are allowed to grow the wet season rice inside the protected area. In the beginning just after the protected area was established, the villagers in Pongro and Sambuor were not allowed to grow rice in the area, but after a demonstration by the villagers in 2003, the terms were renegotiated and rice cultivation inside the protected area in the wet season was allowed, because the Sarus Crane in this season is not present in the area.



Figure 4 - The Interest-power grid graphically presents the interest and power and influences of each the involved parties in the conflict about the big water gate and water level in the reservoir. (Model described by: Eden & Ackermann, 1998)

If the government continues to let their fields being flooded, then the villagers in Pongro and Sambuor think that they should be given other land instead as compensation, even though they do not legally own the land. This was revealed during the focus group discussion in Pongro. All farmers in the area have though prior to the establishment of the protected area, during the land division in 1986, been given 1.5 ha of land

downstream of ATT. However according to villagers in Pongro and the Chiefs of Poay Ta Ong and Trapeang Thmor Kandal most villagers in Pongro and Sambuor decided to sell this land in 1999.

According to the chief of Poay Ta Ong the rice yields in the fields south of the big water gate have increased from 1 - 1.5 ton/ha to 2 – 2.5 ton/ha since the water gate was constructed and because of the ECOSORN project in the area. This has led to a general increase in the standard of living in the villages with rice fields in this area. Furthermore there has been an increase in international and Khmer tourists and increased fishing yields. Pongro and Sambuor have missed out on all these increases and because of the flooding, the rice yields on many fields have decreased to less than 1 ton/ha/year. This was discovered after analysis of the questionnaires. In accordance with this, the chief of Pongro says that the yield went down this year by 60%. Also many of the fields cannot be cultivated at all now and the villagers in Pongro say that they have lost 800-900 ha of cultivatable land, so that only 200-300 ha can be cultivated now. Furthermore the land that still can be cultivated can now only be used in the wet season when the crane is out, lowering the potential yield in a year by 50%. Because of all this the standard of living is decreased in the two villages.

The villagers in Pongro and Sambuor feels very much overlooked in this conflict, they state to have sent

Box 6- Locals suggestions to solve the conflict with the water level in the reservoir and unequal share of benefits from PA

The chief and villagers of Pongro have suggested digging a canal inside the protected area to lower the water level and make cultivation of wet season rice possible. However there have been no answer to this suggestion yet, and It might not be feasible to start a major construction work inside a protected area.

According to the provincial department of water resources and meteorology the construction of the canals south of the reservoir will be finished June 2009, so at that time the canals would be able to lead more water away without flooding the rice fields and the water level could be lowered. This will however only be done if there are no other real reasons to keep the water level high, see box 2.

At the moment only the villagers next to the dam are benefitting from tourism. There are plans from the WCS to build a 10 person guest house in Pongro village, this will probably attract tourists to Pongro and Sambuor and give them access some of the new income opportunities. several complaints to the commune and the district without receiving any answers. Also they state to have invited higher authorities to come and look at the problem for themselves but no one has accepted the invitation yet. They want the problem to go to a higher government level so it can be solved.

There are also complaints from the village of Yeang Otdam situated to the north of the reservoir. Migration into the area started in 1992. The villagers are slowly buying up land but do not receive papers of legal ownership. The farmers here also complain about too high water level and they demonstrated to get the dam opened in September and October 2008. The neighboring unrecognized village of Kon Khlaeng is situated further to the north and the village chief there does not report of any problems with flooded rice fields. According to the PDWRM these settlements are illegal and the people do not have the right to live there, *"it is their own fault if their fields are flooded"*. Figure 4 graphically presents all the involved parties in the conflict about the management of the big water gate and the water level in the reservoir.

In the dam to the east of the reservoir there is a small manually controlled water gate, situated right next to the Pongro village. The water gate irrigates the dry season rice and lotus fields to the east of the dam and according to the FGD in Poay Ta Ong even though these fields are owned by farmers from many of the nearby villages it is only controlled by Pongro. Apparently the communication with Pongro about the control of this water gate is not working well and the villagers in Poay Ta Ong complain about either too high or too low water level in the dry season rice fields. To them there is no solution to the problem, they just have to be calm and not escalate the conflict.

Birds

Another problem reported by Pongro is the destruction of rice fields by birds. In the questionnaire survey 24% (6 of 25) reported that birds had destroyed the rice and it was also mentioned in the FGD. Even though most state that it is cranes destroying the rice fields this is unlikely though since the Sarus crane migrates away from the protected area in the wet season (Chamman & Goes, 2001). Nevertheless the farmers just experience that their fields are destroyed by animals and then probably blame the most noted specie in the area. This however does not change the fact that it is a problem. However, it should be noted that the cranes are omnivores; they consume fish, insects, crabs and other small invertebrates.

Cassava Cultivation

Before the establishment of the PA, almost all individuals living in the area were rice farmers, but also employed other livelihood strategies such as fishing and livestock breeding. Statistics taken from the questionnaires administered to both Sambuor and Pongro shows that 77% of the total population has not changed their main occupation.

As an alternative strategy to rice cultivation, now limited by the protection of the area and the flooding, villagers in Pongro and Sambuor have started cassava growing in the forest area to the east of the villages. This was discovered through the use of satellite imagery, informal interviews with the NGO facilitators and the forestry administration representative.



In 2007 the villagers in Pongro borrowed money from other villages to start the cultivation of cassava. At that time the prices were high and still rising as seen on Figure 5. Now however the prices are dropped and there is a blockade on agricultural products on the Thai border which started in February 2009. The cassava cultivated by villagers in Pongro was destined to be bought by Thai middle men before the blockade, and this is not possible any more. This has caused fields to be left standing, and has not been harvested.

The forest is a state public forest and the cassava cultivation is actually illegal according to the law (Land Law, 2002), even though the management of the forest has been minimal. For details see Box 7. Though the cultivation of maize, sweet potato

Figure 5 - International cassava prices. The price on cassava was inclining rapidly in 2007, mostly on processed cassava, but also on roots. In 2008 prices started decreasing. (Cited from: FAO, 2008)

and mango has been practiced in the forest for at long time, and as long as no new fields are cleared the cassava growing is accepted, and there is a general understanding that the locals should be able to use the forest that they have used for many generations. To this the local FA and the village chiefs have made an

agreement saying that cultivation can be done up to one kilometer from the main road leading past Pongro. The FA on higher levels however wants the cultivation to stop, but the local administrator is afraid of being excluded from the community where he lives if he

Box 7 - Land law of 1992

"The land law of 1992 maintained the situation of rights of possession for agricultural and residential land, while the state continued to be the legal owner. The 1992 land law also created ownership rights for residential properties. Two types of state land are recognized in the 1992 land law: State public land and state private land. Only State private land can be released for concessions." (Pel, 2007)

forces this wish through. There have also been proposals within the FA to make the forest community forest for Pongro and Sambuor but this idea is abandoned because other villages would claim the right to also receive community forest rights in the forest, and this is not wanted in order to keep some control over the management of the area. The FA representative also mentioned that if there were some job opportunities in the area, the pressure applied on the sustainability of the forest east of ATT would be alleviated.

Currently as it is shown, many villagers are stuck in the middle, as they have lost the use of their rice fields in ATT due to flooding through the year; the cassava market has crashed since the closing of trade with Thailand. This has caused the livelihoods of villagers from Pongro and Sambuor to deteriorate.

Figure 6 shows a situation map, graphically presenting the involved parties and effects in the conflict with the high water level in the reservoir.



Figure 6- Situation map presenting the involved parties and the effects of the conflict with the high water level in the reservoir. The red arrows show the direction of negative effects whereas the green arrows show the direction of positive effects, and black arrows represents a connection. (Model described by: Friedman & Miles, 2006)

Local Livelihoods

As explained in the background, the people living in the surrounding of ATT are strongly depended on natural resources. The state of the natural resources directly affects the local people's livelihoods. In this part, the role of the livelihood of the villagers is assessed; both concerning how they are affected by the fact that they live on the border of ATT and how the local livelihoods are affecting the environment in and around ATT.

Direct utilization of natural resources for livelihoods is commonly present. As assessed by the questionnaires surveys, and confirmed by the interviews, observations and transect walks, the main

pressure on water, land and forests is caused by the following livelihood activities; the rice cultivation in ATT, shifting cultivation in the forests east of ATT and irrigation of rice fields south of ATT.

According to the head of conservation in WCS, the rice cultivation in the buffer zone of ATT has rules and regulations on the use of pesticides, insecticides and fertilizers. He said that "situation has been improved comparing with the period before 2000, when people that grow the rice in ATT always used the poison to kill the crabs, rats and insects". According to the head of conservation in WCS the last water quality measurements showed the decrease of the acidity in the water, meaning that the use of pesticides, insecticides, and fertilizers decreased. However the questionnaire surveys indicated the fertilizers for rice cultivation in ATT are still used. Amount of used fertilizers is almost standard, one bag (150kg) per ha for a year. Currently this does not present a high risk to ATT due to the fact that around 1/3 of the fields are flooded and therefore not cultivated.

Figure 7 shows the distribution of livelihood strategies among the households in Pongro and Sambuor. As it can be seen most households apply wet season rice cultivation in ATT and livestock breeding. The most common livestock is hens and chickens, followed by cows, ducks and pigs. Only few households have water buffalos. Only three households had their livestock grazing in ATT, but of the 11 collecting NTFP in ATT



Figure 7 Livelihood strategies that the households apply. The number in after each description is representing the amount of interviewed households who applied the described strategy.

most of them collects fodder for the livestock in ATT. Also 68% of the households are fishing in ATT making it a very common practise.

Only three households are cultivating cassava in the state forest to the east of the villages and two are cultivating sweet potato and maize in the forest. From FGD in Pongro with eight participants, the impression was made that cassava growing was even more common, than the questionnaire survey has shown. Still according to the questionnaire 20% of the households have agricultural production inside the state forest. During the transect walk it was also noted that there is a great pressure on the wood resources and land in the form of a lot of cassava fields.

Only four of the interviewed household has changed their main livelihood strategy after the PA was established and three of these changed because of factors not related to ATT. However, only two villagers answer that they have not been affected in any way with the establishment of the PA. In this most of the respondents' answers that they are affected by the high water level, though not something related to the protection of the area in itself.

Only four interviewed persons have seen illegal activities, that being bird hunting, fishing with electricity and cutting of trees. This can be a sensitive subject to talk about, explaining the low occurrence, but also according to the WCS this is not a big problem. Therefore the establishment of the PA have not caused the households to look for other main activities instead of rice cultivation, or forced people into illegalities because of threatened livelihood strategies. Only they are looking for other opportunities in the form of cultivating the state forest.

Management of natural resources

ATT is an area with a diverse avifauna as well as vegetation. The diversity has been assessed through simple methods, why the findings are not complete and the analysis of the state of the environment in the area just an assumption. Nevertheless this part provides a biodiversity assessment as well as an explanation of the role of WCS in the management.

Biodiversity assessment

In this part an assessment of the biodiversity in and around ATT is brought about. The part will examine the vegetation and the avifauna. Natural resource assessment has the aim to provide the overview of its current status in ATT and the surrounding areas, and its complex interaction with local livelihoods. The

Box 8 - Key bird species in ATT (WCS, 2009)

- Sarus Crane Grus antigone
- Palla's Fish-Eagle Haliaeetus leucoryphus
- Grey-headed Fish-Eagl Ichthyophaga ichthyaetus
- Red-headed Vulture Sarcogyps calvus
- Greater Spotted Eagle Aquila clanga
- Imperial Eagle Aquila heliaca
- Darter Anhinga melanogaster
- Black-headed Ibis Threskiornis melanocephalus
- Spot-billed Pelican Pelecanus philippensis
- Milky Stork Mycteria cinerea
- Painted Stork Mycteria leucocephala
- Black-necked Stork Ephippiorhynchus asiaticus
- Greater Adjutant *Leptoptilos dubius*
- Lesser Adjutant Leptoptilos javanicus
- Asian Golden Weaver Ploceus hypoxanthus

special emphasis is given to biodiversity, particularly avifauna being the resource of the highest priority for conservation in ATT.

Vegetation

In order to assess the status of flora in ATT and surroundings, observations and transect walks were conducted.

The vegetation in ATT is typical for aquatic and wetland ecosystems, dominated by grassland, and with some woodland/flooded forests on the

northern side. The wetland ecosystem is one of the most vulnerable that has been historically destroyed by the human development (Ramsar, 2007). This has been particularly proven north of the lake, in the buffer zone, where the primary wetland vegetation is replaced with the agricultural land, mainly the rice fields.

The vegetation in the eastern surroundings of ATT are to the large extent degraded due to the shifting cultivation; the clearance of the land for cassava and other agricultural cultivation. As explained in the conflict assessment, at the moment the cassava cultivation is abandoned.

The south and southeast surroundings of ATT are inhabited by the six villages: Paoay Ta Ong, Trapeang Thma Cheung, Trapeang Thma Kandal, Trapeang Thma Tboung, Poay Char, Poay Snuol and their rice fields cultivated in both dry and rainy season.

On the northern surroundings, open dry dipterocarp forest was noted. According to the FA, as well as stated in Chamman & Goes (2001), logging was widely spread in this area during 1990s. The pressure on the forest in this is increasing, due to increase of population in Kon Khlaeng.

Avifauna

A number of rare and endangered bird species (see Box 8) was the main reason for the designation of ATT as a PA in 2000 (Chamman & Goes , 2001). It was observed that grassland in the core zone of ATT is mostly flooded. This has been a consequence of closed main water gate in the southeast of the dam. A ranger from WCS explained that *"flooded fields are not suitable for most of the birds, especially those species that are breeding in the core zone as well for feeding of birds"*. Particularly population of Sarus crane, the most

promoted bird species among conservation and bird watching society as "*the tallest flying bird*" (ICF, 2009) has migrated from ATT to Srah Chik (13°44'05.1N 103°19'20.4E).

The table below presents the list of birds assessed in the transect walks and observations, in ATT (1) and Srah Chik (2). Assessed bird species are characteristic for wetland ecosystems; however on seasonal or daily basis they need a dry land, mainly for breeding or nesting. This is the reason for migration to Srah Chik. It is of importance to note that the assessment was carried out in two occasions: one day in the afternoon in ATT, and another day in the morning hours in Srah Chik. Certainly, this was not sufficient for a detail assessment of avifauna, but in general this assessment strongly indicates that avifauna is plentiful in number of species and amount of birds.

One of the key mammal species in ATT is the Eld's Deer (*Cervus eldii*). A group of three Eld's deers was noted during the transect walk in remote northern surrounding of ATT (13°53'47.3"N 103°20'4"E).

Species	IUCN Status*	Observation	Location	
Grus antigone, Sarus crane	Vulnerable	Around 85 birds where noted on the tree, flying, and	1	-
<i>Egretta garzetta,</i> little egret	Least Concern	Over 40 birds noted on the tree	1	-
Ephippiorhynchus asiaticus,	Near Threatened	Few birds noted on the ground, the dry grassland	2	-
black-necked stork Leptoptilos javanicus, Lesser	Vulnerable	Noted on the tree together with black headed ibis	2	-
Mycteria cinerea, milky stork	Vulnerable	Around 20 birds are noted on the tree, together with	1	-
Mycteria leucocephala,	Near Threatened	Around 13 birds are noted on the tree	1	* From IUCN Red
Pelicanus philipensis, spot-	Not Evaluated	Five birds noted in the flooded grassland	1	list of threatened
Porphyrio porphyrio, purple	Least Concern	Two birds are noted on the flooded field	1	
Sarkidiornis melanotos, comb	Least Concern	One bird noted flying	1	
Threskiornis melanocephalus, black headed ibis	Near Threatened	Over 20 birds noted on the tree	2]

Table 2 - The list of species observed in ATT

Role of WCS

According to the Head of conservation, WCS activities in the area are guided by overall mission presented

in Box 9.

Box 9 - WCS mission

- 1. To protect biodiversity wildlife for future generation
- 2. To promote tourism, attract tourists
- 3. To reduce poverty
- 4. To protect fish breeding ground
- 5. To conserve water for villagers

In the interviews with WCS employees, it has been explained that fishing is completely forbidden in the core zone, and is allowed in buffer zone only for subsistence needs, and with restriction on usage of electrical equipment. Hunting animals, logging and use of certain chemicals such as pesticides are strictly forbidden in ATT. By the PA Law, the PA should have four zones (see Box 10). However, in reality,

there are only two main zones, and two separate zones of the same type (see Box 11).

