

Catfish fry collection in Kandal/Phnom Penh in the Mekong River

by

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1. Abstract

The collection of fry of Trey Pra, *Pangasianodon hypophthalmus*, is a recent fishing practice since 1980 which takes place in a relatively short period (June – July and sometimes in August) during the closed fishing season. The very particular capture technology was developed and imported by Vietnamese fishers at the beginning of 1980s. The catch of this mosquito netting bag net consists of the fry of many different species. However, only one single species, *Pangasianodon hypophthalmus*, is of economic interest, and therefore selected and mainly transported to private nurseries in Vietnam (Dongthap province) for further distribution to cage and pond culture enterprises in about eight provinces of southern Vietnam. Small numbers of fingerlings of this species are kept for pond culture in Cambodia. From 1989 to 1993, this type of fishery was allowed under the Cambodian fisheries law at one specific location only in the Mekong River in Kandal province. However, its uncontrolled spread to Kampong Cham province induced the Cambodian Government to ban this fishery in 1994. It is unclear whether the effects of this fishing practice have led to a decrease in annual production of catfish species. However, the catch composition of the bag net (Dai) fisheries in Phnom Penh/Kandal province measured in 1994 and 1997 shows that the annual total catch of Trey Pra was estimated at 355 tons and 43 tons respectively. Likewise, the wild catch of catfish species that amounted to about 10,000 tons in the Great Lake area in 1987-88, decreased to half in 1992-93. This paper describes the current activities of this illegal fishing practice. A thorough understanding of this fishery in terms of its impact on fish stocks, as well as its socio-economic dimensions is needed and is critical for developing options for improved fisheries management in general.

2. Introduction

Trey Pra, the Khmer name of one of the dominant Mekong River catfish species (*Pangasianodon hypophthalmus*) forms an important part of the total annual catch in Cambodia. This species is very popular in aquaculture in both cage and earthen pond culture due to its biological adaptation to a different type of environment. It's also known as a riverine species, which migrates to the rapid system at the upstream of the Mekong River and its tributaries for spawning. People located along the Mekong River believe that catfish eggs flow and develop along the way downstream during the early stage of the Mekong floods in June, July and sometimes in August.

The huge demand for *Pangasianodon hypophthalmus* fry for cage and pond culture in southern Vietnam has led to a surge in fish fry collection from the wild. A number of Vietnamese fishermen moved up to Cambodia where they are able to catch much more than in their own waters.

Reportedly, the fishing activities carried out by Vietnamese fishers in Cambodia started around 1980 in the Mekong downstream from Neak Loeung to the Cambodian-Vietnamese border with the collaboration and support of the Department of Fisheries. In 1989 it was incorporated in the fishery law. However, in 1994 it was officially banned.

As it is a profitable business, the catfish fry collection has expanded in the main channel of the Mekong River from the Kampong Cham–Kratie border down to the Cambodian-Vietnamese border. It also takes place in the whole Tonle Toch river in Kampong Cham and Prey Veng province and in the Tonle Sap river from Phnom Penh to Prek Kdam.

This paper is based on observations on one site with the aim to find out more about the fishery.

3. Background

Catfish fry collection with the fry bag net has spread to most parts of the Mekong river, but especially in the four provinces: Kampong Cham, Kandal, Phnom Penh and Prey Veng. In Kandal/Phnom Penh, catfish fry collection started along the Mekong river in 1980 by Vietnamese fishers. In 1989 the Fisheries Department demarcated the catfish fry collection lots in Kandal and Prey Veng province so they could be auctioned for catfish fry exploitation. In Kandal province there were 21 catfish fry collection fishing lots (equal to 480 units of dai) in the area from Neak Loeung down to the Cambodian-Vietnamese border in Leuk Dek district (Fisheries Law, 1990). After the demarcation, Touch Seang Tana conducted research, which mainly focused on catfish fry collection. The result of his research showed that the catfish fry dai caught not only *Pangasianodon hypophthalmus* fry but also fry of many other species among which *Cyprinidae* form about 70 to 80% of the catch. Although the research showed that many other species were destroyed, the number of catfish dais was increased and expanded to other districts in the province: Kien Svai, Lvea Em, Phnom Penh and Muk Kampol. In 1994 a discussion on the catfish fry collection problems was organized with collaboration of Ministry of Environment, Non-Governmental Organizations and bio-diversity experts. After the discussion, the catfish fry collection activities were officially stopped, giving the opportunity to the Fisheries Department to conduct research. However, fry collection continued illegally and expanded further to the Kratie border.

