

The country representatives of the Asian Fisheries Social Science Research Network (AFSSRN) held their annual meeting in Chiangmai, Thailand on 10 November 1998 in conjunction with the Asian Fisheries Forum. Representatives from Indonesia, Philippines, Vietnam, Cambodia and Malaysia were present at the meeting. The meeting was made possible by a grant from ICLARM. Members expressed their thanks to the Director General of ICLARM, Dr. Meryl J. Williams for providing the grant. An observer from the Institute for Fisheries Management, Hirtshals, Denmark was also present. Country representatives reported on developments in the social science research activities in each of the countries and shared their views on future directions for Network activities. The meeting also bid farewell to Dr. Robert S. Pomeroy who left ICLARM at the end of December 1998. Dr. Pomeroy served as the Network coordinator for about eight years. During his period, the Network also experienced a transformation from a research project based network to a section of the Asian Fisheries Society. Dr. Mahfuzuddin Ahmed, the Program Leader of the Policy Research and Impact Assessment Program of ICLARM, was elected to Dr. Pomeroy's position as the Vice Chairperson of the AFSSRN. Dr. K. Kuperan Viswanathan continues to serve as the Chairperson of the AFSSRN. Members of the Network also had a successful social science session at the Asian Fisheries Forum. This session was well attended, indicating the interests among fisheries scientist on the importance of social, economic and institutional issues in fisheries and coastal resources management. The Network members emphasized the need to explore ways of getting from economic and social analysis to policy advice. The need to explore ways of making the Network economically viable in the longer term was also discussed at the meeting.

K. Kuperan Viswanathan

Fish Consumption Pattern in Major Freshwater Fisheries Provinces of Cambodia¹

M. Ahmed, Hap Navy, Ly Vuthy and R.A.V. Santos

Abstract

Production and consumption of fish were estimated for a one year period during 1995-96 using a sample of 5 117 households. The sample was taken from a study area covering 83 sample communes in 51 fishing districts belonging to eight freshwater fisheries provinces. About 39% of households in fishing dependent communities were actively involved in fishing. Of the total fishing households, 14% took part in commercial fishing using middle-scale fishing gear. Average annual catch per household for middle-scale and family fishing was 3 319 kg and 647 kg, respectively. Nearly 40% of the fish catch was consumed within the communes. The per capita consumption of fresh fish by fishing households (49.7 kg/yr) was higher than that of non-fishing households (39.9 kg/yr). Including processed fish, the total fish consumption by the fishing dependent communes was estimated at 75.6 kg per capita per annum. Given this high rate of fish consumption, development interventions must consider the role of fisheries in ensuring a sustainable livelihood and food security to Cambodia's growing population.

Introduction

Cambodia lies almost entirely in the catchment area of the

Mekong. Fish and other aquatic products contribute significantly to Cambodia's food security. Excluding provinces that are mountain-

ous or open to the sea, all provinces produce a substantial amount of freshwater fish (Fig.1). The Department of Fisheries (DoF)

¹ ICLARM Contribution No. 1482. This paper is based on the data collected and analyzed during 1995-96 under a project entitled "Management of freshwater capture fisheries of Cambodia" implemented by the Department of Fisheries, Cambodia, and the Mekong River Commission through the assistance of DANIDA. A poster version was presented to the Fifth Asian Fisheries Forum, Chiang Mai, Thailand, 11-14 November 1998.