/ Box 10 - Management zones (PA Law, 2005)

Management zones in Protected Area Law

Chaper V, Article 1

- 1. Core zone
- 2. Conservation zone
- 3. Sustainable development zone
- 4. Local community zone

Box 11 - Management zones in ATT

1. Core zone

a. First fish breeding zoneb. Second fish breeding zone

2. Buffer zone

However, Royal Decree provides a possibility to managers of specific protected area to adapt official zoning. According to WCS staff, ATT is divided in two zones, though the Royal Decree document from 2000 and its additions made in 2003 were unavailable; therefore the information about regulations and zoning in ATT could not be triangulated.

Extension activities

Extension activities aim to promote the rules of protected area, and educate villagers about the wildlife and conservation. These activities are conducted 10 times per a month by the WCS staff. As an example of this, a female villager from Pongro said: "WCS rangers came to me to talk when I was working in my rice field. He explained to me how the use of fertilizers damages the water and fish in the lake". These activities were started by ICF prior to establishment of ATT, and continuously carried on up to present.

Monitoring the wildlife

The morning, afternoon, and night observation of wildlife are conducted 10 times per a month. Although WCS responsibility is officially limited to the PA, they assess the birds in the remote surrounding areas as

well. The Sarus crane population is of a particular interest; therefore the staff of WCS is monitoring the cranes every day, from February to April. The WCS facilitator stated that this year, there are around 270 Sarus cranes in the area.

Local participation in conservation

Of the 25 questionnaires, 11 persons answered that they have never participated in any kind of meetings and one person answered that she has never heard about the WCS. These persons were obviously not asked to answer the questions about their level of participation. This gives a number of observations on only 13 concerning the questions about participation, which is far too few to give any general picture of the truth. However these observations might though give an idea about how the level of participation and understanding is among the villagers in Sambuor and Pongro. The following part analysis the villagers' level of participation as well as the general understand and awareness of the PA among the villagers. Finally the villagers' perceptions on ATT and conservation are analysed.

People's participation in PA management is one of the cornerstones of the notion of ICDP (Well & Brandon, 1993). The level of participation and environmental understanding among the villagers has been assessed through questions about their awareness of the WCS' presence in the area. The majority (86%) of the villagers from Sambuor and Pongro have heard about the WCS (refer to Figure 8). Information about the NGO has in most cases been provided by the authority (54%), referring to the local village chief or commune chief. In some cases, the villagers may have interpreted *the authority* as the WCS. Nonetheless, 29% of the villagers have heard about the "crane NGO", WCS from the organization itself and 14% heard about the NGO from their neighbor. Several villagers chose more than one source of knowledge, which is why 27 answers have been analysed. From this information it seems as the NGO has been very active in its promotion work and that the local authorities (village or commune chiefs) has been collaborating on their promotion.



Figure 8 – Question from the questionnaire "Have you heard of WCS, and if so, from where?"

There is a general confusion about whether WCS has actually been providing specific training courses on conservation and sustainable use of the area. It is equally not clear whether they have invited villagers for information meetings or if information and "training" has simply been a part of the village meetings among other important subjects. Therefore, when villagers mention the training courses and the meeting they have been participating in, this might very well refer to the same activity. 21% of the villagers say that they have been participating in a training course, while 46% (out of the 24 persons who had heard about the WCS) has been participating in any kind of activity in relation to ATT and WCS (which may include training courses). 31% of the villagers participated in the planning of ATT while 69% are currently joining meetings about the PA. The percentage of villagers who have been participating in meetings within the last 6 months is 69% (see Figure 9 Figure 10) which leads back to the understanding that participation is seen as going to any kind of meeting.

From these results, it can be said that although the villagers are participating at a passive level (see Box 13), over half of the villagers are participating in the meetings regarding ATT. This means that over half of the villagers have an idea, based on these meetings, of what management activities have been occurring in ATT. When combined with data from Figure 10 - When was the last time the villagers attended a meeting, which shows that 69% of villagers who attended a meeting did so within the last 6 months, it can be said that of the villagers who spend the time and effort to attend meetings, most are kept up to date on the latest occurrences within ATT.



Figure 9 - Percentage of villagers who attended meetings





Motivations for participation in activities connected with ATT are many and quite different (refer to Figure 11). Many villagers answer that they are participating in the meetings out of interest in conservation *"to get knowledge about wildlife conservation and cranes"*. Some say that they are obliged to show up because they have been invited by the village chief. This is an interesting point that shows that apparently not everybody can participate, but only a selected group of villagers. One woman claimed that women are not allowed to participate in the meetings although several other women answered that they have been

participating. Other villagers go to the meetings to get influence on the actions and others again claim that they are participating in the meetings because they are provided rice.





Some villagers have however not been participating in the previous meetings about conservation. When asked about their reasons for not participating, two answers are brought about; either they do not have time to participate (45%) or they are not invited (55%), further underlining the point that not everyone has an opportunity to participate. However, when asked if they would like to participate in the next meeting, two thirds (64%) of the villagers who did not previously participate in a meeting, would like to do so.

This means that there is a very high potential for further improvement of the villagers participation. For those who do not want to participate in the next meeting, the reasons are equal to those from the previous question; no time available and or no invitation received. One woman would only like to participate in a meeting if she can be sure that the information provided is useful.

Box 12 - The villagers' involvement in the planning process of ATT

Extension workers visited them in the field and taught them about the PA, the chief invited some of the villagers to meeting where the WCS then spoke about ATT and a map of ATT was shown to the villagers before the establishment of the PA.

Now the village chief is still inviting a selected group of villagers to meeting where WCS is also invited to inform about the PA, the water level and about the tourism in the area. One of the villagers explains how she has "attended meeting where the villagers heard about how to conserve cranes for next generation".

When looking at how the villagers are participating, the impression is that the villagers are never asked about their opinion and that they are not listened to. At an ideal level of participation, the villagers should feel responsible for the conservation project themselves, and they should arrange meetings and activities by own initiative. When analyzing the level of participation, using the typology by Hobley (1996) shown in Box 13, it becomes clear that spending time on meetings arranged by the conservation organization is not a satisfying level of participation and it cannot be referred to as community based management.

Box 13 - Hobley's (1996) typology of seven different levels of participation

The level with the least participation is the *Manipulative participation*, which can hardly be called participation, since at this level; representatives of the villagers do not have any influence or power.

On the second level, the *Passive participation*, villagers are informed about decisions made by authorities, but their opinion is still not considered.

The *Participation by consultation* refers to a form of participation where villagers are consulted when professionals need some questions answered, but the professionals are not obliged to listen to the response.

A forth level of participation is the *Participation for material incentives*, where the villagers contribute to a project by providing resources, but are still not involved in decision making of any kind.

In the fifth level, *Functional participation*, the participation by the villagers is used as a tool for the professionals to achieve their goals, though still not solely for the benefit of the villagers.

The sixth and the seventh level of participation; the *Interactive participation* and *Self-mobilization* are the highest levels of participation in the typology. They describe interactive forms of participation, with *Self-mobilization* as a form of participation where the villagers are making the initiative independently.

The level of participation obviously differs a lot from person to person, as well as it is unclear what kind of participatory activities have actually been planned by the WCS and the village chiefs. One third of the villagers participated in meetings during the planning phase of ATT while two thirds of the villagers are currently participating in meetings (refer to Box 12). This seems as a quite high percentage of villagers who are active in

activities concerning conservation of the protected area. The level of the villagers' participation can be described as the second level in Hobley's typology: *Passive participation*. Villagers mention that they have been invited for information meetings about ATT and some of them have received training courses about *"Wildlife conservation, water resource utilization, crane conservation, forestry conservation and the environment in general"*. This form of participation is though more a kind of environmental education than actual participation.

Understanding and education

Conservation projects like ATT are by nature meant to last for generations, which is why environmental education of the local children is a very important factor when it comes to the long term success of a conservation project. If the children are not aware of the importance of saving species or natural resources

for future generations, then conservation may not succeed, because they will be the ones managing ATT in the future.

According to the school teacher and the school secretary of the primary school in Pongro, the children attending 3rd to 6th grade have four different subjects; one of them being *social science*, which contains morality, geography, gender education and art. When the children thus are taught about geography, they learn among other things about forestry, the PA, the cranes and tourism. Despite the fact that the children are not taught specific classes on the environment, their teacher is of the opinion that it is a very important issue and he would like to have more education about it.

In their classroom they have pictures and drawings of the lake and the different species living in and around it (refer to Appendix XVIII). When asked to make drawings of things related to the lake, a lot of birds, plants, rice fields, trees and fish including fishing gear showed up. From the drawings also appeared symbols indicating the tourism aspect; inflatable tubes for playing in the water and the boat for taking tourists for a boat ride were drawn. One crane was discovered in the one of the drawings and as the teacher explained, that the children were used to see the cranes *"when the cranes fly over the school on their way to the forest where they sleep. The cranes feed in the lake"*. This means that even the children are aware that the birds do not live in the PA.

Perceptions

The questions within the questionnaire concerning the villagers perceptions on; the local involvement in the management of ATT and on nature and crane conservation in general, were often misunderstood, either due to translation complications, or simply because they were too abstract for the villagers to have an opinion about. Never the less, the questions were answered to the best of their ability and through the answers a general picture can be drawn.

In general the villagers are aware of the presence of a protected area next to their village. They are aware of the rules to follow and of the existence of the cranes. The protected area is widely understood as

Box 14 - A young mother's perceptions on ATT and her village chief

She does not want to join the meetings. She hates the village chief because he does not solve the problems of the villagers. ATT is not good, because she can not grow rice. She is angry with WCS and the village chief because they want to save the cranes. It is good for the next generation to save the cranes - but not for her.

equal to the constructed lake, why many villagers have the impression that the flooded fields are a direct cause of the establishment of the protected area. Some of them even claim that the high water level is benefitting the cranes.
Negative perceptions (as the one in Box 14) on ATT among villagers are more present than the positive ones. This can of course be explained by several answers: One of them could be the fact that many of these villagers from Pongro and Sambuor have had their rice fields flooded by the water from the lake. It is a general perception among the villagers that the high water level in the lake is created to benefit the cranes. This is why the birds are often indirectly accused for the flooding of the fields. The different perceptions in Table 3 both positive and negative were expressed by different villagers. Whether the cranes are actually benefitting from the flooded area is not clear: *"Conservation is good, but it affects the livelihood negatively. I want the local authority to open the gate which will also increase the crane population"*, as a woman from Pongro puts it, referring to the main gate.

Table 3 - Positiv	e and negative	perceptions of ATT
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Posi	tive perceptions:	Negative perceptions:
-	Likes ATT because of sustainability and ecology	- Most villagers don't like it. However, if they can benefit,
	conservation	then it is good. Overall, though, they lost a lot of land.
-	Likes the birds	- No idea about the protected area, but the water level is a
-	Very good. Because she can still do farming, fishing etc	problem
	inside the PA	- The birds destroy the rice
		- It is good for nature, good for wilderness. Not good for
		villagers though. Most villagers are unhappy.
		- Doesn't like the lake at all
		- Eco tourism is good, but the problem of the flooded fields
		since 2003 lower the rice yield

Further livelihood opportunities

Despite the conflicts observed in the use, management and conservation of ATT and the surrounding areas, the natural resources still present other opportunities for the local livelihoods. Apart from the traditional livelihood activities of wet season rice cultivation, fishing, collection of NTFPs and most recently cassava cultivation, there exist a number of other opportunities connected with tourism and community forestry. These opportunities are analysed in the following part.

Tourism

"PAs in developing countries are increasingly popular destinations for wildlife tourists, and tourism has the potential to generate sustainable local benefits sufficient for local people to value, and therefore protect their wildlife heritage as a source of income" (Walpole & Goodwin, 2001).

ATT presents huge eco-tourism opportunities for the local population of Sambuor and Pongro. Eco-tourism as a source of income for local livelihood takes its premise from the notion of ICDPs which is based on the fact that local population will preserve biodiversity if they benefit from it. As seen in the quotation from Walpole & Goodwin (2001), tourism in PAs can generate sustainable income for local livelihoods. ATT as mentioned in the area description is a prime bird watching site in northwest Cambodia that attracts tourists during the dry season when the roads are passable. As indicated during an interview with the local representative of WCS, one of the key informants, plans are underway for a community tourism project in the area specifically in Sambuor which to him presents great ecotourism potential. Article 13 of the draft law on PAs in Cambodia also provides support for ecotourism as a way of improving local livelihoods (see Box 15).

Box 15 - Provisions from article 13 of PAs Draft Law promoting ecotorism

Sustainable development zone: Is a zone of high economic value contributing to national economic development, to the management and conservation of the protected area itself, and to promoting the living conditions of local community people and indigenous ethnic minorities.

A sustainable development zone includes the following areas:

- Conservation of national culture and heritage
- Ecotourism
- Wildlife conservation and recreational services
- Restoration of biodiversity resources
- Protected area community
- Botanical garden
- Geology
- Infrastructure development, including irrigation, reservoir, hydroelectricity, electrical network
- Environment-friendly resin exploitation in the protected area and surroundings.

Tourists are not new to the area. Analysing the results obtained from the questionnaire survey, on the question of the area attractiveness to tourists before and after it was declared a PA, Some 20% of the respondents think they have seen tourists since before and after the area was declared a PA. Meanwhile 48% of the respondents think they have seen tourists in the area only after it was declared a PA. It is hard to explain the presence of tourists in this area before it was declared a protected area but since this area served as a passage route linking Angkor to Thailand via Banteay Chhmar temples; this probably explains the presence of tourists. The Figure 12 below presents the various categories and their percentages.



Figure 12 - Respondents' views on tourists in the area before and after PA was established

For reasons mentioned above, it is obvious for many of the respondents to see tourists around the area after ATT was established. During the course of the field work, some international and Cambodian tourists were seen around the area. Informal discussions with one group of American tourists confirmed the fact that ATT was the main touristic attraction. This particular group of tourists lived in Siem Reap, and came to ATT purely for bird watching.

Data analysis on the nationalities of visiting tourist reveals that the majority of the tourists visiting the area are Cambodians with some handful of international tourists. Figure 13 below summarises the respondents' views on the nationalities of tourists visiting the area.



Figure 13 - respondents' views on the nationalities of tourists that visit the area

The most visited site in the area is the lake. The Khmer tourists are reported to go mainly to the beach near the big water gate to the south. Here they swim, drink and eat, and go on rented boat rides. The water gates are also attractive. For the international tourists, bird watching especially the cranes is the principal attraction of the PA. Figure 14 below summarises the respondents' views on the areas visited by tourists



Figure 14- Respondents' views on areas visited by tourists

The general impression and perception of tourism in the area is very good. 80% of the respondents think it is a good idea for tourists to come to the area though only 16% actually know what they can benefit from tourism. Though tourists visit the area, so far there is no benefit from tourism to Pongro and Sambuor as none of the respondents have ever sold any item or benefited from the largesse of the visiting tourists. All respondents were unanimous of the fact that at the moment only the downstream villages are benefiting from tourism. Information gathered from interviews with the Chiefs of Paoy Ta Ong and Trapeang Thma Kandal and a focus group discussion with villagers of Paoy Ta Ong indicated that the downstream villagers sell food, drinks and provide transportation by motor bikes and boat to visiting tourists thus confirming this claim. Several visits to the lake verified and confirmed this fact also.

A similar study on PAs and livelihoods in Bangladesh also show that local communities can get monetary benefit from tourism through weaving, eco-tour guide services and cultural performances (Fox et al, 2007). As stated before Walpole and Goodwin (2001) have demonstrated the potential of tourism both as a factor for conservation of wildlife and an income source for local livelihoods.

Community forestry

Community forestry represents another opportunity that the villagers of Pongro and Sambuor stand to benefit. Community forestry is a new forestry paradigm that gives local communities management control over forest and forest resources to support their livelihoods (see Box 16).

Box 16 - Community forestry defined

Community forestry can be defined as the control and management of forest resources by the rural people who use them especially for domestic purposes and as an integral part of their farming system. This definition also includes situations where forest products are sold to markets under the control of the rural communities.

(Gilmour & Fisher, 1991)

Quoting excerpts from the interview with the local forest administrator who said "the government is thinking about changing the forest east of ATT from a state owned forest to a community forest", there is a bright prospect in terms of the use of the adjacent forest in the future and this would represent another boost to the livelihood portfolios of the local communities. As indicated by Angelsen & Wunder (2003), forests function as both safety nets and an essential source of daily income and food. The villagers of Pongro and Sambuor would benefit from forest resources such as fire wood, tree fodder, leaf litter,

medicinal herbs, timber and revenues from environmental services. It will equally reduce their dependence on timber from far away Kon Khlaeng.

