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Fish is an Integral Part of the Diet of the Rural Poor in Cambodia: Results from Fish Consumption Surveys

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Abstract

As part of a larger project on fish, nutrition and poverty in Cambodia, a survey was conducted to assess the consumption patterns of fish and other aquatic animals in poor rural households in three communes. One hundred and sixty three households were identified and selected in three ecological areas: Andong Snay Commune, Babong Commune, and Tuol Ampil Commune. The survey used recall interviews during three distinct seasons from March 2006 to February 2007: the dry season (March to April, 2006); the rainy season when many types of fishing are prohibited (August to September, 2006) and the rice harvesting and main fishing season (January to February, 2007). The results include detailed household and socio-economic data, fish species caught and consumed, and consumption of fish and fish products.

Introduction

Cambodia's freshwater capture fisheries probably contribute more to national food security and the economy than fisheries in most other countries in the world. The annual catch ranges between 290,000 to 430,000 t (Zalinge et al. 1998; Ahmed et al. 1998; Nao & Zalinge 2000; Department of Fisheries (DoF) 2001), making it the fourth largest in the world. The monetary value of the total fish catch ranges from US\$ 250 to US\$ 300 million (So & Nao 1999), which is 8 to 10% of the GDP of US\$ 2,800 million (Ministry of Economic and Finance 1999). This enormous volume of fish is due in part to the high diversity of Cambodia's freshwater fisheries (Rainboth 1996). At the heart of this enormously rich fishery is the Tonle Sap Great Lake floodplain and the annual flood pulse driven by the Mekong river. The Tonle Sap varies in size from 2,500 km² in the dry season to 13,000 km² in wet season, including 4,800 km² of flood forest coverage, giving rise to a wide range of habitats for fish and other aquatic animals and plants. In addition to the wild capture fishery, small-scale aquaculture production has grown from

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1,610 t in 1984 to 15,000 t in 2000 (DoF 2001).

Many poor rural households are not able to produce enough rice to last an entire year. Fish and other aquatic animals and plants are generally available when rice is not. Fish provide an estimated 75% of the total animal protein intake for the population of rural Cambodia (Tickner 1996; Murshid 1998). In addition to protein, fish and other aquatic animals such as small fish, frogs, and snails are a major dietary source of fatty acids, minerals, and vitamins. However, not all species are of equal value in terms of nutrition. Postharvest handling, cooking habits and storage also affect nutritional value.

Fish and other aquatic animals and plants are important in poor rural households, both as a source of income and a source of good nutrition and health. However, the fisheries in Cambodia are under intense development pressure, and fisheries officials must increasingly justify their objections to development in other sectors in monetary and socio-economic terms. The objective of this study is to provide further data on the socio-economic dimensions of the rural people and to assess the consumption patterns of fish and other aquatic animals in rural poor households in Cambodia. These data will provide a basis for further research on nutrition, particularly in women and children, and research on markets in fish and fish products and how they may or may not connect the poor to the market chain.

Materials and Methods

Three different ecological areas were selected: An-dong Snay Commune (ASC) located in the Great Lake area (largest fishing area); Babong Commune (BBC) located in the lower Mekong (smaller fishing area) and Tuol Ampil Commune (TAC) located far from the main fishing areas (smallest fishing area) (Figure 1). People in a total of 153 households were interviewed, roughly one-third from each Commune. The surveys were conducted during three distinct seasons: dry season (March to April 2006), rainy and closed fishing season (August to September 2006) and rice harvesting and fishing season (January to February 2007). A frequency and five days recall method was used; SPSS and MS Excel software were used to analyze the results.

Results

1- Socio-Economic Status of Rural Poor Households

Households ranged in size from three to fifteen members, with an average of six. In ASC and BBC, over 90% of household heads are men. In TAC, one of the poorest communities in Cambodia, the rate of male household heads drops to 75%. In rural Cambodia, people marry early and there are a large number of children under 14 years of age. A high percentage leave school to help earn income for the family, hence, levels

