SETTLEMENT HOUSEHOLD LIVELIHOODS FOR POOR FISHERMEN: THE CASE OF CAM RANH RESERVOIR, KHANH HOA PROVINCE

Ha Thi Thieu Dao[1*] and Pham Hong Manh[2]

[1]Faculty of International Economics
Banking University of Ho Chi Minh City, 36 Ton That Dam Street, District 1, Ho Chi Minh City
[2]Economics Department, Nha Trang University
02 Nguyen Dinh Chieu Street, Nha Trang, Khanh Hoa Province

Corresponding Author: *daohtt@buh.edu.vn*

ABSTRACT

This study aims to find solutions to solve the basic livelihoods of poor households in the tide reservoir Central Coast. The study results show that livelihoods of majority of families living around Cam Ranh reservoir depend mainly on fisheries resources. The increase effort in fishing effort using different fishing means has caused challenges for local government in solving problems of livelihood, environment and resources. Regression model finds out that besides demographic characteristics: the dependency ratio, education of household members and employment rate of adults, an increase fishing effort (boat) has affected the income and expenditure of poor households. Based on these findings, the authors suggest some recommendations to settle harmonious relationship between livelihoods and the environment for the poor fisherman in this area.

Key words: *livelihoods, reservoir, environment, poor fisher families*

INTRODUCTION

Poverty alleviation is an important policy implemented by Vietnam government for many years. This policy is regarded as a key objective in the process of socio-economic development in Vietnam. Some strategies have been taken including aquaculture and fishing. Aquaculture and fishing sector are quite specific aspects and livelihood of the fishermen living in reservoirs in Vietnam in general, and Central region in particular are mostly dependent on fisheries resources and natural conditions (Son and Thuoc, 2003). The situation of over fishing and lacking of livelihood solutions makes poverty in reservoirs become a hot issue and attract the concerns of the local government authorities.

Reservoir Cam Ranh belongs to Cam Ranh (Cam Lam) district, Khanh Hoa province, with an area of over 2,500 hectares, stretches over 20 km. The widest place of this reservoir is the about 300m. The average depth is 4m. Approximately 5% of the population of Cam Lam district live round the Reservoir Who livelihood households depends on fishing activities

For years, the issues of poverty and livelihoods diversification of poor fishermen have been investigated with various scope, such as: Impacts of HPAI on Rural Livelihoods: Conceptual and Analytical Frameworks (Oparinde and Birol, 2001), Household Strategies and Rural Livelihood Diversification (Ellis, 1998), The Determinants of Rural Livelihood Diversification in Developing Countries (Ellis, 2000), Socio-Economic Factors Affecting Choice of Livelihood Activities Among Rural Dwellers In Southeast Nigeria (Ifeanyi-obi and Asiabaka, 2014), These solutions reduce poverty in households fisherman inshore in the South Central region (Manh, 2012), Rural Livelihoods, Environmental Sustainability and Climate Change in Malawi (Henry *et al*, 2013).

The previous studies only find out the relationship between factors affecting the choice of livelihood diversification and poverty and they do not fully reflect the characteristics of the household fishermen in Cam Ranh reservoir.It is necessary to study the characteristics of household livelihoods in Cam Ranh reservoir,Khanh Hoa province. This research focuses on finding the factors affecting the household livelihoods, and developing some recommendations for settling household livelihoods for poor fishermen in the central region, Vietnam.

RESEARCH METHOD

The study was conducted in five communes of Cam Ranh District, Khanh Hoa Province, Vietnam, namely: Cam Hoa, Cam Hai Tay, Cam Hai Dong, Cam Thanh Bac, Cam Duc. It was applied a random sampling (stratification) procedure. In each of the communes, 25% of sampled households (1,024 households) is collected for the study. This gave a sampling size of 250 households and the respective household heads constituted the respondents for the study.

The primary data were obtained by means of a questionnaire administered to the respondents between the months of October, 2013 to early May, 2014 to obtain information on fishermen' reason for engaging in livelihood diversification. The collected data were analyzed using descriptive statistics (percentage and frequency counts).

For data analysis, this study used two regression models to clarify the factors affecting the choice of livelihood of the fishermen and a logit regression model to assess the influence of these factors to the household income fishermen in this area.