Article 40 of the Law on Forestry (2002) also provides an opportunity for the local communities to benefit from the forest resources in and around ATT. The State recognises the rights of local communities living within or near Permanent Forest reserves to use forest products and by-products for their basic livelihood activities (see Box 17).

Box 17 - Article 40 of Law on Forestry (2002)

For local communities living within or near the Permanent Forest Reserves, the state shall recognize and ensure their traditional user rights for the purpose of traditional customs, beliefs, religions and living as defined in this article.

The traditional user rights of a local community for forest products & by-products shall not require the permit. The traditional user rights under this article consist of:

- 1- The collection of dead wood, picking wild fruit, collecting bees' honeys, taking resin, and collecting other forest by-products;
- 2- Using timbers to build houses, stables for animals, fences and to make agricultural instruments;
- 3- Grass cutting or unleashing livestock to graze within the forests;
- 4- Using other forest products & by-products consistent with traditional family use;
- 5- The right to barter or sell forest by-products shall not require the permit, if those activities do not cause significant threat to the sustainability of the forest. The customers or any third party who has collected forest by-products from local communities with the purposes of trade, in a manner consistent with the provisions of this law, shall have the permit for forest by-products transportation after royalty and premium payments.

A local community cannot transfer any of these traditional user rights to a third party, even with mutual agreement or under contract. These traditional user rights shall be:

1- Consistent with the natural balance and sustainability of forest resources and respect the rights of other people;

2- Consistent with permissions and prohibitions under the provisions of this law.

Involvement of the villagers in the management of ATT

Last but not the least is the management of ATT itself. The management of ATT can present a lot of opportunities for local livelihoods if it is community based with equitable benefit sharing. At the moment ATT is managed by World Conservation Society (WCS) with passive participation from the local communities and no real and visible benefits. Hansen (2006) has investigated many CBNRM projects in Cambodia, and has revealed many benefits such as allowing locals to become more empowered in the decision making process. This has a double effect. Local perception of ownership to the management of natural resources means that locals will generally be more active and show more interest in the process. Another proven benefit is sustainability of local livelihoods. The premise behind sustainable livelihoods follows the concept of sustainability (Brundtland, 1987). This means that sustainable livelihoods is achieved through the further development of the local community to be capable of living their own lives using

resources available in a way that does not jeopardize the capabilities of the future generations usage of the same resource.

SWOT analysis

Table 4 presents a synthesis of the analyses of the result in the form of a SWOT

Table 4 - SWOT analysis of ATT

STRENGTHS	WEAKNESS
 Biodiversity conservation Reservoir for irrigation and water utilisation Fishing Tourism 	-Flooding of rice fields -Food insecurity -Access to fields difficulties - Passive participation by the local communities
OPPORTUNITIES	THREATS
-Tourism - Community forestry -Increase in biodiversity -Training programmes from WCS -Sustainable natural resource management	-Conflicts in water management and utilisation -Increased flood hazard - illegal occupation of adjacent forest -Destruction of rice fields by birds -Water levels threatens crane habitat

In this part, the role of the livelihood of the villagers is assessed; both concerning how they are affected by the fact that they live on the border of ATT and how the local livelihoods are affecting the environment in and around ATT.

Discussion

During the first days of fieldwork it was discovered, as mentioned in the *Justification of the study*, that the participation level was very low, which is why the focus of this report has to be changed slightly compared to the synopsis (Appendix I). Before the fieldwork was carried out it was expected that the villagers in Sambuor and Pongro were actively participating in the conservation and management of ATT. These expectations are very clear from the questions in the questionnaire survey. It was equally expected that the villagers spend a lot more time on the conservation project, and that they would be able to introduce the students to their conservation activities. The level of participation has still been analysed, but more emphasis has been put on how the villagers were affected by the management of ATT than expected.

The management of ATT is certainly affecting the villagers in Sambuor and Pongro. This becomes clear when the villagers mention their flooded rice fields, that birds are destroying their rice and that they are forced to grow cassava in the forest. When asked questions on ATT, the villagers often refer to the flooded

fields and conflicts about the water gates. This might very well have been a problem even without the area being a PA. The villagers still blame the conservation project and thereby the WCS. Before the field work had been carried out, it was expected to find that the villagers, living on the border of ATT would be affected by a lot of restrictions limiting their choice of livelihood strategy. After analysing the data it seems that the only restriction for the villagers is that they are solely allowed to cultivate wet season rice. Fishing activities are apparently not limited.

As mentioned in *Conflicts*, several conflicts were found in the area, which is why this point has been added to the original sub questions in the synopsis. These conflicts were found to be of such importance, that they could not be ignored in a study on ATT and the villages in the surrounding area.

Due to the findings just mentioned, the pressure on the natural resources in ATT was not as high as expected. A questionnaire question like: *"Have you seen any illegal activities in the protected area?"* clearly indicates expectations about discovering illegal activities (hunting, logging, NFTP collection), done by poor villagers, who were limited in their opportunities, and did not have any other choice. However, this has not been the case, and fewer illegal activities than expected were reported, which did not make this issue an important focus in the final report. Another example on how the villagers are not putting as much pressure on ATT as first assumed, is the fact that only 3 households has their cattle grassing inside the PA.

Concerning opportunities for the villagers to improve their livelihood and income possibilities, they have not been foreseen initially, but the opportunities discovered during the fieldwork has been analysed. Tourism seems to be the most obvious opportunity although a lot of effort has to be put into the area, at least if attraction of international tourists are wished to be improved. The international tourists though, are already visiting the area, so they might also be interested in staying overnight if they are given the possibility in the future guesthouse in Pongro. The natural resources in ATT were initially expected to be affected positively, since this is the aim of the conservation project. Whether this is the case has been analysed in the part about natural resource assessment, but due to the lack of natural scientific methods assessing the environment, it can not be stated whether this is the truth. However the Eld's deer and the Sarus crane as well as other rare bird species were observed. The high water level though is threatening the initial idea of the PA.

The whole idea about a protected area, conserving endemic cranes and other endangered species, is a very eco-centric idea, which does not always correspond to the reality the villagers are facing. This point is made

very clear by a woman from Pongro: "It is good for the next generations to conserve the cranes – but it is not good for me!". This reflects the general perception of the villagers on this protected area, who can see their rice fields be flooded in the name of habitat construction for the cranes. The negative perceptions on the protected area might very well have an influence on the level of participation, while in the same time villagers who does not feel welcome or are not invited, will not be willing to participate by any means in the conservation project. This is as well formulated by Ribot (2002), describing empowerment of local people: "...people are more likely to overexploit resources while they can, and are less likely to invest in environmental maintenance if they do not believe their...privileges will last".

Discussion of the methods

Due to the changes made to the objectives and focus of the overall study, changes in the methodology were also implemented in order to gather data related to the new research objectives. These changes include increase of semi structured interviews to eleven from initial five; increase of transect walks to five from initial two, reduction of questionnaire surveys to 25 instead of initial 73 and slight changes in other Participatory Rural Appraisal methods.

The number of semi structured interviews was increased since more stakeholders were identified along the field work. These stakeholders include village chiefs in other villages than Sambuor and Pongro and the PDWRM. This is also the reason why unplanned informal interviews have been carried out, and the interview with Pel Sokha is an example of this. More transect walk were carried out since this method was found to be very useful for information gathering in form of informal interviews and observation together with the facilitator from WCS. The QS was a product of integrating initial ideas from two different synopsises; the one of the Danish students and the one of the Cambodian students. As a consequence, it was notably time consuming to conduct the QS and therefore the initial plan of conducting 73 QS was not achievable. Another consequence has been that the questions and therefore the data collected, was not necessarily matching the aim of this study. Data collected, but not used in the report, are the data concerning luxury goods and income expectations. This data was however useful to the Cambodians.

The QS was tested prior to arrival in the study area, as well as on the arrival with a random villager. Still QS was continuously improved during surveying. Results, from a number of questions confirmed data gathered from SSI, PRA and TW. However, there were some contradictions in answers most probably because the questions were misinterpreted or misunderstood.

Concerning focus group discussions: The two focus group discussions varied in the questions concerning particular south (dry season rice cultivation, tourism) and north area (rice cultivation in ATT, cassava cultivation, etc.). Nonetheless, the questions on water conflicts were matching, but they revealed different answers. As a consequence of this, different perceptions on water conflicts, benefits and constraints of ATT, were obtained.

While analyzing the data after the field work was over it became clear that other methods could have been useful to conduct. For example a seasonal calendar, carried out as a focus group discussion would have been very relevant for the general understanding of wet and dry season rice cultivation and the location of the cranes. To broaden out the analysis of the state of the environment in ATT, an analysis of the water quality and waste management in the villages would also have been very useful.

Gathering information on social structures will usually lead to an issue with biased results. This can be attributed to influences such as having human experimenters, external social influences and the subject trying to appease the experimenter.

Rosenthal (1966) examined the effects of experimenter bias, and it can be that experimenter bias can come from many factors, such as the experimented having presumed expected answers. In this specific field work, however, more specific areas of experimenter bias can be further examined.

The questionnaire could have yielded some answers which could have been a result from experimenter bias. These questions are generally the open ended questions, such as "what is your perception of the protected area?" and "What is your perception of nature and crane conservation?" These questions could yield biased answers, as the participant knows the purpose of the study, and could be trying to give answers which they believe could fit. Beyond that, it would be a somewhat strange answer for interviewees to reply that they are against conserving nature. The question could be considered a leading question.

Other examples of bias with external influences could be seen when interviewing various institutions, such as the PDWRM. In arranging the interview, calls from the governor of the province were made to facilitate the arranging of the PDWRM office time schedule to make space for this interview. The call between the governor and the PDWRM representative could have caused the interview to not yield answers which the governor does not want to be known. However, these are just speculations, and this may not even be the case.

Conclusion

In 2000, the villagers of Pongro and Sambuor experienced changes in the size of their fields for rice cultivation because all was within the designated PA. This led to reduction in their rice yields with a bearing on the livelihoods. The situation has now however deteriorated with the flooding of the rice fields because of the closure of the main gate.

The management of water resources of the reservoir is at the center of a conflict between Pongro and Sambuor opposed to the villages south of the main gate of the reservoir. Officially the management of water resources is under the control of the farmer water user community. Pongro and Sambuor are not part of this user community and feel left out in water management issues in the area, even though they are very much affected. Also the Sarus Cranes habitat is flooded, and consequently the bird has moved out, thereby threatening the intention of WCS and the purpose of ATT. The land in ATT is officially owned by the state however the villagers cultivate the land without legal rights.

The high water levels and the recent increases in cassava prices have led to the illegal encroachment in to the forest east of ATT. The cassava cultivation came in as a buffer to the problems associated with flooded rice fields thus an alternative livelihoods strategy but the crash in the prices as a result of the trade dispute with Thailand, the future of cassava as an alternative livelihood strategy is being compromised. The legal restrictions in the ATT and forest are not affecting the villagers significantly, probably due to the fact that they are not effectively enforced.

With respect to ATT and its management, the general perception of the villagers is negative. This is partly because WCS unilaterally manages ATT and only inform the villages of what has been decided as well as the fact they see ATT as the cause of their flooded rice fields. The level of participation by the villagers is limited to information meetings which is equal to *passive participation*. Even though they have a negative perception of ATT, they are generally aware of the importance of conservation, but challenge the whole idea of compromising their livelihoods for the conservation of birds.

However ATT and the surrounding resources have a potential to sustain the local livelihoods of Pongro and Sambuor. These potentials can be harnessed from tourism and community forestry.

Reflections

This section will reflect upon topics regarding the field work, the reporting and finally on the conclusions and discussions drawn from this study.

Lessons learnt from the field

There are many things that cannot be taught in a classroom about field research. This is due to the fact that there are parts of field research characteristics that are just unforeseeable, and no amount of planning would prepare individuals for these aspects.

Examples of these unforeseeable aspects of field work included:

- The use of faulty information regarding the topic of research, which led to a distorted image of what the state of the area of study was actually like (level of participation specifics)
- Difficulties in the use of the professional translator
- Transportation and logistical difficulties
- Key informants unwilling or unable to provide information regarding the topic

These aspects have changed the shape of the study. These topics and more will be discussed further in the following sections.

The original scope of the study was purely on the protected area and the two villages east of ATT, Pongro and Sambuor. The original aims and objectives of the project were based on information gathered before the field site had been seen and experienced.

Interdisciplinary approach

An interdisciplinary approach to natural resource management has been seen as an effective improvement to the traditional specialized approach (Ewel, 2001). The study focuses on protected area management which involves disciplines such as social sciences, biodiversity and conservation management. Thus, this range of expertises is necessary for the study to effectively engage the topic at hand. The range of expertise within the students is large. Within the group, there are members with biology, natural resource management, geo-forestry, environmental health and management, biology and ecology, management, agronomy, veterinary and animal sciences backgrounds. This group with such varied expertises meant that the project would have to incorporate as many of these aspects as possible – and this may lead to conflicts.

Group dynamics

The group dynamics observed reflected the overall aspirations to cooperate and succeed rather than to compete against each other. Overall, discussions were constructive and efforts were made to involve all the group members in discussions, even though language was an issue at times. Major conflicts were kept to a minimum however, and the occasional small conflicts were quickly resolved before the conflict escalated. Miscommunication had been kept to a minimum by making sure that all members fully understand the

discussion at hand. Due to the effective group dynamics involved, the project was able to involve the expertise of all members, and members were therefore pleased with the overall outcomes.

Merging of two synopsises

Two synopsises had to be merged together in the space of three days. This was an ambitious task, as the two had different focuses, and it is the driving force and gives the study focus. Compromises and problem solving strategies had to be employed to effectively combine ideas from both sides into one coherent project.

Flexibility

Due to the reality being different than what literature had described, parts of the project aims and objectives had to be modified to better suit reality. This meant that some methods and the Gantt chart with the timetable had to be changed drastically in the field within a short period of time (Appendix XIX). This had caused a few minor conflicts within the group due to this sudden change in focus. Due to the group's exceptionally high level patience and its skill in active listening, these conflicts were quickly dispelled.

Group flexibility can also be shown when an opportunity presents itself to gather data from sources not planned from the revised synopsis, even though there were other pressing activities to be completed. Some of these includes: Observations north of ATT, SSI with the Kon Khlaeng village chief and the PDWRM. These extra sources provided information which were unavailable from other sources, and revealed some new aspects to the study previously unknown.

This high degree of flexibility has enabled the group to quickly adapt new ideas and further examine new avenues of perspectives onto the study. Consequently, this has led to a more well-rounded view of the study and gives a much better understanding of the topic than would be otherwise.

Translation

The professional translator provided was not trained as a professional translator, but was in fact an exstudent from RUA who had studied agriculture. Having a background in natural resource management, he sometimes with all good intention tried to answer the questions instead of the interviewees. Communication and empathy skills in the local language were invaluable; however, the translation of information into English was not particularly accurate. This issue is reflected more so within the SSI and FGD than the questionnaires, as the SSI and FGD contains more open ended answers, and these answers can be misinterpreted and misunderstood more easily; and to make matters worse, the translator could add their own understanding to the reply. Some of these issues were quickly picked up during data gathering, and these issues were quickly resolved by clarifying those statements. Other data which were unclear had to be clarified through triangulation with other methods of data gathering.

Unwilling participants

Most participants in the study were more than happy to be part of this study, possibly because they feel that the outcome of the study will benefit them, their village in some way, or perhaps even told by the powers that govern them to provide answers. Dependant on the individual, group or institution involved, in combination with the expected information attained from it, it could range from a minor statistical error which could be corrected to a major information gap. Of all the households which were selected for the questionnaires, only one household had to decline answering, as only the children were home, and were basically unable to answer. This problem was easily corrected by moving on to the next household to administer the questionnaire.

ECOSORN was a key informant who could provide the study with information vital to parts of the project. The key information required was regarding the water conflict between villages on the east of ATT and the villages south of the main water gate, where ECOSORN projects are based. Information regarding the influences ECOSORN has on the management of the main water gate and whether their stake in the issue has led directly to the shutting of the gate was of great interest. However, it is assumed that due to the sensitivity of the subject, the ECOSORN manager had declined to provide any information. This has led to gaps in the information gathered on the water conflicts and the stakeholders involved in this conflict.

Transport and logistical difficulties

Transport and logistical support can be considered one of the important elements to efficient data gathering in any field work. Without it, experimenters cannot effectively gather data from the field, especially if time constraints are applied.