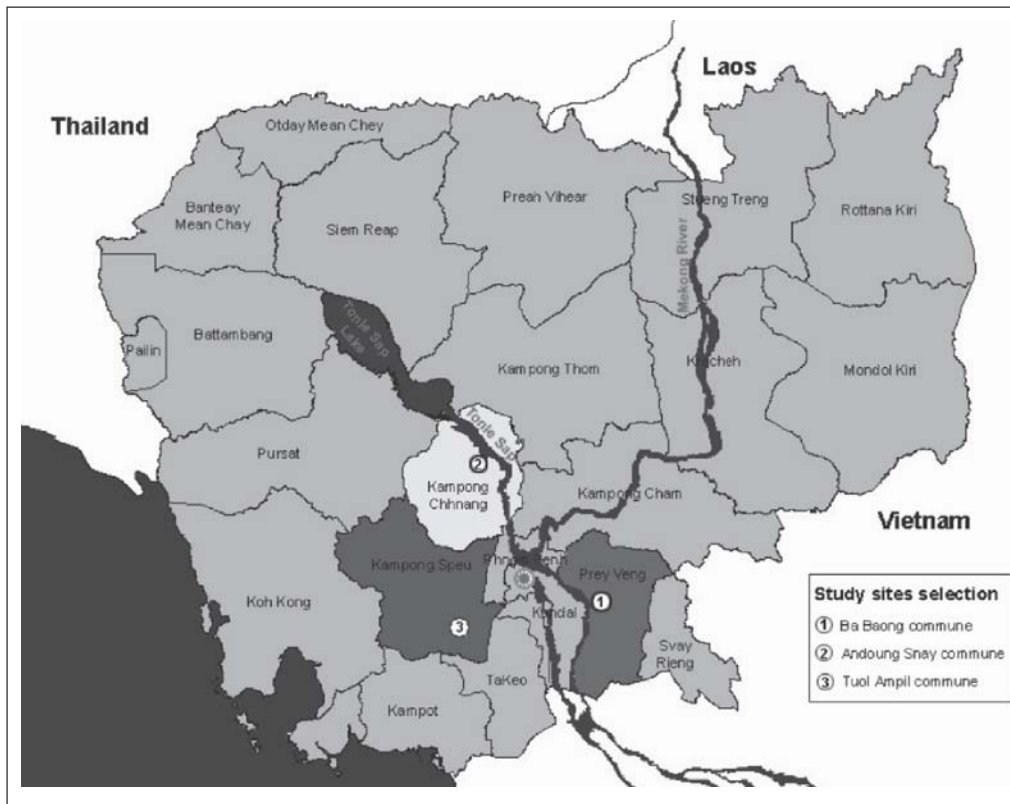


Figure 1. Location of surveyed communes: 1. BBC, 2. ASC and 3. TAC

of literacy is low. No household head had more than a secondary school education. Households in the target communes engage in a wide range of production and income generating activities. Just over half the households (53%) have land and can engage in farming. The main occupations are day labor (33%), fishing (31%), and small home-based businesses. Day labor is the main income for most households. Farming and fishing generally provides only enough for daily consumption. The average annual income of the household is 1.14 million riel (US\$ 285.00). Average income was highest in Babong Commune. There were three basic types of dwelling observed. The poorest people live in houses made of bamboo poles with palm tree roofing. If people are a little better off, they can afford a house with thatched or even tin roofs. Just over 90% of the householders we surveyed live in the poorer type of house. Ninety-nine per cent of the 153 households visited had no proper latrines. Most household members draw their water from a well of some sort and less than 30% boil their water before drinking. About half of the people in the households, we interviewed have access a commune health center. Unless health problems are serious, medications are bought at a local shop in the village and patients consult with the village health worker. Land holdings are small (0.041 ha), but two-thirds of the households owned a rice field and nearly

90% a small orchard. Fish ponds were rare in the survey households.

Most of the rural poor families depend on subsistence fishing. In TAC, 77% of all households engage in fishing, even though this area has the smallest fishing grounds, just over half in the largest fishing area (ASC), and 68% are involved in fishing in BBC. Fishing activity varies by season and geography determines the preferred location for fishing. In ASC, fishing households mainly fish in rice fields, followed by lakes and streams.

The same pattern holds in BBC, except they also have access to flooded forest. In TAC, people fish in rice fields, small ponds, and canals. The most common use of family fishing gears in BBC were hook long line, followed by gillnet and handle scooping baskets; in ASC were hand capture, followed by hook long line, and fish trap, and TAC were handle scooping basket, hand capture, and spear/knife. The five top most common caught species in BBC and ASC were fish whereas in TAC, within the top five caught species; three were aquatic animals (Figure 2, Table 1).

