Factors Affecting Household Income in the Post-Empowerment of Small-Scale Fishermen Wives

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Abstract. Post-empowerment, the wife of small-scale fishermen, can affect changes in household economic incomes. This study aims to assess the factors that affect household income after the empowerment of fisherwomen. Furthermore, a multiple linear regression estimation model was used in this study. The results showed that fisherman’s wife’s household income after empowerment is influenced by wife’s age, education, and the number of active family members. On the other hand, the number of dependent household members and regional differences had no significant influence. In addition, improving the household economics of fishermen can be further enhanced through the skills needed to process processed fish by providing market intelligence for the sustainability of their business.

Keywords: post-empowerment, household income, fishermen's wives

1. Introduction

Women have contributed to the fisheries and aquaculture sectors, with 45 million people working full-time as fishermen and farmers, or 12% of the total workers in these sectors. Countries in Asia and West Africa have up to 60% of the seafood, 30% work in fisheries (harvest and post-harvest) and 47% work in women fishing supply chains [1]. The existence of gender equality by involving women in the fisheries sector will achieve the mandate of the FAO policy in food security, nutrition [2], and empowerment in the sector. Furthermore, strengthening coastal communities can provide opportunities and governance in coastal areas to reduce poverty [3].

In the context of empowerment, women who are empowered economically play a more active role in household decision making to increase their family income [4]. Empowerment is a process that enables powerless individuals or groups to gain power, control their lives and make strategic life decisions [5]. Fisherwomen can play fisherman's wives and family heads when fishermen go to the sea to fulfill their household economy. Simultaneously, women are generally part of two inseparable parts: the community and families with potential national development resources. However, this potential has not been utilized for productive activities such as generating additional income because of its role only as a housewife, accompanying her husband and caring for children [6]. Women are also at the heart of
the success of short-, medium- and long-term poverty reduction efforts through empowerment as a socio-economic power, beneficial resource management and an important element for progress in all regions worldwide [7] especially the empowerment of small-scale fisherwomen who can improve the sustainability of fisheries [8].

Women's participation in fisheries is varied widely because they are involved in various ways depending on cultural, social, and material conditions [9]. If the role of women is empowered, fisheries management will involve women and men in recognition of gender analysis[10] because so far, the fishing sector has been dominated by men [2], [11]. However, women play an active role in fisheries and aquaculture throughout the world, such as fish finders, shellfish, and seaweed [1]. They can penetrate every aspect of fishing [12], post-harvest handling, preservation, processing, and marketing seafood products and providing an integral relationship between producers and consumers [13]. His contribution influences his participation in management and decision making in fisheries [14], [15] as well as development policies [11] through empowering fisherwomen to manage fisheries sustainably [16].

Before the empowerment of fisherwomen in the coastal area of Barru District in the Indonesian province of Sulawesi, changes in household incomes of small-scale fishermen were due to changes in catch production [17], capture business income generated by fishermen each year during capture season [18], and assistance from government programs in the form of government fishing gear and outboard engines [19]. The role of women in the household, especially the fisher women in deciding to choose empowerment, will significantly determine household consumption expenditure. Financial management will indirectly improve family welfare [20], especially after the empowerment of fisher women in the study area.

The research on empowering fisherwomen in improving the household economy has been widely carried out in various countries such one of which is South Aegean Turkey. However, government agencies also do not recognize their participation [21], which enables fisher women to fish sustainably in Mexico [8]. As for the Indian State, in the the West Bengal region, the role of microfinance and self-help groups in empowering fisherwomen was recognized [22]. Similarly, the Balbari District region empowered women with fishing practices [23]. Similarly, Women’s participation in fishing activities in Manipur was centered on the stocking of fish seeds, post-harvest [7], fish processing [24], and fish marketing [7]. Likewise, in the coastal communities in Nigeria, empowering fisherwomen was through the granting of loans and credit facilities, developing capacity, the introduction of new technologies and enhancing transportation network systems in order to improve the socio-economic status of fisher women in the country [25] and the role of women in the fishing industry to improve welfare household economy in Northern Ireland [26]. However, the estimation of the factors affecting household income after the empowerment of small-scale fisher women has not been studied by other researchers.