Due to the scope of the study enlarging, transport and logistical support became an even more vital role to the success of the field work.

Further Implications

There are other topics of interest within ATT for which information has been gathered, but not further examined. Topics include community forestry and rice banking.

Community Forestry

Before the protected area was established, there were meetings held within the villages in Pongro and Sambuor discussing the implications of applying the principles of CBNRM, and sold this idea to the villagers. However, when ATT became a protected area in 2000, the actual level of participation until now has been at a passive participation level until now. It seems likely that when the concept of community forestry is promoted, the villagers would be much more wary of such an idea. This unease causes the collaborative potential between the governing bodies and the local villagers to be much lower, and could prove to be the critical factor on whether or not the community forestry project will be successful.

Rice Banking

Rice banking is a concept mentioned by a villager. This concept involves the giving of rice seeds to the villagers for sowing by the WCS, and then the farmer is then expected to pay back the rice seeds, but with interest. The example given by the villager on the interest rate is that WCS gives the farmer 10kg of rice seeds, and WCS then expects 11.5kg back. This means that per season, the interest rate is 15%, which is high.

A further example of a system of rice banking is given by a different group of students researching rice intensification. ECOSORN, whose project supervisor was unwilling to participate in this study, has a different system of rice banking. Rice seeds are given to a select group of farmers who are part of their project regarding SRI, and the farmers are then expected to sell a portion of their final yields to ECOSORN.

Recommendations

In order to improve the overall standard of living of local villagers while simultaneously improving the integrity of the state of conservation, several recommendations have been made.

Apply more principles of CBNRM

It has been shown in some past examples in other developing countries that the principles of CBNRM work, and it has been shown that the higher the level of participation leads to overall better perceptions and a sense of ownership and responsibility over the environment. This ultimately leads to a higher level of conservation, and ATT would serve as a better habitat for birds such as the Sarus crane.

Opening of the main water gate/use of canals

As previously explored, the flooding of rice fields has been detrimental to the livelihoods of the villagers in Pongro and Sambuor. There are several ways in which this issue can be resolved. The opening of the main water gate is one option; however, this would mean that the rice fields south of ATT would become flooded. For this reason, it is essential that the construction of the canals to be used to irrigate the rice fields south of ATT are completed so then the water from the lake can be drained more periodically.

The automatic mechanism within the main water gate also needs to be repaired. This mechanism prevents ATT water level from exceeding 1.2 meters at the dam. This would also alleviate the issues surrounding flooded rice fields and the flooding of the bird habitat.

Community forestry

Parts of the forest east of ATT have already been used due to the understanding between the District FA representative in the area and the villagers. This understanding between the two parties may further develop the forest into a community forest, where the villagers would have a greater stake in the management of the forest. If all the principles of community forestry is applied, and there is an understanding between the District FA, both the overall state of the forest and the overall livelihoods of the local villagers could be improved.

Greater focus on environmental education and awareness

Environmental education should improve the long term sustainability of ATT. Through more in-depth understanding of the need for conservation rather than just being told that conservation is necessary, the future generations would have a better understanding of this need, and beyond that, a greater will to conserve ATT.

Environmental awareness will improve the general understanding for this need to conserve the area, regardless of the costs the community may have to bear. It could be said that the cost to the villagers can be outweighed by the increase in tourism, and thereby increasing financial capital flowing into the area.

Expansion of tourism into the area

Tourism has been experienced in the area. However, as most of the villagers in Pongro and Sambuor have stated, most of the tourists do not have a need to visit their villages, and some do not even spend enough time in the area to spend any money.

Many roads in the area make these two villages inaccessible by car in the wet season, as they turn into bogs as soon as sustained rainy periods arrive. From transect walks of the two villages, tourist attractions include visiting traditional Cambodian dwellings, homestays dwellings, viewing of the lake and to purchase silk products. However, many of these attractions can also be experienced in the villages in the south, where it is much easier to access for tourists.

Having mentioned this, the overall tourist potential in the area is high. In order to tap into these opportunities for the local villagers in Pongro and Sambuor, infrastructure and attractions needs to be further improved. Paved roads, links to the national electricity grid, improving the market for local silk production, construction of a beach, rides on water buffalo in the area, and a safari to view Eld's deer and other rare fauna in the area can be implemented to further improve the potential of tourism in the two villages.

Further expansion of livelihood skill sets

When the cassava market in Cambodia crashed due to the border trades with Thailand shutting, cassava growers were impacted greatly, as many of them had spent time and resources converting their current fields to grow cassava. This is an example of how if a large portion of the total income of villagers were based on a few sources; the risk of a fluctuating market affecting the villager is much higher.

Beyond the current livelihood strategies of cassava, rice and other vegetable growing, livestock breeding and silk production, other livelihood strategy options could be expanded to this area. This would further vary the sources of income of the villagers, and would therefore be less affected by external influences on the area.

Reflections summed up

From summing up the reflections on the field work and reporting, it can be said that it was a resounding success. Information from the field was gathered effectively, and research questions were answered. Future prospects of this area look promising. WCS has taken an interest in providing the two villages Sambuor and Pongro with homestay houses. Not only that, construction of canals south of the main water gate is planned to be completed by mid 2009, and will enable the water in ATT to be drained further throughout the year. Ultimately, the villages of Pongro and Sambuor will gain some benefit from ATT on the long term.

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Appendices

Appendix I – Original synopsis

AN ASSESSMENT OF THE INTERACTIONS BETWEEN THE LOCAL COMMUNITIES AND TRAPEANG THMOR PROTECTED AREA Synopsis

February 24th 2009 Faculty of life sciences, Copenhagen University

Aaron Wan – ENV08008 Astrid Wodschow - EMS08024 Dominic Taku – EMS08012 Dragana Stojkovic - EMS08016 Kasper Møller – ADK08017

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Table of Acronyms

- CBNRM Community Based Natural Resource Management ICDP – Integrated Conservation and Development Project NGO – Non Governmental Organisation NTFP – Non Timber Forest Products PA – Protected Area
- PRA Participatory Rural Appraisal

Introduction

"Conflicts between local communities and protected area managers, particularly over property rights and livelihood activities occurring within areas now designated as national parks, have been widespread" (West & Brechin, 1999)

Ang Trapeang Thmor Protected Area (PA) is located in the Paoy Char Commune, Phnom Srok district, Banteay Meanchey province of Cambodia. The PA covers about 12,650 ha consisting of a large lake, lowlands and forest (WCS, 2007). The area was designated a PA by Royal Degree no. 0200/110 of 22nd of February 2000 establishing a Sarus Crane Conservation Area following the discovery of a significant nonbreeding congregation of Eastern Sarus Cranes by Sam Veasna in 1998. The area also serves as habitat to fish breeding grounds and the extremely rare Eld's Deer. Several NGOs are present in the area, with Koun Khlaeng Community based organization being the NGO working with natural resources (WCS, 2007). The NGOs has six facilitators in the Pongro and Sambuor villages, and these are key informants for the project. The rich biological diversity of the area attracts international tourists especially during the dry season. Large parts of the PA are under cultivation or partial grazing (SLUSE, 2009).

Background

Ang Trapeang Thmor PA is bordered by a number of local communities including Pongro and Sambuor which will be the focus in this study. Prior to the establishment of the PA, rice farming was common practice and has continued to some degree today (SLUSE, 2009). As seen in the quotation of West & Brechin (1999), conflicts often arise after the establishment of a PA. The livelihoods of the communities

near Ang Trapeang Thmor are closely associated with the PA as it provides fishing grounds, a reserve for collection of non timber forest products and wetland products that supplement what they make from farming. In 2005, the PA was re-zoned, thereby reducing the size of the strict no-use core zone to encompass the wetland habitat and excluding the majority of those areas which the communities have been using for rice production. The cultivated areas now form part of an agro-biodiversity buffer area (WCS, 2007). Though this move helped in improving the land-use situation, a number of natural resource management issues still remain. This includes among others illegal land holding and forest clearance in the Crane reserve, illegal hunting, burning of fields, overgrazing by domestic livestock, unsustainable and destructive fishing practices, unsustainable collection of forest and wetland products and use of pesticides (WCS, 2007).

From the complexity of these issues mentioned, an alternative approach known as Community Based Natural Resource Management (CBNRM) has been employed. CBNRM is a form of resource management that distinguishes itself from the traditional top-down approach. It utilizes both sides of the fundamental paradox between using purely expert theoretical knowledge to manage a natural resource against the knowledge of the local community (Adhikari, 2001; Gamborg, 2008). According to Carson (1998) and Berkes (1987), there are four principles which guide CBNRM: The control of access to the natural resources, the conservation of the resources, sustainable use of the resource in combination of relevant technology, and increased local management of the resource.

Hansen (2006) has investigated many past CBNRM projects in Cambodia, and has revealed many benefits such as allowing locals to become more empowered in the decision making process. This has a double effect. Local perception of ownership to the management of natural resources means that locals will generally be more active and show more interest in the process.

Another proven benefit is sustainability of local livelihoods. The premise behind sustainable livelihoods follows the concept of sustainability (Brundtland, 1987). This means that sustainable livelihoods is achieved through the further development of the local community to be capable of living their own lives using resources available in a way that does not jeopardize the capabilities of the future generations usage of the same resource. Examples of these resources include *"economic viability, ecological integrity and social equity"* (Carson, 1998).

Walker (2000) looks at various reasons why CBNRM might not work. These reasons include the loss of social capital (if for example the local institutions are ignored), if a local elite group or individual takes advantage, or if the strategy moves from a preservation ideology to a conservation ideology.

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In the Cambodian context, historically, there has been some conflict with the ruling government (Jackson, 1989), and that may cause some unease when the government wishes to collaborate with the local communities (Hansen, 2006). Due to this history, it is difficult for the local communities to move away from the vicious cycle of poverty and over-exploitation (Carson, 1998).

According to Hansen (2006) power struggles are also present, as the government is unwilling to turn over power to the local communities. This conflict means that the implementations of all CBNRM principles are drastically slowed down.

Justification of the study

Over the last decades, many PA management efforts have attempted to address the problem of local economic development and conservation of biodiversity through Integrated Conservation and Development Projects (ICDP). Some critics of the ICDPs paradigms assert that development and conservation are incompatible. Proponents argue for the fostering local economic development and conservation and stress that unless local livelihood security concerns are addressed, conflicts between local communities and PAs will continue, social inequalities and injustices will increase and PAs will remain threatened (Siebert & Belsky, 2002). Conservation requires protection of threatened resources including wildlife, forest, pastures fisheries, all of which are resources that local communities rely on for their livelihoods thus putting pressure on the resources. As a result of these threats, there is a radical change in the thinking of the role of communities in conservation; now communities are the locus of conservationist thinking with emphasis on community participation (Agrawal & Gibson, 1999). To support this view, there is a broad consensus today that most PAs will have limited future prospects without the cooperation and support of local communities. The growing pressure on PAs from increasing populations, persistent poverty and the expansion and penetration of the market economy have given room for changes in the management of reserves and parks with local communities taking an important role (Wells & McSchane, 2004). This study, will investigate the interactions between the local communities of Pongro and Sambuor and the Ang Trapeang Thmor PA by analyzing the difficult equation of balancing biodiversity conservation, local community participation in conservation and development and economic development for the rural poor.

Main research question

What is the level of participation of local communities in the management of the protected area, and what are the positive and negative influences between the local communities and the protected area?

In order to answer this main research question, three sub-questions are put forward.

Sub-questions

What is the level of participation of local communities in the planning, implementation and management of the protected area?

The level of participation will vary from the local communities being only informants to being those who take the initiative and manage the resource. In this case the resource is the PA, assuming that the local communities have some rights to extract different products or use the area extensively for their livelihoods. The PA consists of three zones, a core zone, a buffer zone and an integration zone (SLUSE, 2009). The level of participation in the management of the area will be shown through investigation of which activities the local communities might have in connection with the PA. The level of environmental education and awareness will as well be assessed. The first sub-question will also investigate to which extent the local communities are participating in the planning of the PA and during the period of implementation. Finally the different stakeholders will be identified as well as potential conflicts between them.

How are the livelihood strategies of the communities affected by the protected area?

The second sub-question is based on the premise that households in the local communities have diverse livelihood strategies affected by their individual socio economic situation. For communities situated inside the PA, some restrictions on agricultural activities and extraction of products might be applied, which will affect the local communities' choice of livelihood strategy.

To explore the different livelihood strategies, the different land uses will be identified. Furthermore it is assumed that the PA might affect the social, human, natural, physical and financial capital of the local communities. On the other hand, living inside the PA might impose some constraints on the local community e.g. due to regulations. Assuming that the local communities have been living in the area for a long time, the establishment of the PA by the government might have caused changes in the local communities' choices of livelihood strategies as well as land tenure conflicts. For the understanding of the local communities' choices of livelihood strategies, it is important to assess both the changes over time and the potential conflicts.

How is the protected area affected by activities of the local communities?

The function of the PA is to protect and preserve the endangered species living inside the area. This PA is focusing on the endemic cranes, but also other species (e.g. of mammals and plants) are being protected (WCS, 2007). Wherever people are living close to or inside a PA, the area will be affected by the human

activities. This sub-question will investigate whether the PA is affected by the local communities and which livelihood activities are affecting the area both positively and negatively. This includes a brief assessment of the state of the environment in the PA.

Methods

As noted by Chambers (1993), Chambers (1997), Gilmour and Fisher (1991), many development and conservation projects failed because not focusing enough on the opinions of local people. In the last decades there is a shift to "bottom-up", "farmer-first" or "people-centered" paradigm in these projects, because it has been proven that local people have capabilities to assess, manage and monitor the natural resources they depend on. They possess the indigenous (traditional) knowledge that is accumulated throughout generations, which is in many cases more valuable than the knowledge of outside experts and researchers.

Therefore, the data gathered from various PRA methods is crucial. However, other qualitative methods, such as semi-structured interviews and observations will be used. In assessing semi-structured interviews, Gillham (2000) noted "time-cost" and "data richness" as two main for and against factors for incorporating interviews in a research. By balancing these two factors, the semi-structured interviews will be used in order to get deeper understanding of complicated and sensitive issues. Observations will assist to avoid the bias that could appear if people hesitate to tell the truth, or even if they hesitate to participate.

Data gathered from qualitative methods will be verified by data from quantitative method being a closeended questionnaire surveys. From the questionnaire surveys general data about the households will be gathered and from that three strata can be identified for focus group discussions. The sampling strategy will be systematic sampling (see appendix 8).

The data collection will be performed in collaboration with three Cambodian students from the Royal University of Agriculture.

Table 1 describes the relations between the sub-questions, objectives and methods used for data collecting. Also a detailed description and guidelines of each method is found in Appendix.

Table 1: Task and methods table

Sub-question	Objectives	Method
What is the level of participation of local communities in the planning, implementation and management of the protected area?	Identify stakeholders around the PA Stakeholder analysis of key stakeholders Assessing the conflicts between the different stakeholders (regarding CBNRM activities)	Venn diagram, Semi-structured interview with NGO and local leaders
	Identify main reason why CBNRM work/ do not work	Seasonal calendar, Focus group discussion and preference ranking, active participation
	Identify local people's perception on the PA rules	Focus group discussion, questionnaires
	Identify environmental awareness and education of local people	Focus group discussion, questionnaires, semi-structured interview with school personnel, visit to school and PRA with children
How are the livelihood strategies of the communities affected by the protected area?	Identifying the different land uses in the PA (agriculture, fishing)	Transect walk with NGO, observations, questionnaires
	Assess the different benefits the locals get from the PA (monetary, non- monetary, social)	Questionnaires, focus group discussion and preference ranking,
	Identify PA rules and regulations	Literature overview, semi structured interviews with the NGO and local leaders
	Assessing the conflicts over land use	Informal discussion, observations, semi-structured interview with NGO
	Identify how livelihood strategies changed with designation of the PA in 2000	History trend with elder people from Pongro, Semi-structured interview with local leaders, questionnaires, informal discussions
How is the protected area affected by activities of the local communities?	Assessing the state of the biodiversity in the PA, with special emphasis on the cranes habitat and cranes	Transect walk, active participation, semi-structured interviews with NGO, informal discussion with hunters, rangers, bird watching with local expert(s), land use and forest cover map assessment.

Qualitative methods

PRA methods

Transect walk

Three transect walks will be conducted; one with NGO representatives, and two with the facilitators from Pongro and Sambour villages respectively through the PA. Transect walk is a simple method that will be a first step of collecting data. This will help in familiarizing with the study area and in the same time gather information on land use, problems and potentials of the PA.