4. Location and Number of catfish Dais

Data on catfish fry bag nets were collected in five separate districts in Kandal province with the participation of an experienced data collector based in the district. Field surveys were conducted in these districts. In figure 32 a map of the Mekong River in Kandal province is given. The catfish fry bag net rows and the number of catfish fry bag net units in each row are shown in figure 33.

Table 30: Number of catfish fry dais found in Kandal/Phnom in the Mekong River

N°	Name of district	Number of catfish Dai units
1	Mok Kampul	90
2	Lvea Em	35
3	Kean Svai	105
4	Leuk Dek	345
5	Phnom Penh	76
	Total	651

5. Structure of the catfish Dai Gear

Catfish fry dais are installed 30 to 40 meters from the riverbank. In each row the number fluctuates between 1 to 3 units in accordance with the direction and velocity of the water current, but most rows have two units.

Each unit has a 5-meter diameter mouth and a bag net of 10-15 meters long. The mosquito netting bag net has a capture room at the end. The nets are suspended from empty metal tanks attached to wooden poles driven into the riverbed.

The dai's mouth is kept open by the force of the water current and with the help of anchors and two vertical bamboo poles fixed to both ends of the ropes (upper and lower). The distance between one Dai to another is 50 to 100 meters. A picture of a catfish dai is given in figure 35.

The catfish dais operate in water of 4.5 to 6 meters deep. The velocity of the water ranges from 0.2 to 0.5 meter per second in June and 0.5 to 1 meter per second in July in Kandal and Prey Veng province (Department of Fisheries Report, 1994). They are located in parts of the river where the current is relatively slow.

6. Fishing season of catfish Dai fisheries

The first increase in water level of the Mekong River usually takes place in June. The start of the fishing season of catfish fry is heralded by the arrival of highly turbid river water. The catfish fry dais are installed in the Mekong river in late May to wait for fish fry being carried by the first floodwaters.

The peak migration of fish fry depends on the height of the floods. In previous years, migration usually peaked in June but this year (1998) migration peaked on 7th and 8th of July and the best catching period was from 2 to 12th of July in the upper Mekong River in Muk Kampul district down to Phnom Penh.

It is important to know that catfish fry used to be caught three times per year. But in the last few years, there were only two times because the amount of fish fry migrating in the third phase was too small. The second time normally takes place two weeks or so after the first time. But this year the second time of Dai operation was extended about one month and a half. According to the information from the data collectors, the peak period of the second time was on the 27th of August 1998 and lasted only for about 3 to 4 hours (2 to 5 am). See table 33 on page 135: The calendar of catfish fry bag net (dai) operation.

7. Catch and species composition

The total catch is expressed in numbers of heads. In the peak period of the first capture period, which lasts for about two hours a day, a basket on a long pole is used to collect fish fry from the dai's capture room every five minutes. The total catch reaches 500,000 to 1,000,000 heads of fish fry per dai per day (in Muk Kampoul district). In the second capture period, fish fry is usually mixed with more white species than that caught in the first capture period. The small fingerlings *P. hypophthalmus* mixed with about 0.5 - 1% *Pangasius micronemus* and *Pangasius macronemus* are caught in enormous numbers in the Mekong river in Kandal, Kampong Cham and Prey Veng provinces (Mekong River Committee, 1992). However, we can not identify the fish fry in the larvae stage. For Pangasius species, we can only recognize it through its brown color, its better resistance compared to other species. We also get the feedback from pond fish farmers that after they bought the wild Pangasius species fry and cultured it for a period of time, a few Pangasius species in their ponds were seen such as *Pangasius hypophthalmus*, *Pangasius bocourti*, *Pangasius conchophilus* etc.

The dai operators take only the target fish fry (*Pangasianodon hypophthalmus*). The rest is usually thrown into the river or is used as animal feed. Besides the above species many other species, especially Ciprinidae (70% - 80% of the total number) are also caught (Tana, 1992).

The total number of *Pangasianodon hypophthalmus* caught in Muk Kampoul district is estimated as given in Table 31 below:

Table 31: The estimated *Pangasianodon hypophthalmus* fry caught in Muk Kampoul district in 1998

Number of <i>Pangasianodon hypophthalmus</i> fry (million heads) caught in the first capture period (July) in Mukam Poul district in 1998			
	Peak period	Low period	Total
Catch/dai/day	0.5-1	0.01-0.05	
Active days	2	8	10
Active gears	90	90	90
Estimated numbers	90-180	7.2-36	97.2-216
Average	135	21.6	156.6
Other species captured *	360-720	28.8-144	388.8-864

* In the total catch, 25% is *Pangasianodon hypophthalmus* and 75% is other species (Tana, 1992)

If we assume that the dai catch in other districts equals that in Mukam Poul, a quick calculation for Kandal and Phnom Penh shows that a total of 703-1862 million heads is caught, given that there are 651 units.