2. Material and method
This research was conducted in the west coast region of Barru District (Tanete Rilau, Barru, Soppeng Riaja, Balusu Sub-District), South Sulawesi Province, Indonesia. Cross-section data was used in this study. The sample of respondents consisted of 34 women from small-scale fishermen working in large-scale fish processing companies and are in household businesses.

The estimation of post-empowerment household income of small-scale fisherwomen in proxy with the model of agricultural households by Nakajima in 1969 was developed [27]. Households are assumed to improve their welfare through the maximization of satisfaction obtained from the consumption of various commodities which are expressed as functions of satisfaction in the form of:

\[ U = U(L_1, L_2, L_l) \text{ for } a, m, l = 1, ..., n \] (1)

The maximizing household utility (\(U\)) is household satisfaction which results from personal consumption, commodities bought from the market, and leisure time. The constraints faced by households to maximize their satisfaction function are potential income, time resources, and production functions.

Furthermore, to analyze the factors influencing post-empowerment household income of small-scale fisher women, the proxy with the estimation model is as follows:
\[
\pi PHIFW = \beta_0 + \beta_1 AgeFW + \beta_2 FWEd + \beta_3 QAFM + \beta_4 QBHM + \delta_1 DmTRSd + \delta_2 DmBsd + \\
\delta_3 DmSRsd + \delta_4 DmBlssd + \mu
\]  

Where, \( \pi PHIFW \) is post-empowerment household income of small-scale fisher women. \( \beta_0 \) is intercept. \( \beta_1, \ldots, \beta_4 \) are regression coefficient of the independent variable. \( \delta_1, \ldots, \delta_4 \) are coefficient of dummy variable. \( AgeFW \) is fisher woman's age (year). \( FWEd \) is the fisher woman’s education (year). \( QAFM \) are working family member (people). \( QBHM \) are borne household members (people). \( DmTRSd \) are 1, for the Tanete Rilau Sub-district area; 0, for others. \( DmBsd \) are 1, for the Barru Sub-district area; 0, for others. \( DmSRsd \) are 1, for the Soppeng Riaja Sub-district area; 0, for others. \( DmBlssd \) are 1, for the Balusu Sub-district area; 0, for others. \( \mu \) are disturbance error.

3. Result and Discussion

The age variable of a fisher woman negatively influences post-empowerment household income with an error rate of 5% or a confidence level of 95%. Another case before empowerment, variable age of fishing household is not significant to the income of small-scale fishing households in Barru District [18]. The effects of empowerment as well as post-empowerment will have an impact on household income. In contrast to the findings [5] in Bangladesh, empowering women to affect food intake and expenditure patterns quantitatively and qualitatively has a positive impact on the nutritional status and health care of women in the household as a decision-maker. Regarding the age of women's empowerment, changes in age and geographical location among fisher women in Norway can reflect changes in fisheries [28] to create different experiences and knowledge and the complexities of environmental changes such as fisher women in India [29]. Households that depend on representative fishing with maximum utility depend on time, income and fishing restrictions [30]. In theory, households are considered to improve their welfare by maximizing the satisfaction obtained from the consumption of various commodities such as self-produced commodities bought from the market, and leisure time with potential income constraints, resources, and production functions [27].