History trend

History trend will be conducted with elders from Pongro village, being the largest among two villages. The aim of this PRA method is to identify main events and changes that have taken place over time, and how these changes have influenced the livelihoods of the local people. A history trend exercise will also be performed during the semi structured interview with the NGO in the area.

School children drawing exercise

This PRA method aims to identify the level of environmental education through informal conversation and drawing. Through drawing of the lake and their individual households, the children's perceptions and awareness of the PA will be analysed. The school children drawing exercise will be conducted in the school of Pongro village.

Seasonal Calendar

This PRA method aims to provide an overview on amount of time that people engaged in various livelihood activities during different seasons. Firstly, participants will identify all activities, describe them to facilitators, and finally mutually agree on annual time, intensity and importance of various livelihood activities, and how other livelihood activities conflict with CBNRM activities.

Stakeholders mapping (Venn diagram)

In this PRA method stakeholders will be identified and analysed with a diversified group of participants; facilitators assisting the NGO, actively engaged villagers and not engaged villagers in the CBNRM, representatives from local authorities and NGOs, marginalized groups, etc. The aim is to capture, through discussion, different perceptions on who has interest in the PA, and for which reasons (CBNRM activities, agriculture, conservation, NTFP collection, etc). Additionally, participants will discuss and agree on the level

of power of each stakeholder. Possible areas of conflicts will be identified. As a follow up, interviews with important stakeholders might be conducted if time and resources permits.

Focus group discussion and preference ranking

Three focus group discussions will be conducted with three different groups of people: the facilitators, actively engaged villagers and villagers not engaged in CBNRM activities. This method will besides providing data, be a useful learning experience to participants. The discussions will be divided in two parts; with first part being general discussion on the motives for participation and a second a preference ranking exercise where participants will rank motives according to their importance.

Interviews

Semi structured interviews

Three semi-structured interviews will be conducted with representatives from the NGO and two with the local leaders from the two villages respectively. One purpose of performing the semi structured interview with the NGO leaders in the area is to get their perception as well as that of the local communities on the CBNRM. Additionally the purpose is to get an assessment of the biodiversity and crane protection over time.

Follow - up interview with the facilitators

Two follow-up interviews will be conducted with the facilitators from the two villages respectively. The aim of this is to triangulate information achieved from the transect walks.

Interview with school teacher

An interview will be conducted with the teacher in the local school. The aim of this is to get the teacher's perception on environmental education, the CBNRM and the PA.

Observations

Observation is a simple method that will be practiced simultaneously with other methods, but also in non formal, everyday activities during the field work.

Active participation

This method will be implemented in order to understand CBNRM activities, incentives and disincentives for participation. In the same time, the state of biodiversity, with a special focus on cranes will be assessed.

Quantitative methods

Close-ended questionnaire survey (structured interview)

Preferably seventy-three questionnaires will be administered to households in the two villages. The aim is to get quantitative information on the villagers' livelihood strategies and on their general perception of the CBNRM and the PA.

Bio-physical methods

Biodiversity assessment

Through active participation together with villagers engaged in the CBNRM, it is hoped to gather information and understanding of the CBNRM activities. Furthermore an informal interview with a local expert (park ranger) will be conducted.

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Appendix 1: Timeline, Gannt Chart

SLUSE -	ILUNRM
April	2009

U Task Name Pe	ersons r	tours :	start date	end date	0-80 NU 08-0	3 EJ 09-03 P	N 03-03 P1 1	0-03 AN 10-	03 PN 11-03 .	9.M 11-03 PN	12-03 AN 12	-03 PN 13-0	3 AN 13-03 P	N 14-03 AN 1	14-03 PN 15-	03 AN 15-00	3 PN 16-037	AN 16-03
.1 local leader of Pongro village	ω	4	08-03-2009	08-03-2009				IISIN						ii lisia		BUR	FER	
Semi structured Interview with	,	•										_	_					\square
	N	H	08-03-2009	08-03-2009														
.3 NGO	ω	2	08-03-2009	08-03-2009														
PRA: Transect walk with A facilitators in Pongro village	ω	4	08-03-2009	08-03-2009														
.5 facilitators in Sambuor village	2	4	08-03-2009	08-03-2009														
.6 PRA: Transect walk with NGD	ω	4	08-03-2009	08-03-2009														
Follow up interview with 7 facilitators from Pongro	ω	4	08-03-2009	08-03-2009														
Follow up interview with 8 facilitators from Sambour	2	4	08-03-2009	08-03-2009														
Structured Interview with	(3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (∞	09-03-2009	12-03-2009														
2 Interview with school teacher	N	4	09-03-2009	09-03-2009														
PRA: History trend with elder 1.1 people from Pongro	4	2	13-03-2009	13-03-2009														
PRA: School children drawing	4	N	13-03-2009	13-03-2009														
PRA: Seasonal Calender with 13 both villages	4	2	13-03-2009	13-03-2009														
PRA: Venn Diagram with both 14 villages	4	2	13-03-2009	13-03-2009														
Focus group discussion with 1 people actively engaged	ω	4	15-03-2009	15-03-2009														
Focus group discussion with .2 people semi engaged	ω	4	15-03-2009	15-03-2009														
Focus group discussion with 3 people not engaged	2	4	15-03-2009	15-03-2009														
Biodiversity assessment with 1 local expert	~	4	16-03-2009	16-03-2009														
Active participation in CBNRM	~	4	16-03-2009	16-03-2009														
Appendix 2: Introduction to fieldwork and ethics

Overall quidelines of field work

As foreign students studying the local communities' home environment, the students are obliged to act accordingly towards their traditional customs and culture. Respect must be shown to all. Societal structures and institutions must be treated with the upmost reverence.

As the local people are based in the vicinity of study, this study could disrupt their normal daily patterns of living. The local interests must be taken care of; in the form of a report/seminar to the communities on the outcomes of the study. Beyond the local communities benefiting, provincial leaders, NGO groups and PA managers will also receive the report. Through this, they will get a better insight into the local communities' desires, problems, opportunities and suggestions to further improve the status of the area. However it will be stressed that the project is carried out by students and the purpose is a learning experience.

Ethics regarding the study of sensitive subjects

This study may encroach on topics and study subjects that may have ethical issues. Some of these include the study of children, the history of the area, family structures and other culturally sensitive topics. Extra care should be taken into consideration when designing and implementing the study methods.

Confidentiality should also be considered when participants are giving personal information. Unless given explicit permission to do so, all participants taking part in this study will have their private data protected.

Categories of qualitative data

Qualitative data can come in many forms. The following categories of qualitative data will be focussed upon, as they would provide in-depth information regarding the study topics.

- Perceptions Feelings
- Behaviour
- Values
- Relationships
- **Events**

- Understandings
- Formal roles Informal roles
- Beliefs Emotions
- Stories

Explanation to participants

The following points will be used for explaining the participants when conducting interviews, questionnaires and PRA exercises.

• Our project involves looking at the cause and effects of the establishment of this PA on the livelihoods of local communities

- With this information, we will assess how local communities both positively and negatively affect the PA and vice versa.
 - We will stress that there are no right or wrong answers, just what you think is the most accurate.
- This information would be of great help to us and your village, as we hope that our findings will help identify the relationship your community has with the PA.
- This should not take up too much of your time; only about () time.

Appendix 3: An introduction to semi-structured interviews

Participants: NGO managers, local leaders of Pongro and Sambuor village and school teacher.
Facilitators: All (8), 3 in Pongro and NGO, 2 in Sambuor (+translator). 2 with school teacher
Materials needed: Interview guides, notebooks, pens
Time needed: 1 hour per facilitator and school teacher, 2 hours with the NGO managers
Aim: To get the official view on the PA, the views of the NGO and the environmental education in the area.
Expected outcomes: Completed interview guides.

Description: Semi-structures interviews will be conducted with representatives from the NGO managing the crane sanctuary, local leaders in Pongro and Sambour villages, and with other stakeholders identified from Stakeholder mapping (Venn diagram). The semi-structured interviews will be based on questions from interview guidelines (appendix 4, 5 & 6). The purpose of performing the semi structured interview with the NGO leaders in the area is to get their perception of the CBNRM, the local communities, as well as an assessment of the biodiversity and crane protection and if it has improved since the area was protected. There will also be interviews performed with the NGO facilitators in the villages because they are both working with the PA and the local communities. Therefore they know the pattern of interactions more than anybody else. The interview with the local leaders separately in the two villages is important to get the official view of the communities on the protection of the area and they will preferably enlighten us into the discussions and different opinions within the community, as well as problems and opportunities for the villages regarding the PA. The interview with the school teacher will help us in assessing if the school is focusing on environmental issues and endangered species. Also it will help in identifying if the children are taught about environmental and sustainable behavior, and if the children learn anything about the PA in general or the CBNRM. The education in the school might say something about what is considered important in the community and how the future might look.

Appendix 4: Semi structured interview guidelines with local leaders

Proposed time of Interview with local leaders	1 hour
Proposed date:	08/03/2009
Personnel number 3 for Pongro; 2 for	
Sambour; names:	
Name of Interviewee and position	
Actual Date and time	/March/2009 :

An introduction

- 1. What are your experiences of the PA?
 - a. Any stories you can share? (loosen him/her up, get into the mood)
 - b. Can you comment on your experiences? (again, to make it feel like a story time)
- 2. What are your thoughts on the PA?
 - a. Do you think that it's a good idea to conserve this reserve?

Local Level of management

- 3. Do your villagers assist with the management of the PA?
 - a. What kind of things do they do? (don't ask if he mentioned it in the 'story time')
 - b. Do you join in with the activities? (again, don't ask if its already mentioned)
 - i. Do you enjoy taking part?
 - ii. Do you mind if we join your next tour of duties in the PA?(maybe)
 - c. Would you say that you promote the active participation with the PA?
 - i. If so, how?
- 4. Would you happen to know if any of the other villages assist with the management of this protected area?
 - a. What are your relations with the other villages in terms of management of the PA?
 - b. Do you share the responsibilities?
 - c. Do you work with them or do you take different shifts?

Higher Government Level

5. Do the higher levels of government interfere or help manage the protected area?

- a. If they do, how do they interfere/help?
- 6. How are the communication lines between you and the NGO, other branches of government?
 - a. If good: Does good communication help your ability to manage the protected area?
 - b. If bad: Does bad communication hinder your ability to manage the protected area?

Non-Timber forest products (NTFP)

- 7. What sort of products would you say your village requires from the protected area?
 - a. Did you notice any difference in the collection of products in the PA after it was protected nearly 10 years ago?
- 8. What is the local perception of what can be utilized and what can't be?
 - a. Do you know of others who are utilizing NTFP (illegally)?
 - b. Do the villagers understand what can be used and what can't?
 - c. If some villagers tap into resources which are supposed to be conserved, are there any consequences?

What needs to be changed?

- 9. What things do you think should be changed to further improve the management?
- 10. Do you think that local education about the protected area is enough?
- 11. To what degree do you feel is this particular protected area well known outside of the immediate area in Cambodia/World?
- 12. What issues do you think needs to be addressed about the interactions between the local management of the protected area and the higher government levels?
- 13. What issues do you think needs to be addressed about the interactions between various villagers who help manage the protected area?
 - a. Does it affect your leadership position? (unsure, maybe too personal?)
 - b. If it does, how it affects your work? (again, perhaps too fast to build up)
 - i. Examples?
 - ii. If anything interesting happens, lead on from there!

Closing

- 14. Is there anything you would like to ask/comment to us about?
 - a. Anything you think is great/not good at all?
- 15. Is there anything at all you would like to add that you believe might help us in any way?

16. We are greatly appreciative in taking your time to help us!

Appendix 5: Semi structured interview guidelines with NGO Coordinator (key informant)

Proposed time of Interview with NGO	2 hr
Proposed date:	08/03/2009
Personnel number 3 for NGO	
Names:	
Name of Interviewee and position	
Actual Date and time	/March/2009 :

General

Try to draw a time line while he is talking...

- 1. What kind of activities do you do?
- 2. How long have you been working in this area?
- 3. We read that the PA was established in 2000, but according to you, when would you say it was established?
- 4. What was the motive behind its creation?
- 5. What is the general perception of the villagers vis-à-vis the PA

Participation

- 6. Who was involved with the original establishment of the PA?
- 7. Were the local communities consulted before the establishment of the PA?
 - a. If no, Why?
- 8. Who is involved in the management of the area?
- 9. What activities are the local communities involved in regarding the management of the PA?
- 10. Who is eligible to participle?
 - a. And why?
- 11. Why are others not involved in the CBNRM?
- 12. What is the level of participation of the local communities in the CBNRM?

- 13. Do you notice any illegal activity around the PA?
 - a. If yes, what and how big is the problem?
- 14. How do you manage problems of illegality?

Conflicts (inter-community, intra-community and between stakeholders)

- 15. What types of conflicts do you encounter between the local communities and the PA management?
- 16. How big is the problem of conflicts? And are they escalating or improving?
- 17. How are they managed?
- 18. What assessment can you make of the state of the PA today in comparison to when it was created?

What needs to be changed?

- 19. What things do you think should be/could be changed to further improve the management?
- 20. Do you think that local education about the protected area is enough?
- 21. To what degree do you feel is this particular protected area well known outside of the immediate area in Cambodia/World?
- 22. What issues do you think needs to be addressed about the interactions between the local management of the protected area and the higher government levels?
- 23. What issues do you think needs to be addressed about the interactions between various villagers who help manage the protected area?

Closing

- 24. Do you have any questions for us?
- 25. Would you like to add anything that you believe would be useful for our study?
- 26. Thank you for your time, and have a good day!

Appendix 6: Semi structured interview guidelines with local school teacher

Proposed time of Interview with teacher	1	hour
Proposed date:	09/0	03/2009
Personnel number (2); names		
Name of Interviewee and position		
Actual Date and time	/March/2009	:

One or two teachers are needed. Preferable that one of them have been a teacher for more than 10 years (since before the protected area was declared)

Introduction

- 1. How many years have you been a teacher?
 - a. And in this school?
- 2. Approximately how many children do you have in this school?
- 3. What is the age of the children?
 - a. Are they divided into different classes?
- 4. Which subjects do they have in general?
- 5. What do you consider the most important subjects/issues that the children should learn about?

Environmental education

- 6. (If not mentioned by the teacher:) Are the children taught about the PA and the cranes?
- 7. What is the importance of environmental issues in the in children's education?
- 8. What kind of importance does the protected area and the management of it, in your perception, have to the school children?
- 9. Did you notice any change in what the children are being taught during the last 10 years?
- 10. To which extent was the environment a part of children's education 10 years ago?

What needs to be changed?

- 11. What further resources would you say you require to strengthen the environmental education?
- 12. Do the children know (enough) about the PA?
- 13. Do you think that local education about the protected area is enough?
- 14. What issues do you think needs to be addressed about the interactions between various villagers who help manage the protected area?

Closing

- 15. Can we attend a class of environmental education, or can we see some books?
- 16. Can we use 2 hours together with your school children, letting them make some drawings?
- 17. Do you have any questions for us?

Thank you for helping us

Appendix 7: PRA with school children

Proposed time of PRA with children	2	hour
Proposed date:	13/0	03/2009
Personnel number (4) names:		
Name of Interviewee and position		
Actual Date and time	/March/2009	:

Participants: 7 – 10 school pupils

Student researchers: 2 and a translator

Materials needed: 15 pieces of paper, pens in different colours, 2 large pieces of paper, notebooks, pens and camera

Time needed: 2 hours

Aim: to discover the level of environmental education and awareness among the pupils of the school of Pongro.

Expected outcome: pupils will be expected to produce individual drawings of their households and one common drawing of the lake.

Description: As a start the children will draw a picture of their own household, meaning their (extended) family and their house with fields and livestock. This exercise will do as an introduction and as a means to make the children confident with the facilitator and the situation of strangers visiting their school.

The second part of the excise is a PRA where the children are working in one group. The facilitator draws the lake on a large piece of paper (a big circle with space enough around it to let the children add motives). The children are now told to draw everything that they consider important in connection with the lake.

The aim of this second part of the exercise is to discover how the children see the lake and its surroundings and whether they are aware of the endangered species (cranes) or they just see the lake as a resource (fishery).

