



Consultant's Report

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Cambodia: Tonle Sap Environmental Management (Tonle Sap Community Fisheries Baseline Assessment: Status Report 2005)

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TABLE OF CONTENTS

	Page
A. Introduction	3
B. Questionnaire	3
C. Results	4
1. Status of CF Maps, Boundary Delineation	4
2. Awareness-Raising	5
3. Community Fisheries Bylaws, Regulations, and Management Plans	6
4. Community Fisheries Characteristics	7
5. Socioeconomic Data	8
6. Characteristics of Resource Use	9
7. Environmental Issues	10
8. Fish Passage Issues	11
9. Discussion	12
D. Recommendations for the Conduct of the 2006 Survey	16
E. Literature Cited	17
APPENDIX	18

A. INTRODUCTION

1. Through the Tonle Sap Environmental Management Project (TSEMP), the Royal Government of Cambodia has confirmed its commitment to community fisheries (CF) by borrowing from the Asian Development Bank (ADB) to develop CF on a comprehensive scale. Organization of communities around the Tonle Sap for community-based natural resource management began in the mid-1990s in Siem Reap with the Belgian government-supported Participatory Natural Resource Management Project that was implemented by the Food and Agriculture Organization (FAO) of the United Nations (UN). Through TSEMP Component 2, CF development is now under considerable expansion in the five Tonle Sap Biosphere Reserve (TSBR) provinces (Siem Reap, Battambang, Pursat, Kompong Thom, and Kompong Chhnang). TSEMP became effective on 23 March 2003 and closes on 30 June 2008, with a 31 December 2007 project completion date. Grants and/or cofinancing for CF development were also received from ADB, the UN Development Programme, and the Global Environment Facility.¹

2. In 2003 to 2004, while implementation of the FAO contract for Component 2 services was delayed, the Department of Fisheries (DOF) Project Implementation Unit (PIU) staff continued to work on the development of CF organizations in the TSBR. DOF, various non-governmental (NGO), and international organizations, such as FAO and German Technical Cooperation (GTZ), initiated approximately 152 CFs by the end of 2004. Because the status of most of these organizations was unclear, the TSEMP Project Management Coordination Office (PMCO) designed a survey to take stock of CF development progress and the current socioeconomic and environmental setting. From November 2004 through March 2005, PIU staff collected data to complete baseline assessment questionnaires in each CF by interviewing women, commune council members, village chiefs, CF committee members, and local residents and through direct observations in TSBR villages.

B. QUESTIONNAIRE

3. Parts I to III of the four-part 2005 questionnaire asked for general information about TSBR communes, districts, and CFs, which could be completed by PIU staff. Part I was concerned with identifying districts and communes with proximity to the lake in each province in order to identify districts and communes that have land within the flooded forests and where populations would be inclined to establish CF. Part II asked for an inventory of existing community fisheries, the district and commune where they were found, and the number of villages located in the community fishery. Part III was an attempt to identify important villages (eight largest or most important) within communes close to the lake and whether the villages consisted predominantly of stilt/embankment or floating homes. PIUs were instructed to fill out Part IV in the field by interviewing people in the villages, such as village chiefs and commune council members, or through field observation and by reviewing CF management plans. Most questions on Part IV required yes/no responses.

4. The PMCO provided the attached 2005 survey to the PIUs in Khmer and English. A Microsoft-Access database, which included five forms (Districts, Communes, CF-inventory, Villages, and CF-detail, with approximately 160 fields for Part IV questions), was provided to the TSEMP Project Implementation Office (PIO). The PIO entered and analyzed the data, and summarized results.

¹ For details of ADB's work in the Tonle Sap area, see: http://www.adb.org/projects/tonle_sap/.

C. RESULTS

5. This PMCO baseline assessment survey describes the status of certain aspects of individual CFs at the time of the survey. The data characterize progress of CF development in the TSBR and can be used to compare progress between the five provinces. Although the *yes/no-response* format is, by design, easy to implement, it lacked detail necessary to detect trends within CFs, which would be needed to justify a change in management of a fishery. Thus, it must be made clear that this survey provided a status report for the TSBR, but was too limited to be used for monitoring and evaluation of individual fisheries.

6. TSBR CF development in early 2005 is characterized by the following summary.

1. Status of CF Maps, Boundary Delineation

7. The status of boundary delineation and mapping of TSBR CFs varied greatly (Figure 1). Because of progress under the FAO Participatory Natural Resource Management Project, 100% of CFs in Siem Reap had boundaries and maps to scale delineated by global positioning system (GPS) instruments and geographic information system (GIS) software that were accepted by district and commune authorities. Provincial authorities had accepted 57% of Siem Reap's CF maps. Boundaries could be identified in the field at 93% of the CFs and 86% of the CFs had marked their boundaries (Figure 2).