Table 1. The Estimation of Post-Empowerment Household Income of Small-Scale Fishermen Wives

| Independent Variable | \( \beta_i \) | t-test | VIF | Park test |
|----------------------|--------------|-------|-----|----------|
| Wife age             | -5.719**     | -2.555| 1.451| 0.143**ns |
| Wife education       | -349.872**   | -2.560| 1.451| 0.337** ns |
| Working family members | -692.784*   | -1.925| 1.381| 0.155** ns |
| Borne household members | 15.637 ns | 0.938 | 1.396 | 0.878 ns |
| Tanete Rilau Sub-District | 607.996 ns | 0.513 | 3.400 | 0.704 ns |
| Barru Sub-District   | 216.194 ns   | 1.684 | 3.553 | 0.688 ns |
| Soppeng Riaja Sub-District | 184.866 ns | 0.317 | 3.027 | 0.923 ns |
| Balusu Sub-District  | -221.503 ns  | 1.432 | 2.650 | 0.612 ns |
| Intercept            |              |       | 729.536|        |
| F-test               |              |       | 2.729|         |
| Adjusted R²         |              |       | 0.466|         |

** is a level error significance of 5 % (0.05), or confidence level 95%. * is a level error significance of 10 % (0.10), or confidence level 95 %. ns is not significant. ES is an expectation sign. ns is a not significant. If the VIF value is less than 10 then there is no multicollinearity, otherwise if VIF value is greater than 10 then multicollinearity occurs. If park coefficient (β) value is not significant, then it is not available heteroscedasticity, otherwise if the park coefficient (β) value of β significant, then there is heteroscedasticity.

The education of small scale fisher women has a negative and significant effect on the post-empowerment household income in the study area with an error rate of 5% or a 95% confidence level, which means that every aging fisherwoman wishes to reduce her household income. In addition, another case before the empowerment findings, household income hurts outboard motor fishers, and a positive effect for non-powered motor fishers is influenced by the education of fisherwomen in Barru District. This happens when the women's formal education can help manage family finances well [18].
These results are not in line with the findings [31] in the Anambra region of West Nigeria and [32] Manipur in India that education has a positive effect on empowering women through fishing activities. However, it is in line with the findings [33] in Vietnam that women's education level in fishing households is lower and that the opportunity to work in fish processing will be small even though they have access to credit. Education of women at a young age can increase income and employment status through faster wage growth [34] to meet future economic needs [35].

Women's education is a major determinant of their participation in income-generating activities (formal and informal) and household structures [5] because formal education increases awareness and decisions in terms of skills, knowledge, and marketing behavior [32]. For this reason, fisherwomen have an essential role in making decisions in assisting a productive household economy by providing opportunities to work according to their nature and abilities, such as the search for oysters, fish processing, sales of fishery products [6] in addition to their husbands as the head of the household. Unskilled fishermen with many family members are likely to have low income from fishing. However, findings [36] that the role of women's fishing groups in Japan in carrying out entrepreneurial activities can increase economic, social, and environmental development family and community.

The working family members who are active at work lowers household income after empowerment with an error rate of 10% (90% confidence). This result is different from fishers in the South Aegean of Turkey such that, in addition to their wives, children also help fishing to meet their families' needs [21]. Likewise, in Malaysia, the primary source of household income is the sale of harvested fish markets, but family members can also participate in non-fishing wages and can seek financial support from working-age children [30]. In another case, in Kashmir Valley of India, most of the roles women play in the socio-economic household, such as catching and selling fish, to support men’s share of other livelihoods [20]. In theory, the agricultural household model is the balancing of household budget in the form of expenditure equal to the potential income derived from household production, family labor, non-family labor, variable production input prices, and non-work variable production inputs [27]. For this reason, there must be the participation of family members (wife and children) in finding sources of income, such as the findings of [37] in Malawi, South Africa, where fisherwomen are involved in fish value chain activities on household food security and income. However, the husband acted as an intermediary. In another case in Northern Norway, the roles in household businesses is carried out by husband and wife as a team, where women contribute as advisors and support for husbands in fishing activities [38]. In contrast, in India, most of the decisions in the affairs of a fishing household are in the wife's hands through her husband's consultation [39].

