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EDITORIAL

The importance of fish in the diet and nutrition of rural households in developing tropical countries, especially in Asia, is well recognized. Declining catches from common or open access inland capture fisheries are resulting in declining intake of fish by low-income rural households who depend on these resources for their animal protein requirements. This is resulting in malnutrition, especially among children. This issue contains a paper which brings out the importance of small indigenous fish as a source of calcium, iron and Vitamin A and the possibility of culturing these fish along with other carps.

Rice field fisheries are a major source of fish for people in many provinces of Cambodia and managers and development workers should not neglect to conserve and manage these resources, while promoting aquaculture and other developmental activities.

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Rice Field Fisheries—a Resource for Cambodia

H. Guttman

Abstract

Small-scale fisheries in and around rice fields in the lowland areas of Cambodia are greatly underestimated and undervalued. Their contribution to the protein requirements of the poor rural households is significant. In Svay Rieng province, they could provide 65-75% of the animal protein requirements of these households. The value could well be around 40% of the value of rice production. It is, therefore, important that these natural stocks and the fisheries are managed well and that developmental activities explicitly consider their impact on these fisheries.

Introduction

This article aims to increase awareness of the importance of small-scale fishing in and around rice fields in the lowland areas of the lower Mekong river basin. This is a little studied fishery resource which contributes significantly to the income and animal protein consumption of rural households. At present this resource is virtually unmanaged. This article highlights the importance of this resource and calls for agencies involved in development to take it into consideration in their projects.

The Asian Institute of Technology (AIT) Aqua Outreach Programme has collaborated with the Cambodian Fisheries Department and Provincial Department of Agriculture in Svay Rieng province (Fig. 1) since 1994 to promote small-scale aquaculture and improve aquatic resources management. Svay Rieng province was chosen as it was considered to have limited fisheries resources. Indeed, it is still officially considered to be a "fish deficit" area. According to official estimates, the provincial fish production is less than 100 t/year.

Over the past 3 years fish culture in small ponds, rice fields and systems linking ponds with rice fields has become increasingly popular, especially in the western part of the province. Currently

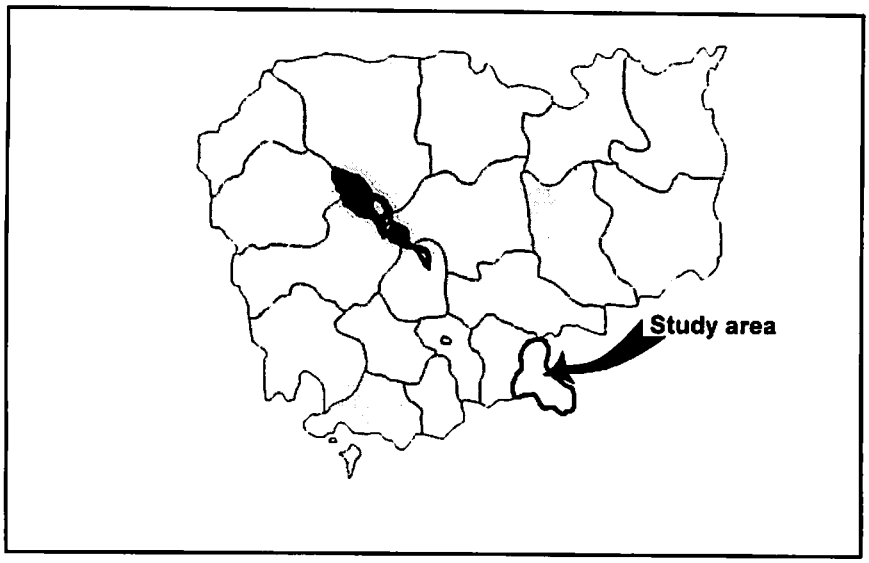

Fig. 1. Map of Cambodia and Svay Rieng province.

some 700 families have taken up the practice and the harvest is estimated at 20 to 30 t of fish for the 1997-98 season.

Field studies revealed that some districts seemed to have more water, longer periods of flooding and a relatively higher abundance of fish than other areas. Experience from earlier Outreach work in northeast Thailand indicated that fish culture was often not adopted by farming families that could catch enough wild fish from natural waters (AIT 1992). Thus, it seemed that the scope for successful promotion of aquaculture was spatially dependent. This led to the need to identify areas where efforts to promote aquaculture should be concentrated.

Estimates of Fish Production

To assess the spatial variation in wild fish production from rice fields and swamps, Outreach developed a tool: trap pond mapping (Fig. 2) (Gregory et al. 1996a). Three zones were identified: Zone 1 having poor wild fish resources, Zone 2 being intermediate and Zone 3 having a productive fishery of wild fish. The mapping showed that natural production of wild fish is still rather high in the eastern and southeastern districts. Culturing fish there would offer farmers few additional benefits in terms of overall fish production and returns by trapping fish in ponds as they move towards dry season refuges at the beginning of the cool season (Gregory and Guttman 1996). In these areas efforts should be directed to the management of natural fish stocks.