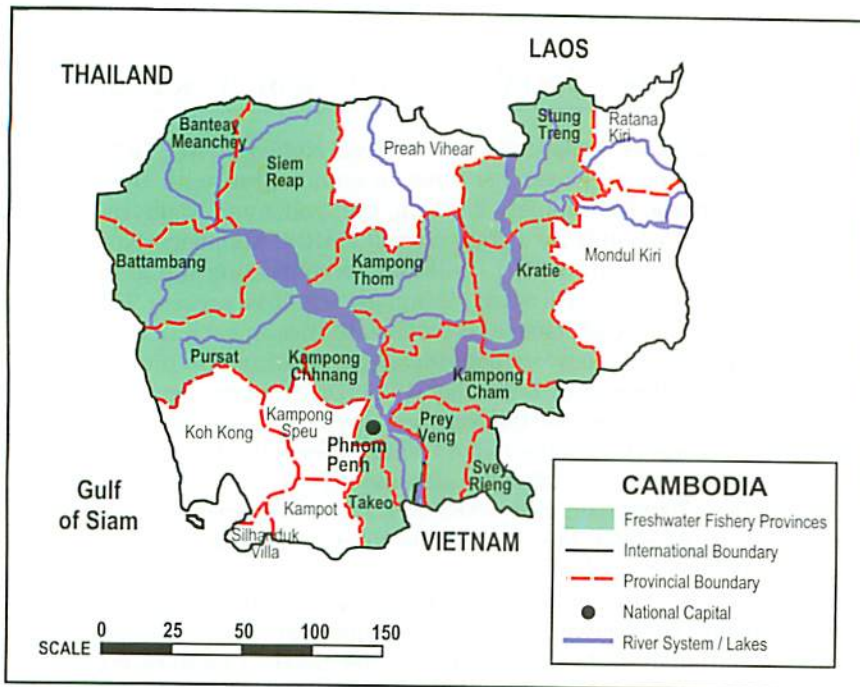


Fig. 1. Map of Cambodia showing the freshwater fishery provinces.

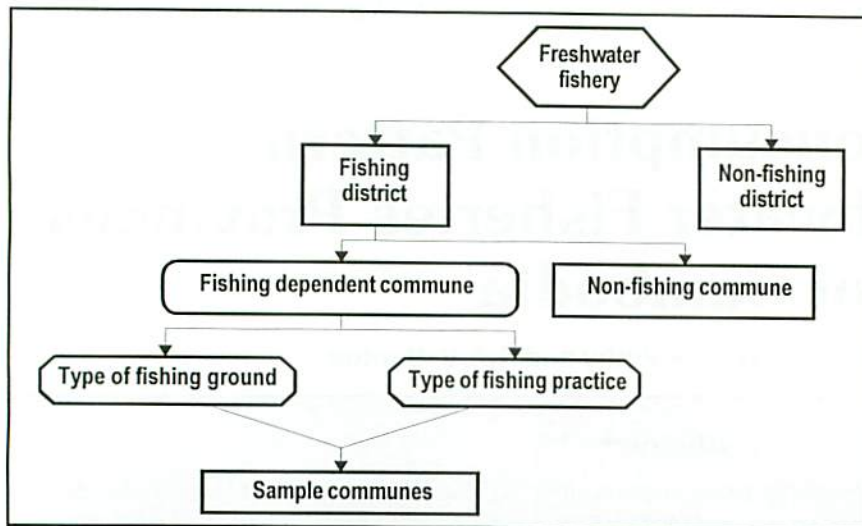


Fig. 2. Sample selection of fishing dependent communes.

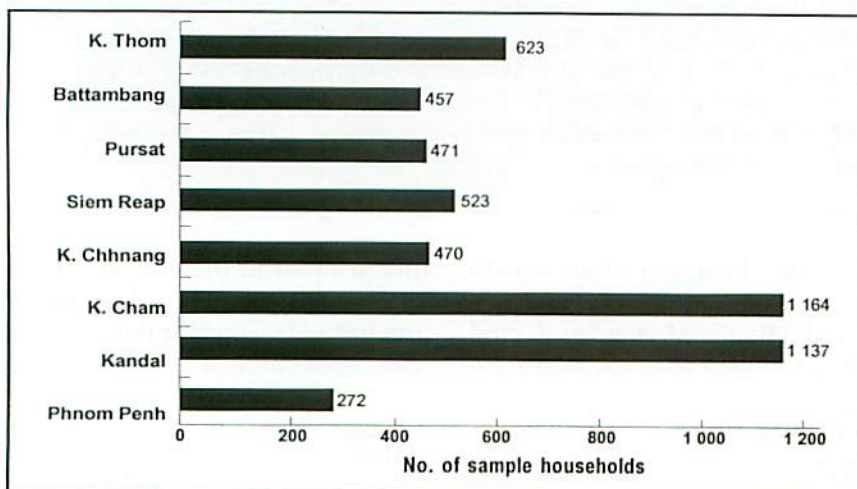


Fig. 3. Number of sample households.

considers nearly all of these provinces (excluding Svay Rieng) as important for commercial freshwater fish production, and currently administers a system of distributing fishing rights through leasing and licensing as well reports their annual fish catch (Ahmed and Tana 1996). Such statistics on production are, however, considered to be an underestimate (van Zalinge and Tana 1996). They do not reflect the catch from small-scale and subsistence fishing (known as family fishing) operations by households, nor do they include fish production from provinces where fisheries are not covered by licensing and leasing systems (Ahmed et al. 1998).