Figure 1: Boundaries, Maps, Approvals

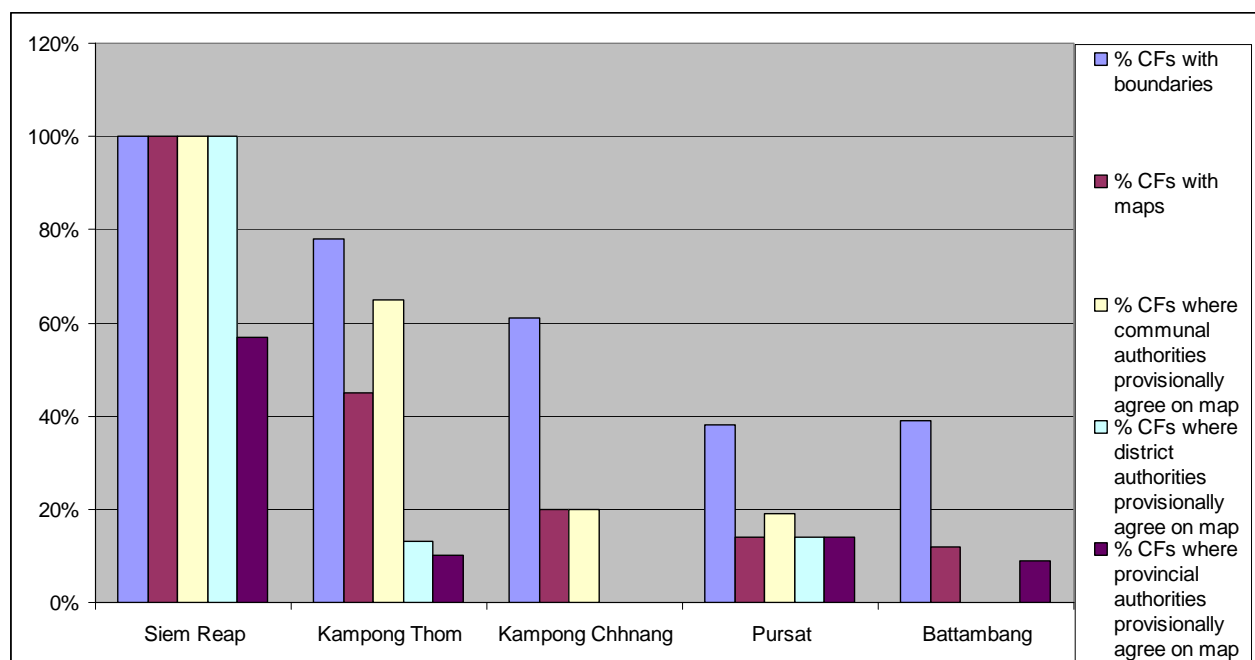
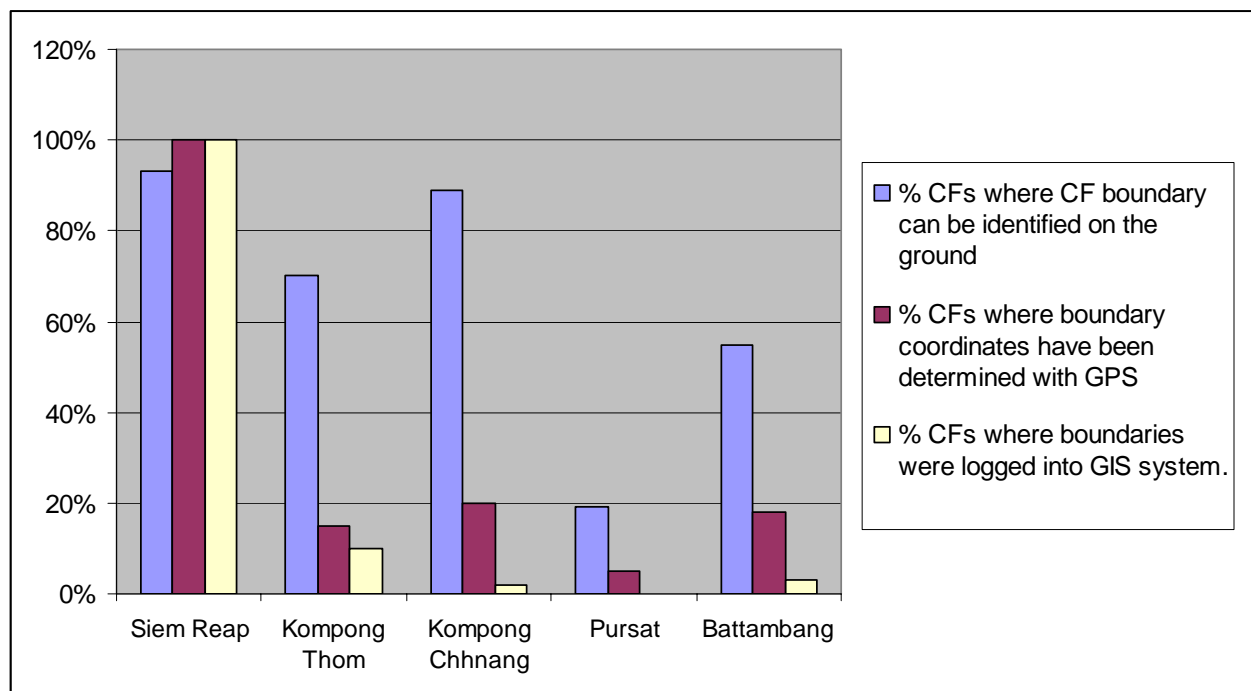


Figure 2: Boundary Quality

8. Because of GTZ's support, Kompong Thom's CFs were the next furthest along with mapping and boundary delineation. Seventy-eight percent of the CFs had boundaries, 45% had maps, and commune, district, and provincial authorities had accepted 65%, 13%, and 10% of the CF maps², respectively.

9. As Figure one and two illustrate, boundary delineation and mapping remained to be done in most of the CFs in Kompong Chhnang, Pursat, and Battambang. Except for Siem Reap and Kompong Thom, relatively few CF boundaries were determined with GPS and entered into a GIS project file. Most of Kompong Thom and Pursat CF boundaries were based on administrative boundaries. Battambang, Kompong Chhnang, and Siem Reap reported that most of their CF boundaries were based on administrative and fishing lot boundaries. Furthermore, the types of administrative boundaries CFs used were about evenly split between commune, district, and fishing lot lines. The survey results also indicated that information included in CF maps (natural and man made features, settlements, biodiversity resources/areas, productivity resources) varied greatly.

2. Awareness-Raising

10. Community facilitators in nearly all CFs had held meetings to inform commune councils, villages, and the general populace about natural resource issues (Table 1). Posters were also a popular media for awareness-raising in all provinces. Radio and television was used to a great extent in Kompong Chhnang and Pursat. A majority of Pursat CFs were also informed by newspapers. NGO brochures were used mostly in Siem Reap (57%) and Kompong Chhnang (50%).

² Pursat and Kompong Thom's responses were somewhat inconsistent; inexplicably, more CF maps are accepted by the authorities than there are maps.

Table 1: Means Used to Raise Awareness in Communities

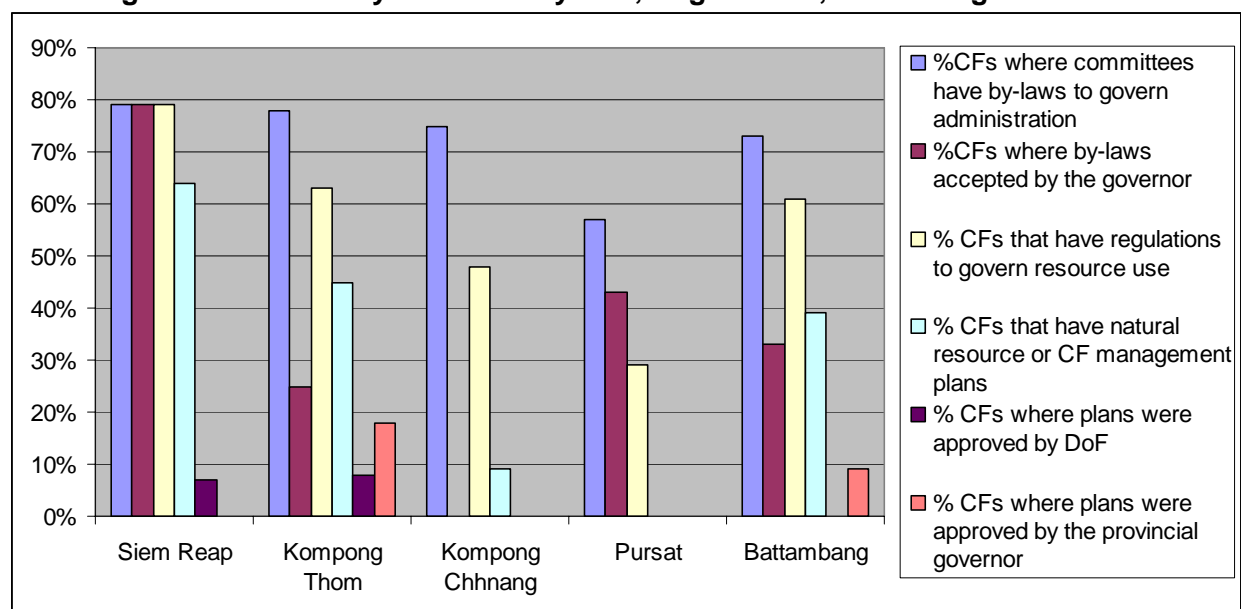
	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
Radio	45	93	23	1	0	57
Television	55	98	1	95	36	59
Newspaper	18	23	1	62	0	22
Community Meeting	97	86	1	1	93	95
NGO Brochure	39	5	43	19	57	42
Poster	97	84	73	100	93	87

