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THE CONDITIONS TO APPLY COMMUNITY-BASED CO-MANAGERMENT APPROACH IN VIETNAM: THE CASE OF THANH PHONG COMMUNE, THANH PHU DISTRICT, BEN TRE PROVINCE

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Abstract: The dependence of people on marine and coastal resources is increasing. Specially the small scale fisheries creates employment for coastal communities, produces more than half of the world's annual marine fish yield and being the main food supply for human, mainly in developing countries including Vietnam. However, the status of overexploitation and environmental degradation are threatening directly these resources. Existing approaches have failed to decrease fishing capacity or to solve management conflicts. The management of small scale fisheries is in urgent need of reform worldwide. Whereas, co-management is one of the new and promising management approaches that has been noticed recently. Co-management is based on common property theory, which recognizes fishermen's participation, local stewardship, and other stakeholders. This paper would like to mention premises to apply community-based co-management in Thanh Phong commune, Thanh Phu district, Ben Tre province in Vietnam.

Key words: Co-management; Community-based management; Vietnam's small scale fisheries.

I. CO-MANAGEMENT AND COMMUNITY-BASED MANAGEMENT

1. Co-management

Cooperative management or co-management can be defined as the cooprative arrangement in which the community of people who use local resources (fisherman), local authority and other stakeholders and other outside representatives (non-government organizations, research institute, universities) all share rights and responsibility on the fishery management [1].

Through consultancy and negotiation, stakeholders carry out the official agreement on the equivalent role, responsibility and rights in management, is considered as the ability of negotiation. Co-management is also called cooperative management, intergration, participation or multisides.

Therefore, it is acknowledge that all responsibility and power are given to community level. The numbers and kinds of responsibility and/or power that the State level and different community levels are given will be different depending on each nation and specific condition of each area. The core of responsibility and power share is negotiated among community's members and authorities according to the State's policy. To define the numbers and kinds of responsibility and/or power to allocate to community is basically political decision, in which authority always plays the higher role. However, the key problem to co-management is power negotiation in which there is reciprocal influence of the State and non-government representatives, that is a very important factor in determination of the normal balance and can be accepted in power share and responsibility assignment.

2. Community-based management

Basically, community-based management is a very simple concept that originate from fishermen and coastal communities, whose life depends on the sea resources, so they play the large role in the management of this resources. The concept is suitable for the popular opinion of the best management decision often originating directly from that level [2].

The thought of resources users and communities responsibile for their resources management first makes community-based management different from other resources management methods that are little relevant to people who most depend on resources and their own communities.

With the ideal of resources users being the first resources managers, it is supposed that they must be already and have ability of management. community-based management requires individuals work together because of common benefits and they must note their behavior's influence on community, resources.

Beside the notice of collective responsibility for self-management, self-administration, community-based management also includes preservation or is the resources users' conciousness. Community fishery not only seeks ways to increase the exploited yield or profit but also must try protecting the ecosystem, strengthening preservation and using resources and the ecosystem durably [2].

Above opinions expressing the basic definition of community-based management, there are many complicated matters in fact. Complications happen as trying to determine who manage and which is managed? If community-based management shows the nature of organization structure in which localities can cooperate complicated matters and have reciprocal relation that impacts on community, who will decide whom are the community's members and which matters they are faced with?

Community-based management can be considered in two aspects. The first aspect of legal authority hand-over to manage resources, community-based management is a process of authority hand-over to community and resources user, therefore they have right of coastal resources use and management. The process can be seen as a part of larger movements that community can reach the economic strength and stronger power. The second aspect of community-based management is the ability of community to carry out co-management activities, especially studying or planning of management development. Now, community-based management is considered as a system of skills to implement management activities that are done by localities on behalf of authority [2].

II. TO COMPARE CO-MANAGEMENT AND COMMUNITY-BASED MANAGEMENT.

Above definitions on resources management based on community show that there are many same and different points between co-management and community-based management, the difference in each method's key content. The differences center in level and time of management participation in program. Community-based management is the method with centered person, cored community; as co-management focuses on these matters and arrangement of the cooperation between authority and resources user's community. Besides, the process of resources management is organized differently. Co-management has larger range and scale than community-based management because co-

management focuses on both inside and outside community. Authority can play the minor role in community-based management; on the contrary co-management according to above definition shows that authority plays the very important role.

Co-management often focuses on problems that do not belong to community level, but national and regional levels, influence on community to reach higher effectiveness. Otherwise, co-management strategies relevant to authority agencies, resources managers, ellected officers are all equal to community and stakeholders establish the mutual belief.