Appendix 8: Questionnaire survey

Participants: 73 Households (from both villages)

Facilitators: All (8) + 1 translator in 3 groups

Materials needed: Questionnaire, note paper, writing implements

Time needed: 1 hour per questionnaire, 73 hour total

Aim: To gather information about the perceptions of CBNRM and the protected area among the community

Expected outcomes: completed questionnaire

Description: Systematic sampling is used when selecting households for structured interviews. This is because we have no knowledge about the structure of the communities, and to get a representative sample that permits generalization to all the households. When determining the sampling size, the method for selecting a sample from a small population described by Rea & Parker (1997) is used. When choosing a 95 percent confidence and a margin of error of 10%, 73 households in Sambuor and Pongro together should ideally be part of the sample. However depending on the time and resources available it is difficult to say how many households that will be part of the sample, but 73 is the target number. There are 217 households in Pongro and 84 households in Sambuor, therefore the questionnaire will be performed on every fourth household in the two villages. If some of the households are unwilling or unable to be part of the research the neighbor will be interviewed.

Questionnaire guide

Names of interviewers:		
Date:	Time:	Household no.:

1. Household Members Profile

1.1. How long has the head of household lived in this area?_____

1.2. Member profiles

Household	Gender	age	Level of	Main	2 nd occupation	Permanent	Involved in
member			education	occupation	(time)	Living in	CBNRM
				(time)	(optional)	household	
				(optional)			
1(Resp.)							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

2. Household Activities

2.1. What activities contribute to the household income and maintenance? (Mark by X, If don't know mark by O)

Activity	Inside PA	Outside PA	Activity	Inside PA	Outside PA
Rice production			Other agricultural production		
Vegetable gardening			Handcraft		
Mushroom collection			Off-farm work		
Timber harvesting			Fishing activities		
Tourism related activities			Firewood collection		
Cassava production			Food plant collection		
Livestock			Other:		
Non-food plants collection			Other:		
Employment in larger city			Money transfers/ Remittances		

2.2. Does the protection of the area limit your household activities?

No	Yes

2.3. Have you noticed any difference in your use of the area after the PA was established 9 years ago?

No	Yes
	Please explain:

2.4. Have you seen any illegal activities in the protected area?

No	Yes

Please explain:

2.5. Do the household have livestock?

No	Go to 3.1.	Yes

2.6. Please explain the number of livestock in the household:

Buffalo:	Cattle:	Goat:	Chicken:
Duck:	Pig:	Silk worms:	Other:

2.7. Where is the livestock grazing?

Inside PA Outside PA

3. Community Based Natural Resource Management (CRNRM)

3.1. Have you heard of the CBNRM programme in the protected area?

No	Go to 4.2.	Yes

3.2. Have any of the household members participated in the CBNRM programme in any way?

No	Go to 3.7.	Yes

3.3. What is the motivation for participating in the CBNRM programme?

Influence:	Financial support:	Other:
Other:	Other:	Other:

3.4. Did the household member(s) participate in the planning of the protected area?

No	Yes
	How:

3.5. Did the household member(s) participate in the implementation of the protected area, when it was established?

No	Yes
	How:

3.6. Do the household member(s) participate in the management of the protected area?

No	Yes
	How:
	After 3.7 Go to 4.1.

3.7. What is the level of encouragement by the NGO to local involvement?

Non existing	Very little encouragement	Little encouragement
Adequate encouragement	High encouragement	Very high encouragement
Comment?		

3.8. Why haven't you participated in the CBNRM programme/meetings?

No time:	No interest:	No invitation:
Other:	Other:	Other:

3.9. Would you like to participate in the CBNRM programme/meetings?

No	Yes
Please explain:	

4. Open ended questions

4.1. What do you think of the CBNRM programme?

4.2. What is your perception of the protected area?

4.3. What is your perception of nature and crane conservation generally? (E.g. Global scale)

Appendix 9: Transect walks

Participants: Facilitators of the NGO and the NGO manager

Student researchers: 2 groups of 3 students, 1 group of 2 students

Materials needed: sketch paper, notepad, camera, GPS

Time needed: 4 hours per transect + 1 hour of follow up interview

Aim: to be introduced to the area and the people, and to get to know the NGO facilitators

Expected outcomes: maps, points of interests on the GPS and further general information

Description: Transect walk through the protected area is a simple method that will be the first step in collecting data. While familiarizing us with the study area, key informants will present information on land use, problems and potentials through the protected area. Furthermore it is a good and less formal way of getting to know and gaining the trust of the stakeholders participating in the walk. One student will take notes, and sketch the area. Issues brought out by the transect walk will be the focus in further data collection. Three transect walks are planned, two with the facilitators of the NGO from each village, and one with the NGO representatives managing the protected area. The transect walks are planned to take a maximum of four hours; this amount of time includes time expected for unforeseen occurrences. Two groups of three students will do the transect walk with the NGO managers and the facilitators from Pongro, and one group of only 2 students will do the transect walk with the facilitators from Sambuor.

In the transect walks we expect to see a good representative of the whole area and evidence of different land uses in the area. By conversing with the guides, useful information and facts about the protected area, the communities, NGO and the relations might be attained.

The guides will not be told which paths to take; it is up to them to decide what they believe is important, and guide accordingly. But it should be explained to the guides what the project is about and the expected transects of the other groups. This will hopefully lead our guide to leading the group to a different and previously unexplored area.

This method is modified from Selener et al. (1999).

Afterwards a short unstructured follow up interview with the guides will be performed based on the issues and questions generated from the transect walk.

Appendix 10: History Trends with Elderly People from Pongro

Participants: Elderly people who have lived in Pongro for a long time (identified from the questionnaire)
Student researchers: four students
Materials needed: Flip charts, markers
Time needed: 2 hours
Aim: to identify historical trends and other important historical information of the area
Expected outcomes: Diagrams, timeline and drawings of main historical events

Description: It should be a visual representation of the trends and main events in the history of the village and greater area. The PRA should ideally be conducted with elderly people who have lived in the area for a long time. These people might have the best available knowledge of the local history and it will help in identifying important historical events influencing the situation today and the subject of the study. It might also help discover problems, conflicts and the potential solutions to these issues. The theme of the trend should mostly be about the protected area, but the elderly are free to involve different themes that they might think is important in the overall study. The participants will be asked to draw main events in relation to the theme on a timeline, and if needed the facilitators will ask to draw specific diagrams or matrixes on some of the events.

These history trends will be useful in identifying important events that have marked the history of the area and how these events have impacted on the local livelihoods.

This research method is modified from the Community history and trend analysis exercises described by Selener *et al.* (1999)

Appendix 11: Seasonal calendar

Participants: People engaged, and semi engaged in CBNRM, around 8-10 per group

Student Researchers: Three students and one translator

Materials needed: markers in different colors, flip chart papers,

Time needed: 2 hours

Aim: to identify and describe annual livelihood activities, the intensity of activity and time needed. Further on, the importance of CBNRM activities in relation with other livelihood activities will be analyzed.

Expected outcome: A completed seasonal calendar of activities engaged by the local communities

Description: As described by Nathan *et al.* (2008), the seasonal calendar consists of a vertical diagram with the months of the year indicated in the top row and with name of activity in the first column. In a case that some of participants is illiterate, the simple sketches or symbols will be used instead of the words. In the cells the description of activity, intensity and time needed will be described.

This PRA method aims to provide an overview on amount of time that people dedicate to CBNRM activities during different seasons. Firstly, participants will identify all activities, describe them, and finally mutually agree on what time of the year, and how much time per day is needed for CBNRM activities.

After a short introduction on the project, the participants will be asked to identify and describe what they do for a living (agriculture, fisheries, business, tourism, CBNRM, etc.). A seasonal calendar will be drawn, and from comparing the time spent on various activities, the relative importance of CBNRM activities can be assessed.

Appendix 12: Venn Diagram

Participants: people engaged, semi engaged and not engaged in CBNRM, representatives from NGO, and local authorities. Around 8 people in each group.

Student researchers: Three students and one translator

Materials needed: Post-it paper cards, markers, flip chart paper

Time needed: 2 hours

Aim: to identify stakeholders around the PA, their main interests and the importance of their influences

Expected outcome: Completed Venn diagram, power balance diagram, a complete list of stakeholders as perceived by the participants.

Description: Stakeholders will be identified and analysed in both Pongro and Sambuor village together. Besides local people involved in CBNRM, representatives from local authorities and NGOs will participate. The aim is to capture different perceptions on who has interest in the protected area, and for which reasons (agriculture, conservation, NTFP collection, etc). Additionally, participants will discuss and agree on the level of power of each stakeholder. As a follow up, interviews with important stakeholders will be conducted later on.

After the presentation of the project, participants will identify all stakeholders with the interest in the Protected Area (farmers practicing agriculture in the PA, people engaged in CBNRM, rangers, hunters, fishermen, NGOs, government and local leaders, etc.). They will be asked to write a name of each stakeholder on a separate post-it paper card and put them on the table, floor or a wall. In a case there are illiterate participants, a different symbol or a simple drawing will be used for each stakeholder.

When no more suggestions for stakeholders are presented, the main interest of each stakeholder will be identified. The paper cards will be organized in clusters of related interests.

The cards will be organized in a star like style, where a number of lines will be equal to number of interests. In the center of the "star" will be the stake – the PA. Cards with stakeholders will be put closer or further from center depending on their importance. The stakeholders "star like" sketch will be used in later stakeholder analysis, as it represent a common picture of all perceptions. Eventually, if new, important stakeholders are indentified by participants, they might be interviewed, providing there is enough time.

The guidelines are modified from LFA manual (Danida, 1996).

Appendix 13: Focus group discussions and Preference Ranking

Participants: One group of the facilitators, one group of actively engaged villagers and one group of villagers not engaged. Each group will have between 6-8 people.

Student researchers: Two groups of three students for the facilitators and the actively engaged villagers, and two plus a translator for the not engaged group of villagers.

Materials needed: Notebooks, pens, markers, flip chart

Time needed: 4 hours per group

Aim: To gather information regarding the motivations behind CBNRM participation or not.

Expected outcome: A rank of motives for participation in CBNRM activities, and another rank of motives for not participating

Description: The three groups are identified based on the questionnaire and the interviews. The facilitator group will be defined as those who are facilitators assisting the NGO. The active group will be defined as individuals who have answered yes on question 3.2 in the questionnaire. The non-engaged group will be defined as individuals who are not participating in CBNRM activities in any capacity.

The focus group discussions will be split into two sections; the first half will be a discussion on motivations, and the second half will take place as a preference ranking exercise. Each motive will be ranked according to their preferences using stones.

This is a method that will besides providing key data, be a useful learning experience to participants. The aim is to assess the motivation to participate in CBNRM through discussion with a diversified group of local people. This study will attempt to involve marginalized groups to get their views. Moreover, people who are not involved in CBNRM and marginalized groups will have an opportunity to express their hesitations. At the end, participants will rank all identified reasons according to their importance.

Guidelines for this method are modified from Selener et al. (1999).

Appendix 14: Biodiversity assessment

Participants: one or two local experts (PA rangers)

Student researchers: 8 and the translator

Materials needed: notebooks, pens, land use and forest cover maps and camera

Time needed: 4 hours

Aim: To have an overview of the biodiversity and the changes over time in the PA

Expected outcome: A species list and to get an assessment of the changes that have occurred since the establishment of the PA.

Description: A shortlist of items of interest including bird populations, forest cover, fish population density and plant species populations will be discussed with the PA rangers in the field. By gathering this information and analyzing this data, the impact the local communities on the PA could be better understood. Furthermore, the land use maps will be studied to assess the changes in land use in the area over time. Forest cover maps from the Cambodia atlas will be used likewise to assess the changes in forest cover in the PA.

Appendix 15: Active participation

Participants: Villagers engaged in the CBNRM

Student researchers: 8 and the translator

Materials needed: binoculars, map, notebooks, pens, GPS and camera

Time needed: 4 hours

Aim: to gather information and understanding on the CBNRM activities

Expected outcome: first hand information on the CBNRM activities that will enable us to triangulate some of the information gathered from other methods. It will also provide valuable hands-on experience that will enable a better understanding about CBNRM activities.

Description: Active participation will be performed with locals engaged in the management of the protected area. The villagers are carrying out a wide range of activities in relation to the CBNRM. These activities might include: guarding the protected area, chasing away predators and assist in tourism activities.

The idea to join the locals in the activities is to learn from experience. This experience will greatly assist in the understanding on the motivations, challenges, opportunities and workload involved with CBNRM activities.

Appendix 16: Observations

Observation is a simple method that will be practiced simultaneously with other methods, but also in non formal, everyday activities during the field work. The main obstacle of observations is that it can be biased by researcher's perception, but in this case, through combining with data from other methods it will give weightier scope of problems within area.

Appendix II - Interview with chief of Pongro

Interview with chief of Pongro

Chief for 2 years

History

Pongro and Sambour are situated in the upland area

Population is increasing since Pol Pot regime leading to lack of land

After establishment of PA population is still increasing

Population in Pongro: 287 families (households), 1296 persons

Sambour: around 100

Immigration from the village to the Thai border (Poi Pet), 50-60 families in the last 2 years

Two kinds of immigrants; one group going to Bangkok to work in the industry and the construction and one group to the border and the seaside to work with fisheries

PA

A source of food, fish and water

Problem: water utilisation. Lowland is flooded during the rainy season. Rice fields in the lowland are destroyed when the villagers in the upland are opening the gates to irrigate their rice fields.

Was this a problem before the PA was established? How is this connected to the PA?

Maybe due to ex pec tati ons of the I ocal people...

Opinion of the chief: Conservation is good, but the ministry of water resources does not understand the problems of the local livelihoods. He said that the government cares only for the cranes and less for the people. The chief wants to have a balance.

There is a need for a law for water utilisation, so that the villages in the upland and in the lowland don't have to fight about who has the right.

The villagers were demonstrating (in 2003) against the government and the NGO (WCS), because they had set borders in the area. The villagers were concerned that their land in the PA belonged to some other owners. The local livelihood is based on the growing of rice inside the protected area.

For the question on the demonstration, 3 more people in the house of the chief got involved in the discussion.

Participation

Only the guard and the facilitators of the NGO are allowed to take care of the birds. The villagers are not participating.

Tourism

Decrease of cranes in general as a consequence of the flooded area in the rainy season.

Nesting in the dry season

Before 2003 the number of tourists was higher from January to March, during the dry season. 10 to 12 people per day coming in minibuses. Now only the NGO and the government visit the protected area, and tourists are not seen.

The villagers do not benefit from tourism at all, since they stay in larger villages further away from the lake.

Farming

No market for vegetables, only for rice.

Farming land: 1168 ha

Cropping land: 152 ha

Village land: 1,5 km<mark>2</mark>

This year 60% of the yield was destroyed by the flooding of the area.

Jobs

Beside the rice production, other jobs in the village are: growing mulberry, silk production, working in the border, and sewing.

Silk

Silk production does not attract tourists. The silk raw material is sold to the NGO and silk products are produced in another area.

Rice production is a better source of income than silk production.

Management

During three years before the establishment of the PA, the government discussed with and informed the villagers

NTFPS

The collection is very time consuming

The forest is distant and the collection is small

Land tenure in Pongro village

Traditional rules exist and no official rules (no certificate)

Appendix III - Interview with chief of Sambuor

SSI with the local chief of Sambuor

Background

With: Mal Seeo

Chief is a 58 years old farmer and also the community chief

Is related to ECOSORN.

Originally, ECOSORN came to Sambour to observe, and it ended up testing some vegetable plantations.

A NGO that used to work in the area is called 'Vakaki'. This NGO taught the villagers how to build and maintain pigsties.

Sambuor is an old village; it started with a single small family.

The chief overall is not too happy with the establishment of the PA, as it has severely hindered his village's rice production.

Village background

To this day, there are 114 households present.

3 years ago, there was a major natural disaster, when major flooding occurred.

There are no new immigrants in Sambuor; and occasionally, the residents of the village migrates out

The village of Sambuor rarely gets tourists. The tourists that come by end up taking a bus through the village, take photos of the cranes, and then leave. This usually happens when the water level in the lake is lower, and causes the cranes to locate closer to the banks, allowing tourists to see them better.

Protected Area

Rice fields are difficult to plan for, as the establishment of the PA restricts their actions.

After 2002, most people can't grow and fish as easily as it was before the PA was established

150 ha was set aside as a core area, whose main objective is to provide fish breeding grounds.

In the PA, people are allowed to fish, but are allowed only to use nets and cages. They are not allowed to use the old 'shocking' technique which electrocuted fish in the water.

Before the establishment of the PA, villagers were allowed to farm rice in the area without any hindrance.