11. During awareness-raising meetings, nearly all communities and commune and village leaders expressed interest in CF co-management and natural resource management goals and objectives due to: loss of biodiversity, loss of fishing livelihoods, destruction of flooded forests, and overall household economy. Only 63% of the Kompong Thom CFs considered food security an objective for CF management. Many CFs specifically indicated an interest in CF co-management because of the perception that illegal fishing was a problem. A majority of CF residents received "awareness" about livelihoods, public health/welfare, security, and economy.

12. A high proportion (89%) of CFs had received help from NGOs or government organizations to inform and support development of community fisheries, although only about half of Pursat's CFs had received help.

3. Community Fisheries Bylaws, Regulations, and Management Plans

13. Consideration of the completion of CF bylaws, regulations, and management plans may be the best indication of how well CFs were functioning when the 2005 survey was conducted (Figure 3).

Figure 3: Community Fisheries Bylaws, Regulations, and Management Plans

14. About three-fourths of all CFs had by-laws and one-quarter of the CFs had bylaws that had been accepted by provincial governors. In Siem Reap, provincial governors had accepted about three-fourths of the CF bylaws. Pursat had the lowest percent of CFs with by-laws (57%) and no bylaws were accepted by provincial governors in Kompong Chhnang.

15. About three-fourths of Siem Reap's CFs had developed regulations to govern resource use. Pursat CFs had the lowest percentage (29%) of regulations.

16. Siem Reap had the largest proportion of management plans (64%) containing much more information than those in other provinces, but had low acceptance by DOF (7%), district (29%), and provincial governors (0%). Some Kompong Thom and Battambang CFs (45% and 39%, respectively) had developed management plans with a low rate of acceptance.³ Kompong Chhnang and Pursat CFs have developed few management plans (9% and 0%, respectively).

17. About half of the TSBR CFs had set aside land or water for conservation purposes. About 30% of CFs had established fish sanctuaries. Only Siem Reap CFs were monitoring harvests in small-scale CF fisheries. About half of Pursat's CFs have identified and estimated quantities of commercial species. A much lower proportion of CFs in other provinces have identified and estimated quantities of commercial species.⁴

4. Community Fisheries Characteristics

18. Villages were excluded from CF management in a high percentage of CFs in Battambang (61%), Pursat (62%), and Siem Reap (79%) (Table 2). Kompong Chhnang reported that very few of its CFs excluded villages (2%) or ethnic groups (2%). The highest exclusion rates of minorities from CF management were reported in Pursat (43%) and Kompong Thom (23%). Siem Reap CFs had the largest committees (27 people) with the most women (4). Other provincial CF committees had six to ten members with about one woman per committee. Very few TSBR CF management committees had minorities.

Table 2: Community Fisheries Characteristics

	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
% CFs with villages not included	61	2	30	62	79	38
% CFs with ethnic groups not in CF organization	18	2	23	43	14	18
% CFs that permit outsiders to fish in the CF area	94	64	100	90	100	87
% CFs that charge outsiders a fee to fish in the CF area	18	7	18	10	29	14
Mean no. members on CFM committee	6.5	6	7.9	10	27	9.2

³ Some PIUs had plans with no information or acceptance; other PIUs have no plans, but indicate some contents and/or acceptance.

⁴ It is unclear how frequently or how systematically harvest data is collected. This should not be a one-time activity. Lack of harvest data prevents making reliable conclusions about overall trends in TSBR fisheries.

	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
Mean no. women on CFM committee	0.9	0.6	1	0.9	4	1.1
Mean no. ethnic minorities on CFM committee	0.1	0	0.1	0.2	0	0.1

19. In Battambang, Kompong Thom, Pursat, and Siem Reap, 90 to 100% of CFs allowed outsiders to fish in the CF. Only 64% of Kompong Chhnang's CFs permitted outsiders to harvest fish in the CF area. Seven (Kompong Chhnang) to 29% (Siem Reap) of CFs charged outsiders a fee to fish.

20. Membership in the CF organizations represented about three-fourths of the household population of the administrative area covered by CFs. In Battambang, CFO membership represented the household population in the administrative area in only 43% of CFs.

21. Most CF committees met monthly. Generally, Siem Reap CF committees met more often than CF committees in other provinces.

5. Socioeconomic Data

22. Siem Reap's 14 CFs were largest with an average population of 6,516 with an average of 8.4 villages (Table 3). Battambang's 33 CFs were also large with a reported average size of 1,857 people. CFs in the other provinces, Kompong Chhnang (44), Kompong Thom (41)⁵, and Pursat (21), generally include only one village with about a thousand residents at the time of the survey.

Table 3: Community Fisheries Socioeconomic Data

	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
Mean permanent registered pop. in CFs	1,857	966	847	1,028	6,516	1,655
Mean registered Cham pop. in CFs	44.2	6.9		6.8	18.1	14.2
	(0–1,045)	(0–253)	0	(0–135)	(0–201)	(0–1,045)
Mean registered Vietnamese pop. in CFs	38.3	0.3	5.6	87.3	250.7	44.7
	(0–1,000)	(0–7)	(0–200)	(0–1,286)	(0–2,957)	(0–2,957)
Mean number people entering CF area seasonally to subsistence fish	800	352	369	489	1,106	526
	(0–4,000)	(0–7,200)	(0–1,500)	(0–2,002)	(110–3,997)	(0–7,200)
Mean number people entering CF area seasonally to fish commercially	92	6.5	150	97	142	87
	(0–1,100)	(0–50)	(0–1,000)	(0–320)	(0–1,222)	(0–1,222)

⁵ Kompong Thom PIU reported 41 CFs, but only 40 part IV questionnaires were submitted to the PIO.