When the management basing on community is considered as an essential part of co-management, it can be called **community-based management.** Community-based management owns both co-management and community-based management's features; centered human, cored community, based on resources and cooperation. Therefore, community-based management considers community as the core; to do this, it needs to have a horizontal intergration (through community) and vertial intergration (outside organizations and community agencies as authority). Community-based management is popular in developing nations as the demand of general economic and community, social power and resources management development.

Therefore, community-based management and community-based management programs are durable managment processes, basing on many specific management activities; in which, community-based management is the nuclear.

The advantage and disadvantage of community-based management in comparision with community management and other fishery management methods.

Potential advantages of co-management:

- Different benefits and stakeholders all bring fuller awareness of resources.
- As community relates to develop and carry out co-management methods, the reached results are higher, more legal and suitable to plans and regulations.
- Community's members can give criteria on more effective behavior than admistrative agencies.
- More knowledgement and communication information among stakeholders can minimize social conflicts and maintain or improve the social intergration in community.

Disadvatages of co-management:

- It can not be suitable to some fish communities. Many communities do not agree or have no skill of co-management.
- The locality's leadership, as fishermen organizations, can not exist in community to develop or do co-management works.
- In short term, it needs to have initial investment in time, human resource and finance to establish co-management.
- To many individuals and community, there have not been yet the encouragement on socio-economic and/or political to undertake in co-management.
- There can not be the perfect on politics and law to support co-management.
- Authorizer's troublesome in the power share.

- Community can not have enough ability of becoming an equal and effective mangagement agency.
- Activities of users outside and next to community can break up or reduce effectiveness of management activities done by community.
- Characteristics of specific resources in locality as the fish emigration model can lead to difficulties or can not carry out in community joining in resources management.
- The need of establishment of the agreement basing on big benefits can make the process of making dicision longer and achievement lower than compromise.
- It is said that co-management takes lots of expenditures and time, so it is better to be replaced with other methods as more strict regulations
- There is always unequal and unfair share in power among authority and community, …

Therefore, in fact small-scale fishery management needs to receive the suitable consideration to select suitable approach, co-management or community-based management or both. Otherwise, it needs to assess the program's feasibility; it can receive which support and at which scale before implementing.

III. CONDITIONS TO APPLY COMMUNITY-BASED CO-MANAGEMENT APPROACH IN VIETNAM – HE CASE OF THANH PHONG COMMUNE, THANH PHU DISTRICT, BEN TRE PROVINCE

1. Introduction to Thanh Phong's geography, natural and socio-economic condition.

1.1. Geography

Thanh Phong Commune is one of 18 communes, Thanh Phu district, Ben Tre Province. It borders Thanh Hai commune to the north, Co Chien River to the south, the East Sea to the east and Giao Thanh commune to the west. Thanh Phong commune has 5 villages: Đại Thôn, Thạnh Phước, Thạnh Hoà, Thạnh Lộc và Thạnh Lợi. Its capital is at Thanh Phuoc far from Thanh Phu CPC 25 km to the East.

Its natural area of 6.411 ha including 2.858 ha of production land, 921 ha of forest and 17 km of coastline. This area is raised by two rivers Co Chien and Ham Luong to the East Sea, so it expands day by day. There are many running long and flat sand dunes in the mainland so inhabitant can assemble and cultivate. Thanh Phong's climate is rather temprate with two obvious rainy and dry seasons. All commune's terrain is low with the height of 1,8-2 m as compared with sea level, most of land is flooded as heavy rain and flood-tide happen.

1.2. Socio-economy.

Thanh Phong's population is about 9.252 persons/2.380 household, including of 4.613 female; the average density of 6 persons/km^2; most of them are the Kinh people, came from near areas: Vinh Long, Tra Vinh, Ba Tri then resided. Regious liberty is developed at Buddhism, Catholism and Caodaisme.

Habitant in Thanh Phong meets lots of difficulties in life. Thanh Phong has the rather high ratio of poor household (16.07% in 2007, 13.25% in 2008), the number of household have not production land is about 10%.

a. Career development

Thanh Phong commune develop strongly kinds of career as: fishery (mainly aquaculture), agriculture (planting) and service. Especially, clam resources which will provide benefits as it is good managed (estimated about 20 bill VND) as follows:

- To fishery aquaculture: the commune's fishery aquaculture area is 2.955,7 ha, in which land for shrimp is about 2,558 ha, prawn 194 ha of forest, 50 ha black cockle, management and exploitation of natural clam of 288 ha, of which Doan ket Cooperative with 94 ha, Thanh Loc cooperative with 159.7 ha. 80% population of Thanh Phong participates in fishery-related activities; 15% do agricultural activities and 5% belongs to commercial and service sectors.