According to our data supervisors' report, there were 161 catfish fry dai units in Kampong Cham and 136 units in Prey Veng province. The catching period and number of *Pangasianodon hypophthalmus* caught per dai per day in Kampong Cham province are slightly different from that in Muk Kampoul district but in Prey Veng province the average catch per dai per day is around 10,000 to 35,000 heads. So both provinces caught:

Table 32: Estimated total number of *Pangasianodon hypophthalmus* fry (million) for Kampong Cham and Prey Veng province in 1998

	Kampong Cham	Prey Veng	Total
Total Estimated catch (expressed in million heads)	173.88-386.4	1.36-4.76	175.24-239.16
Other species captured *	695.52-1545.6	5.44-19.04	700.96-1564

* In the total catch, 25% is *Pangasianodon hypophthalmus* and 75% is other species (Tana, 1992)

8. Fish Fry breakdown and handling practices

After being caught, fish fry is collected and taken into a basket with small mesh size, which is usually placed in a hapa. The hapa is fixed near the riverbank where the water current is slow, so that the fish fry will not be hit by the force of the water. Fish fry is sorted by the basket; only *Pangasianodon hypophthalmus* fry is selected into the hapa. The other species are kept in the basket because they are bigger than the basket mesh size. After being caught, the *Pangasianodon hypophthalmus* fry in the hapa is fed with beaten raw egg yolks.

In the peak period, *Pangasianodon hypophthalmus* fry is usually exported within 24 hours after being caught, and within 48 hours in the low period. Sometimes, if there is not enough to export, the catch of several dai owners is combined. The boat owners transport the fish fry by boat to Vietnam. The other dai owners go to Vietnam using their own transport to sell their products on their own. However, the dai owners who combine the catch have to pay the expense for crossing the checkpoints to the boat owner, according to their oral agreements. Nearly all fish fry is exported to Vietnam. Only a small amount for culturing is sold in Cambodia especially the fish fry caught in the second capture period. Each year at least 100 million catfish fry were

exported to Vietnam (Mekong River Committee, 1992). According to the fry catchers, there is an adequate supply of wild seed to satisfy the Vietnamese market.

9. Discussion

Catfish fry bag nets are illegal fishing gears and operate only in the closed season. They are difficult to approach as they are protected by armed men. The number of catfish fry dais allocated by the Fisheries Department in 1989 was 480 units. However, about 650 units were estimated to be active in 1998, despite the government ban since 1994. This reflects a strong increase in illegal fishing activities.

Since the ban on catfish fry dai, the DoF lost 100 to 200 million Riels (equal to US\$ 50,000 to 100,000) per year in auction fees. Moreover, these illegal activities have caused anarchy in the fishing community.

The annual total catch of catfish species from bag net (dai fisheries) in Phnom Penh/Kandal province was 355 tons in 1994-95, 192 tons in 1995-96, 43 tons in 1996-97 and 157 tons in 1997-98. It is not yet clear why there is a reduction in catch despite an increase in effort.

10. Recommendations

- The catfish fry bag net fisheries must be studied scientifically in more details before firm conclusions can be drawn about its suspected negative impacts.
- To facilitate this research declaring the fishery legal would be helpful.
- The results of the research should be used to determine the future of this fishery, i.e. prohibit it completely or allow it and regulate it properly.

11. References

- Department of Fisheries, 1994. **Report on Catfish Fry Fishing for Experiment in Kandal and Prey Veng province.**
- **Fisheries Law, 1990.**
- Mekong River Committee, 1992. Interim Committee for Coordination of Investigation of the Lower Mekong Basin: **Fisheries in the Lower Mekong Basin.**
- Touch, T.S., 1992. Personal Communication.