	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
Mean distance (km) traveled by outsiders	33	21	32	29	19	27
	(2–80)	(0–100)	(0–70)	(5–49)	(1–50)	(0–100)
Mean duration (days) outsiders remain in CF	60	12	38	134	48	49
	(7–180)	(0–160)	(0–350)	(5–365)	(1–120)	(0–365)
Mean % of young people that stay to live/work in CFs	49	28	36	56	57	41

23. Battambang CFs had the greatest numbers of Cham. The Cham population was low in other provincial CFs. No Cham were reported in Kompong Thom. Vietnamese populations were highest in Siem Reap, Pursat, and Battambang. Very few Vietnamese lived in Kompong Chhnang.

24. People from other communities traveled further to reach Battambang's CF fishing areas (33 km) than in other provinces (19 to 31 km) and the average stay was quite long (60 days). Average length of stay by outsiders in Pursat CFs (134 days) was much longer than in other provinces. Outsiders entered CF fishing areas by road (88%), inland watercourses (77%), and by way of the Tonle Sap (59%). Very few outsiders entered Kompong Chhnang CF fishing areas by way of the lake.

25. At least 60% of the TSBR CF populations depended primarily on CF resources in 83% of the CFs. In Siem Reap CFs (57%) and Pursat (56%), a slight majority of young people remained to live and work in CF areas. In Battambang (49%), Kompong Thom (36%), and Kompong Chhnang (28%) remain in CF areas. Residents in roughly the same proportion of TSBR CFs (about three-fourths) fished for personal consumption in each province. About one-third of TSBR CF residents depended on fishing for a livelihood. A higher proportion of people in Siem Reap CFs depended on fishing for a livelihood than in other provinces.⁶

6. Characteristics of Resource Use

26. Most of the CFs in Battambang (91%), Siem Reap (86%), and Pursat (76%) had markets for fresh fish and established market goods and services to support fishing (64%, 71%, and 57%, respectively) (Table 4). A lower proportion of CFs in Kompong Chhnang and Kompong Thom had markets for fresh fish and support goods and services. Prahok was produced in most CFs, 91% in Battambang CFs. A high proportion of CFs (3/4) "attempted" to market fish cooperatively. Fish cages and pens were used to the greatest extent in Siem Reap CFs.⁷

⁶ Several question about subsistence fishing, commercial fishing, and dependence on fishing as for a livelihood were quite similar. The terms in the questions had slightly different meanings and therefore were highly dependent on translator, interviewer, and informant interpretation.

⁷ Blank responses were interpreted by PIO as 0 cages and 0 sq m of fish pen.

Table 4: Characteristics of Resource Use

	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
% CFs with market for sale of fresh fish anywhere in or near the CF	91	18	30	76	86	51
% CFs with established market for goods/services to support fishing	64	18	15	57	71	38
% CFs where prahok is produced locally	91	70	78	71	79	78
Total no. fish cages (all sizes) per province	271	24	136	290	417	1,138
Total area (sq m) of fish pens maintained per province	0	0	0	685	787	1,472
% CFs that have reasonable seasonal truck access	70	23	78	33	71	53

27. Except for Kompong Chhnang (27%), most CFs had access to fishing areas by motorcycle. Most CFs in Kompong Thom, Siem Reap, and Battambang had reasonable truck access part of the year.⁸ Fewer of Pursat (33%) and Kompong Chhnang's (23%) CFs had good truck access part of the year. Even fewer CFs had truck access all of the year.

7. Environmental Issues

28. Flooded forest covered 60% or more the land area in less than one-half of the CFs. Siem Reap had the highest proportion of CFs with 60% or more coverage. Only 5% of Kompong Chhnang's CFs had 60% or more coverage by flooded forest (Table 5).

Table 5: Environmental Issues

	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
% CFs where flooded forest (either scrub or gallery) covers more than 60% of CF land area	48	5	60	76	86	46
% CFs where fires occurred over the last 3 years	58	18	75	86	57	55

⁸ Considering the large size of Siem Reap CFs, adequacy of access may not be comparable to other provinces. Additionally, all-season access may not be important if access is only needed during fishing seasons.

	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
% CFs where outsiders farm on land within the CF in the dry season/low water period	52	75	18	10	50	43%
% CFs where agricultural, wood cutting, or development adversely affected fish rearing or spawning habitat	39	43	45	10	57	39%
% CFs where water quality is impaired because of pollution, such as solid and liquid waste or the improper use of agricultural chemicals	67	68	23	24	36	47%
% CFs where activities conducted at adjacent fishing lots adversely affected productivity in the CF area	64	7	55	29	14	36%

29. Forest, brush or grass fires were the most prevalent in Kompong Thom and Pursat CFs. In Kompong Chhnang, dry season farming by CF members and outsiders occurred in a greater proportion of CFs (93%) than in other provinces.

30. Interviewees believed that significant adverse impacts to fish rearing and/or spawning habitat had occurred in about one-third of the CFs as a result of agricultural, fuel wood collection, or development activities. Siem Reap had the highest proportion of CFs (57%) with significant adverse habitat impacts. Water quality was impaired in about one-half of the CFs because of pollution, such as solid and liquid waste from towns and cities or the improper use of agricultural chemicals. According to interviewees, Kompong Chhnang had the highest proportion of CFs with water pollution problems (68%).

31. Only about one-fourth of CFs "identified" rare or threatened species. In over one-third of the CFs, productivity was adversely affected by activities conducted at fishing lots adjacent to CF areas. Battambang (64%) and Kompong Thom (55%) had the greatest proportion of CFs with productivity adversely affected by fishing lots. Only 6% of CFs in Battambang had a formal assessment of bio-diverse resources.

8. Fish Passage Issues

32. Upstream fish migration was being blocked by fishing activities (traps, barrages) in about a third of the CFs, but particularly in Siem Reap (71%), Battambang (48%) and Pursat (48%) (Table 6). Downstream passage is blocked by fishing activities in about 42% of the CFs, particularly in Battambang, Kompong Thom, Pursat, and Siem Reap.

Table 6: Fish Passage Issues

	Battambang	Kompong Chhnang	Kompong Thom	Pursat	Siem Reap	Tonle Sap Biosphere Reserve
<i>% CFs where fishing activities (such as arrow set traps or barrages) block passage of migratory fishes</i>						
Upstream	48	14	15	48	71	32
Downstream	58	9	58	52	50	42
<i>% CFs where man-made structures (other than for fishing) block fish passage</i>						
Upstream	9	0	13	10	0	7
Downstream	12	2	43	5	0	15

33. Upstream migration is blocked by manmade structures (other than fishing gear) such as irrigation diversions in about 7% of the CFs. Downstream migration is blocked by manmade structures in about 15% of the TSBF CFs, particularly in Kompong Thom (43%).

9. Discussion

34. The questionnaire survey is one of the most conventional methods for data-gathering. It is regarded as an efficient way to obtain comparable and up-to-date data from a study area. Unfortunately questionnaires often only reflect ideas and expectations of outsiders, such as development workers or government officials. Questionnaires are prepared beforehand away from the field, normally without any involvement from local people. They are rarely modified later, even if a clear need requires it. The reason for this is the willingness to apply the same, easily comparable questionnaire everywhere in the study area. As a result the outcome of the survey might be quantitative and easily comparable; but does it reflect the diverse reality of the area or just the general assumptions of interviewers (Keskinen 2003)?