- To fishery exploitation: the number of fishery exploiting boad is about 68, mainly coastal fishing, using kinds of forbidden fishing gears that destroy the fishery resources as: bottom net, trawler, seine net, traps. Exploited yield is not significant to the total yield of the province but is the main means of livelihood of fishermen who exploit fishery.

b. Infrastructure and practical means

Transport infrastructure in Thanh Phong is degraded seriously, there is no the road to clam ground; fishing boat with small capacity can not go to the open sea, coastal fishing equipment is backward leading to low productivity and destructive. Watch house is not strong enough, there is no communication information mean (telephone) using in urgent cases (storm, destruction).

c. Most people with low years of school is big obstacle in career change training and scientific technological application.

Most people in Thanh Phong commune own only the years of primary school and secondary school level, the number of peole has the years of high school is low, the rate of illiterate is rather high. These are big limitation to enhancement of professional knowledge, skill and to career change training for inhabitant. People with the years of high school is 15%, of secondary school 30%, of primary school 64,5% and 0,5% of illiterate.

2. Bases to select Thanh Phong Commune to develop co-management model.

To select Thanh Phong Commune to develop pilot co-management bases on following criteria:

- The rate of poverty

- The dependence of habitant on fishery resources.

- Destruction rate of fishery resources.

- The agreement of local authority and fishermen.

- Ability of new livelihood development based on current local potentials and partly support from outside objects.

- Currently, in the commune beside other resources, there is annually a large quantity of seed clam, the commune also realises that it is rather high profit to community and established 02 cooperatives to manage but low effectively. The main reason is the weak ability of management, the habitant's conciousness of community and resources protection has not been high.

- To the right of resources ownership and use: currently Provincial People Committee licenced the use right of coastal tidal area to community with the area of over 200 ha.

- To local knowledge on resources: most of habitant, local authority realize that the resources are exhausted, fishermen know their career that is not lawful, exhausts the fishery resources but they depend on the resources and have not got new livelihood so their consciousness of resources protection is not high.

- To fishery resources: clam, prawn, crab, tiny shrimp, fishes….The yield of clam, shrimp, crab and some kinds of small fish appear annually with rather large quantity in coastaline, estuary. These are objects that les migrating, living with groups.

By meetings and survey at the commune, authority at all levels, sectors, groups sympathize to develop co-management model, especially people community in Thanh Phong commune. However, most of opinion show that in the initial time of establishment, the model's scale should be at Thanh Loc and Thanh Loi (having clam resources), fishery exploiting group and poor household, policy in the commune; after some years it will be expanded over the commune. By investigation of consultancy and locality, the core group is defined and trained to part in the model management board: officer from CPC, policeman, farmer association, woman association, frontier-guard, leader from cooperatives and fishery exploiting group and representatives of fishermen. However, the core group also needs to be enhanced their ability of planning, reporting, production and bussiness management…

3. The situation of information seeking and resources management support

- Ben Tre province has Sub-department of fishery resources exploitation and protection and Inspectation of Department of Agriculture and Rural Development that cooperate with posts of frontier-guard in going on a patrol, often controlling or as requested.

- Centre of Technology Transfer and Vietnamese Fishery Service consults Ben Tre province to develop the model.

- The management model is being supported by FSPS II.

4. The situation of sponsor finding

Currently, Ben Tre is sponsored by DANIDA to develop the model through activities as: training to enhance ability, investigation, issuing reguilations,…but there is no detail support to develop new livelihood for community, especially for fishermen who do forbidden works, destructive

fishery resources exploting careers, poor household without production land,… Therefore, it extremely needs support fron NGOs, NGs, institutes, universities, scientists in training, awareness enhancement, career development for community and improving infrastructure to serve management and local economic development.

5. Conclusion of preparation process of developing co-management model in Thanh Phong Commune.

The preparation process to develop co-management model in Thanh Phong commune shows that:

- Thanh Phong commune is stable highly in politics, local authority and inhabitants community who participate actively and enthusiastically.

- Inhabitants community is authoried to exploit resources.

