



Baseline Survey Report

Kampong Speu, Kampot, Prey Veng and Takeo Provinces

For

JICA- Freshwater Aquaculture Improvement and
Extension Project (FAIEX)

By

Dr. SO Nam

**Research Scientist, Inland Fisheries Research and Development
Institute**

E-mail: sonammekong2001@yahoo.com

Phnom Penh, November 2005

TABLE OF CONTENTS

EXECUTIVE SUMMARY	iv
ACKNOWLEDGEMENTS	vi
LIST OF ABBREVIATIONS	vii
CHAPTER 1: OVERVIEW	1
1.1 BACKGROUND	1
1.2 NATURAL ENVIRONMENT IN CAMBODIA.....	2
1.3. SOCIO-ECONOMIC CHARACTERISTICS IN CAMBODIA.....	3
1.3.1 <i>Demography, education and employment</i>	3
1.3.2 <i>GDP and economic growth</i>	5
1.3.3 <i>Poverty profile</i>	6
1.4. CURRENT STATUS OF INLAND FISHERIES IN CAMBODIA.....	6
1.4.1 <i>The importance of inland fish to the Cambodian people</i>	6
1.4.2 <i>Freshwater aquaculture development in Cambodia</i>	9
1.4.3 <i>Natural stock enhancement using community ponds</i>	10
1.4.4 <i>Institutional framework of fisheries sector</i>	11
1.4.5 <i>National development plan and strategy</i>	14
1.4.6 <i>Past and present aquaculture project/assistance</i>	15
1.5 METHODOLOGY FOR TARGET AREAS IDENTIFICATION	15
1.6 FAIEX PROVINCES AND TARGET AREAS	17
1.6.1 <i>Kampong Speu</i>	17
1.6.2 <i>Kampot</i>	22
1.6.3 <i>Prey Veng</i> .	23
1.6.4 <i>Takeo</i>	25
1.7 COMPREHENSIVE HOUSEHOLD BASELINE SURVEY	27
1.7.1 <i>Survey</i>	27
1.7.2 <i>Survey target areas and target households and key informants</i>	28
1.7.3 <i>Data collection</i>	29
1.7.4 <i>Data analysis</i>	29
CHAPTER 2 HOUSEHOLD AND FARM CHARACTERISTICS.....	30
2.1 DEMOGRAPHIC PROFILE OF HOUSEHOLDS.....	30
2.2 EDUCATION	31
2.3 HOUSEHOLD OCCUPATION.....	33
2.4 HOUSEHOLD INCOME.....	33
2.5 TYPE OF HOUSE.....	34

2.6 SOURCE OF LIGHTING	35
2.7 SOURCE OF DRINKING WATER.....	36
2.8 FUEL USED FOR COOKING	37
2.9 TOILET FACILITY WITHIN PREMISE.....	37
2.10 HOUSEHOLD DURABLES AND ASSETS.....	38
2.11 LAND HOLDING AND OWNERSHIP.....	39
2.12 LIVESTOCK.....	41
2.13 MONEY SAVING AND DEBT	43
2.14 RICE CONSUMPTION AND PRODUCTION.....	43
2.14.1 Rice consumption.....	43
2.14.2 Rice production	44
2.14.3 Pesticide application for rice production.....	46
2.14.4 Main purpose of rice production.....	46
2.15 HOUSEHOLD EXPENDITURE FOR BUYING RICE	47
2.16 HOUSEHOLD FISH AND ANIMAL CONSUMPTION.....	48
2.16.1 Distribution of fish and other animal protein intake.....	48
2.16.2 Fish consumption	49
2.17 CAPTURE F_PTURE.....	50
2.17.1 Number of fishers and fishing days.....	50
2.17.2 Main fishing grounds	51
2.17.3 Fish capture from trap ponds.....	51
2.17.4 Fish capture from other fishing grounds	52
2.17.5 Household expenditure for buying fish	54
2.18 CURRENT SITUATION OF FISH REFUGE PONDS	57
2.19 CURRENT STATUS OF HOUSEHOLD PONDS.....	57
2.20 SUMMARY	59