35. At the October 2005 ADB midterm review of TSEMP Component 2, PIU staff members were asked to provide feedback on the survey. Conduct of the 2005 survey amounted to considerable time and effort in terms of personnel, travel and per-diem, as well as the PMCO's effort to write and translate the survey, and the PIO's time to provide guidance, enter, and analyze, and summarize the data. Also worth consideration is the time that PIUs could have spent actually doing CF development work, rather than conducting the survey. Therefore, before repeating the survey it is important to review the responses and determine whether questions produced useful information and whether the information might be more accurate or more efficiently obtained from a source other than CF members. It is important to also consider that the quality of responses could be the result of a question's wording or the translation from English to Khmer. Was the wording phrased such that responses were vague or misleading?

36. After comparing results and considering quality and usefulness of responses, it was determined that most survey questions and their order should be preserved for the subsequent survey period, and a few questions should be modified. The questionnaire (attached) with

proposed changes highlighted is follows this section.⁹ Below are comments and recommendations on many of the questions.

37. Part I of the questionnaire contains a list of districts and communes in each province and the distance from the commune to the lake. Spellings of these place names were corrected when entered into the database to be consistent with official spellings found on the Ministry of Planning's National Institute of Statistics website.¹⁰ This information would remain consistent from year to year; therefore, the 2005 data should only be checked for accuracy in 2006. Part II provides a list of CFs, which must be updated during the next survey. Since early-2005 the total number of CF has increased or decreased in various provinces. In Kompong Thom, a few GTZ-established communes organized to manage natural resources were split in to many village-size CFs just prior to the 2005 survey. Some of these village-size CF are now being merged into units that are more manageable. Several commune-size CFs in Siem Reap are being subdivided. Also, a few new CFs have been organized in some provinces (about 4 more in Kompong Chhnang). Part III requests information on villages within each commune. The PIUs should check the 2005 data for accuracy and completeness.

38. On Part IV, questions 1 to 10 provided necessary names and dates and important information on the status of mapping and boundary delineation. However, as Pursat PIU pointed out, "boundary" (#4) as an idea can be confused with "boundary" as a marked border. It might be more accurate to ask if the CF members know the extent of their area. In question 9, they suspect that the wording "on the ground" was taken literally to mean on land. Question 10 is similar but more detailed; therefore, it is recommended that question 9 be deleted.

39. Question 5 establishes whether a map had been completed by CFs. Questions 11-12 ask about neighboring CFs. This information should be available on the CF maps and remain consistent. Questions 13 to 15 also concern information available on maps. Also, UTM coordinates will be included with the map database. The 2005 responses to this survey indicate that previous methods and/or requirements for TSBR maps were inconsistent. However, PIUs are currently in the process of mapping with GPS and GIS and will be learning proper procedures from the FAO team and the GIS contractor. The FAO Project Support Office is trying to ensure that methods are consistent. The Battambang PIU felt that questions 1 to 15 should be answered by fisheries officials instead of by CF members. Nevertheless, because this information can be found and assessed directly from CF maps, these questions (11-15) can be eliminated.

40. Questions 16 to 19, 21, 22, 54, 57, 63, and 70 to 72 should be made specific to the recording period, since the early-2005 survey.

41. Pursat PIU pointed out that question 22 is almost a repeat of question 16. Also, question 17 is really part B of question 16. This information could be collected with only 2 questions. Also, question 23 should be worded more clearly.

42. Some of the terms in question 20 were unclear or vague to the PIUs and CFs, such as "security." The difference between economy and livelihoods was also unclear.

⁹ These recommended changes will not be made in the MS-Access database forms until they are debated and approved.

¹⁰ <http://www.nis.gov.kh/index.htm>

43. It was felt that for question 25 to be useful, the actual cost charged by the CF to outsiders using the CF fishing area should be included.

44. Questions 26 to 28 and 37 to 40 ask for numbers of individuals and households. Keskinen (2003) found approximately 5.4 persons per household in each of five zones from the lake to the highways, including urban areas. It is suspected that the responses to the household portion of these questions, which varied greatly, were likely based on informal estimates by interviewers rather than data. Household numbers are probably redundant given the consistency throughout the region.

45. If question 33, regarding natural resource management plans, is answered *no*, interviewers should be asked to skip ahead to question 37, because the subsequent questions should have negative responses. Additionally, terms throughout the survey should be made consistent with the Sub-Decree on Community Fisheries Management. Fishery/natural resource management plans were called Community Fishing Area Management Plans in the Sub-Decree.

46. The Battambang PIU recommends that questions seeking specific demographic data (37, 38, 39, 40, 44, and 45) could be answered better by government officials and/or NGOs. On the below draft revised form, there are no instructions for where questionnaire items should be completed, but that responses should be checked in the field if practicable. The source of data should be up to the discretion of the PIUs. We have to assume that PIUs will use the best available source for data.

47. On question 42, Pursat PIU recommended that approximate dates be provided for when outsiders arrive and leave the area. They also recommend that this question should try to establish the reasons for outsiders entering the CF area to fish.

48. On the 2005 survey, question 44 regarding seasonal/continuous population changes yielded very little data. Because answers received were typically in the wrong format the question may have been too complex. It should be split into several portions for clarity.

49. In question 45, Battambang PIU was unclear what age(s) are "young people". Pursat PIU recommended that question 52 be improved by asking what portion of the year (or how many months per year) is it generally possible to land fish harvests by truck. They also believe the question 54 regarding cooperatives needs to ask, "If the answer is yes, how has the CF attempted to market fish cooperatively?"

50. Question 55 and 56 ask whether 60 percent or more of the total population depend primarily on the CF for their livelihood and whether the flooded forest cover more than 60 percent of the land area of the CF (*yes/no*). The vast majority of the responses about CF dependence were positive. This information may be a bit misleading; in early 2005, many CFs were yet to be well organized. A percentage response, rather than whether a 60 percent threshold was exceeded, would be much more informative.

51. The percentages reported in the 2005 survey for the dependence on fishing as a primary source of livelihood (#55 about 1/3) are similar to those found by Keskinen (2003), but lower than that found by Rab *et al.* (2005) in Siem Reap and Kompong Chhnang. Rab *et al.* found that about 65% of Siem Reap and Kompong Chhnang households fished all year round, whereas the 2005 survey reported 55% and 31% in CF in those provinces.

52. Question 58 only asks whether members of the community or outsiders farm on land within the CF area in the dry season or low water period (*yes/no*). It would be important to understand whether farming is insignificant or extensive and whether this is a habitat issue that should be addressed. It is recommended that the number of farmers (residents and nonresidents) be estimated.