- Most of coastline inhabitants live depending on fishery resources, a large part of fisherman without production land and secondary career. However, if they are supported a part of finance and given production land or new livelihood that are suitable to local conditions and potentials, they can live with new kinds of livelihood as: seed growing, aquaculture, trade village development, processing and consumpting current local products to raise value and to ensure food safety and hygence.

- Most of inhabitants lives closely to the local fishery resources (clam, oyster, shrimp, fish,…), there are exploiting boats from other provinces in the area but limitted. Most of fishermen in Thanh Phong commune exploits the resources not complying with the legal regulations but there is no suitable solution.

- Inhabitants community, authority, organizations,… need to be supported from universitues, research institutes and NGOs.

- Current regulations and custom: Development of co-management model in Thanh Phong Commune through investigation and survey that are suitable to social, tranditional and custom features in the province.

- Be ability of establish a co-management agency in the area.

The development of co-management model in Thanh Phong Commune to manage, protect and effectively exploit fishery resources in order to meet the community's economic aspect, to help poor household improve their lieves and eradicate hunger. Besides, fishery development combining with suitable management and exploitation of mangrove forest can strongly develop other economic types as: ecosystem tourism, trade village basing on local current potentials.

In general, during the preparation process of co-management model development, Thanh Phong has reached the high agreement from community, authorities at all levels, relevant sectors as well as received lots of ideas and conclusions from consultants: to develop co-management model is right and feasible action to help Thanh Phong inhabitants have better life, protect fishery resources, increase income, improve living standard and eliminate hunger and reduce poverty. However, to

develop the model successively it needs lots of time, human resource and resources, but first some conditions as:

- Need more resources to support poor inhabitants without production land, destructive fishery resources exploiting household, people who have no stable career or work to change into new careers and to provide stable work for inhabitants community.

- Need to disseminate and raise awareness and knowledge for inhabitants community.

- Support inhabitants community to develop strength, current potentials basing on local resources.

- To perfect regulation system, to create the ability of cooperation of stakeholders in protecting resources, creating works, stabilizing market and sandwiching activities of commune authority with some essential and urgent community ones. To support training the group of community representatives on management, planning, reporting and production,…

- Need to receive the State's positive support through activities as: cultural toursism training; giving right of land-use and management and natural resources to community; infrastructure enhancement, interior transport, communication information, markets,…

- Need to promote scientific researches as: preventing diseases for clam and cockle; transfer of productivity technology, clam, oyster, shrimp production, environment assessment from clam, oyster aquaculture; projects of clam and oyster investigation and protection…

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INITIAL ACHIEVEMENTS FOR DEVELOPMENT OF FISHERIES CO-MANAGEMENT IN ASSOCIATION WITH CONSERVATION AT BINH THIEN WETLAND, AN PHU DISTRICT, AN GIANG PROVINCE

Tran Anh Dung,

Hứa Quang Lập

FSPS II An Giang

I. OVERVIRE OF BINH THIEN WETLAND

Binh Thien wetland located at co-ordinate of 10º 54'46"-10º 55'53" nothern latitude of 105º 03'35"-105º 05'49" easten longtitude, spreading in 3 communes. The North of Wetland belongs to Khanh Binh commune (a part of Satô humlet), the South belongs to Nhơn Hội commune (called Big wetland), the East belongs to Quoc Thai Commune (Bình Thiên humlet). In the flood season, the area of the wetland is enlarged (flooded), in the dry season, the area is around 200-300ha, the length of the wetland is 4km and width is about 500m. Natural area managed by An Phu district is about 220ha.

Bình Thiên wetland has 5997 heads belonging to 1107 households (statistics 2008). Bình Thiên humlet and Satô humlet are almost Kinh people, the Big wetland is Cham people. This is also considered as higest percentage of poor people compared with others. Female is accounted for 52% and male is 48%. In total of 300 household being surveyed, there were 173 households involved in fishery activities, accounted for 57,7% (Khánh Bình with 29 households, Quốc Thái with 56 households and Nhơn Hội 88 households). 56 are poor households with certified poor books, accounted for 18,7% (Khánh Bình 3 households, Quốc Thái 21 households and Nhơn Hội 32 households).