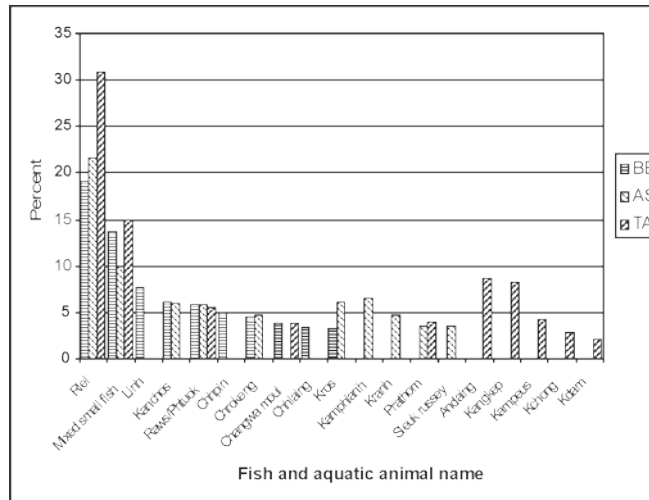


Figure 2. Top 10 most consume fish and others aquatic species in all round and survey communes (Scientific name is in Table 1.)

Table 1. Local and scientific name of fish and others aquatic species

No.	Local name	Scientific name
		Fish species
1	Andaing	<i>Clarias macrocephalus</i>
2	Changwa moul	<i>Rasbora myersi</i>
3	Chhlaing	<i>Mystus nemurus</i>
4	Chhpin	<i>Hypsibarbus spp</i>
5	Chrokeng	<i>Puntioplites spp</i>
6	Kamphlanh	<i>Trichogaster spp</i>
7	Kanchos	<i>Mystus spp</i>

8	Kranh	<i>Anabas testudineus</i>
9	Kros	<i>Osteochilus hasselti</i>
10	Linh	<i>Thynnichthys thynnoides</i>
11	Prathom	<i>Pangasianodon hypophthalmus</i>
12	Raws/phtuok	<i>Channa striata</i>
13	Riel	<i>Henicorhynchus spp</i>
14	Sleuk russey	<i>Longiculter siahi</i>
Aquatic animal		
1	Kampeus	<i>Macrobrachium lanchesteri</i>
2	Kangkep	<i>Rana tigrina</i>
3	Kchong	<i>Pila ampullacea</i>
4	Kdam	<i>Somanniathelpusa brandti</i>

Household food and fish consumption

The mean household consumption of food items (gram of raw whole food/household/day) was calculated from the one week frequency data. The mean household rice consumption in all households was 2016.4 g household⁻¹ day⁻¹, vegetable 765.1 g household⁻¹ day⁻¹, fish and fish products 654.6 g household⁻¹ day⁻¹, meat 71.9 g household⁻¹ day⁻¹ and fruit 222.2 g household⁻¹ day⁻¹. The mean rice consumption was highest in TAC, the poorest commune, followed by ASC and BBC. People in households in all three communes said they ate rice everyday; and just over half said they consumed fish and vegetables every day of the week.

Household fish consumption was calculated using five-day recall questionnaires. Fish consumption was composed of fresh fish, other aquatic animals, and processed fish. The mean raw whole fish consumed was calculated as the sum of the weight of fresh fish and aquatic animal consumed and the weight of converted raw whole fish from processed fish consumed (Table 2). The mean raw whole fish consumed of rural poor people was 524.8g household⁻¹ day⁻¹ or 192.1kg household⁻¹ year⁻¹ or 32.0kg person⁻¹ year⁻¹. Overall, mean total household fish consumption was high in ASC, reflected the access to fishing grounds. Overall household consumption of fresh fish was 285.1 g household⁻¹ day⁻¹, aquatic animals was 78.2 g household⁻¹ days⁻¹ and processed fish was 93.5 g household⁻¹ day⁻¹. The mean household consumption's proportion was fresh fish 62%, aquatic animals 17%, and processed fish 21%. Overall, 54% of rural poor householders said they consumed fresh fish and aquatic animals everyday. All rural household said they consumed fish paste and fish source everyday.