53. Question 59 asks if land or water areas within the CF have been set aside for conservation purposes. This *yes/no* question should be split into two parts: a) land areas and b) water areas. Also, question 61, regarding CF-established fish sanctuaries, seems to be redundant with the water portion of question 59.

54. It was felt that question 60, which asks if there are there "natural areas in the CF that contain bio-diverse ecosystems," was usually misunderstood by the CF respondents. The Battambang PIU recommends that areas containing diverse ecosystems be described (latitude/longitude coordinates and/or a description of the location) or mapped. Pursat PIU also stated that this question was much too vague.

55. On question 63, it is unclear whether the question asked whether rare/threatened fish are present or whether an investigation was conducted. "Identified" probably meant investigated in this question. Pursat PIU recommends that if the species have been identified, the rare/threatened species should be listed. Also, this information lacks value without knowing the comprehensiveness of the study and its investigators. Pursat also recommended that if the answer to questions 64, 66, and/or 67 is yes, then additional information should be provided to substantiate the response. They suggest attaching data, or possibly including a table in the form, that could be filled out during the survey. It is agreed that these questions provide very little information, but it is unclear what approach should be taken to improve the quality of these items.

56. Questions 68 and 69 ask about upstream and downstream migration barriers. These questions also ask about barriers "within" the CF area, which would provide information redundant with information on upstream and downstream barriers. Few responses were received on the "within" portion of this question; it was probably misunderstood and should therefore be eliminated. Battambang PIU recommended that the owner or party responsible for the blockage (or at least the location) be identified in the survey.

57. Questions 70 and 71 about habitat and water quality are too vague to be of much use. Question 70 should be split into three parts to ask if a) agriculture, b) fuel wood collection, and/or c) development activities have adversely affected fish rearing or spawning habitat. Question 71 should also be split into three parts to ask about various pollutants; a) solid waste, b) liquid waste, and c) agricultural chemicals. On question 70, Pursat PIU recommended that "significant" use be replaced with a question asking about the proportion of land and/or to describe how fish rearing is affected by pollution.

58. Pursat PIU recommended that question 72, which asks if there are "activities conducted at adjacent fishing lots adversely affecting productivity in the CF area", would more useful if it was expanded to include neighboring CFs and the identification of detrimental activities. This information would be needed by DOF and MoE to address the issue.

D. RECOMMENDATIONS FOR THE CONDUCT OF THE 2006 SURVEY

- In 2005, it was felt that information for some of the questions should have been obtained through secondary sources rather than from villagers. Some of responses provided were more likely people's perceptions, which can be qualitatively measured, but they are inappropriate for a CF data bank. Pursat PIU recommends that the questionnaire identify questions that should be answered by interview, observation or both. Kompong Thom PIU recommended that other organizations involved with CF development should be invited to work with PIUs on the survey. In some CFs, local NGOs may be better placed to conduct interviews. At the least, survey results should be coordinated with the other stakeholder organizations.
- The *yes/no* checkbox format of the MS-Access form makes data entry very efficient. Checking a box resulted in *yes* entry, and skipping over a box (not marking it) resulted in a *no* entry. When no response was provided by the PIUs, it had to be assumed a blank meant *no*, which would provide a slightly lower percentage for some questions. In 2006, the PIUs should be instructed to fill in *yes/no* question based on their best information and not leave blanks unless the can be treated differently by Access.
- The Pursat PIU recommended that surveyors need to be instructed how some questions relate to one another. If a *no* answer is provided on some questions, the subsequent question(s) should also be answered *no* or skipped. For example on question 4 (Is there a boundary?), if the response was *no*, then question 5 to 11 should logically also be answered *no*.
- Two PIUs turned in difficult to read hand-written forms. All (or nearly all) of the PIU staff members are competent with MS-Word and have access to computers. They must be required to fill in the forms electronically so that they are legible and data entry can be conducted efficiently. We must also be careful to ensure that only one version of the questionnaire is used. In 2005, some of the PIUs used an old version with an extra three-part question, which altered subsequent question numbers and made data entry much more challenging.
- In 2005, only Siem Reap responded to the request for a map along with the part II list of CFs. GTZ has produced maps showing the location of CFs it has established in Kompong Thom. These maps are on A4 paper at a scale of about 1:1,000,000. On the next survey, results should be submitted regardless of the completion of maps.
- Instructions for Part III were unclear or incorrectly followed. Some villages were left off the list. Also, rather than determine whether village homes were "mostly" on rafts or stilts, some PIUs interviewers provided both answers. In these situations, the PIO entry was based on the trend set by other villages in the commune.
- Translation of the 2005 survey questionnaire and instructions should be reviewed for accuracy. The Battambang PIU felt that some questions were misunderstood by the interpreter. For example, many respondents indicated the presence of fishing boundaries within CF fishing grounds because of the wording, when in fact they were non-existent during the period of the interview. Additionally, some questions seeking number or percentage responses were filled in with *yes/no* responses. A glossary in Khmer of significant terms used should be provided. Pursat PIU stated that they failed to receive a Khmer translation and had to

translate the survey themselves. A Khmer version of the questionnaire and instructions were available. This recommendation indicates a major gap in the lines of communication and implementation from Phnom Penh.

- Kompong Thom PIU also thought that training of PIU staff was insufficient for them to explain technical terms to villagers. Additionally, the choice of PIU staff conducting the surveys must to be made carefully. Only technically trained staff should be tasked with collecting the data. There was also concern that staff failed to choose the best CF members to interview. On many questions it was unclear what stakeholders might be best to interview. In general, there was little instruction on the proper survey conduct and technique. Battambang PIU staff also felt that they lacked a uniform understanding of the questions, and as a result were unable to provide proper guidance to respondents during the course of the interview.
- Kompong Thom PIU also expressed concern that there must be good rapport with the villagers when they don't feel responsible for their answers. Feedback should be provided to the villagers who took part in the survey. Obviously, stakeholders will be more forthcoming if they feel ownership of the results and they realize the answers may make a difference to them.
- In general, the PIUs felt that the questionnaire language seemed complicated. The PIO should provide additional instruction and oversight to ensure the PIU members understand the survey questions and how the survey should be conducted. However, generally the survey provided useful information, although many of the questions lacked sufficient detail. One should be cautious with this data and should consult other sources. It will be interesting to compare the responses obtained on the next survey to these results. Hopefully, 2005 survey responses were not inflated to make the PIUs look good or the environmental problems more or less severe. Otherwise, the next survey results may indicate little progress as a result of TSEMP.

E. LITERATURE CITED

- Keskinen, M. 2003. *The Great Diversity of Livelihoods? – Socioeconomic Survey of the Tonle Sap Lake*. WUP-FIN Socioeconomic Studies on Tonle Sap 8, MRCSS/WUP-FI. Phnom Penh.
- Rab, M.A., Navy, H., Ahmed, M., Seng, K., and Viner, K. 2005. *Socioeconomics and Values of Resources in Great Lake – Tonle Sap and Mekong Bassac Area: Results from a Sample Survey in Kompong Chhnang, Siem Reap and Kendall Provinces*. WorldFish Center. Penang, Malaysia.