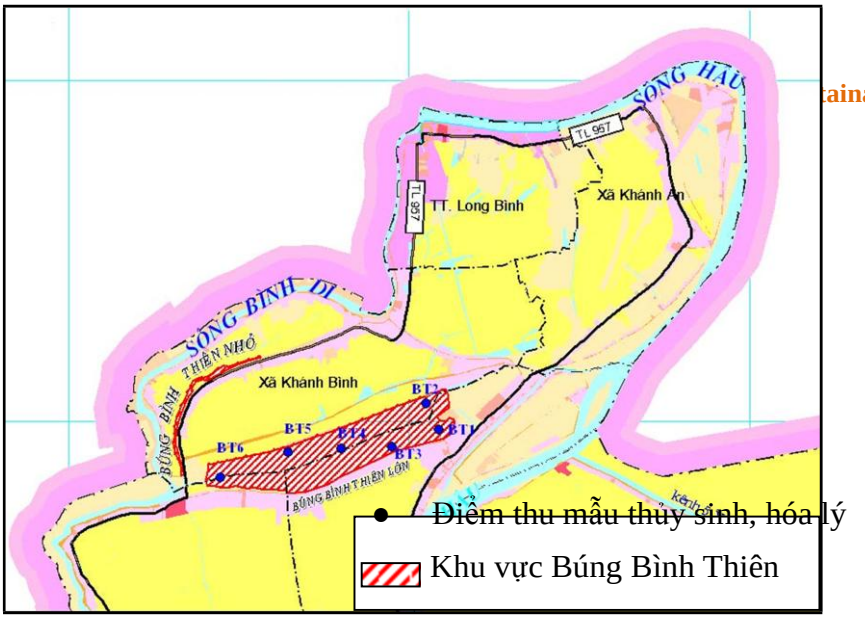


Figure 1. Map of Bình Thiên Wetland

II. STATUS OF AQUATIC RESOURSES AND FISHERY ACTIVITIES

1. Chemical and Physical factors of water environment

Survey and monitoring of ground environement is an essential step for research of environment. Survey result will be the base to demonstrate changes of environment when fishing activities happened. At the same time, the survey result is to help environement management agencies to set solutions in case of polution.

Based on analysis of survey, the status of environment in Binh Thien Wetland was noted as follows:

- Surface water and sediment of Binh Thien Wetland are in risk of organic polution and nutritions.

- Oil content found in water samples and sediment is rahter high and exceeding permitted standard (for water).

- DO content at this site is very low compared with limited level in Vietnam standard TCVN 6774 – 2000. The main cause is that reduction of oxygien dissolved in water in the Wetland is oxygien consumed for oxydizing organic substances, nutritions and oil in water.

- Iron content in water and sediment is rather high. Togetehr with high SO_4^{2-} content, the result of analysis shows that: Bình Thiên wetland is poluted with iron alum.

- Solid substances hanging in water are much and over permitted standards at most of collected positions.

- There is also appearance of small content of pesticides in water sample and sediment. However, by time, when these substances agglomerated in water with big enough content, they would danger with aquatic species.

Evironment components have big impacts from human activities. Decree of impacts to environment depends on each activity and measures to protect environment and apply for specific period.

According to reports [8], [9] and [10], in research area, the main cause leading to the

increase of pollutants could be as follows:

- Wastes and waste water, agricultural waste water and households living around the Wetland are not treated and released direct to the wetland;

- Raining will sweep pollutants on the way and pour into the lake;

- The water way from Binh Thien lake to Hau river was blocked at Dong Ky bridge, this caused accumulation of pollutants in wter and sediment.

2. Aquatic Fauna (Phytoplankton, Zooplankton, Zoobenthos)

2.1. Phytoplankton flora

The search result identified 66 algeas (Phytoplankton), belonging to 23 families 14 branches, 5 phylum in Binh Thien lake. Algea density in Bình Thiên lake is very high, fluctuation from 4.776.375 - 12.220.250 cells/little, highest is at BT3, lowest is at BT6. High density is due to over development of blue algeas. *Anabaena viguieri* developed and dominant in whole Binh Thien lake, with dominant high percentage, fluctuation from 39-56%. Besides, some other blue algeas such as *Microcystis, Anabaena* also dicovered very dominant in Binh Thien lake.

Algeas flowering is sign showing that the lake is seriuously nutrition. When algea flowering that changes environmental properties, at noon DO could be up to >10 due to algea is photosynthesis, it is however down at night time (0-3) cause the death of shrimps and fishes, break down the balance of ecosystem, biodiversity. Besides, there are many algeas which have ability to discharge poisons into environment and endanger to aquatic species and people.