The number of dependent household members and dummy differences in each District region, namely Tanete Rilau, Barru, Soppeng Raja, and Balusu does not affect changes in household income after empowering the fisherwomen in the West Coast region of Barru District. Various pre-empowerment variables of household members that become dependents and regional differences positively affect the income of small-scale fishing households [18]. Dependent household members have no impact on household income changes after empowering the fisherwoman, which is because the number of family members working like fisherwomen can find additional income to meet their family needs. According to [29], family size is a major determinant of household diversification in order to increase income. Fishing households can earn additional income from supplying labor to local wage laborers or seeking financial support, including from family members

4. Conclusion and Suggestion
Changes in household income after the empowerment of fisherwomen on the west coast of Barru Regency are negatively affected by the age and education of these women and the number of active working family members. On the other hand, the number of households insured and the regional differences did not become significant. Household income after the empowerment of the wife of small-scale fishermen is obtained from the fisherman's results and the fish processing business by his wife. Increased catches, processing results, and market intelligence can increase the household income of small-scale fishermen for the sustainability of their household economy.
References

[1] Frangoudes K and Gerrard S 2018 Gender perspective in fisheries: examples from the south and the north Transdiscipl. Small-Scale Fish. Gov. 119–40

[2] Lentisco A and Lee R. 2015 a review of women’s access to fish in small-scale fisheries. (Rome: Food and Agriculture Organization of The United Nations Rome)

[3] Kullenberg G 2010 Human empowerment: opportunities from ocean governance Ocean Coast. Manag. 58 405–20

[4] Awan A G and Zerthas 2015 Determinants of women empowerment: a case study of District D.G. Khan Dev. Ctry. Stud. 5 65–70

[5] Toufique M M. 2016 The Context specific factors affecting women empowerment and empowerment’s implications for resource allocation, awareness and fertility: an econometric analysis Int. Lett. Soc. Humanist. Sci. 66 38–44

[6] Febri S P, Wiyono E S, Wisudo S H, Haluan J and Iskandar B H 2017 The role of women in small-scale fisheries of Langsa City, Aceh, Indonesia AACL Bioflux 10 402–9

[7] Meetei W T, Saha B and Pal P 2016 Participation of women in fisheries: a study on gender issues in Manipur, India. Int. J. Bio-resource Stress Manag. 7 905–13

[8] Torre J, Hernandez-Velasco A, Rivera-Melo F F, Lopez J and Espinosa-Romero M J 2019 Women’s empowerment, collective actions, and sustainable fisheries: lessons from Mexico Marit. Stud. 18 373–84

[9] Frangoudes K 2013 Women in fisheries: a european perpective (Rome: European Parliament)

[10] Kleiber D, Harris L M and Vincent A C J 2015 Gender and small-scale fisheries: a case for counting women and beyond Fish. Fish. 16 547–69

[11] Harper S, Zeller D, Hauserb M, Pauly D and Sumaila U R 2012 Women and fisheries: contribution to food security and local economies Mar. Poliicy 39 56–63

[12] Zhao M, Tyzack M, Anderson R and Onakpovike E 2012 Women as visible and invisible workers in fisheries: a case study of Northern England Mar. Poliicy 37 69–76

[13] Biswas M P and Rao M R M 14AD Fisherwomen of the east coastal India: a study Int. J. Gend. Women’s Stud. 2 297–308

[14] Di Ciommo R C and Schiavetti A 2012 Women participation in the management of a marine protected area in Brazil Ocean Coast. Manag. 62 15–23

[15] Mutimukuru-Maravanayika T, Mills D J, Asare C and Asiedu G A 2017 Enhancing women’s participation in decision-making in artisanal fisheries in the anlo beach fishing community, Ghana Water Resour. Rural Dev. 10 58–75

[16] Hauser M, Dearden P and Murray G 2013 The fisherwomen of Ngazidja island, Comoros: Fisheries livelihoods, impacts, and implications for management Fish. Res. 140 28–35

[17] Rahim A, Hastuti D R D, Firmanzah, Sabar W and Syam A 2019 The Applied of Cobb-Douglas Production Function with Determinants Estimation of Small-Scale Fisherwomen’s Catches Productions Int. J. Ocean. Oceanogr. 13 81–5