Under the project "Management of Freshwater Capture Fisheries of Cambodia", implemented by the Mekong River Commission (MRC) and the Department of Fisheries, Cambodia, efforts were made to assess the socioeconomic conditions of the households living in fishing dependent communes and thereby generate information on the production and consumption aspects of the freshwater capture fisheries in the country (Ahmed et al. 1998). This paper provides an analysis of the pattern of fish consumption by households living in communities within the major freshwater fisheries provinces, based on a household socioeconomic survey conducted under this project (Ahmed et al. 1998).

Methodology and Data

The household survey was conducted in selected fishing communities (communes/villages) in eight freshwater fisheries provinces covering the Great Lake and Tonle Sap River environment, as well as the floodplains of the Mekong-Bassac river systems. The provinces covered by the study are: Kandal; Kampong Cham; Kampong Chhnang; Siem Reap; Pursat; Battambang; Kampong Thom and

Phnom Penh (Fig. 1). Out of an estimated population of 5.65 million people (60% of the national population) living in these eight provinces, about 2.4 million live in the communities that have substantial access to fishing grounds (waterbodies). These were regarded as fishing dependent communities (communes).

Sample households were identified following a two stage sampling technique (Fig. 2). In stage one a total of 83 sample fishing communes were randomly selected from a list of 328 fishing communes in the eight selected fishery provinces. In the second stage a random sample of 5% of the households was chosen for interview from each of the sample communes giving a total number of 5 117 sample households (Fig. 3). Details on sampling methods and data collection can be found in Ahmed et al. (1998).

Results and Discussion

Fishing Involvement by Households

Households in the fishing communes are usually engaged in a wide range of production and income generating activities (Fig. 4). Most households are land-based and hence combine fishing and farming. There is only a small minority of households engaged exclusively in fisheries. These are mostly located in floating villages around the Great Lake or along the Tonle Sap, Mekong and Bassac rivers.

Of the surveyed households, 39% are actively involved in fishing. These are regarded as fishing households or fishing dependent households. Fishing is considered an important (primary, secondary or tertiary) occupation in these households (Ahmed et al. 1998). A major portion of the catch by these households is sold or exchanged in both fresh and processed forms. The remainder of

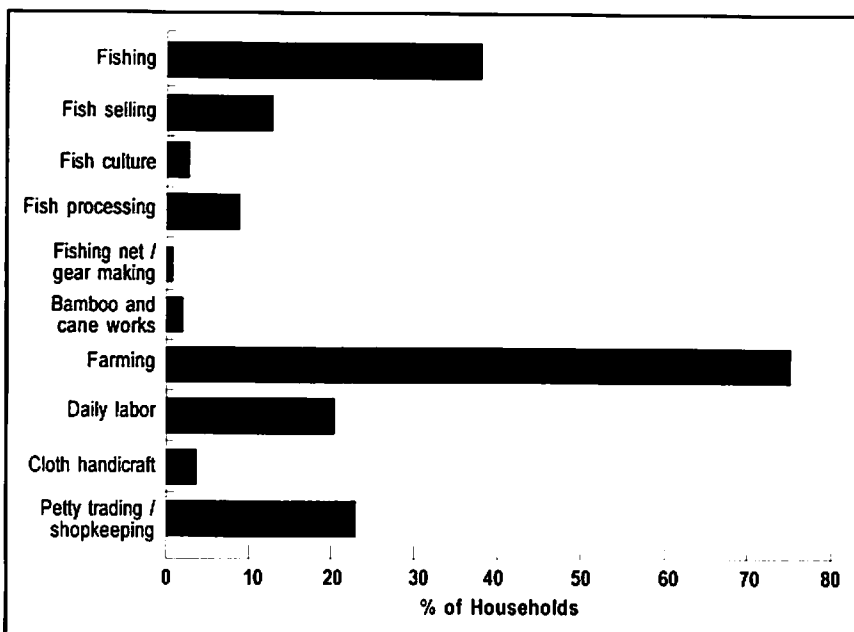


Fig. 4. Percent of households involved in major production and income-generating activities in fishing communities, 1995-1996.