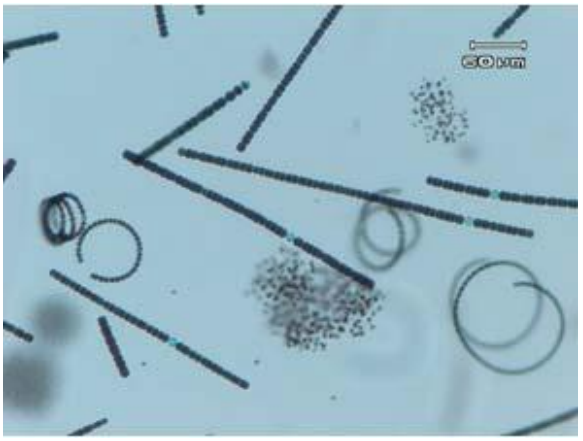


Figure 2: Algeas flowering in Bình Thiên lake, July 2008

2.2. Zooplankton fauna

Research result identified 47 plankton species (Zooplankton) belonging to 6 groups:

Rotatoria, Copepoda, Cladocera, Ostracoda, Insecta and some larva. In which, most developed is rotatoria, they have 13 species, accounted for 35,1%, next is copepoda with 9 species, accounted for 24,3% and cladocera with 6 species, accounted for 16,2%. The remains are only from 1 – 3 species, accounted for 2,7 – 8,1% relatively.

- Species indicated with alum infected: most of recognized species in copepoda such as *Macrothrix spinosa*, *Ilyocryptus halyi*, *Chydorus sphaericus*, *Euryalona orientalis*, *Kurzia longirostris* are heavily infected by alum in BT4, BT5.

Macrothrix spinosa

Figure 3: Species indicated the environment infected by alum

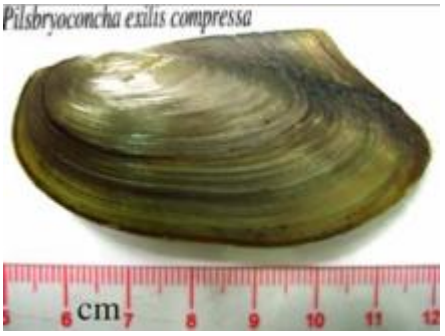
- Species with wide ecological distribution: Bình Thiên lake has many species biologically distributed, they could be seen in most of freshwater body in Mekong delta. Particular such species as: *Polyarthra vulgaris* (Rotifera), *Tropocyclops prasinus*, *Mesocyclops leukarti*, *Thermocyclops hyalinus* (Copepoda), *Heterocypris anomala* (Ostracoda), *Bosmina longirostris*, *Bosminopsis deitersi*, *Ceriodaphnia rigaudi* (Cladocera). These species appeared in most of studied points and repeated in 2 surveys in 2008.

- Species for food: species which have value for food belong to groups as Cladocera, Copepoda and their larva. In survey of July 2008 showing that, there were 15 species of Cladocera, Copepoda and some tiny larva, passive swimming which become food for aquatic species in the lake, particular: *Ilyocyprus halyi*, *Macrothrix spinosa*, *Moina dubia*, *Ceriodaphnia rigaudi* (Cladocera), *Tropocyclops prasinus*, *Mesocyclops leukarti*, *Thermocyclops hyalinus*, *Allodiaptomus raoi* (Copepoda).

2.3. Zoobenthos fauna

Research result identified 34 zoobenthos species, belonging to main groups of: Mollusca, Annelida and Crustacea. Of which, molluse is dominant with 18 species (accouted for 52,9%). Oyster, mussel (Bivalvia) are strong development, particular high economic value species of Amblemidae and Corbiculidae. These bivalvia is exploited by local people in Binh Thien lake with quite high yield (over 50 kg/day).

Based on research result, 3 fresh oysters were recognized: *Scabies crispata*, *Pilsbryoconcha exillis exillis*, *Pilsbryoconcha exilis compressa* for big invertebrate zoobenthos fauna in Vietnam



Scabies crispata ***Pilsbryoconcha exillis compressa***

Pilsbryoconcha exillis exillis

Figure 4. Three new species recognized with invertebrate zoobenthos fauna in Vietnam

3. Fish fauna and status of fisheries

3.1. Fish fauna

According to the survey, we collected and identified 103 fishes belonging to 25 families, 10 groups. Of which, carp (Cypriniformes) has largest species of 40, accounted for 38,83%, next is Siluriformes with 26 species, accounted for 25,24%, the third is Perciformes with 19 species, accounted for 18,45%, Synbranchiformes with 7 species, accounted for 6,80%. The remains are not many, from 1-3 species, accounted for 0,97 – 2,91% of total species collected.