Community Fisheries Baseline Assessment Evaluation Form

Instructions: Update Part I to Part III and complete Part IV. Submit an electronic copy of this form to the PIO. The data must be legible; it will be entered at a later time into a database program such as Access. (Leave shaded fields blank.)

PART I

Province/District Level Data

For each **province**, answer the following questions:

Province:

List each district within the province and indicate whether all or part of its land area is within the TSBR:

District		In TSBR? (Y/N)

District		In TSBR? (Y/N)

For each **district**, answer the following questions: (Repeat this section for each district listed.)

District:

List each commune within the district with all or part of its land area within the TSBR buffer zone and/or core area zone (BZ/CZ, land and water between Route 5 and 6), and indicate the approximate distance from the nearest point along its administrative boundary to the low water shoreline of the lake: (For communes bordering the lake, this value would be "0".)

Communes		Distance to low water shoreline

Complete the same form for each district in the province with all or part of its land area within the BZ/CZ.

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PART II
Community Fisheries Data
General Inventory of Community Fisheries

List each existing community fishery (CF) located in the province, and indicate the district and commune in which it is located. Indicate also the number of villages included in the community fishery:

Province: _____

	Community Fishery		District		Commune		No. of Villages
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
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14.							
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36.							
37.							
38.							
39.							
40.							
41.							

Once the survey is complete and results sent in to the PIO, prepare a map(s) at suitable scale (1:50,000 or smaller (to 1:200,000)) to show approximate locations and/or boundaries of districts, communes and community fisheries within the province.

PART III**Commune/Village Level Data**

For each **commune** with part of its land area within the TSBR (based on responses in Part I), answer the following questions:

Indicate the "Total Number of Villages" found in the commune in the blank indicated. For each commune, list all the villages that are in the TSBR. Indicate whether the village is included in one of the community fisheries. If the village is not within a community fishery, enter "N". If the village is within a community fishery, indicate which fishery using the number indicator found to the left of the community fishery name on the previous form. Finally, indicate whether most households of the village live on rafts or in stilt houses/on embankments

Commune: _____				Commune: _____			
Total No. of Villages: _____		In CF? (N/#)	Rafts/ stilt homes	Total No. of Villages: _____		In CF? (N/#)	Rafts/ stilt homes
Villages:				Villages:			
1.				1.			
2.				2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			
11.				11.			
12.				12.			
13.				13.			
14.				14.			

Commune: _____				Commune: _____			
Total No. of Villages: _____		In CF? (N/#)	Rafts/ stilt homes	Total No. of Villages: _____		In CF? (N/#)	Rafts/ stilt homes
Villages:				Villages:			
1.				1.			
2.				2.			
3.				3.			
4.				4.			
5.				5.			
6.				6.			
7.				7.			
8.				8.			
9.				9.			
10.				10.			
11.				11.			
12.				12.			
13.				13.			
14.				14.			

Reproduce this sheet and complete the form for every commune, making sure to include every village within each commune in the list.

PART IV
Community Fisheries Detail Sheet

Answer the following questions as accurately as possible, using a combination of interview members of the community and direct observation at the village/commune/community fishery. While some or most of the data appearing on previous forms may be available in the provincial fishery office (and hence the forms can be filled out all or partly in the CFDU office), the accuracy of the following data should be checked in the field.

Duplicate the form as many times as necessary to cover the entire inventory of community fisheries listed on page 2.

 Dates for completion of Part IV (D/M/Y): From _____ To: _____

1. Name of Community Fishery: _____
2. Province: _____; District: _____; Commune: _____
3. Indicate the month and year that the CF committee was elected: _____

Demarcation and Mapping:

4. Does the CF know the extent of its CF fishery management area? (Y/N) _____
5. Is there a map describing the boundary? (Y/N) _____ (If the answer is NO, skip to question 16.)
6. Do the authorities agree provisionally on the map of the boundary?
 - a. Communal authorities? (Y/N) _____
 - b. District authorities? (Y/N) _____
 - c. Provincial authorities? (Y/N) _____
7. Was the community fishery boundary established based on?

a. Administrative boundary <input type="checkbox"/>	b. Fishing Lot boundary <input type="checkbox"/>
c. Both <input type="checkbox"/>	d. Neither <input type="checkbox"/>
8. What type of administrative boundary is used? (check box that applies)

a. Provincial <input type="checkbox"/>	b. Commune <input type="checkbox"/>
c. District <input type="checkbox"/>	d. Fishing Lot <input type="checkbox"/>
9. Do markers or other types of identifying features exist along boundaries and at corners? (Y/N/partly) _____

Administration:

10. In 2005, what NGOs, government organizations (or projects to inform and support community fisheries development) have the community received support from? _____
_____, _____, _____
11. Have community facilitators held meetings to inform members of the community about natural resource management? Commune councils (Y/N) _____, villages (Y/N) _____
_____general populace (Y/N) _____.
12. In 2005, did the commune, village level structure or overall community express interest in community fisheries and natural resource management goals and objectives due to: (Y/N)
- Loss of biodiversity _____
 - loss of fishing livelihoods _____
 - destruction of flooded forest _____
 - food security _____
 - overall household economy _____
 - Other _____. Specify: _____, _____.
13. Has awareness raising reached to a majority of members of the community for: (Y/N)
- biodiversity _____
 - livelihoods _____
 - public health/welfare _____
 - Sub-decree on Community Fisheries Management _____
 - problems with destructive fishing practices _____
14. By what mean(s) ~~does~~ did awareness-raising reach the community in 2005? (check those that apply)
- | | | | |
|-----------------|--------------------------|----------------------|--------------------------|
| a. Radio | <input type="checkbox"/> | b. Television | <input type="checkbox"/> |
| c. Newspaper | <input type="checkbox"/> | d. Community Meeting | <input type="checkbox"/> |
| e. NGO brochure | <input type="checkbox"/> | f. Poster | <input type="checkbox"/> |
15. In 2005, did the commune/village level group(s) received help to organize a community fishery organization (CFO)? (Y/N)_____. Starting in what year?_____
16. What percent of the people living in the CF area are members in the CF? (%) _____
17. Are any villages (Y/N) ____ or ethnic groups (Y/N) _____ excluded from the CFO?
18. Does the CFO permit outsiders to fish in the CF? (Y/N) _____. Is there a fee? (Y/N)_____
19. How many members are on the CFM committee? (#) _____
20. How many women are on the committee? (#) _____
21. How many ethnic minorities are on the committee? (#) _____
22. How often does the committee meet? (week/ month/3 mo/6 mo/year) _____

