

# Impact of Aquatic Resources on Livelihood of the People Lower Mekong Basin — A Case Study in Phu Loc, Khanh An Communes, Tan Chau, An Phu District, An Giang Province

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**Abstract:** The results showed that people who live along the river are dependent on natural resources. They are mainly the poor, low education, and landless. Their income resources are mainly based on exploitation of natural fisheries and hired work. Therefore, the reduction of fisheries resources affected their livelihoods such as reducing employment opportunities and their income, making their life unstable. Although the aquatic resources impacted on their livelihoods, only 30.35% interviewed households in Khanh An commune, and 20.25% in Phu Loc wanted to change their job. 69.65% of interviewed households in Khanh An and 79.75% in Phu Loc commune would continue with their exploitation of natural fishes resources since they have no capital, land and other production facilities to switch to other jobs.

**Key words:** natural aquatic resources, livelihood, Khanh An, Phu Loc, An Giang

## 1. Introduction

An Giang is one of the big provinces located in upstream Mekong River in the South of Vietnam. It borders Cambodia in the North, Kien Giang in the West, Can Tho in the South and Dong Thap in the East. An Giang province is located deep inland, as the lower Mekong River and formerly of An Giang normal conditions with fresh water available all year round. However, in recent years due to increasing number of hydroelectric dams on the Mekong River upstream causing downstream impact including An Giang, a province on the online channel with signs of salinity

intrusion in the dry season, for example, in April 2009, channel 3 of Thoai Giang commune, Binh Thanh, Thoai Son district is 7.5‰ salinity affected agricultural production and livelihoods of people [1].

Fig. 2 shows a number of amazing statistics: about 17% of fish caught in the internal marine waters around the world is from the river and 90% of residents of the basin Mekong farmers depend primarily on natural fertile silt from the river for cultivation. Thus, it will impact heavily on the lives and socio-economy, environment and livelihood of the people in lower Mekong Basin and An Giang province. Therefore, “Impact of aquatic resources on livelihood of the people lower Mekong Basin, A case study in Phu Loc, Khanh An communes, Tan Chau, An Phu district, An Giang Province, Viet Nam” is inevitable.

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## 2. Research Objectives

- To explore the impacts of fisheries resources on the livelihoods of people living downstream.
- To give recommendations and solutions, policies suitable for people living in the Lower Mekong Basin.

## 3. Research Methods

During the study, the following activities were carried out simultaneously, the data collection methodology was a combination of qualitative and quantitative methods including: (i) Literature review: to refer previous researches and reports at national, provincial, district and commune levels related to the research. This activity helped the researchers find out more information about the research problems, and informed the research to up-to-date issues; (ii) face to face interview method was the main method used throughout the research.

Firstly, key informants who knew well about the aquatic resources in An Giang province were interviewed at three levels: at province level as Department of Environment and Natural Resources, Department of Aquatic Natural Resources; at district level Committee, Department of Aquatic Natural Resources, and Office of Aquatic Natural Resources; and at commune level (Commune committee, Office staff of Aquatic Natural Resources).

Secondly, group interviews (Participatory Rural Appraisal) were done to get general information at commune level. Two meetings were held in two communes: Khanh An and Phu Loc. The participants were those living based on exploitation of natural fisheries in areas along rivers and outside the groups along rivers. Tools such as direct observation, Time Line; Seasonal Calendar; Venn Diagram; Problem Ranking Matrix; SWOT analysis were used.

Finally, information collected from the previous steps was used for designing a questionnaire which was tested, edited and then ready to be used widely. Based on the numbers of household exploitation of natural

fisheries in areas along rivers in the research areas, 60 households were used and the interviewees were selected randomly from people who exploitation of natural fisheries in areas along rivers in 2015.

## 4. Results and Discussion

### 4.1 Flood Occurrence during 1926-2015 and Adaptation with Flood of People in An Giang Province

#### 4.1.1 Flood Occurrence over the Years in the Period of 1926-2015 in An Giang Province

The annual flood season in the upstream lasts about 6 months; at the same time, the level of inundation varies between 0.3 to 3 meters depending on the topography of each place. Floods are divided into three levels including high, medium and low levels according to upstream flood levels, corresponding to the water level at Tan Chau Station at more than 4.5 m, 4-4.5 meters and less than 4 meters respectively. Large flood occurs when having a large amount of water pouring in from upstream, large long-lasting rains and the impact of surges in place. The daily increase and decrease flood levels for about 10-20 centimeters for big floods and 5-7 centimeters in normal floods [3]. According to Ref. [4] from 1926 to 2015, there were 22 greater floods and 31 small floods. In particular, 2015 was a special year having the smallest flood (Fig. 1). Small floods have caused considerable disturbance of crop calendar, affecting agricultural production, causing difficulties to the people's livelihood depending on floods such as fishing, fishing gear production and means for fishing during floods.