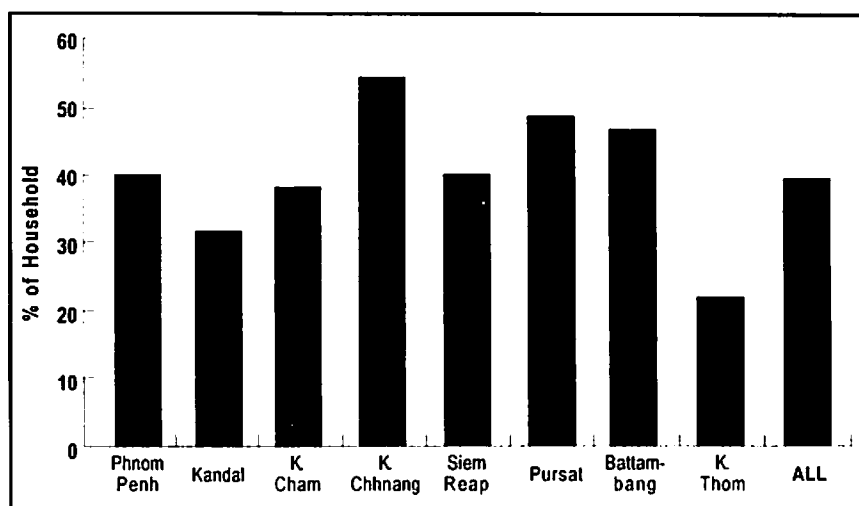


Fig. 5. Fishing involvement of households, 1995-1996.

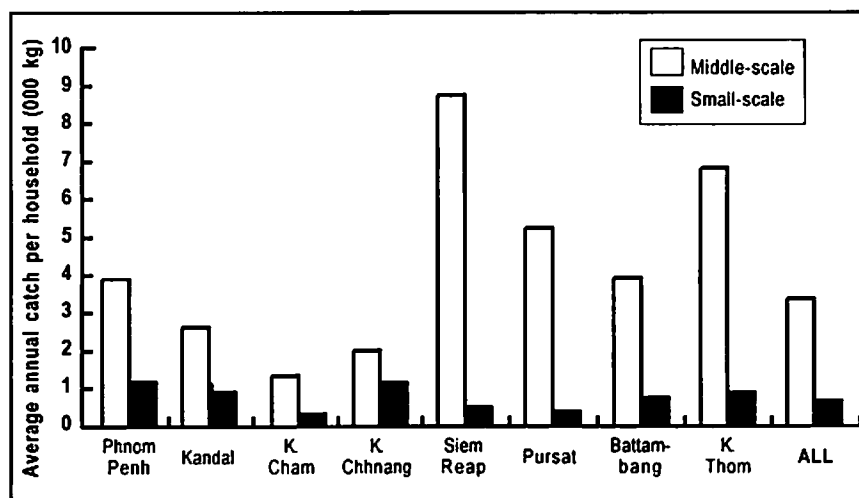


Fig. 6. Average annual catch per household from middle-scale and small-scale fishing, 1995-1996.