23. Does the committee have any by-laws to govern administration? (Y/N) _____
24. Are the by-laws of the committee recognized and accepted by the governor? (Y/N) _____
25. Does the CFO have any regulations to govern resource use? (Y/N) _____
26. Does the committee/CFO have a Community Fishing Area Management Plan (Y/N) _____ (If answer is *no* skip to question 37.)
27. If yes, does the plan include: (Y/N)
- description of fishery area _____
 - description of fishery/environmental resources _____
 - review of past and expected fish production _____
 - types of gear and methods to be used _____
 - means for monitoring catch _____
 - fisheries resource conservation program _____
 - environmental conservation program _____
 - means for restricting outsider access _____
 - permits or memberships for outsiders to fish? _____
 - means for conflict resolution _____
 - seasonal fishing prohibitions _____
 - identification of restricted fishing grounds _____
 - allowances for subsistence fishing _____
 - means of enforcing restrictions _____
 - systems for surveillance and enforcement _____
 - benefits and costs of implementation _____
28. Has the plan been submitted to the Department of Fisheries? (Y/N) _____
 Has the plan been reviewed by the Department of Fisheries? (Y/N) _____
 Has the plan been approved by the Department of Fisheries? (Y/N) _____
29. Has the plan been approved by the district governor (Y/N) _____, provincial governor (Y/N) _____?

Population:

For the village, group of villages, commune or other administrative unit making up the community fishery, answer the following questions related to population.

30. What is the current permanent registered population residing in the area covered by the community fishery? _____
31. What is the current permanent registered population of the Cham ethnic minority in the area covered by the community fishery? _____
32. What is the current permanent registered population of Vietnamese ethnic minority in the area covered by the community fishery? _____
33. What is the approximate, current, migrant, non-registered population that enters the area seasonally to fish:
- Subsistence fishing : no. of people _____
 - Commercial fishing: no. of people _____

34. Provide a best estimate of the average distance traveled by outsiders to the CF.(km) _____
35. (a) Provide a best estimate of the average duration outsiders remain in the area. (days) _____
 (b) What are the approximate dates of their stay on the fishing grounds? _____
 (c) What are the origins of the outsiders that enter the CF area? _____
 (d) What are the reasons for outsiders entering the CF area? _____
36. Are there significant numbers of outsiders entering the area from:
 a. Inland, by road (Y/N) _____
 b. Inland, by watercourse (Y/N) _____
 c. By way of the lake (Y/N) _____?
37. (a) In 2005, was there a change in numbers of people in the CF area (Y/N) _____
 (b) In 2005, was there a change in the ethnic-composition of the population in the CF area (Y/N) _____
 (c) In 2005, was there a change in the ethnic-composition of the population in the CF area (Y/N) _____
 (d) Did the population in the CF area change due to migration? (Y/N) _____
 (e) Was migration in or out of area? Circle the correct response:

Migration in ---or -- Migration out

- (f) In 2005, was the population change seasonal (during a couple months) or continuous (gradual all year)? Circle the correct response:

Seasonal – or -- Continuous

38. What percent of young people (about 16 to 21 yr) remain to live and work in the community fishery? (%) _____

Economy:

39. Is there are market for sale of fresh fish anywhere in or near the community fishery? (Y/N) _____
40. Is there an established market for goods and services to support fishing? (Y/N) _____
41. Is prahok produced locally? (Y/N) _____
42. What is the approximate number of fish cages owned by members of the community?
 Small: _____ Medium _____ Large _____
 (~2X4 m) (~ 4X10 m) (~8X13 m and larger)
43. What is the approximate area of fish pens maintained by the community (sq m)? _____
44. Does the community fishery have a landing site accessible by motorcycle? (Y/N) _____
45. How many months per year does the community fishery have reasonable truck access for landing fish? _____

46. What estimated percentage of household population fish mostly for personal consumption?
 (%) _____ or depend on fishing as a primary source of livelihood?
 (%) _____

47. (a) In 2005, did the CFO attempted to market fish cooperatively? (Y/N) _____
 (b) If the answer to part (a) is Yes, how has the CF attempted to market fish cooperatively?

Environment and Resource Assessment at Community Fisheries:

48. Approximately what percentage of the total population depend primarily on fishing in the CF area for their livelihood? (%) _____

49. Approximately what percent of the flooded forest (either scrub or gallery) covers the land area of the CF? (%) _____

50. Did forest, brush or grass fires occur in the CF area in 2005? (Y/N) _____

51. a) Approximately how many community members farm on land within the community fishery in the dry season, or low water period? _____
 b) Approximately how many people from outside the community (non-members) farm on land within the community fishery in the dry season, or low water period? _____

52. a) Have land areas within the CF been set aside for conservation purposes? (Y/N) ____
 b) Have water areas within the CF been set aside for conservation purposes? (Y/N) ____

53. (a) Are there natural areas in the CF that contain bio-diverse ecosystems? (Y/N) ____
 (b) If part (a) is YES, provide latitude/longitude coordinates and/or a description of the location. _____

54. Has the CF established a fish sanctuary within its boundaries? (Y/N) _____

55. Has there been any formal assessment of biodiversity resources (for instance, as part of a CFMP)? (Y/N) ____ Who conducted the study? _____

56. Are there rare, or threatened fish species in the CF area? (Y/N) _____
 Who identified the fish or cite the report? _____

57. Are data on weight of catch recorded? (Y/N) _____

58. For catch data in #64, what is:
 (a) the period of record? _____,
 (b) frequency of data? _____

59. Have commercial species been identified and quantities estimated for individual species? (Y/N) ____

60. Have species harvested in the CF by small-scale fishing techniques been identified and quantities estimated? (Y/N) _____

61. (a) Are there places where fishing activities (such as arrow set traps or barrages) block upstream or downstream passage of migratory fishes, affecting the CF area? (Y/N) Migration blockages upstream_____, downstream_____.
- (b) If the answer to (a) is YES, provide more information on the location and scale of the migration problem._____
62. Are there any places where man-made structures (other than for fishing) block upstream or downstream fish passage?(Y/N) Blockages upstream _____, downstream _____.
(b) If the answer to (a) is YES, provide more information on the location and scale of the migration problem._____
63. In 2006, were there significant amounts of land the CF management area developed where:
(a) agricultural (Y/N) _____
(b) fuel wood collection (Y/N) _____, or
(c) development activities (Y/N) _____have adversely affected fish rearing or spawning habitat? (Y/N) _____
(d) If parts (a) to (c) are answered Yes, provide information describing the habitat/development issues. How has fish rearing been affected?
64. In 2006 in the CF area, were there places where water quality is impaired because of:
(a) pollution, such as solid and liquid waste from towns and cities? (Y/N) _____, or
(b) the improper use of agricultural chemicals? (Y/N) _____
65. In 2006, did activities conducted at adjacent fishing lots or neighboring CFs adversely affecting productivity in the CF area? (Y/N) _____ If the answer is Yes, what activities are they?_____