The first model, OLS estimation methods are used for the elements of the socio-economic characteristics of the fishermen in this area. The regression model used is specified as:

$$Y = S_0 + S_1 X_1 + S_2 X_2 + S_3 X_3 + S_4 X_4 + S_5 X_5 + S_6 X_6 + S_7 X_7 + S_8 X_8 + S_9 X_9 + S_{10} X_{10} + V$$

Where:

Y: the standard of living of households (per capital expenditure),

X_i: the independent variables (explanatory variables) in the model (X_i = 1,10), include: gender (Female = 1) (X_1), age (head of household) (X_2), educational of adults (X_3), the proportion of dependents (X_4), the rate of employment (X_5), credit (Yes = 1)(X_6), farming land (X_7), Vessel/ boats (Yes = 1) (X_8), inshore fishery (X_9), other jobs (X_{10}).

The second model, Maximun Livelihood (ML) estimation method is used by a binary logistic regression model to explain the factors that influence the choice of fishermen households' livelihood in Cam Ranh reservoir. The regression model is specified as:

$$Y = S_0 + S_1 X_1 + S_2 X_2 + S_3 X_3 + S_4 X_4 + S_5 X_5 + S_6 X_6 + S_7 X_7 + \dagger$$

Where:

Y: the livelihood of fishermen households (household livelihoods is fishing = 0, otherwise = 1)

X_i: (1 = 1, 7): Gender (Femal = 1) (X_1), age (head of household) (X_2), educational of adults (X_3), farming land (X_4), household size (membership of households' organizations) (X_5), the dependency ratio (X_6), the average income (X_7).

RESULTS AND DISCUSSION

Descriptive analysis

Studies have investigated from the fishermen households with sample size of 300 households from July 12/2013 - 05/2014. After removing the unsuitable sample for analysis, such as heads of households do not cooperate to provide information or provide incomplete information, incorrect data with the respondent, remaining sample for analysis of 210 samples. The survey shows that most of the fishermen households in the area are low-income. According to the Vietnam national poverty line, the total number of poor population is 25.71%; and according to the international poverty line ($1.25 a day) is 35.2%; while at the poverty line ($ 2 a day) is 62.9%.

The survey shows that, in 210 surveyed households, male-headed households are 85.2%, while female-headed households accounted for only 14.8%. The education level of the household head is also quite low. Up to 26.67% is not completed primary education, primary school education is 30.0%, and all junior high as 34.76%, just graduated from high school is 8.57%. Training status is also very low, only 2.38% of household heads were trained. Some demographic characteristics of the household head are shown in Table 1.

Table 1. Characteristics of surveyed households and communities

Size of household (people)	Frequency	Percent	Dependent status of house-holds	Frequency	Percent
Less 4	171	81.4	Under 3	144	68.6
From 5 to 6	21	10.0	From 3 to 4	56	26.7
From 7 to 8	15	7.1	From 5 to 6	8	3.8
Up to 8 people	3	1.4	Up to 3	2	1.0
Total	210	100	Total	210	100

Source: Calculated from survey data, 2014

Livelihood of the fishermen households in this area is quite diverse, such as: Aquacultures, building worker, small business, hired-labor. However, the majority of households in these areas are engaged in fishing. It means that the majority of households in the reservoir, their livelihoods depend mainly on fisher resources. Their main fishing methods are such relatively primitive as exploitation by nets (crab nets, fishing nets), start manually (snails, clams, oysters), or other methods of fishing, such as: diving, picked seaweed, jellyfish.