CHAPTER 3 CURRENT STATUS OF SMALL-SCALE AQUACULTURE IN FAIEX PROJECT AREAS

3.1 BIO-PHYSICAL POND CHARACTERISTICS	62
3.1.1 Pond characteristics	62
3.2 FARMER'S EXPERIENCE IN AQUACULTURE.....	67
3.2.1 Years of experience	67
3.2.2 Major purpose of fish culture.....	68
3.2.3 Major source of information	68
3.2.4 Fish farmer's record	71
3.2.5 Fish species cultured.....	72

3.2.6 Pond preparation and fertilization.....	.74
3.2.7 Rearing duration.....	.75
3.2.8 Feed 75
3.2.9 Harvesting	77
3.2.10 Household member's participation in fish culture.....	..79
3.3 CONSTRAINTS TO FISH CULTURE.....	81
3.4 FARMER'S ASSESSMENT AND ATTITUDE TO FISH CULTURE	82
3.4.1 Fish culture farmer	82
3.4.2 Non-fish culture farmer.....	.83
3.5 SUMMARY 84
REFERENCES.....	86
APPENDICES.....	88
APPENDIX 1 TERMS OF REFERENCE.....	88
APPENDIX 2 BASELINE SURVEY TEAM MEMBERS.....	90
APPENDIX 3 LIST OF FARMERS FOR INDIVIDUAL INTERVIEW	92
APPENDIX 4 LIST OF KEY INFORMANTS FOR GROUP INTERVIEW/DISCUSSION.....	97
APPENDIX 5 QUESTIONNAIRE SURVEY FORMAT FOR INDIVIDUAL FARMER'S INTERVIEW	100
APPENDIX 6 QUESTIONNAIRE SURVEY FORMAT FOR KEY INFORMANT GROUP DISCUSSION	131

EXECUTIVE SUMMARY

Socio-economic characteristics of surveyed households in FAIEX project areas

Rice and fish are the mainstays of food security for all inhabitants of Cambodia. Fish is the single most important and affordable food source accounting for over 70% of total animal protein intakes. While wild fish from capture fisheries are abundant in areas close to major water bodies like Tonle Sap, there are many fish scarce areas. The Freshwater Aquaculture Improvement and Extension (FAIEX) Project of JICA identified four target provinces including Kampong Speu, Kampot, Prey Veng and Takeo, which were fish scarce areas with potential for small-scale aquaculture development. A baseline socio-economic survey of 327 households (i.e. 84 from Kampong Speu, 80 from Kampot, 80 from Prey Veng and 83 from Takeo) was conducted between August and November 2005.

Socio-economic conditions of surveyed households in the target areas were similar and higher than the average for rural households in Kampong Speu, Kampot, Prey Veng and Takeo provinces. The percentage of economically productive household members was high, indicating that the availability of productive labour force in surveyed households to construct new ponds and to search for natural fish feed is sufficient. Sampled households had more family members and higher literacy levels than the national average for the rural sector of Cambodia, suggesting that they have higher ability to take advantage of this new fish culture technology introduction. Though still classed as poor and marginal, surveyed households were not the poorest community members. Surveyed household heads were predominately male, suggesting that access to male labour for pond construction may be a constraint to the participation of women in aquaculture.

Rice cultivation was the most important activity in the surveyed areas and the predominant occupation of household heads, and provided highest household income. The overall average land area owned by surveyed households was 1.50 ha, which less than the average area for three of the four provinces. Having slightly smaller land holdings and more household members indicates that households need to intensify their production systems to achieve the same standard of living. The construction of a fish pond allows households to intensify and diversify their production activities and since all sampled farm lands are owned by individuals, land tenure is not a problem of

digging fish ponds. The majority of surveyed households produced only one crop of rice, with an overall maximal rice production of 2.87 tons per household per year in good years (sufficient rainfall) and minimal rice production of 1.91 tons per household per year in bad year (drought). All surveyed households for the four provinces consumed averagely 1.64 tons of rice per household per year. Therefore there is a high surplus of rice in good years and rice production and consumption is nearly equal in bad years.