Binh Thien lake belongs lower section of Mekong river, but it is a upper part of Mekong delta. Therefore, it is a fish fauna of mekong delta that has closely link with lower section of mekong delta and close to Cambodia fish fauna. This relationship indicated in number of species as well as repeatation of species (same species) between fauna.

As mentioned above, the lake is upper section of Mekong delta, water of the lake is fully regulated with freshwater. So fish fauna in the lake is freshwater and species live with wide

ecology. Based on collected data for species components, we divide Binh Thien fish fauna into 2 main groups which are : local fishes (black fishes) and river fishes (white fishes).

- Local fishes include species live totally in Binh Thien lake (black fishes). Typical representatives of this group is: snakehead (*Channa striata*), climbing perch (*Anabas testudineus*, fresh ell (*Monopterus albus*), *Trichogaster trichopterus*, *Trichogaster microlepis*), v.v... These species adapt with unmoving or slow movement water, ability to adapt low oxygien and pH, high temperature in dry season. In teh flood season, these species move to flood areas for reproduction, juvenile and adult fishes live in flood areas until the flood season end and back to Bung Binh Thien. Flood areas are habitate for adult and juvenile fishes.

- River fishes (white fishes) are adaptive with runnig water. They are distributed in rivers, however, these species also live in unmoving or slow movement water. Some species of these group can live whole life or a certain time in Binh Thien lake such as: *Cyclocheilichthys enoplos*, *Macrochirichthys macrochilus*, *Macrognathus siamensis*, *Mastacembelus armatus*, *Mastacembelus favus*, *Hampala macrolepidota*, *Pristolepis fasciata*, *Pangasius larnaudi*, *Labeo chrysophekadion*, *Hemibagrus nemurus*, etc… and some species like migration. Migrating species could appear in Binh Thien Lake in season, or live in the lake for a long time (even in dry season) as well. In rainig season, these species migrated from river for food and breeding. In dry season, they move out main rivers for living. Some of them is: *Cirrhinus microlepis*, *Henicorhynchus siamensis*, *Thynnichthys thynnoides* etc...

Rare and vulnerable species: there are 6 species named in Red Book Vietnam (2007) at different threaten. Of these 6 species, there is one considered as criticaly endangered by IUCN. These species are very important for science, they need to be protected for not only in Binh Thien lake, but also protection for the biodiversity of Mekong river system at a higher decree, global decree (IUCN). Checklist of rare and vulnerable species (table 1)

Cirrhinus microlepis Sauvager, 1878

Vulnerable (VU) (Red Book Vietnam, 2007)

Toxotes chatareus (Hamilton, 1822)

Vulnerable VU (Red Book Vietnam, 2007)

Figure 5. Species appeared in Red Book Vietnam 2007

Table 1. Rare and vulnerable species in Bình Thiên lake

No	Vietnamese name	Scientific name	VN	IUCN
I	**BỘ CÁ THÁT LÁT**	**OSTEOGLOSSIFORMES**		
1	**Họ cá thát lát**	**Notopteridae**		
1	Cá còm	*Chitala ornata* (Gray, 1831)	VU	
II	**BỘ CÁ CHÉP**	**CYPRINIFORMES**		
2	**Họ cá chép**	**Cyprinidae**		
2	Cá hô	*Catlocarpio siamensis* Boulenger, 1890	EN	
3	Cá duồng	*Cirrhinus microlepis* Sauvager, 1878	VU	
III	**BỘ CÁ NHEO**	**SILURIFORMES**		
3	**Họ cá tra**	**Pangasiidae**		
4	Cá tra dầu	*Pangasianodon gigas* Chevey, 1930	EN	CE
4	**Họ cá chiên**	**Sisoridae**		
5	Cá chiên nam	*Bagarius yarrelli* (Sykes, 1841)	VU	
II	**BỘ CÁ VƯỢC**	**PERCIFORMES**		
5	**Họ cá mang rổ**	**Toxotoidae**		
6	Cá mang rổ	*Toxotes chatareus* (Hamilton, 1822)	VU	

Note: *Decrees according to IUCN (1994): EW (extinct in the wild) : CR (criticaly endangered) ; EN (endangered) :VU (vulnerable) : LR (lower risk) : DD (Data deficient) :*

3.2. Status of Fisheries

Economic species: most of fishes caught in Binh Thien lake is used for daily food by local people. However, not all fishes are econmics species. Economic species have to meet two factors of high commodity and yield. Economic issue is also dependent by years. Because, some migrating species, they could be a high economic species in this season but not valuable in another season.