Households can use one or more methods of fishing for income. All of the means of fishing in Cam Ranh reservoir, fishing with nets is popular (103 households). Almost every household has one rowing boat/ship, a 8-12 CV machine. In addition to fishing, the fishermen families also join in varieties of production activities, such as aquaculture, rice-growing, hired labor. Only 76 households (36.2%) do not add other jobs. Livelihoods of the people of this region outside fishing activities are shown in Figure 2.
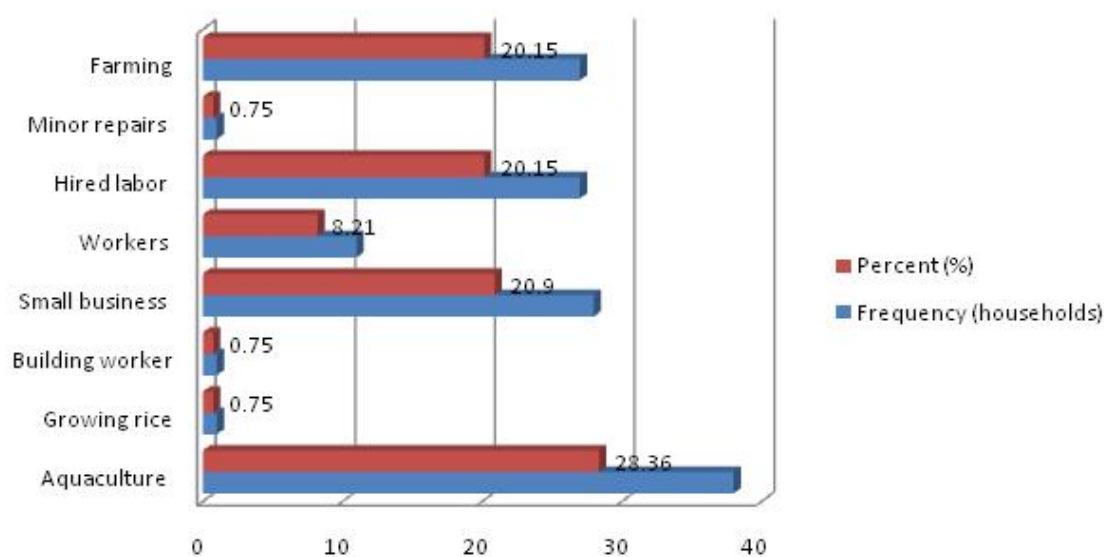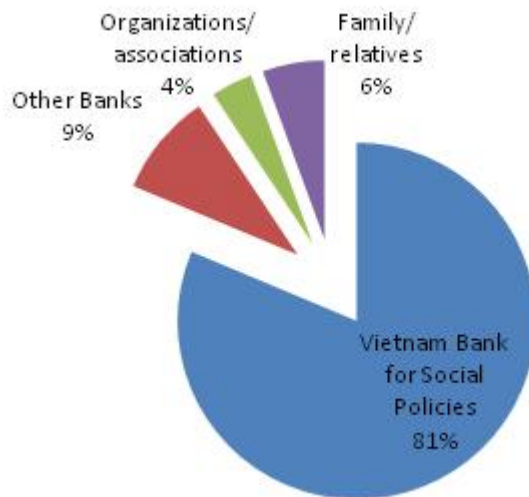

Source: Calculated from survey data, 2014

Figure 2. Activities of diversified livelihoods of households in the study area

Access to social resources and funds are quite limited. Results show that among those 210 households surveyed, there are 107 have borrowed from credit institutions, individuals and families (Figure 3). The minimum loan size is 5 million VND and the highest is 80 million VND. On average, each household loans is about 40.87 million VND. Loans are often borrowed from the Social Policy Bank (81.31%), and from other banks (9.35%). The rests borrow from families and the local social organizations. In addition, there is 41.9% of total of surveyed households in need of loans for production, 26.7% of households desire to support job (Figure 4).

Source: Calculated from survey data, 2014

Figure 3. Loans of fishermen households
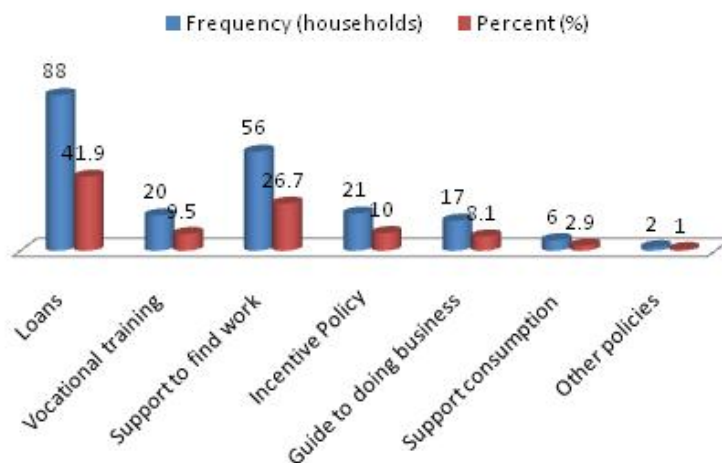
Source: Calculated from survey data, 2014

Figure 4. Aspirations of households with access to social resources

Results of the econometric model

To determine the influence of these factors to the standard of living (expenditure) for household's fishermen, an econometric model was used. The estimated results show that, the survey data was 43.0% explained variance of the dependent, in which most of the explanatory variables were as expected and significant statistic at 1%, 5% and 10%. The factors effected to households' expenditure including: education of adults, the proportion of dependents, employment rate, and vessel owners or not. In particular, rate depends strongly on affecting the living standards of households after removing the variables, it does not have statistically significant and perform a secondary analysis, the results are presented in Table 2.