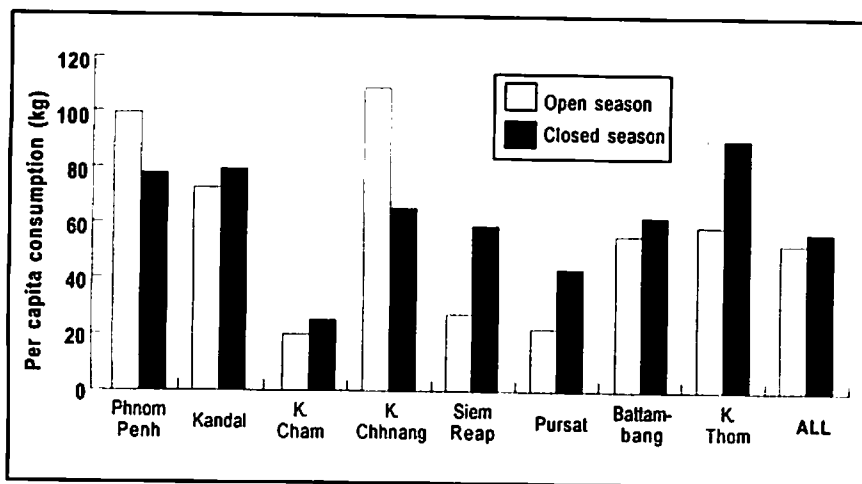


Fig. 7. Average monthly catch per household from family fishing in open and closed seasons, 1995-1996.

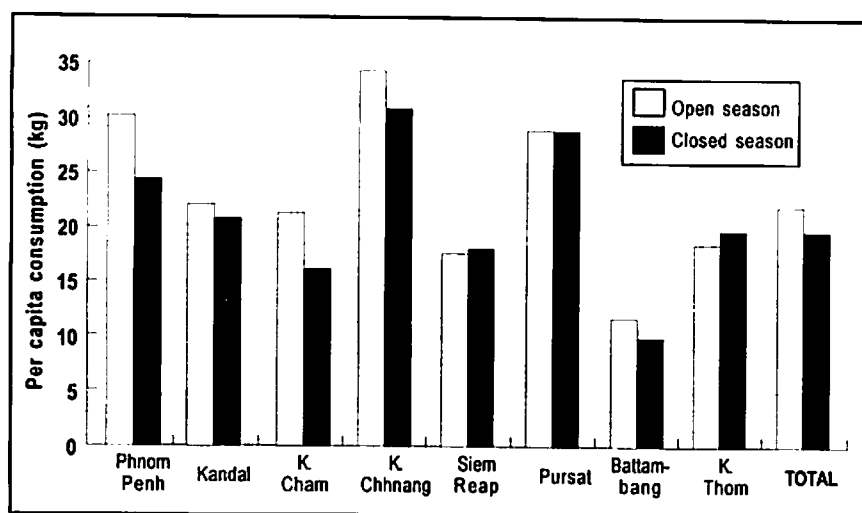


Fig. 8. Average monthly consumption of fresh fish per household from family fishing in open and closed seasons by province, 1995-1996.

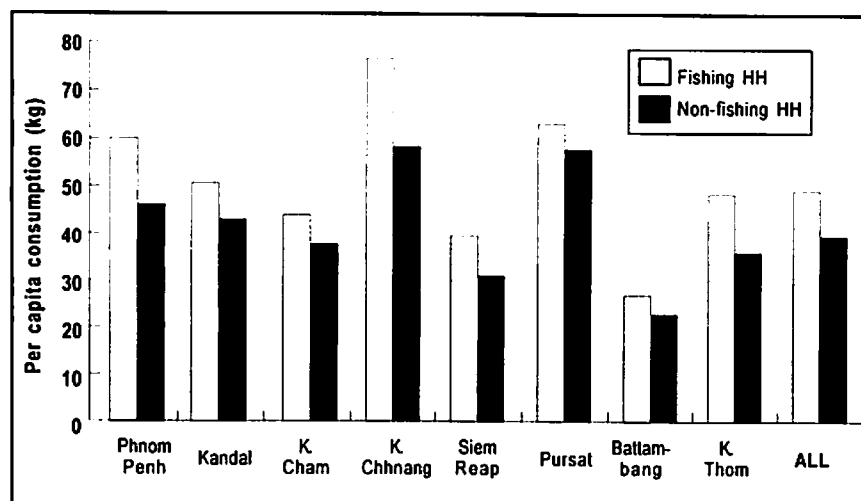


Fig. 9. Per capita annual consumption of fresh fish in fishing and non-fishing households by province, 1995-1996.

the households have either occasional involvement or do not have any involvement in fishing at all. About 13% are actively engaged in selling fish and 9% are actively involved in fish processing. Usually, it is the other members rather than the heads of the household who are involved in fish selling, fish processing and other fishing related activities. The rate of involvement in fishing by households varies between provinces. For instance, in Kampong Chhnang, 54% of the households are actively engaged in fishing compared to only 21% in Kampong Thom (Fig. 5).