According to Ref. [5], the yield of natural fisheries resources exploitation decreased from 2000 to 2015. Beside, Mr. Tran Anh Dung, director of An Giang Protecting Fisheries Resources Sub-department stated that the yield of natural fisheries resources exploitation reduced within ten year by many causes: (i) dykes; (ii) over-exploiting as using small mesh size; large amount of fisherman, catching parents fish herd and (iii) pesticides. In addition, the results from interviewed

household (2016) in Fig. 2 show that reduction of natural aquatic resources yield are caused by many reasons such as crowded fishermen, electric fishing, dykes, pesticides, small mesh size and slow and less

flood water. In which, effect of flood level and speed is the most important reason with 40% households in Phu Loc and 43.33% households in Khanh An communes response.

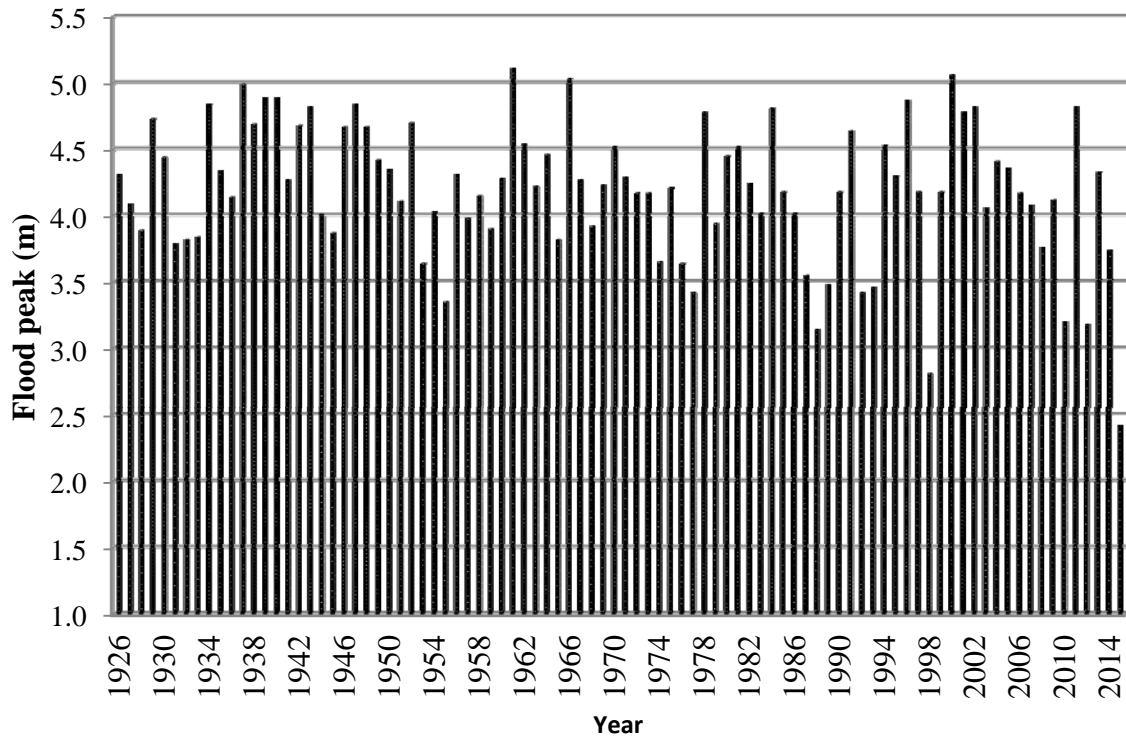


Fig. 1 Flood peak of Tan Chau from 1926 to 2015 (Source: Meteorological radio of An Giang, 2016).