Dependency ratio: Results of the analysis show that the rate depends is a negative impact of household spending and significant statistic at 1%. This means that, when the dependency ratio increases, the household living standards will be decreased. Thus, those households with high dependency ratios are likely to fall into poverty status of households easily. This result is similar to many previous studies, such as: Haughton and Khandker (2009), Pham Hong Manh (2012).

Table 2. Parameter estimates of final regression model

Variables	Standardized coeficientes	t - statistics	Sig.
Dependent variable			
(Constant)		14.779	.000
Education of adults	.321	5.641	.000
The proportion of dependents	-.331	-5.462	.000
The rate of employment	.128	2.207	.028
Vessel /boat	.156	2.799	.006
Observations	210		
R^2 (R^2 Adjust)	.398 (.386)		
F (Sig.) Statistics	33.846 (0.000)		
Durbin-Watson statistics	1.513		

Source: Calculated from survey data, 2014

Adult education level: From the coefficients regression and t - statistics shows the education level of adults in the household gives a positive impact on expenditure of households. This may be the adult basic education conditions, especially in finding employment and improving incomes.

Employment rate: Employment rate of adults has a positive impact to household living standard (a positive sign) and statistically significant at 5% level. Employment is very important for poor households as when they do not have jobs, they will have no income and they will become a burden for those families that are not wealthy. This will make the household poverty worse.

Boat: This factor is a positive impact on households' expenditures and statistically significant at 5% level. This means that, if fishermen households have boats, they will have a condition to fishing the aquatic resources in Cam Ranh reservoir, so that they will have support to improve for income and expenditures. However, in the current context, the increase in fishing capacity will deplete fishery resources. This is considered as unsustainable livelihood for fishermen households in this area. Factors affect the choice of livelihood diversification fishermen households

To determine the factors affecting the choice of household livelihoods, the study used binary logistic regression model. The analysis results are showed below (Table 3). The model indicates the goodness of fit of the model estimation. This result shows a better relationship between odds ratio (log of odds), probability of factors which influence to choose livelihood diversification and the explanatory variables included in the model collectively contribute significantly to the explanation of fishermen's influence in livelihood diversification. Although, on individual basis, some coefficients are not significant. The Nagelkerke R–squared value also suggested that the estimated model has a good explanatory power.

Table 3. Parameter estimates of logit regression model

Dependent variable: (livelihood diversification = 1)	(b_k)	S.E.	Wald	df	Sig.	Exp(B)
Gender (head of household)	-1.166	.488	5.701	1	.017	.312
Farming land	3.833	1.030	13.848	1	.000	46.198
Size of household	.015	.007	4.175	1	.041	1.015
The proportion of dependents	.016	.008	3.964	1	.046	1.016
The average income	.070	.034	4.256	1	.039	1.072
Constant	-.390	.633	.379	1	.538	.677
Observations	210					
-2 Log likelihood	216.988					
Nagelkerke R Square	.32					

Source:Calculated from survey data, 2014

CONCLUSIONS AND POLICY IMPLICATIONS

From the results of the study showed that the main livelihood of fishermen in Cam Ranh reservoir depends mainly on fishing. Besides, the fishermen households have many kinds of work to improve the income and living standards for themselves, such as farming land, aquacultures. However, these jobs are not stable to generate sustainable income for these fisher families. In addition, the analysis also shows that the factors affecting the living standards of households in this area include: education of adults, the rate dependent, the ratio of employed people, and families with boats or not.

The decline of fishery resources in Cam Ranh reservoir is to set for many challenges in ensuring sustainable livelihoods for households in this area. As a result, solving the livelihood of the fishermen should have appropriate solutions. There are several solutions can be considered, such as:

First, raising the education level and intellectual standards of the fishermen in this area. To do so, a promotion should be strengthened to alter the perceptions of fishermen on the importance of education and training for their own future; to facilitate adults' participation in training that the Government of Vietnam is doing, such as a program of vocational training for rural workers.

Second, the characteristics of fishing households are larger household sizes and higher dependency ratio. Some solutions require attention, such as strengthening the propaganda for the fishermen to raise awareness; improving self-awareness in implementing policies and family planning to improve knowledge of health care for the members of the household.