Household Fish Catch

Fishing is organized at the household level both as subsistence (family fishing) and commercial activities (Ahmed and Tana 1996). Almost all fishing households are involved in family fishing throughout the year. However, about 14% of the fishing households take part in middle-scale and 1% in large-scale fishing allowed only during the open season (October–May). Based on the catch reported by the fishing dependent households during interviews, the average annual catch per household from middle-scale fishing is 3 319 kg and family fishing is 647 kg (Ahmed et al. 1998) (Fig. 6). There is a large variation in the catch from family fishing between the open and closed seasons and between different provinces (Fig. 7). Nearly 40% of the fish catch is consumed within the fishing communes.

Fish Consumption Pattern

The average annual consumption of fresh fish by households varies between different provinces, although there is not much variation in the monthly consumption of fresh fish between the open and closed seasons (Fig. 8). Fishing households have a higher per capita annual consumption of fresh fish (49.7 kg) than non-fishing households (39.9 kg) (Fig. 9). The average per capita consumption of fresh fish

by all households in the fishing community is 43.5 kg per annum.

Besides fresh fish, a wide range of processed fish is also consumed. Due to the seasonal nature of the fish harvest, various fish processing and preservation techniques have developed. Hence, the consumption of processed fish is expected to be considerably high in Cambodia. There are five types of processed fish products included in this study: salted dried fish, smoked fish, fermented fish, fish paste and fish sauce. Both fishing and non-fishing households exhibit a uniform level of consumption of all types of processed fish. When converted into fresh fish, processed fish can be seen to account for up to 32 kg of fresh fish. Hence, per capita consumption of fish in both fresh and processed form amounts to 75.6 kg per annum (Fig. 10). For the fishing households, per capita consumption of fish is about 84 kg per annum compared to about 71 kg for non-fishing households. If fish sauce is excluded, per capita consumption of fish (fresh and fresh equivalent of processed fish) for all households taken together will be about 71.1 kg.

Conclusion

Based on the per capita consumption of the sample households the estimated total fish consumption of fish by the 2.4 million people living in the eight study provinces is about 163 000 t for the year 1995-96. On the other hand, total fish production by the households from both small-scale and middle-scale fishing in the eight study provinces is estimated to be close to 200 000 t. The consumption of fish by households living in the remaining provinces, not covered by the present study, is also expected to be high. Some of these provinces also have large areas available for fishing by the households. The production from fishing lots (large-scale fishing) is also significant at about 80 000 t (Diep et al. 1998), and forms part of the national supply of fish. Thus, the consumption

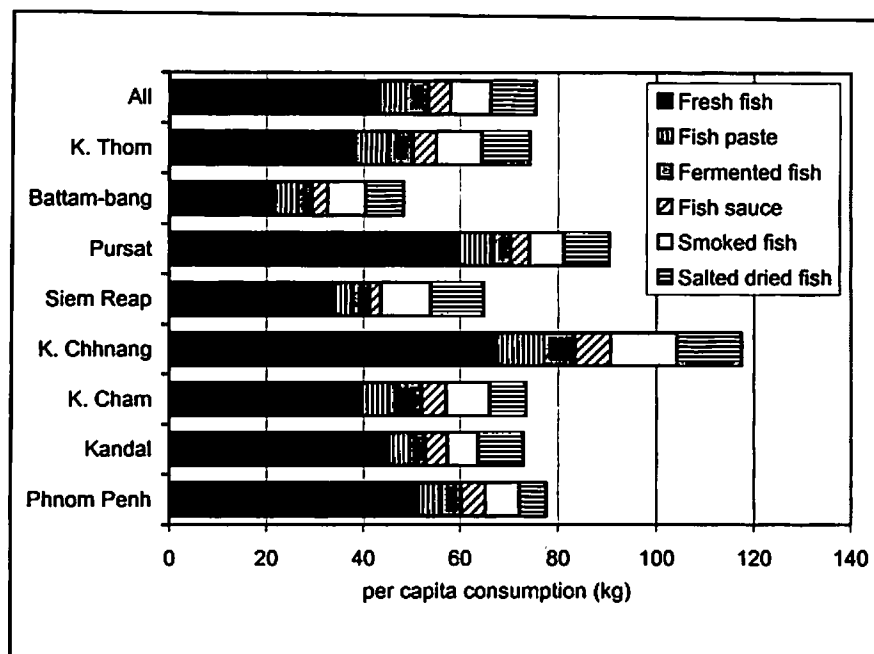


Fig. 10. Average per capita consumption of fresh fish and processed fish (fresh equivalent).

of fish by the 9.5 million people of Cambodia is high. There are few countries in the world where there is such a high consumption of fish by such a large number of people.