There were land use issues, due to the limited amount of land, and the increased need for various landuses. But this issue is not limited to this village; a lot of the other villages surrounding the PA area were also affected.

Soon after the establishment of the PA, many restrictions were placed on the PA area, and that limited the rice farming potential and fishing potential.

Villagers farm rice in the core zone and the lowlands after the laws governing the landuses within the PA were changed. Now, villagers are allowed to farm rice in an area in the PA during the wet season.

The rice yields are about 2tonnes/ha/year.

In the last 9 years, in Sambuor, there has only been 1 main agricultural problem, namely flooding.

The PA brings some benefits, including keeping the genus of rice, and the genus of many fish species.

Sambuor has a quota of fish which is about 1tonne/day

The chief believes that the PA was established in the 1980s. However, according to the literature and the NGO facilitator, the PA was established in 2000.

There is an area of approximately 180ha set aside for villagers to fish from.

Water utilization has not caused conflicts, as there has generally been an equal share of water use.

The Village

The 2 main methods of gathering resources in Sambuor are fishing and rice farming. Having said that, there are many other methods which villagers use, including potato farming, mango farming, banana farming and collecting snails.

After the NGO visited the village, most people enrolled into the management of the PA. Some, however, didn't like the idea of CBNRM, and/or conserving the cranes, and therefore declined to join.

Vegetable farming has also been used, but the market for vegetables has been limited, and only 2 villagers were known to be growing vegetables.

There is no coordination between Sambuor and other villages in CBNRM activities.

There is no school education about environment or the PA in local education.

The overall standard of living has fallen since the establishment of the PA. This is due to the restrictions put on the villagers regarding the use of the land in the PA.

Some villagers (not many) utilize NTFP as a livelihood strategy.

The ICF was the NGO that initially started the silkworm production among the locals in Sambuor.

Silkworms are also used as a livelihood strategy; however, during the dry season, it is generally too hot for silk production.

Since there is no proper irrigation system installed, utilizing water resources during certain seasons

There used to be a temple in the village; but due to poor maintenance, it has turned into a ruin.

The village has both lowlands and highlands, which make it difficult to classify the land height of the village.

The village of Sambuor does not have any touristy souvenirs available for sale. This hinders the potential for economic development in Sambuor.

Charcoal making is also present; however, it is used by the villagers, and generally not for sale.

One of the main buildings in the village includes a rest point, which is a place where people from all surrounding villages can come and take a rest and acts like a social meeting point.

The local school is funded by the education sector development project. There is only a primary school available here; the secondary school is located in Pongro, which also provides its secondary school education to other surrounding villages.

The school is also anticipating an expansion project soon, as it has nearly reached capacity.

Another important village infrastructure is the national-international phone mast.

There are 2 wells in the village. One is only about 6m deep, and supplies drinking water as a bucket-well, and the other is a 30m deep well which has a hand pump, but a villager says that it is not drinkable. The second well is located inside the vicinity of the primary school, and some children have been known to drink from it.

CBNRM

Many villagers in Sambuor are involved in CBNRM activities.

The chief believes that it is a good idea, as it keeps up fish numbers and increases sustainability. This, he believes will allow his village in the long term to have a steady supply of fish.

The chief knows at least 1 other who conserves cranes in the PA.

The district and ministry government agencies only set aside the areas and defined the borders of the PA. After the initial border setting, there was very little else that the higher levels of government did.

When illegal activities are observed by the villagers, park rangers or police are called in.

Appendix IV - Interview with chief of Poay Ta Ong

SSI with Poay Ta Ong chief

Chief for 6 years, deputy chief in 2000

Dam was finished repairing in 2004. Reason: storage of water for dry season rice and maintaining fish stocks and biodiversity. The Japanese government funded the dam, the major stakeholders are the ministry of agriculture and the forestry and fisheries ministries and ministry of water resources and meteorology. The stakeholder provide technical support to the villagers. A comity for managing the water consists of elected representatives, 3 from each village, and 3 from each commune (3 communes participate in the management of the lake, the 3 surrounding the lake). The participation by the villagers is very important. The comity is a local level management, but the assistance for major problems come from the district and provisional level.

Villagers thinks good of the dam since it provides water for irrigation and good fishery. It is negotiated within the comity to share the water at the bottom of the dam. Last year the rice fields were flooded because of a prolonged rainy season. Both upstream and downstream. The gat ere opened so that the fields in the north weren't that flooded, the main reason though was to keep the water level at a manageable level.

Since the construction the standard of living has improved, because of increased rice yields, and much better fishing. Rice yields: 1-1.5 t/ha \rightarrow 2 – 2.5 t/ha. They can catch 5 – 50 kg/day of fish. Fishing is both for subsistence and commercial. To open the damns: Chief of commune \rightarrow department of water and meteorology \rightarrow doors will be opened or closed.

Villagers are very much involved in the ECOSORN project. The village is a major target for the ECOSORN project, because they have a lot of uncultivated rice fields, and are underdeveloped compared to other areas. ECOSORN projects are based on agriculture and socioeconomic development. ECOSORN has a impact on rice yield and give technical advice in the dry season. Water level problems are recorded during the rainy season, when there is too much water in the lake. The fields upstream are flooded as well as the fields downstream.

There are conflicts between up- and downstream villages, but there relationship is close. The conflict is at the commune level. The upstream villagers upstream wants the gate to be open during rainy season, but a compromise is that it is open for 1 week during the season.

Before the reparation of the dam, there were also a problem. The dam was build during the Khmere Rouge regime.

After Khmer Rouge, every household were allocated 1 - 1.5 ha of rice fields down of the dam, but the villagers in Pongro and Sambour villages sold their fields.

Tourists go to the lake and buy beer and food at the shops and are also transported by locals to the site. Renting off boats as well. (most of the operators of the shops are from Siem Riep). Most tourists are Khmer tourists.

People are happy with the PA, because they think that the PA means more fish and a conservation of endangered species and biodiversity for future generations. The cranes attract tourists.

Chief is one of five ECOSORN facilitators in the area. He is not working with the WCS but he is involved with the community of fishery, that has an office at WCS building.

Appendix V – Interview with the chief of Kon Khlaeng

Interview with the village chief of Kon Khlaeng

1992: People migrated into the area in the search of land after the Khmer Rouge. Before, the area was a forest. 8 settlements were created, each having a chief. The chiefs redistributed the land among the families; 2,5 ha per family and larger families had more.

1999-2000: Problems with WCS on land and forest issues, but the chief says that at the moment they don't have any problems with WCS. Now they have what he mentions as community forestry and the people respect the regulations of the area.

The village was created in 2000.

Two organisations are working in the area:

"Buddhist" (Buddhists for development?):

- rice bank
- literacy program

Ockenden International:

- construction of roads
- animal bank
- construction of bridges
- local village bank

Rice fields:

Their rice fields are never flooded with water from the lake. They only grow wet season rice. Their rice fields are located at the borders of the PA. Between the forest and the PA; cut across by a rural road. They harvest in the month of January.

Appendix VI - Interview with head of conservation of WCS

Interview with WCS

He is director of Finance in district Phnom Srok, and Head of conservation in WCS

He works in WCS from its establishment in 2000 was in this are from 2000?

There is 16 people employed in WCS: 6 police, 6 locals (3 from Pongro, 2 from Sambour and 1 from Chouk Ang), and 4 in Phnom Penh.

3 groups are assigned to guard the birds. Groups 1 and 2 have 3 people, group 3 has 4 members.

The morning and afternoon observation dates are 2nd, 5th, 8th, 11th, 14th, 17th, 20th, 23rd, 26th and the 29th of every month. For nighttime group observations, the dates are 3rd, 6th, 9th, 12th, 15th, 18th, 21st, 24th, 27th and 30th of every month.

Extension working dates are 1st, 4th, 7th, 10th, 13th, 16th, 19th, 22nd, 25th and 28th of every month.

The reasons for establishment of the PA:

- 1. To protect biodiversity wildlife (birds and animals) for future generation
- 2. To promote tourism, attract tourists
- 3. To reduce poverty
- 4. To protect fish breeding ground
- 5. To conserve water for villagers

WCS coordinate the rice bank (community of rice): WCS give the rice to villagers (10kg) and villagers pay with the small interest (11.5kg), and this 1.5kg stays in the bank for community.

The poverty is reducing with tourism; tourists pay 10 dollars for admission fee.

ICF started management of conservation in this area since 2001 to 2005, and from 2005 to present WCS is responsible. The money from admission fee is kept by one group (finance responsible from village, community or district?)

Benefits for villagers from the PA

Increase of fish by providing fish breeding ground

Villagers can get the money from tourism, by selling food and others to the tourists

Tourism community in Sambour

Villagers from Sambour benefit from tourism by selling food, sightseeing tours (showing tourists around), and boat tours.

Tourism community in Sambour plan to build a guesthouse with 10 rooms in 2009.

ATT

Surface of the lake during dry season: 784ha

Volume of lake in the rainy season: 100 million m3

The maximum capacity of the lake: 170 million m3

1152ha forest 2516ha Plong fields (grass land) 2439ha rice field 165ha rice in bamboo 5770ha rice in forest 949ha water 6712ha agro biodiversity conservation area

Rules of PA

Growing rice in the dry season is allowed. The use of fertilizer and pesticide is forbidden, but it is difficult to train the farmers about that.

Land in the PA is owned by the government. People cannot have a title of deed for the land they utilize in the PA. A precondition to use the land and resources in the PA is to respect the rules of the PA. The stuff of WCS observe the activities every day, and illegal activities should be fined, but he has compassion for the locals and he doesn't want to charge them for illegalities.

In 2003 7% of acid in the lake (Ph?)

In 2008 4% of acid in the lake

Biodiversity in the PA

There is 182 bird species, from which 18 are endangered.

The assessment of birds is done by counting the number of birds in the group while flying or while on the ground.

WCS studied the socio-economy of the local people (th ey don't have the results of the research)

Villagers' perception about the PA

People are happy about the PA, because they can fish, collect NTFPs and fire wood, grow rice, collect the grass for livestock...

There is a proposal from people to the authority to use the PA with less restrictions, but to accomplish this there are some preconditions.

Appendix VII - Interview with WCS facilitator

Interview with facilitator (from WCS)

Name: Kean Torn

General information

He works for WCS from 2002, and at the same time works as a policeman in the commune.

Work from WCS is a part time job?

He works as a ranger, and his job is to observe illegal activities in the PA

ATT history

Ang Trapeang Thmor was ancient road to Angkor Wat.

1976/77 during Pol Pot (Khmer Rouge) regime the road is transferred to the lake, over 100.000 people worked on construction

PA description and history

9x11 ha - the surface of the lake

The gate of the lake (water reservoir) can hold 170 million m3 of water

3 bridges over canals to the rice fields

3 communes are irrigated from the lake (Poay Char, Ponley, Phnum Srok)

Pongro and Sambuor are outside the PA, but cultivate rice in the PA during the rainy season (it is legal). They got this right after demonstration in May 2003.

Before the PA establishment, Pongro and Sambuor villagers owned the land in the PA.

Before the PA establishment, the area was owned by Khmer Rouge Army

Before the PA establishment, the government discussed and informed villagers for 2 years

2004 – 1.7 millions dollars donation from Japanese Government for road construction, and repairing of irrigation system

PA Management

WCS and the government (Ministry Agriculture, Forestry and Fishery)

WCS is established by USA funds
Extension workers – work 2xper month, they talk with villagers and provide information about conservation, educate about the PA, illegal activities in PA...

Extension workers in Pongro and Sambuor are from WCS

3 (150???) families from Sambuor and 115 (300???) families from Pongro

27 villages from 3 districts, living around the PA, involved in the PA??? (How???), approximately according to facilitator it is around 80% (of what???)

Zonation

Core zone (2 core zones for fishing + 1 big cover zone (include this 2 small) for cranes)

Buffer zone

Integration zone - rice fields, watermelons...

Illegalities

There are fewer illegalities in 2004 comparing with 2002

If villager see illegalities they reported to WCS, and they report it to the police. People who do illegalities are taken to police station

For small illegalities the fine is 50.000 riels

Illegal activities are during night

Only outsiders from Pon Ley (village?) district do bigger illegalities

Illegalities: hunting with net, sling shot (catapult), poisoning

After establishment of the PA cranes are more used to people, distance around 15m

Rice production

Outside the PA Pongro and Sambuor villagers cultivate rice both in dry and rainy season, but inside the PA only in rainy season

Rice yield Inside the PA (rainy season only) 1.7-2 tones/ha/year

Outside the PA: over 2 tones/ha/year

NTFP (mushrooms, bamboo, firewood, resin)

Open access for everybody in the flooded forests,

Collection of timber is not allowed

There is Forestry Community.

Fishing

Substance fishing is allowed for everybody (open access), with exception of two fishing core zone (48 ha and 100ha)

The fishing core zone of 100ha is recently established.

Community Fishery is funded UNDP

15% has fishing as a main occupation (main livelihood)

Bird species

270 bird species, 18 endangered species

Other

ODEN - NGO dealing with animal bank, mainly cows

Cambodian teacher! Sokha

Core zone

Conservation zone

Sustainable Development zone

Socio-economic zone

Kon Khlaeng Zone, not official zone yet

Appendix VIII - Interview with Provincial Forest Administration representative

Interview with Forest administration

Sau Salad, staff of the forest administration in Phnom Srok district, Ang Traepeng Thmor. Work with WCS as one of the group who is conserving the birds. He started working in 1990, focus on forestry in all levels and the whole area. Lives in a village close by where he is also a policeman. He tries to control the illegal forest activities and other illegal activities in the Phnom Srok district. There is a forestry community in Kon Khleang district. There are more than 200 ha of community forest in Kon Khleang. Since 1996 a lot of wood is available, but from 1989 to 1990 people from Sras Cheak, Poay Chhar, and Nam Tav commune did a lot of logging for mainly firewood, now it is decreasing. In 1993 people from the forests in the North moved down to Yang Ord Dorm, Om Peal Koung, and a third village because of population pressure. Agriculture was expanding in the northwest, cassava growing was expanding slowly as well. There is land sharing program in these 3 villages, and the newcomers from northwest got land deeds for the land they live in, but they didn't get deeds for the forest use

During the civil war, many refugees escaped to the bordering countries such as Thailand. Many of them decided to move further away as asylum seekers in countries such as the USA. The government is thinking about changing the forest east of the PA from a state owned forest to a community forest. The problem with this is that if it became community forest everybody else in the area would want a piece of the forest. The commune chief contacted the forest administration to create a one kilometer from the road area where there could be plantations.

Actually the villagers are not allowed to use the land, but they have used it for a long time now and it is difficult to kick them out of the forest. If Salad decide to kick them out he will become very unpopular in the area he is living in. New plantations in the forest is not allowed, but they can continue on the fields that is already cultivated. Many people applied for land ownership but no ownership has been signed. If the village was to be the owner they have to go to the village chief (official letter) \rightarrow Commune chief \rightarrow Ministry of agriculture, forestry and fishery \rightarrow will be land concession and then legal ownership.

To solve the problem he proposed that jobs could be provided so then the pressures applied on the forest would be alleviated.

Appendix IX – interview with Provincial Department of Water Resources and Meteorology

Interview with Tim Narong, administration of creation of: farmer water user community.

Provincial department of water resources and meteorology

The farmer water user communities are created to manage the water from the lake and the dam

Ang Trapaeng Tmor is the main water user community around the lake

Two districts are managing water in the province; one of them is Phnom Srok.

5 communes are involved in the management of the water

Conflicts concerning the management of the water and the dam are managed at the commune level and by the local authority, the commune council.

When the water user communities want to open the gate, they apply to the commune councillor, who has the power to open the gate.

To solve the conflicts between villages upstream and downstream, they are digging the principal canals deeper, to lead the water evacuate. Until now, the canals have been blocked due to farmers cultivating rice in the canals. 4 canals are being reconstructed, among which 2 are linked to the principal canal. The province administration hopes to complete the work by June 2009.

They have prioritised the downstream canals and villages since more people are living in this area, than upstream. At the moment there is not a budget for reparation of the canals in the area around Pongro. Furthermore: People living north of the lake are living there illegally. They do not have the right to live in the area, and it is their own fault if their fields are flooded and they can not grow rice.

2005: reconstruction of the dam. Purpose: for the birds and for irrigation. Before there was just a lake and during the Khmer Rouge, the dam was constructed.

His perception on the PA: positive; the birds benefit from the fish in the lake and it serves as a nesting site.