Based on survey and interview with local people in the area, 33 species identified as economic species. These contribute an important value for local people and are stable fisherfolk's life in the area.

Status of fishing activities: According to survey data from 3 communes: Nhơn hội, Quốc thái, Khánh Bình, Binh Thien area has 1107 households with 5997 people residing in 4 hamlets around the lake, of whom there are 85 households participating in fishing. There are three types of fishing households in Binh Thien lake:

- Full time fishermen: their main income depends on fishing (over 50% of total income of household): main labourers are fishermen;

- Part-time fishermen: (income from fisheries is less than 50% of total income of household);

- Fishing house for daily meals (catch is for using in their families): they are many and they are not normally refered in local reports on fishing situation.

Fishing gears used by local people in Binh Thien lake inclding: drag-net with diferent mesh net sizes as: 2-3cm, 4-5cm, 6-8cm, etc...; drift-net (mosquito net); fixed traps, hooks and

line, fresh ell trap, etc...

Target species of fishing: most of species in Binh Thien lake are target species of fishing. However, main species are: Notopteridae, river anchovy, , cá mè vinh, cá dảnh, cá linh ống, linh rìa, cá ngựa nam, cá duồng, cá mè lúi, cá trèn bầu, cá kết, cá chốt, cá lăng nha, cá tra, cá vồ đém, cá chạch lá tre, lươn, cá rô đồng, cá sặc bướm, cá rô sông, cá bống tượng, cá bống cát, cá lóc, v.v... Besides, there are many crustacean, mulluse also target species of fishing: musel, prawn, egg shrimp, tiny shrimp, etc...

Fishing seasons and areas: fishing activities in Binh Thien Lake are almost whole year and every where in the lake: lake side areas, middle or along the lake.

Figure 6. Fishing gears in Binh Thien lake

III. INITIAL RESULTS FORDEVELOPING CO-MANAGEMENT MODEL IN BINH THIEN WETLAND

1. Period I: from 2008-2009

Training on fisheries co-management

Core group, district and commune staffs were trained on fisheries co-management

Dissemination on co-management to local communities at 3 hamlets in Binh Thien arean

Study visits for core group and community members.

Collect consusus of local communities on developing fisheries co-management in Bình Thien area

Develop and organize activities on fisheries co-management in Bình Thiên wetland

Organize workshops and local group meetings in order to raise priority issues for solving problems and decisions by local community on development of fisheries co-management in Binh Thien wetland.

Develop co-management groups in Binh Thien wetland

Review legal document system in order to develop legal documents to submit Provincial People Committee for making decision of issuing regulation on how to develop fisheries co-

management model in Binh Thien wetland.

Organize workshop and local meetings to develop village rules.

2. Period II: from 2010 and orientation to 2015

Fisheries co-management model implemented, including coommitment from local communities and related activities.

Capacity of core staffs on co-management strengthened.

Regulations, vilage rules supporting for co-management model reviewed and finalized.

Capacity of local community developed, including dissemination, mobilazation a and development of sustainable livelihoods, e.g. livelihood alternatives or fishing gears and types of fishing, etc.

Support local communities such as monitoring and assessment of model; assessment of changes of natural resources in Binh Thien lake and decree of resource rehablitation when fisheries co-management applied.

Continue looking for fund sources for the model and closely cooperating with consultants in order to propose solutions of support.

IV. DISCUSSION

1. Study, assess and implement periodical researches on aquatic resources and socio-economic condition, local life in Binh Thien area are very necessary as well as confirming the value of biodiversity of Binh Thien wetland in particular and Mekong delta in general. These could help orient clear objectives for development of fisheries co-management in Binh Thien wetland and priority issues needed to be solved.

2. Development of fisheries co-management in the period I is to strengthen the model based on the consensus of local communities. Local community raises and solves problems with help from management officers, specialists in order to ensure that the model implementation is inappropriate to existing government laws.

3. Continue calling support from central level and sponsors in order to ensure the implementation of fishery co-management model in Binh Thien wetland at least from 3-5 years.

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3. Final report "survey on status of socio-economics of fisheries community in Binh Thien wetland"

4. Report "design and select model; develop strategy and plan to implement fisheries co-management integrating with conservation in Binh Thien wetland".

5. Report on participatory community method on developing planning map for fishing activities in Binh Thien wetland

6. Report on participatory community method on developing planning map for aquaculture activities in Binh Thien wetland

7. Report on participatory community method on developing planning map for conservation in Binh Thien wetland.

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