Most surveyed households owned two or three cows, one or two pigs and 15 or 20 chickens. Around half of sampled households owned a small number of ducks (i.e. 9-15 ducks per household). Livestock were mainly free range and there was only limited scope for integration, because penning livestock requires feed that many target households cannot afford. Only manure from large ruminants was collected and this was primarily used for rice fields. The use of improved stocks and vaccines is increasing slowly only.

The majority of sampled households owned television sets, indicating that extension materials relating to farming technologies (including fish culture) should be available on TV's program. Radios and cassette players were the second common durables in the surveyed areas. Bicycles were by far the most important means of transportation in the four survey province, followed by motorcycles, which are the second most important means of transportation.

Wild fisheries play an important role in the livelihood strategies in the surveyed areas. Most households captured wild fish 3 to 5 days a week from various fishing grounds including rivers/streams, lakes, rice fields, community ponds, trap ponds and roadside ponds. Capture fisheries provided each family member with 13.2 kg in Kampong Speu, 13.8 kg in Kampot, 18.7 kg in Prey Veng and 11.6 kg in Takeo. All of these households reported that wild fish catches were not enough for household consumption. Most of these households spent about Riel 26,642 (US\$ 1 = Riel 4,000) to buy 6.21 kg of fish per month in wet and dry seasons. As for households who did not capture wild fish spent more money (Riel 37,302) to buy more fish (8.19 kg) per month in both seasons. These should be objectively verifiable indicators for monitoring and evaluation of FAIEX activities.

All surveyed households consumed more fish in wet season than in dry season. Fish contributed around 65% of the total animal protein intakes, which is closed to the national average for the whole country. Average annual per capita fish consumption was

18.15, 20.86, 18.29 and 18.95 kg per person for Kampong Speu, Kampot, Prey Veng and Takeo provinces, respectively. The survey results confirm that the Kampong Speu, Kampot, Prey Veng and Takeo provinces are fish scarce areas, where fish consumption is well below the national average.

Analysis of current patterns of resource use and availability show that surveyed households have sufficient resources to undertake fish culture as a new activity. Moreover current fish consumption levels of surveyed households are relatively low, demand and preference for fish is high and around 95% of surveyed households owning ponds were interested in trying fish culture. Therefore, these surveyed households will require only minimal encouragement to grow fish.

Current situation of small-scale aquaculture development in FAIEX project areas

The survey results showed that there was no tradition of fish culture practice in the four provinces and that the majority of farmers started culturing fish in the last five years. While a large number of fish farmers had learnt fish culture knowledge from several sources including training courses, extension materials, television and radio organized and produced by the government (i.e. DoF/PFDs) and various NGOs/IOs, they had little basic knowledge on the subject.

Most ponds were closed and a small number open or connected to rice fields. All rain-fed ponds were several years old and between 263-364 m² in area and between 2.0-3.0 m deep. The pond area and depth was usable for profitable fish culture in the surveyed areas. Nearly all ponds were constructed within the homestead, which would deter theft and would allow all household members to participate in fish culture. Water retention of the majority of fish ponds was reported to be good or fair and between 7-9 months per year. Moreover water condition of most ponds, which were fertilized with organic animal and green manure, supplemented by a small amount of inorganic fertilizers before stocking were fertile. With supplementary feeds such as rice bran, vegetables, kitchen waste, duckweed and termites, sampled fish farmers could produce between 45 and 106 kg fish per household or 25-41 kg fish per 100 m² in the closed pond culture system and between 20-57 kg fish per household or 32-41 kg fish per 100 m² in the open pond or pond connected to rice field culture system. Fish yield in the open pond culture system was slightly higher than yield in closed pond culture system. This finding is concordant with the results reported by PADEK- Fisheries program and AIT Outreach project in Svay Rieng Province that while ponds connected to rice fields

were more productive than closed ponds because fish have access to additional food sources in the rice fields, there were increased problems with predatory fish species.