Third, to plan livelihood strategies and create stable jobs for fishermen in the area, such as: (i) to push the work throughto encourage agricultural expansion; (ii) to encourage an agricultural expansion associated with the application of science and technology in production; (iii) to encourage an agricultural expansion must stem from the empirical fact, meet the aspirations of fishermen and suitable climate, soil and local characteristics.

Fourth, to prioritize the livelihoods of fishing communities in the region associated with the jobs that they are doing. The Livelihood diversification can be connected to closely fishing, such as: aquaculture (shrimp, oyster, seaweed, mussel farming); offshore fishing, occupations related to fishing logistics (purchasing products, processing products, supplying aquatic breeding, feeding aquaculture).

Fifth, to convert inefficient inshore fishing, depletion of fisheries resources to other occupations. This conversion is consistent with the policy of reducing fishing vessel of small capacity and creates conditions for the improvement of the household living standards in this area. To implement this policy is not easy, as the fishermen is in inshore fishing habit constraint. The local government should consider some suggestions policies: (i) Raising awareness for fishing communities on the depletion of fishery resources in Cam Ranh reservoir and advocated cutting fishing capacity (Khanh Hoa Provincial People's Committee, 2013) so that people are aware of the need to change their jobs and they are self-awareness of switching jobs; (ii) Guiding them change to aquaculture production (both objects have economic benefits for both individual benefits to the community in the restoration of marine resources, such as seaweed, oyster planting mangroves in the lagoon); (iii) giving some incentives, such as: tax policy, especially fees, credit policy to support families to change jobs; focus on changing job from previous fishing in Cam Ranh reservoir to offshore fishing; and (iv) Should be pilot cooperative groups for new jobs. If this job succeeds, it will encourage fishermen to voluntarily switch jobs and joining; the authorities need to have the cooperation of management and support markets.

REFERENCES

Efeanyi-obi, C.C. and C.C. Asiabaka. 2014. Impacts of climate change on sustainable livelihood of rural dwellers in Southeast Nigeria. Nigerian Journal of Agriculture, Food, and Environment 10 (3): 71-77.

Ellis, F. 1998. Household strategies and rural livelihood diversification. The Journal of Development Studies 35(1): 1-38.

Ellis, F. 2000. The Determinants of rural livelihood diversification in developing countries. Journal of Agricultural Economics 51 (2): 289-302.

Haughton, J. and S.R. Khader. 2009. Handbook on poverty and inequality. World Bank, Washington, D.C.

Henry F. C. M.., S. Chiotha and W. Phalira. 2013. Rural livelihoods, environmental sustainability and climate change in Malawi: An Annotated Bibliography. LEAD Southern and Eastern Africa, Chancellor College.

Haughton, J. H. and S.R. Khandker. 2009. Handbook on poverty and inequality. World Bank Publications.

Khanh Hoa Provincial People's Committee. 2013. Decision No. 05/2014/ Q   -UBND date 10.02.2014 on "Manage promulgate regulations fishing activities in the province of Khanh Hoa.

Krantz, L. 2008. The sustainable livelihood approach to poverty reduction: An introduction. Swedish International Development Cooperation Agency.

Long, N. 2003. A preliminary analysis on socioeconomic situation of coastal fishing communities in Vietnam in assessment, management and future directions for coastal fisheries in Asian countries. The World Fish Center and The Asian Development Bank (ADB), Malaysia.

Manh, P.H. 2012. Poverty in coastal fishing communities in Khanh Hoa. Journal of Aquatic Science and Technology 1: 24 –29.

Ministry of Fisheries and World Bank. 2005. Vietnam fisheries and aquaculture sector study. Retrieved from http://siteresources.worldbank.org/INTVIETNAM/Resources/vn_fisheries-report-final.pdf.

Oparinde, A. O. and E. Birol. 2010. Impacts of HPAI on rural livelihoods: Conceptual and analytical frameworks. Africa/Indonesia Team Working Paper. Retrieved from http://influenzatraining.org/ documents/s17585en/s17585en.pdf.

Manh, P.H. 2012. Poverty in coastal fishing communities in Khanh Hoa. Journal of Aquatic Science and Technology 1: 24-29.

Son, D. M. and P. Thuoc. 2003. Management of coastal fisheries in Vietnam. In Assessment, management and future directions for coastal fisheries in Asian countries. World Fish Center Conference Proceedings 67 (1): 957 – 986.