Figure 33: Map showing rows of catfish fry bagnets on the Mekong River in Kandal province

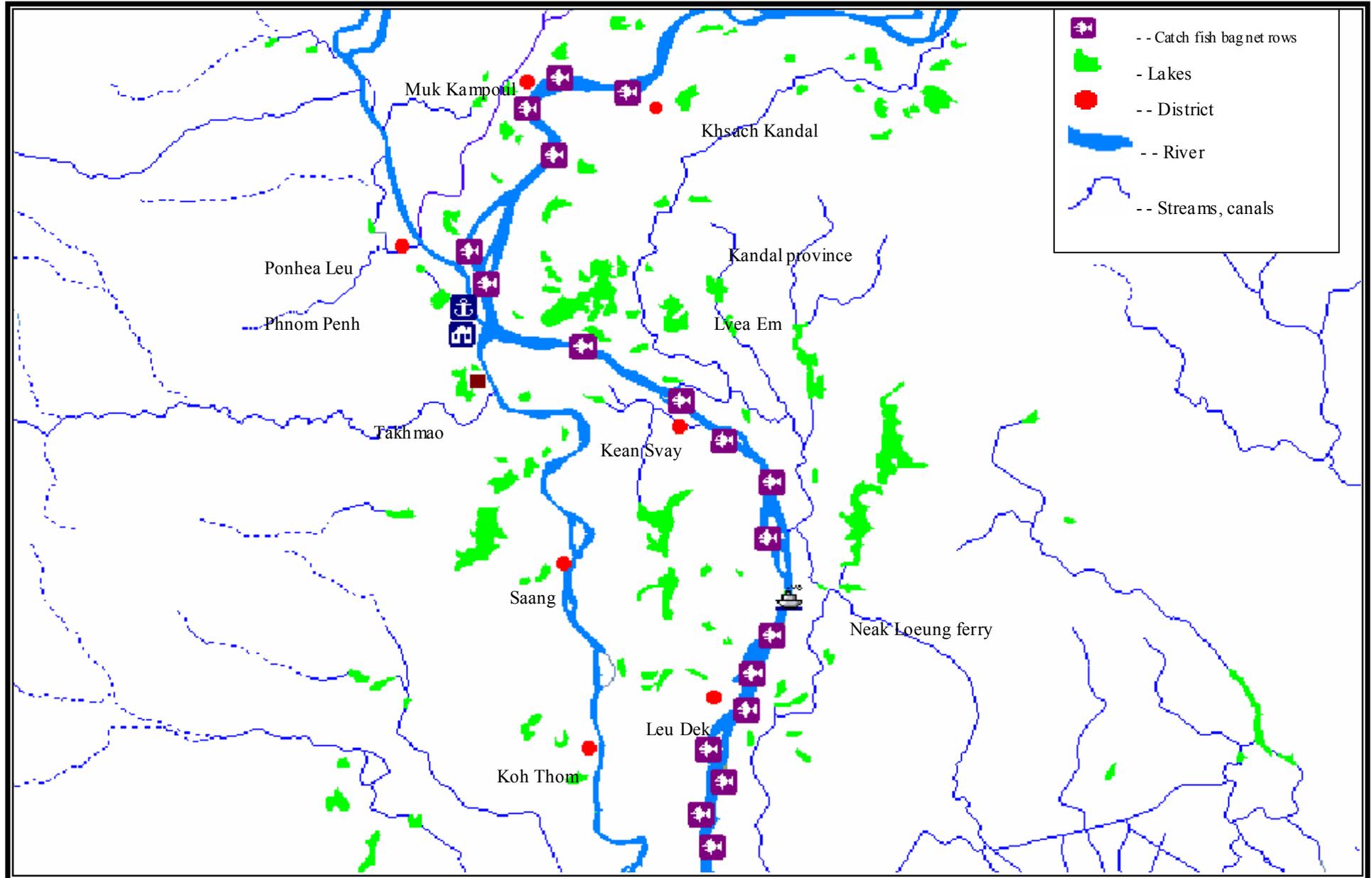


Figure 34: Location of dai operations in the Mekong River

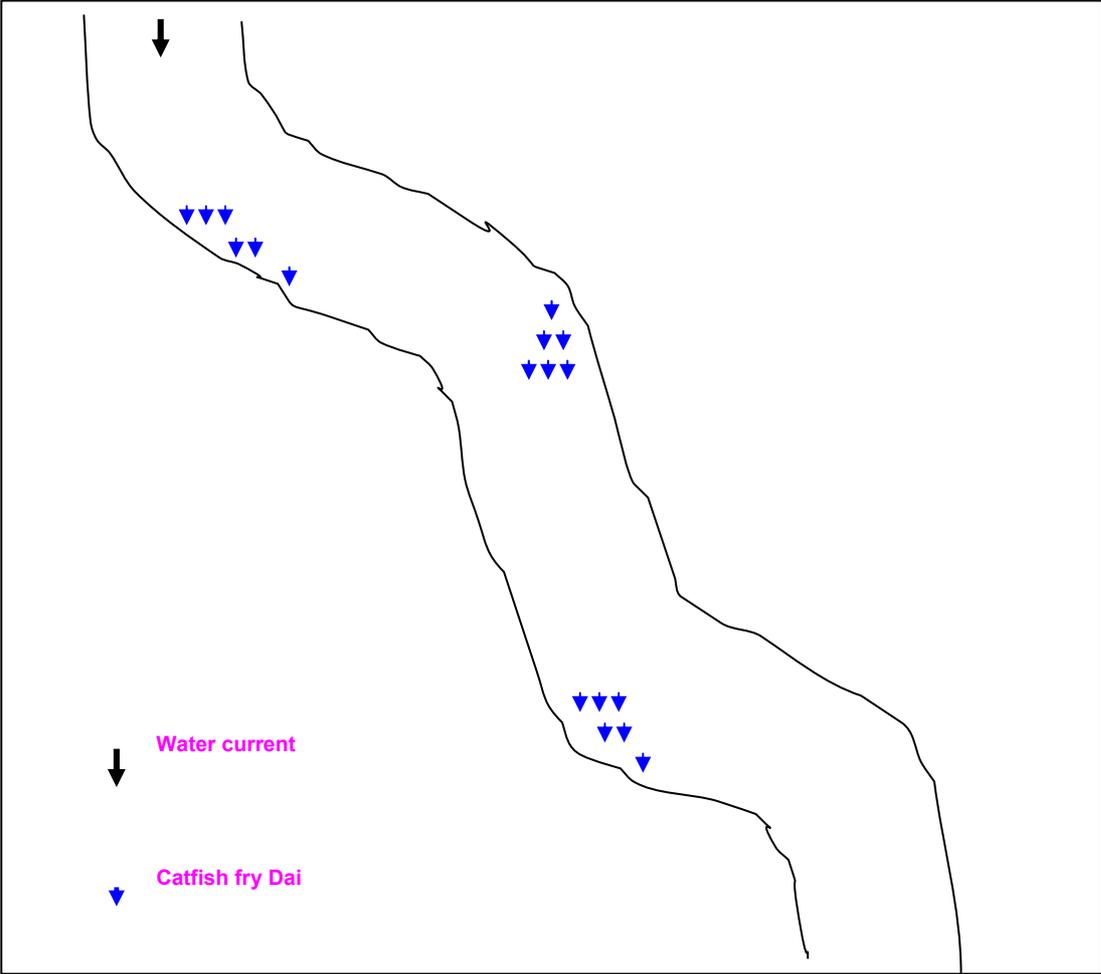


Figure 35: Side and top view of Catfish fry bag net

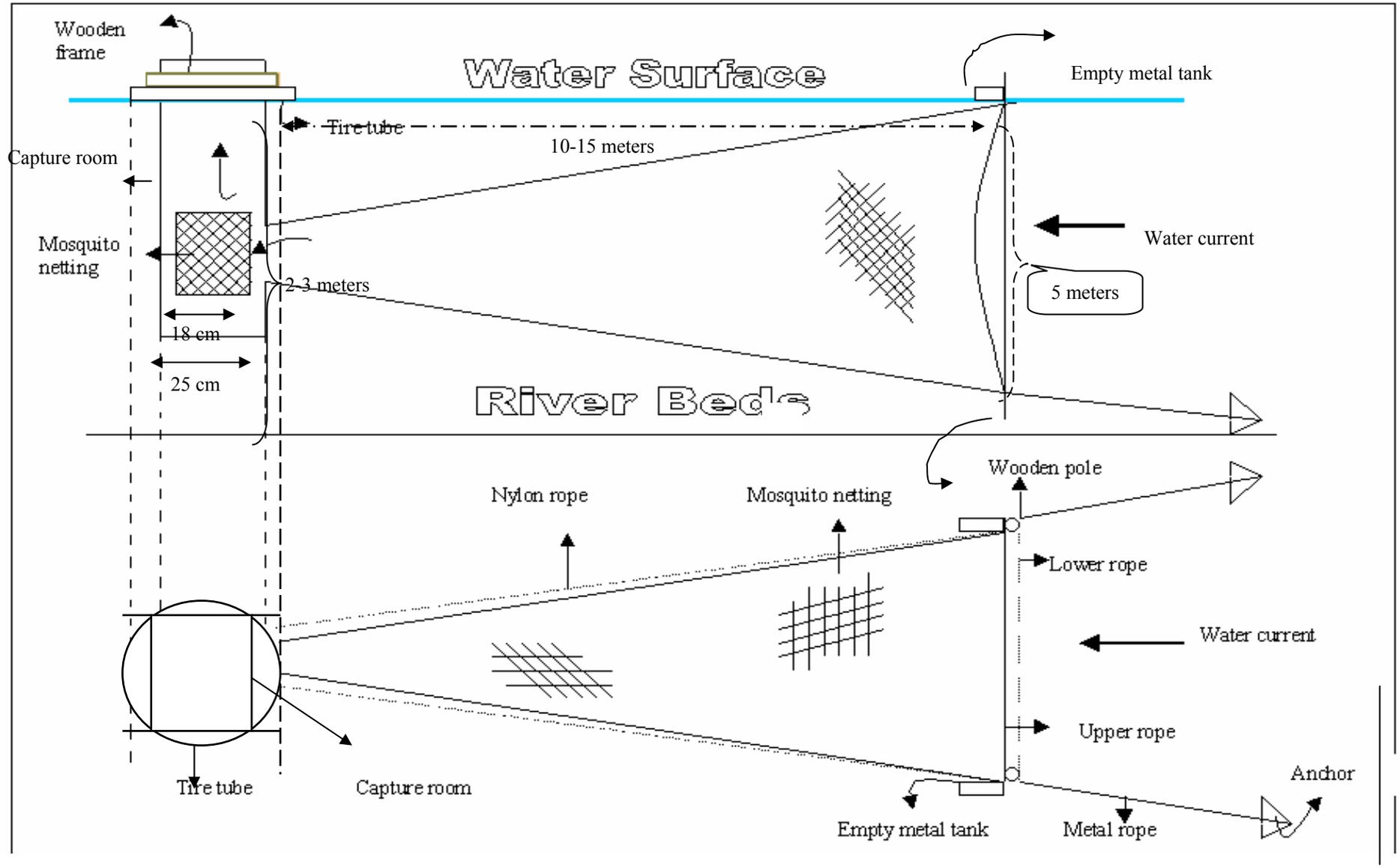




Figure 36: The water current entering the capture room splits into three currents: two lateral ones, escaping through the mosquito netting and a third current, that transports the fry to the water surface, where it is scooped out.



Figure 37: The capture rooms of two Catfish fry bagnets. One row may have from one to three bagnets (*dais*).