For many generations, fish and many other aquatic products (plant and animal) have supplied a sizeable portion of protein and nutrition to Cambodians. This is due to the existence of a wide expanse of waterbodies in the Mekong river system. Given the current high consumption of fish, it is an essential element in Cambodia's food security. Any disruption to the ecological system that threatens the fisheries will affect the food and nutritional security of the Cambodians (Guttman 1999, this volume). Thus, development interventions must consider the role of fisheries in ensuring a sustainable livelihood and food security to Cambodia's growing population.

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In many developing countries, availability of suitable tags for use in genetics and aquaculture research has been a problem as they are often expensive and have to be imported from other countries. A simple and inexpensive method used by scientists in Ghana that can be tried and improved by others is described below. Members of INGA are encouraged to report any innovative research methods they might have developed through the Newsletter to inform others engaged in similar research.

There is a brief description of the aquaculture genetics research being conducted by some of the INGA member institutions. All members and Associate Members of INGA are invited to share with others the results/progress of research being conducted by them. Research papers/articles are also welcome and will be published in The Features or Aquabyte sections of the *Naga*.

M.V. Gupta

A Simple and Inexpensive Fish Tagging Method

Introduction

Historically, several methods have been employed to 'mark' animals as individuals or groups of individuals. These have included markings with dyes, branding, tattooing and clipping of various parts of the animal. Where applicable, tags have also been fastened or stuck to animals as a 'mark'. Irrespective of whether animals are marked or tagged, the objective of doing so is to identify an individual or a group of individuals at a later date.

Laird and Scott (1978) categorized the methods employed for marking fish into group marking and individual marking. Under group marking, they considered fin clipping, branding and marking with dyes or stains. For individual fish marking, they considered tagging as the approach, although tagging is also appropriate for fish group marking. It is important that the marking or tag does not unduly influence fish behavior, movement, growth or make it more prone to capture. To achieve both permanent labelling and reduce the adverse effects of a tag, several developments have taken place. These include the use of electronic/

radioactive tagging materials.

The two basic studies requiring the use of permanent labelling of fish include: (i) mark and recapture studies for fish movement (migration) and stock estimation; and (ii) comparative estimation of fish growth or culture performance of different stocks or populations under communal testing conditions. Marking is especially important where the test fish are different populations of the same species. In both cases, the inclusion of different size fish groups can give more comprehensive conclusions. Therefore, the desirable characteristics of tagging materials would be a combination of availability, affordability, simplicity, ease of identification, light weight, high retention capacity and wide size ranges (to suit different sizes of fish).

To achieve a combination of the above features in a tagging material, the authors have used a set of simple materials for tagging in a study undertaken to evaluate the culture performance of three populations of Nile tilapia (*Oreochromis niloticus*) in Ghana.

The materials used to prepare the disc tags and the tagging procedures are described below. These could be

usefully adopted in other developing countries where availability, affordability and/or importation of tags are a constraint.

Materials and Methods

The materials needed to prepare the disc tags are: polyvinyl sheets (as many colors as may be required); perforator of different sizes and shapes (e.g., paper puncher); monofilament nylon fishing twine/string; and an injection needle.

The procedure is:

- Use a perforator(s) to punch through polyvinyl sheets to produce discs (disc sizes and shapes may be varied by use of different perforators).
- Make a hole in the center of each disc by using an injection needle.
- Pass a length of nylon fishing string through the hole in the disc and tie one end of string to secure disc.
- Use an appropriate sized injection needle to pierce through fish and leave it in place. (In our study the point of piercing was between the posterior end of dorsal fin and the lateral lines).
- Insert string attached to disc