Farmers identified major effects of fish culture such as (1) increase fish availability thereby its contribution to household food security, (2) reduction in expense for buying fish from market leading some household saving, (3) additional household income from selling fish and better use of unused on-farm resources.

Fish farmers were facing a number of technical problems including (1) lack of fish culture knowledge, (2) lack of water source during dry season, (3) high fish mortality, (4) inadequate availability of good quality seed, (5) lack of local fish seed suppliers, i.e. fish seed have to be obtained from distance places, (6) polluted pond water, (7) poaching and (8) small size of fish seed. Other problems such as lack of capital, credit availability and the high interest rate remain as major issues constraints farmers to fish culture.

Although fish culture farmers facing several problems as mentioned above, all were willing to continue the activity and the majority of them wanted to expand their fish culture activities for both household fish consumption and sale. Interestingly, 97% of sampled non-fish culture farmers who never engaged in fish culture previously were interested in starting fish culture and expected meeting part of household fish consumption as wild fish catch is far below household requirement and this was an important factor in household motivation and interest in trying fish culture as a new activity.

Most households were poor and marginal with little cash income therefore fish culture recommendations must be low cost and low risk. This requires relying primarily on on-farm resources like organic animal and green manures and supplementary feeds such as rice bran, vegetables, kitchen waste, duckweed and termites.

ACKNOWLEDGEMENTS

This baseline study was funded by JICA- Freshwater Aquaculture Improvement and Extension Project (FAIEX).

I would like to thank H.E. Mr. Nao Thuok (Director - General of Department of Fisheries), Mr. Hav Viesth (Chief of Aquaculture Division), Mr. Haing Leap (Deputy-Chief of Aquaculture Division), Mr. Chin Da (Deputy-Chief of Aquaculture Division) and all Chiefs and Deputy Chiefs of Fisheries Divisions in Kampong Speu, Kampot, Prey Veng and Takeo provinces for their firm support.

I would like to acknowledge commune leaders, village leaders, commune council members, local fish seed producers, as well as to villagers from Kampong Speu, Kampot, Prey Veng and Takeo provinces who gave their time and support to the field survey.

I am indebted to all FAIEX project extension staff: Mr. Phon Pech, Mrs. Chhoum Chantha, Mr. You Sam On and Mr. Kheav Sambok in Kampong Speu province; Mr. King Sophany, Mr. Sar Sarin, Mr. Pheun Phalla and Mr. Ly Seyha in Kampot province; Mr. Chan Samnang, Mr. Seng Sam Oeun, Mr. Ngin Sok and Mr. Khan Bonvarun in Prey Veng province; and Mr. Ouk Hak, Ms. Hun Sotheary, Mr. Mear Sareth and Mr. Sao Kosal in Takeo province for their field guidance and tireless efforts.

In particularly I would like to express my sincere gratitude to my baseline survey team members including Mr. Thao Lo, Mr. Eng Tong, Mr. Soeun Norng, Mr. Meas Vichit, Mr. Seng Leang, Ms. Hing Sopheavy, Mr. Ngo Sarakmony, Miss Hy Tang Horn, Miss Tan Phalla and Mr. Sen Rotha for their valuable contribution and great efforts which allowed the successful completion of the survey and the production of this baseline survey report.

Last but not least, my sincere thanks to Miss Aya Yamaguchi (Rural Development Specialist of JICA- FAIEX project) and Mr. Satoshi Chikami (Chief/Advisor of JICA-FAIEX project) for providing useful comments to improve this report, and Miss Mineko Sato for help with administrative and accounting aspects.