The trap pond map data also revealed that trap ponds yield substantial amounts of fish. Some trap ponds in better endowed areas yielded several hundred kilograms of fish. The data for mapping studies included visits to all villages in five of the six districts in the province and a total of 1 267 households were interviewed. Data collected included the area and number of trap ponds in the village and fish production from these ponds. From this information it was estimated that in these five districts there were a total of about 34 000 trap ponds in 468 villages. As each trap pond produced an average of 47 kg of fish, total production was estimated at over 1 500 t. This is 15 times higher than the official estimate for the entire province. This logically led to the question: what is the annual production of fish in the province?

The consumption of fish, including processed fish such as fish paste and dried fish, and other aquatic animals in the area has been estimated at between 13-17 kg/caput/yr (Tana 1993; Nandeesha and Heng 1994), consistent with the estimated national averages ranging from 10 to 16 kg/caput/yr (Nandeesha 1991; Cambodian Department of Fisheries 1992; Mekong Secretariat 1992). This is approximately between a third to one half of the annual animal protein requirements of people in the lower Mekong basin (Mekong Secretariat 1992; Tana 1993). Extrapolating the above figures gives an estimated annual demand for fish in the province of between 6 300 and 8 100 t.

Two aspects of these fish consumption figures are surprising.

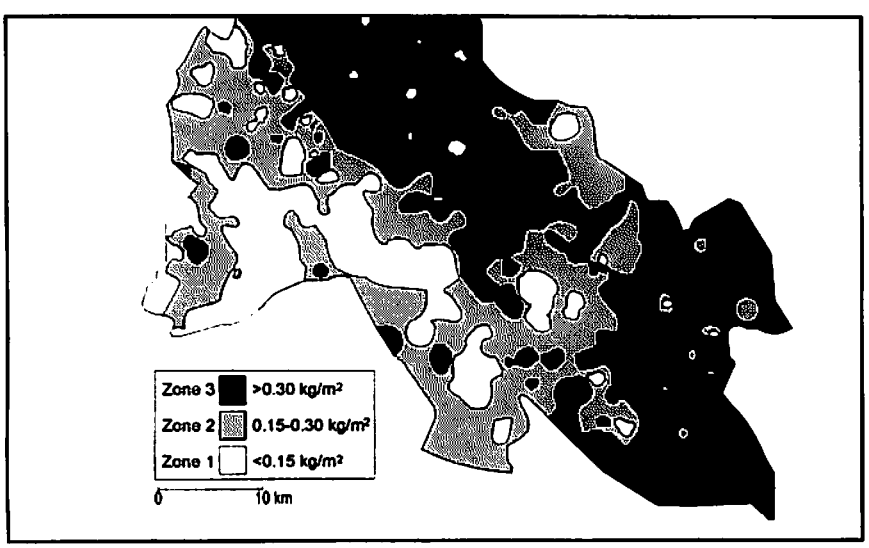

Fig. 2. Study area zones based on trap pond yields.

Firstly, these figures are much lower than for other similar areas in the region. In northeast Thailand, an area agroecologically very similar, the consumption was 20 to 30 kg/caput/yr (Prapertchob 1989; AIT 1992). Secondly, it was difficult to identify other sources of animal protein available to the farming households. Although Svay Rieng produced enough rice for local consumption in most years (CIDSE Cambodia 1993; Nandeesha and Heng 1994) there was seldom a surplus available for sale. Cattle and buffaloes were kept either as draught animals or sold for cash, and pigs were reared by some families for sale. Poultry was the most common livestock but it was mainly raised for sale rather than for consumption. Tana (1993) indicates that fish is the most important source of animal protein. But, how could farming families satisfy their animal protein requirement if fish and other aquatic animals only contributed between a third to half ? Though malnutrition is widespread, studies indicate that it is not acute and is more likely due to the effect of seasonal rather than chronic food shortages (Tickner 1996).

To gain a better understanding of fishing and fish consumption in the province, a nine month longitudinal study was undertaken in a relatively fish rich area of the province. The aim of the study was to determine fishing practices and their use by 15 households in three villages.

The households studied had an average fish consumption of about 40 kg/caput/yr (Gregory et al. 1996b). This figure was much higher than earlier estimates and studies in other provinces revealed similar figures. A study in the western part of Takeo province in areas with poor water resources estimated fish consumption to be around 40 kg/caput/yr (CIAP, unpubl. data). The estimate for Kampot province was over 38 kg/caput/yr (APHEDA 1997). Interestingly enough, the households in Takeo were prepared to spend up to 50% of their income on purchasing fish (Helmers 1996), indicating a clear preference for fish as the main source of animal protein. A consumption of 30-40 kg of fish would provide between two-thirds and three-quarters of the annual animal protein requirement (Mekong Secretariat 1992).

Fishing in a canal next to the rice field .

Such a high consumption rate means that an average family of 5 to 6 household members would need between 170-240 kg of fish per year. According to Tana (1993) families close to waterbodies caught 86 kg per family while those further away from waterbodies caught under 30 kg per family per year. He suggests that much of the

Drag netting is effective at the end of the wet season.

fish consumed was imported from other parts of Cambodia and some from Vietnam.