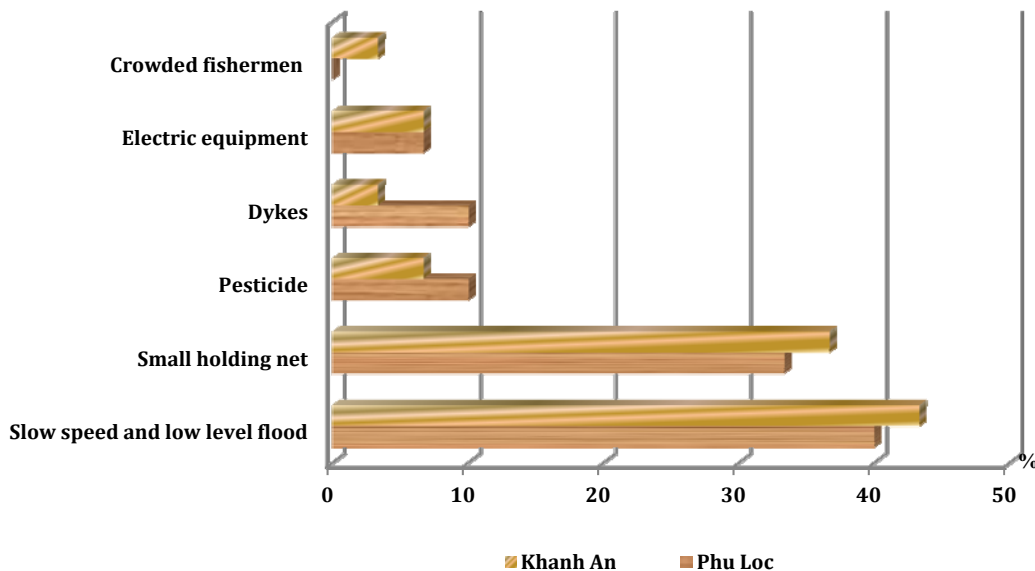


Fig. 2 Causes reduce natural fisheries yield (Source: Interviewing household, 2016).

The lower flood level decreases the fisheries yield and the higher flood level increases those yield. According to the reports [6, 7] and household survey results, the yield of natural fisheries resources per capita reduces from 1,120.52 kg/household/year in 2000 to 679.82 kg/household/year in 2015. It is equivalent to 60.67% reduction within 15 years.

Based on the results of Fig. 3 and Fig. 4, it is showed that correlation between the flood water level and fish production (see Fig. 5). When the water level decreases, natural fishing yields also decreases; when flood levels increase, the fishing yields rise. This means there is a linear correlation between the flood water level and fish production by a factor of  $R^2 = 0.87$  (Fig. 5).

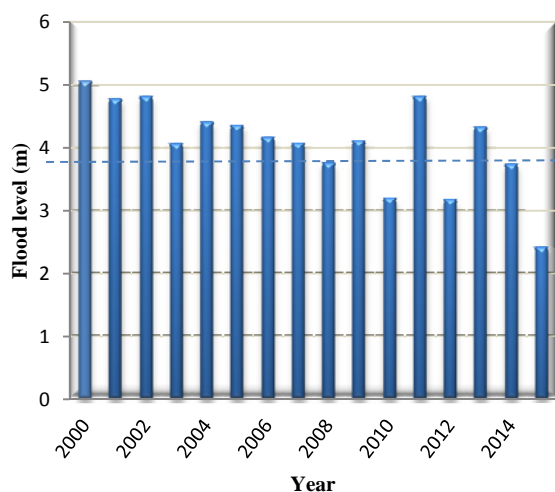


Fig. 3 Flood peak from 2000 to 2015

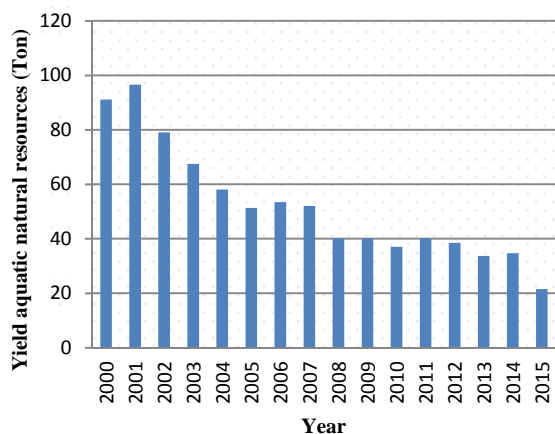


Fig. 4 Yield of natural fisheries exploitation from 2000-2015.