Figure 38: Catfish fry is sorted directly into special net cages in shallow water near the riverbank. They are fed with egg yolk.

Table 33: Calendar of Dai operations

Month Description	May				June				July				August				Source
1997 - Water level of Mekong River	1.56	1.27	1.32	1.37	1.81	1.83	1.65	1.68	2.27	3.10	4.10	5.27	5.98	7.10	6.72	7.18	*
	1.23	1.36	1.29	1.76	1.78	1.68	1.58	2.10	3.08	3.60	5.11	5.91	6.97	6.78	7.08	7.02	
	2.47	2.22	2.04	2.31	2.68	3.04	2.56	2.74	3.78	4.88	6.32	7.86	8.82	9.99	9.30	10.1	**
	2.21	2.04	2.24	2.66	3.01	2.62	2.64	3.48	4.86	5.83	7.67	8.72	9.90	9.39	9.94	7.74	
- Dai installation - Operation period			■						■								
1998 - Water level of Mekong River	1.23	1.34	1.23	1.16	1.59	1.40	1.82	1.50	1.72	3.14	3.76	3.58	1.57	3.44	3.88	4.48	*
	1.36	1.20	1.25	1.59	1.47	1.82	1.54	1.70	2.67	3.74	3.62	3.14	3.37	3.85	4.37	4.37	
	1.93	1.79	1.96	1.98	2.42	2.46	2.86	2.52	2.70	5.05	5.70	5.48	4.35	5.30	5.99	6.84	**
	1.75	1.98	1.92	2.40	2.42	2.87	2.54	2.66	4.44	5.70	5.56	4.76	5.22	5.67	6.76	6.42	
- Dai installation - Operation period			■						■								

Note:

- * Neak Loeung Hydrological Station.
- ** Chroy Changva Hydrological Station.
- The catching period of Catfish fry collection.
- Peak period of fish fry migration.

The water level was recorded 2 times per week (Monday and Saturday)