To better understand the marketing of fish, a study of wholesale fish markets in Svay Rieng was undertaken. The study revealed a relatively well developed marketing structure, moving from the villages through larger markets to Phnom Penh or for export to Vietnam (Guttman and Kunty 1997). Between 100-200 people are involved in the marketing of fish in Svay Rieng province. The study showed that only small amounts of fish were imported from other provinces and Vietnam. This suggests that most fish consumed originated in Svay Rieng, indicating that local production covered or was in excess demand in the province.

The longitudinal study also revealed highly productive fisheries (Gregory et al. 1996b). The 15 families studied caught on average 681 kg of fish from the rice fields and adjacent areas. This included other aquatic animals such as frogs and shrimp which averaged 18% by weight of the catch. The area studied was relatively rich in fish, a Zone 3 area according to the trap pond map (Fig. 2). A more conservative figure for the annual catch set at 500 kg per household for the five districts studied resulted in an estimated annual production of over 8 900 t for Zone 3. This estimate was based on an average of 140 families per village in 159 villages, of which 80% are fishing households. This would still be an underestimate as it does not include production in Zone 1 and Zone 2.

If the 1 500 t from trap ponds were added to this the annual production would be 10 400 t. This would provide the population in the five districts studied with almost 30 kg/caput/yr. Is this a realistic estimate for an area with limited water resources?

Dividing the estimated annual production by the total area of rice fields in the five districts gives an annual fish production of over 80 kg/ha/yr. This figure does not include swamps, lakes and other areas contributing to fish production. If these are included the annual production per hectare will perhaps be reduced to 50-60 kg for rice fields. Gregory et al. (1996b) estimated 100 kg/ha/yr for Svay Theap district and the estimates for areas around the Great Lake in Cambodia are as high as 150 kg/ha (Peter Degan, pers. comm.). Further afield in Bangladesh the productivity for unmodified floodplain areas was estimated at 130 kg/ha/yr (MRAG 1997). An assessment of the standing stock in rice fields in Zones 1 and 3 in Svay Rieng, conducted in late October, revealed an extrapolated stock of between 25-96 kg/ha (Gregory and Guttman 1998). These fields dry out in the dry season and this estimate did not take into consideration any fish caught before the assessment. The actual production must, therefore, be at least as much as the standing stock, probably much more. It should also be mentioned that the 1997 wet season had poor rains and much of Svay Rieng was affected by drought so these estimates may be much lower than actual production in a year with good rains.

Although there are discrepancies between these different estimates, they suggest that an estimated wild fish production of 50-100 kg/ha/yr from rice fields and swamps in southern Cambodia is feasible.

Conclusion

A comparison between Svay Rieng's emerging aquaculture activities and the natural fish production is sobering. Although aquaculture is growing in importance, it should be put in a proper perspective. The relative effort directed to the promotion of fish culture vis-à-vis management of natural stocks should to some extent reflect their relative importance. The activities are not mutually exclusive. In areas with richer aquatic resources, it is imperative that the existing resources are managed in a sustainable manner. In areas with poor water resources, aquaculture provides an opportunity for growing fish for household consumption as well as for sale. The best way is perhaps to view aquaculture as a supplement to the wild fish resources.

Though Svay Rieng may be comparatively poorly endowed with aquatic resources in the Cambodian context, there are still substantial fisheries in rice fields and seasonal swamps. The economic importance of these fisheries should not be underestimated. At an average price of fish of US$0.80/kg (Gregory et al. 1996b), the total value would be over US$8.3 million per year. For comparison, the value of the rice harvest in 1992-93 was US$22.6 million. The value of the fish is 37% of this. Extrapolated over the population the fishery represents a value of over US$22 per person or over US$100 per household.

In Svay Rieng the average rice production is just over 1 t/ha with a value of US$0.15/kg (Helmers 1996). This means that the value of the farmers' rice production is US$150/ha. At a fish production of 80 kg/ha the fish from the rice field would be worth over 42% of the value of rice production.

Increasing population pressure (Cambodia has one of the highest population growth rates in Asia), environmental degradation, changes in agricultural practices, infrastructure and industrial development all put increasing pressure on this underestimated resource. The fundamental issue is that this is a resource of major importance, perhaps second only to rice, and thus needs to be managed in a sustainable way. In practical terms, this means that an appropriate amount of national and provincial resources should be directed to monitoring and management of rice field fisheries. Development of proactive management strategies of waterbodies that serve as dry season refuges for fish and other aquatic animals is needed.

Infrastructure developments that affect the water regime, such as large roads, irrigation and flood control structures, must be evaluated for their potential impact (whether positive or negative) on fish production. This is especially true for changes in agricultural practices such as promotion of dry season irrigated rice farming. As pointed out by van Zalinge et al. (1998), the importance of fish in the food security equation has not been recognized by the Government or FAO and, as a consequence, they may neglect the protection and management of these aquatic resources. Projects for the development of infrastructure, flood prevention and agriculture must take into consideration these impacts on the fishery to understand the overall effect on the rural population. This discussion does not question the need for infrastructure and agricultural development. It argues that the planning of development activity in and around rice fields should take into consideration their impact on these fisheries to ensure that the target beneficiaries do benefit from the developmental projects.

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