Table 2. Mean total household fish consumption

Commune	Mar-Apr, 06 (g/hh/d)	Aug-Sep, 06 (g/hh/d)	Jan-Feb, 07 (g/hh/d)	Mean (g/hh/d)	Mean (kg/hh/y)	Mean (kg/person/y)
ASC	638.6	555.9	701.7	632.1	231.3	38.6
BBC	463.5	476.4	568.8	502.9	184.1	30.7
TAC	394.9	495.9	430.5	440.0	161.1	26.9
All	498.4	509.6	566.6	524.8	192.1	32.0

hh-household

Among 10 most common consumed fish species the dominant were trey Riel, mixed small fish, and Ptuok, found in all communes, while other aquatic animals such as kangkep, kampeus, kchong, kdam was found only in TAC (Figure 2). The results from cooking practices showed that fish soup with vegetable and grilled fish were the most common preparations.

Discussion

By all measures, the people in these household surveys are poor. They have low levels of literacy, poor access to health facilities, small land holdings or no land at all, not enough rice to last for even half the year, and low income. What they have is fish. Specifically, they rely on a relatively small number of species, most of which are 'whitefish' of low commercial value and varying nutritional value. The larger blackfish species such as climbing perch (trey Kranh) and snakehead (trey Ptuok) are usually sold for cash. Fish are both food and a source of income that can be exchanged for rice and other food products. The result of this study was very similar to fish consumption surveys conducted by Touch (1993), Ahmed et al. (1998), and Hortle et al. (2004); and much higher than FAO Food Balance Sheets (1998). The result of this study was lower than consumption figures in six provinces around Tonle Sap Lake, Kandal province, and Phnom Penh (between 22 and 68 kg per year of fresh fish and 10 and 24 kg per year of process fish). Some fishing communities in the Tonle Sap Lake area may consume 75.6 kg person⁻¹ year⁻¹ (Ahmed et al. 1998, Hortle et al. 2004). The national average fish consumption is in the range of 30 to 40 kg person⁻¹ year⁻¹. These differences are due largely to the sample selection and location. The Mekong Committee figures are based on a basin-wide sample and the other studies included a wider range of income groups.

As in previous studies, these results also indicate that fish species consumed vary with fishing place and season. In another study, the most commonly consumed aquatic organisms are shrimps, crabs, and frogs as well as snakes, insects, and wading birds (Gregory et al. 1996). In the work studied by Shams and Hong (1998), the average distribution of aquatic animals in three districts of a central Cambodian province was 26% frogs, 22% crabs, 20% snails, 15% insects, 13% shrimps, and 4% snakes.

Most of the people in households, in our survey, engage in subsistence or family fishing, which involves many family members. Poor householders consume low-value fish and aquatic animals from rice fields and the wild and also buy low value fish in local markets. Fish consumption was high during the rice harvesting and fishing season, low at the end of the rainy season and the beginning of the closed fishing season, and lowest in the dry season. Rice field fishery ecosystems are known to be rich in aquatic resources derived from animals such as fish, small shrimps, crabs, snails, beetles, and from aquatic vegetables such as morning glory, lotus, and water lily. Processed fish products, such as fish paste and fish sauce play an important role in peoples' diets, especially during the dry season and in areas where there is less access to fishing grounds. Low price and ready availability of these products should be a high priority, along with more effective processing technology.

Conclusion

The results of this study indicate that poor people eat less fish overall, but eat fish more often than their more well-off neighbors. More well-off households can afford to supplement their diets with meat and other food items. Fish is a staple food item for the rural poor and central to their livelihood strategies. A major threat to rural poor livelihood strategies is the combination of increasing land pressure and decreasing access to common property resources (flooded rice fields, rivers, lakes, inundated forest, irrigation canals, and dikes) and pesticide pollution in rice fields and wetland areas. Many rural households are landless or have only small land holdings. As access to common property becomes more restricted, diminished, and priced out of reach, the poverty and vulnerability of rural poor can only intensify. Perhaps most importantly, the fish consumed by poor rural households are mostly migratory species. Any development initiative that impedes or alters migration routes will have an impact on the income and health of the poorest people in Cambodia.

A number of authors have indicated that aquaculture can be promoted to fill any gaps. This is unlikely given the size of the population that depends on wild fish and aquatic animals and plants, the volume of fish the wild capture fishery produces, and that fact that aquaculture requires an investment the poor can seldom afford.

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