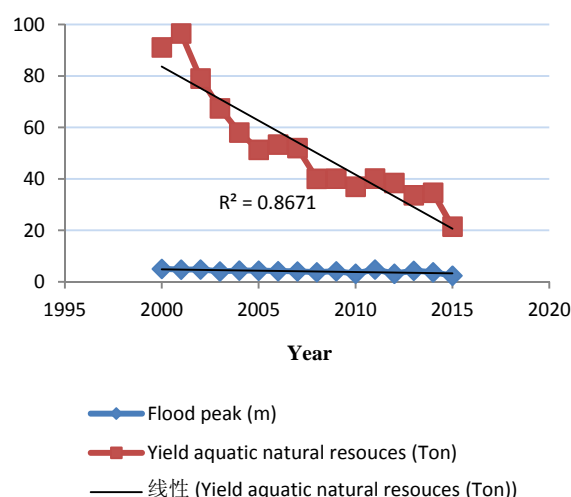
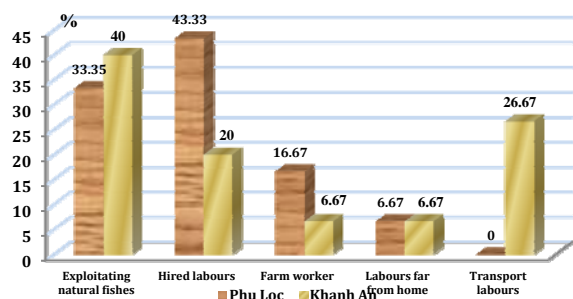


Fig. 5 Correlation between the flood level and natural fish exploitation

#### 4.1.2 Impact of Aquatic Resources on the Livelihood of People Living in Lower Mekong Basin and Their Livelihood Strategies

The income sources of households living along river are shown in Fig. 6, most of their income come from two sources as exploiting natural fishes (about 40% households in Khanh An and 35% households in Phu Loc) and labors (with 66.67% households in Phu Loc and 60.01% households in Khanh An communes). Income from farming is the lowest and the reason can vary from the situation of the households. Most people who participate in exploiting natural fishes resources are poor households, they are landless or have small land. Although exploiting natural fish are about one-third of total income, it affects other related jobs, and thus affects total income of households. The reduction of natural fish exploitation leads to reduce job opportunity of households. Mr Huynh Van Thanh, vice chairman of Khanh An people's committee, says that flood season is the working season of people in the communes where there are many traditional occupations which relate to exploiting natural fish. Those occupations can create jobs for nearly 80% of people in the commune. If the flood comes late and low level, it will reduce job opportunity and income of local people.



**Fig. 6** Income sources of people who living along river

According to interviewing household’s results, their living is based on available natural resources, particularly from the exploitation of natural fisheries resources. Because of many upstream dams, decreased natural fish resources in two commune decrease, 30.35% interviewed households in Khanh An and 20.25% interviewed households in Phu Loc wants to change their occupations as animal husbandry, cultivation, small trader, bricklayer and labors. However, due to having low education levels, they can only be labored in agriculture and non-agricultural or as unskilled labors in factories. The remains of 69.65% households in KhanhAn and 79.75% households in Phu Loc do not want to change their jobs because of it is habitual one. In addition, they are poor people with small capital, small or no land and other means of production for doing other jobs.

## 5. Conclusion and Recommendations

### 5.1 Conclusion

Reduction of natural fisheries resources impact on the livelihoods of people who are living along rivers in Phu Loc and Khanh An commune, Tan Chau and An Phu districts, An Giang province through concrete facts as the decrease of natural fisheries exploitation from 2000 to 2015 (by 60.67% within 15 years). Natural fisheries exploitation affects household income in both ways, directly and indirectly.

Although the yield of natural aquatic exploitation reduces, 69.65% households in Khanh An and 79.75%

households in Phu Loc continue exploiting fisheries while 30.35% households in Khanh An and 20.25% households in Phu Loc want to change to animal husbandry, cultivation, small business, bricklayer.

### 5.2 Recommendations

The thinking of conservation and preservation fisheries resources by decentralized management of fisheries resources based on community needs to be changed.

Awareness and education of protection and development aquatic resources in the community should be enhanced.

It is necessary to organize vocational and technical training, funding support for farmers who wish to change their jobs to animal husbandry, farming, small trade, bricklayer for their stable life

Policy on mechanisms for the protection of natural aquatic resources should be required.

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