Other stakeholders:

Chhoy Koem, chief of water user community in Trapeang Tmar Tboung

His assistant: Suy Le

We asked if he knew any organisations related to the lake:

He knows that there is an organisation working with birds in the area. He did not know the name (WCS), even when we mentioned it to him. He knows about ECOSORN, but gave no details. He mentions that there is a problem between ECOSORN and the provincial authority. The provincial authority had to cancel some ECOSORN projects.

Appendix X – Interview with secretary of primary school in Pongro

Interview with the secretary of Primary school of Pongro

Name:

General information

He has this job since 1982

Description of school

230 students (99 female)

There are 6 grades, 1st grade starts with 6 years

The subjects are: Khmer language and literature, math, physics, sports, handicraft (especially for female), drawing

According to his opinion the most important subjects are Khmer and Math

Education about PA

From 3rd to 6th grade

After primary school, 80% children continue education in college (last three years), and 60% of college students continue education in high school

Most of older people are illiterate, but after Khmer Rouge regime education is improving

Children learn: first aid? or aids?, about bird flu, traffic signs and rules... not relevant to PA and environmental education!!??

There are some pictures of cranes and the lake in classrooms

He could not tell us how much and how often children learn about PA, because it depends on chief of education (who is he?)

According to his opinion, it is important that children learn about conservation and utilization of natural resources

His opinion about PA

It is good for conservation, but bad for local villagers and their livelihoods

The opinion might be biased by presence of chief of Pongro (chief had the same opinion)

Both secretary and chief said that this questions is very difficult

There are both positive and negative aspects???

Appendix XI - Interview with teacher of Pongro

Interview with teacher

He has been a teacher for 15 years: 5 years in Pongro.

He is a teacher in the 3rd grade and hi has 32 students. 8-9 years old

The subjects are: Khmer, algebra, social science, science practise

The social study contains: morality, geography, gender education, art

Most important subject according to the teacher is Khmer.

The children learn about the protected area through the geography classes, when these include forestry they hear about the PA and the cranes.

The teacher thinks that the environmental education is important, and he prefers to have even more.

It is his opinion that before it was easier to make the children understand. Now a days the level is too high so the best students gets better but the less good students gets less good.

The school has 12 teachers and one of them is a woman.

The PA is a good thing since it promotes tourism. The children equally learn about tourism in the classes of geography.

The children see the cranes when the cranes fly over the school on their way to the forest where they sleep. The cranes feed in the lake.

PRA with children from the school of Pongro

Facilitators: Dragana, Thyra and Astrid

The children were divided into two groups, one with the boys and one with the girls (about the same number in each group). They sat on the floor in two circles.

First they were asked to draw their household with their family. They drew one each on their own piece of paper with coloured crayons.

We chose 4 children who had drown very detailed drawings, to explain their drawings. All the children kept their drawings.

4 explanations of drawings

1st girl

Household members: her parents, herself and her older brother

She and her brother is given 2 bath every day when they go to school

3 coconut palms

Chicken

2 cows

Flower

6 ducks

Banana trees

2nd girl

Household members: Her older sister and brother and her parents

2 coconut trees

1 banana tree

A flower in front of her house which is now gone

A lot of chicken - she can not count them all

The neighbour who is visiting

A window in the house

1st boy

Household members: Him self and his younger brother

Bird

Mango tree

Water tank

4 coconut trees

Papaya tree

Motorbike

2nd boy

Household members: 2 younger brothers, an older brother, him self, his mother and his father

4-5 chicken

1 duck

Egg of chicken

Appendix XII - Transect walk with WCS facilitator

Transect walk in eastern part of the PA with facilitator

13.03.2009

We were walking on the path that is boundary between the core zone, and the buffer zone of the PA. Inside core zone there is a fish breeding core zone, indicated by the table with the sign.

Following bird species are noted in the core zone:

Mycteria leucocephala, painted stork

Mycteria cinerea, milky stork- around 20 birds are noted on the tree, together with painted stork

Pelicanus philipensis, spot-billed pelican – around 13 birds are noted on the tree

Sarkidiornis melonotos, comb duck - one bird noted flying

Porohyrio porphyrio, purple swamphen - two birds are noted on the flooded field

Facilitator explained that the only difference in rules and restrictions between the core zone (outside fish breeding zone) and the buffer zone is the allowed rainy season rice cultivation in the buffer zone. Activities like collection of NTFPs and fishing are allowed with equal limitations (not using of electric equipment for fishing, not cutting trees, and bird hunting).

However, it has been observed that the fields in the core zone are mostly flooded. This has been a consequence of closed dam in the first bridge. Facilitator confirmed that the flooded fields are not suitable for most of the birds, especially those species that are breeding in the core zone but as well for feeding of birds.

The most importantly, it has been discover that there is no Saurus crane in the PA. Due to the high level of water in the PA they migrated around 10km outside the PA, in the rice fields of the farmer, near the district hall.

Every year in June, Saurus crane population migarate to the Preh Vihea province and stay there until December for breeding. In December they are coming back with their offspring.

The stuff of WCS is doing assessment of Saurus crane population every year from February to April. In this year, until now around 270 Saurus cranes are noted.

Appendix XIII - Focus group discussions with villagers from Pongro

Focus group discussion with the villagers from Pongro

1. History trend:

1975:

The population doubled in the area due to the Pol Pot regime.

Pol Pot decided to construct the lake and took people from all over the country to speed up the construction process. More than 100.000 people were working on the construction of the dyke

1976 - 79:

Construction of the dam. When the Pol Pot regime was over, the dyke was still not finished

People returned to their original places all over the country. After this 90 families were left in the area and they were given 1 ha of rice land south of the dam.

1990s:

The fields upstream were not flooded since the dyke was damaged

1993:

After 1993 a lot of refuges from Thailand came and stayed in this area.

1998

Planning of the PA started in 1998, led by the ICF, and supported by the government.

1999:

Villagers sold their land south of the lake to the villagers downstream, since the land prices were high at that time (1500-2500 bth per ha) and also because they needed money for medical supplies to cure the dengue-fever that their children had.

2000:

The planning of the PA ended in 2000, and the royal decree was announced.

2003-04:

The area was chosen for conservation which led to conflicts between villagers up stream and the WCS. Villagers were demonstrating against the decision of WCS. The locals also disputed the zones and borders proposed by the WCS, as they lost a lot of land. Around 200 villagers were part of this demonstration. The outcome of this demonstration ended with the PA zones shrinking a bit to allow the villagers to utilize more in the PA.

2005-06:

The dam was repaired and then the villagers started to have problems with flooded rice fields upstream.

2007-08:

The villagers started to grow cassava in the forest on old farmland and each farmer has 0,5 to 1 ha farmland in the forest.

2009:

Government is constructing the irrigation canals in downstream. They are planning to build the one upstream, as well.

2. Cassava fields in the forest

In 2007 the villagers borrowed money from other villagers to saplings for cassava, but by the time where the cassava was ready to harvest, Thailand closed their borders, so there was no market for the Khmer.

Old cultivation area was used to cultivate their cassava. There's no much cassava for personal consumption.

One female participant wants to start growing cassava.

Another female participants spend 5000bth/ha for growing cassava.

They believe that they can get benefit from cassava 30.000 bth/ha.

The villagers would like to be able to grow both (rice and cassava).

3. Rice cultivation in the PA

Before the Pol Pot the land in the PA could be cultivated.

People want to cultivate the rice, but there is not enough to survive, because cranes eat their rice inside the PA.

There is an agreement between WCS and the villagers that the buffer zone can be utilize, but the fields in the PA are destroyed due to the floods.

Villagers do not have the title of deed for their rice fields inside the PA, according to the law this land belongs to the state. People can "sell" their land occupation even though it is not legally their own land.

If the government continue to let this are become flooded, then they should give them other land to replace the lost one.

4. Control of the gate and conflict

The villagers always proposed the open the gate, but they know that when they open it, the downstream villages will be flooded.

They think that WCS is keeping the gate closed because they want to increase the number of birds in the PA. Some also think that it is governmental strategy to keep them outside the PA.

Between September and October the gate should be open. The gate should be automatically open if

the water level reaches 1.2 m at the gate. But this automatic mechanism is not working, because downstream villagers block it with the wood.

Downstream villages have 18.000ha for dry season rice, so they are governmental priority. Upstream villagers proposed to reduce the dry season rice to 500-600 ha.

The rice fields upstream inside the PA are 1.100ha, of which one half is flooded. Last year it was even worse due to heavy rain, so they asked the WCS to open the gate to lower the overall water level in the lake. The villagers believe that the southern villagers are generally richer than they are.

The village is even contemplating organizing a demonstration if the government doesn't help with their plight of the high water levels.

The local commune decided that the water gate at the dam should be opened; after some negotiations, it was decided that the gate would be opened for only 2 days, after which the southern villagers forcefully shut the gate by use of a tractor. Afterwards, the fields for their village ended up being flooded badly.

5. Proposals

They believe that there is no simple solution to this problem.

Some proposals were suggested. These include:

- 1. For the district chief to invite all the local chiefs for a meeting to discuss the issue.
- 2. To open the gate
- 3. Find markets for cassava and rice
- 4. To construct a canal in the centre of the PA (to be able to better control flooding)

5. To get additional technical help from outside the region to better improve farming techniques. The villagers think that the only topic which causes heated arguments surrounds this water issue.

Otherwise, they think that their relationship with the southern villagers is not bad overall.

Villagers have very little idea which stakeholders actually control the water gate. And they said that this information can be attained through the commune chief.

6. The powers that be

The local chief writes reports on the water issue, and sent one copy to the commune chief. The commune chief then replied by saying that it is a district level issue, and told the chief to relay it directly to the district chief instead. The district chief then replied by saying that it is a provincial problem and not a district problem, and told him to instead contact them about it. After several tries, the local chief still has not heard any reply from the provincial chief regarding this water issue.

The chief also said that the district chiefs has not visited the area in a long time, and this prevents them from making the right decisions on this issue.

7. Other question section

The village was told about the establishment 2 years prior to its actual establishment.

The villagers were promised to be part of the management of the PA (CBNRM)

They had no issues with partaking in the conservation efforts, but ultimately are still unhappy about the water situation.

Appendix XIV - Focus group discussion with villagers from Poay Ta Ong

Focus Group Discussion Poay Ta Ong (15/3/2009)

1977 The lake was created by Pol Pot regime to be able to cultivate dry season rice

1979 Fall of Pol Pot. The first gate was completed, but the 2nd and 3rd gate was not completed. The labor force that created the lake was Cambodians. The construction was managed by Pol Pot.

before 1990 there was a big province named Battambang, after 1990 the province were split into two provinces: Battambang and Banteay Mean Chey. Because after Pol Pot regime there was a high level of immigration, so it was decided to make two provinces out of one.

1994-5 Seila established in the area, the give loans to villagers in Poay Ta Ong but with very high interest rates.

1999 WCS appears in the area. Organize meeting with locals and talks about importance of conserving the crane and that it will attract tourists to the area.

2000 The Protected Area was established.

2003 Pongro and Sambour demonstrate against WCS about ban of wet season rice cultivation inside PA.

2004 The first water gate that was destroyed was repaired, funded by the Japanese government.

2007 WCS headquarter was established.

2008 ECOSORN begins project with 20 households (the initial idea was to have 30). ECOSORN gives rice seeds, fertilizers, fruit trees, vegetable seeds, material to grow SRI rice. 20 model households.

PA benefits

Villagers collect vegetables such as water lily and spinach, and they fish. PA also provides water utilization for irrigation of vegetable gardens. The water is also used in the irrigation systems for the dry season rice. The water is also used for washing of cloth and bathing.

The PA attracts a lot of tourists that the villagers downstream can sell food, drinks and transportation by motorbike to. They can also take the tourists to the birds and on boat trips.

PA constraints

If the villagers in Pongro don't open the small gate that they control, the villagers in Poay Ta Ong cannot get their dry season rice irrigated.

The villagers upstream and downstream has conflict about the two gates. Downstream villages are: Poay Ta Ong, Poay Char, Ang Traepang Thmar and Kandal. If the big gate must be opened the five villages must meet with chief of commune. The small gate upstream is only controlled by the Pongro village.

All the participants in the focus group discussion had dry season rice fields on the east bank, irrigated by the Pongro gate, and wet season rice downstream of the big gate.

Villagers downstream have a good relationship with Sambour, but they have a conflict with Pongro village.

Sambour village also have some problems with Pongro over the control of the small water gate that irrigates the dry season rice.

Pongro opens the gate in September and October and according to the water level.

There is no solution to the conflict, because the villagers in Pongro don't follow the rules, they just have to calm down.

The downstream villages keep a high a water level in the reservoir in case the rainy season fails to provide enough water, and to keep the crane in the area.

Appendix XV – Focus group discussion with villagers from Yeang Otdam Focus group discussion in the village of Yeang Otdam

In the beginning we were interviewing a lady who has lived in the village for more than 10 years. She has come to the area from a refugee camp in Thailand and she arrived in 1992 searching for land. She has no land, but is slowly buying land from the indigenous people of the village, when they are in need of money.

She says that they have paid 10-15000 R to have the area mapped. Until now they have not received any papers as well as the land has not been registered. They only have a contract.

More people are joining and the interview turns into a group discussion. The villagers originate from the districts of Cantour and Pongro (Phnom Srok?).

They have their rice fields next to the village. Their problems: flooded fields and too dry fields

Their fields are flooded because of the dam, because in September the gate was closed. The gate is located east of the lake (the gate next to Pongro?)

The authority of Traeng Paeng Tmor controls the gate

In September and October 2008 the villagers have demonstrated to have the gate opened.

They have had problems with flooded fields since the dam has been constructed in 2005 (this was when it was repaired)

One of the women in the group has lost all her land because of flooded fields caused by the dam.

Perception on the PA:

Maybe it is constructed for the benefit of the birds (this point is not clear)

Conservation of the habitat of the people or of the birds

Proposed solutions:

- Open the gate during the rainy season and also when there is too much water in the lake during other times of the year. Water should flow and not accumulate in the lake, flooding the fields.
- At least letting the people harvest their rice so they have grains to sow for next season.

Appendix XVI –Focus group discussion with villagers from Poay Ta Ong: Drawing of ATT



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Appendix XVII – PRA drawing by schoolchildren



Appendix XVIII - PRA with children from the school of Pongro

Facilitators: Dragana, Thyra and Astrid

The children were divided into two groups, one with the boys and one with the girls (about the same number in each group). They sat on the floor in two circles.

First they were asked to draw their household with their family. They drew one each on their own piece of paper with coloured crayons.

We chose 4 children who had drown very detailed drawings, to explain their drawings. All the children kept their drawings.

4 explanations of drawings

1st girl

Household members: her parents, herself and her older brother

She and her brother is given 2 bath every day when they go to school

3 coconut palms

Chicken

2 cows

Flower

6 ducks

Banana trees

2nd girl

Household members: Her older sister and brother and her parents

2 coconut trees

1 banana tree

A flower in front of her house which is now gone

A lot of chicken – she can not count them all

The neighbour who is visiting

A window in the house

1st boy

Household members: Him self and his younger brother

Bird

Mango tree

Water tank

4 coconut trees

Papaya tree

Motorbike

2nd boy

Household members: 2 younger brothers, an older brother, him self, his mother and his father

4-5 chicken

1 duck

Egg of chicken

Appendix XIX – Revised activity timetable

			1680
CBNRM	MORNING broken	AFTERNOON 3	EVENING -
9 Monthey	7:00 Group meeting 8:00 Meeting with WCS	12:00-16:00 Questionnaires	Type up data Group meeting
10	8:00 Internaw with teacher 9:00-11:00 PRA with school children	12:00 Questionnaires	Type up data Group meeting
TUESDAY	11:00 Queentoonneines + WITCH 8:00 Redesigning OBJECTIVES and RESEARCH METHODS	×	
WEDNESDAY 12	(3-15) Transect drive / usalk in foreat	TRANSECT WITH FACILITATION	
THURSDAY		TRANSET WALK PA	TYPE QUESTIONINA IR
FRIDAY			
14	FOREST ADMINISTRATION	QUESTIONAIRES	
SATURDAY 15	QUESTIONINARES QUESTIONINARES	FOCUS GROUP DIS. CASAVA	An
sunday 16	FOSORN QUESTIONAIRES	PREPARATION DATA SHARING	
MONDAY 17 th	REFULLY INTERVIEWS IN SISOPHON		
TUESDAY -	FOREST ADMWATER ADM.		T
WEDNESDAT	SAM VEASNA CENTER		-
19 THURSDAY			