[18] Rahim A and Hastuti D R D 2018 Applied Multiple Regression Method with Exponential Functions: An Estimation of Traditional Catch Fishermen Household Income Journal of Physics: Conference Series vol 1028 pp 1–8

[19] Rahim A, Hastuti D R D and Syam U 2020 Estimation Comparison of Small-Scale Fisherman Decision on Choice Fishing Gear and Outboard Engine Power J. Eng. Appl. Sci. 15 574–80

[20] Farooqi F S, S. R and Simnani S A 2018 Problems & prospects of fisherwomen of Kashmir Valley Int. J. Fish. Aquat. Stud. 6 358–60

[21] Göncüoğlu H and Ünal V 2011 Fisherwomen in the Turkish fishery, southern Aegean Sea J. Appl. Ichthyol. 27 1013–8

[22] Nandy S 2015 Role of microfinance and self-help groups in empowering fisherwomen community in West Bengal: A Study of Two Selected Districts Int. Res. J. Interdiscip. Multidiscip. Stud. 1 106–12

[23] Haque C M 2016 Fishing practices and the socio-economic empowerment of the kaibartta women: a case study in the nalbari District of Assam: India IOSR J. Humanit. Soc. Sci. 21 51–8
[24] Paul P C J 2016 Empowerment of fisherwomen in fish processing and vending sectors - an analysis J. Econ. Bus. Rev. 4 26–8
[25] Cliffe P T and Akinrotimi O A 2015 Role of Women in Fishery Activities in Some Coastal Communities of Rivers State, Nigeria Int. J. Agric. Res. 10 24–32
[26] Britton E 2012 Women as agents of wellbeing in northern Ireland’s fishing households Marit. Stud. 11 18–29
[27] Singh I, Squire L and Strauss 1986 Agricultural household models: extensions, applications and policy (Baltimore: The Johns Hopkins University Press)
[28] Gerrard S and Kleiber D 2019 Women fishers in Norway: few, but significant Marit. Stud. 18 259–74
[29] Khan F N, Collins A M, Nayak P K and Armitage D 2018 Women’s perspectives of small-scale fisheries and environmental change in Chilika lagoon, India Marit. Stud. 17 145–54
[30] Eskander S M S U, Barbier E B and Gilbert B 2018 Fishing and Nonfishing Income Decisions: The Role of Human Capital and Family Structure Land Econ. 94 114–36
[31] Nenna M G 2012 Factors Influencing Women’s Participation in Fisheries Activities in Anambra-West Local Government Area of Anambra State, Nigeria J. Agric. Food Inf. 13 157–68
[32] Meetei W T, Saha B, Pal P and Pal P 2015 Factors influencing women’s empowerment through fisheries activities: a study in Manipur Indian Res. J. Ext. Educ. 15 35–40
[33] Hao N D 2012 Gender Issues in the fishery communities of the central coastal Provinces of Vietnam Asian Fish. Sci. 25 129–43
[34] Perales F and Chesters J 2017 The returns to mature-age education in Australia Int. J. Educ. Res. 85 87–98
[35] Facer K 2013 The problem of the future and the possibilities of the present in education research Int. J. Educ. Res. 61 135–43
[36] Soejima K and Frangoudes K 2019 Fisheries women groups in Japan: a shift from well-being to entrepreneurship Marit. Stud. 18 297–304
[37] Manyungwa C L, Hara M M and Chimatiro S K 2019 Women’s engagement in and outcomes from small-scale fisheries value chains in Malawi: effects of social relations Marit. Stud. 18 275–85
[38] Pettersen L T 2019 From household business to shareholding companies—impacts on gender relations and influence in fisheries and fish farming in northern Norway Marit. Stud. 18 305–19
[39] Chakrabarti S 2017 Measuring women empowerment in the household sector : a generalized index and an application to indian households Women’s Entrepreneurship and Microfinance. ed C Neogi, A K Bhandari and S Ghosh (Singapore: Springer Singapore) pp 17–39