Women's Participation in Sri Lanka's Blue Economy: An Exploration of the Influence of Socio-Economic Factors

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ABSTRACT

The purpose of this paper was to examine the effect of socio-economic factors on women's engagement in the blue economy of Sri Lanka, an important sector with low female representation and limited empirical studies. Women in the coastal areas of Sri Lanka have important functions in different economic activities within the blue economy, however, women are not fully included and economically empowered because of several barriers existing in the sector. Some of these barriers are low levels of participation in decision-making, limited access to markets and resources, and cultural factors. In that regard, the study seeks to address the existing knowledge gaps in these barriers and opportunities to establish a basis for the development of specific interventions and policies that can help support gender equality and women's economic involvement in Sri Lanka's blue economy. On the above background, this research seeks to establish the relationship between the following independent variables: Education Level, Income and Economic Resources, Legal and Policy Environment, Family and Social Support, and the dependent variable Women's Involvement in the Blue Economy. The results show that all four independent variables are statistically significant in explaining women's engagement in the blue economy, with Education Level and Family and Social Support having the highest effect. The required knowledge and skills to undertake maritime business are offered by education and the strong family and social networks provide women the support they require to be part of the blue economy. Further, Income and Economic Resources and the Legal and Policy Environment have a positive impact on women's participation in the blue economy to a certain extent. Based on the above findings, it can be concluded that the improvement of education, economic capital, social capital, and legal capital can significantly increase women's participation in the blue economy in Sri Lanka. The findings of the research can therefore be useful to policymakers and other stakeholders to propose interventions that are required to address gender discrimination in the marine sector and promote the economic growth of Sri Lanka. Several policies were recommended by the paper including increasing women's literacy, financially supporting women for maritime activities, encouraging women's role in the community, and ensuring the rights of women in the blue economy. Therefore, by paying attention to the above-proposed areas, the blue economy of Sri Lanka can be converted into a more inclusive by expanding the contribution of the women.

INTRODUCTION

Blue economy activities encompass all the economic uses related to marine and coastal environments such as fishing, shipping, tourism, and energy generation. The evidence shows that the Blue Economy is now ranked among the most strategic sectors that can assist in the realization of sustainable development goals and the preservation of natural resources. Some of the global problems including hunger, climate change, and poverty can be solved through sustainable utilization and management of marine resources. In this scenario, the blue economy has been highlighted as one of the most important strategies for sustainable development. Therefore, all the stakeholders irrespective of their age, gender, or other social status should be involved in the blue economy. Worldwide, women's engagement in the blue economy is gradually emerging as an important policy concern since it increases economic capabilities, stability, and equality. It can be observed that women are participants in most of the blue economy sub-sectors such as fishing, marine conservation, and coastal tourism in Sri Lanka. They help to increase household income and improve the standards of living in the communities. Further, they play an important role in the management of marine resources through knowledge and practices gained from their cultural background.

Despite all the above-highlighted benefits, women experience several challenges that limit them from participating actively in the blue economy. Some of those challenges are a lack of resources, training, and decision-making power. The blue economy can enhance Sustainable Development Goals if the above challenges are properly addressed by the respective parties. This research focuses on Sri Lanka's blue economy since women's participation in this sector is limited and research in this area is limited despite the significance of this industry to the economic development. Women living in the coastal areas of Sri Lanka engage in several fields including fishing and fish processing, aquaculture, and tourism. However, at the same time, they face numerous challenges. Some of those problems include social and cultural factors, business confidence, limited market, and little or no support frameworks for businesses. This paper identifies the various barriers and proposes ways of overcoming them to improve women's status, gender equality, and the blue economy in Sri Lanka. Further, this paper aims to evaluate the opportunities and challenges faced by women in this sector. The findings may be useful in the formulation and execution of policies to enhance women's participation and outcomes.

Therefore, the research questions of the paper are how do socioeconomic factors influence women in the blue economy of Sri Lanka? What are the feasible recommendations to encourage women's engagement in the blue economy of Sri Lanka? Therefore, this study shows that women can encourage gender equality and economic growth in the blue economy. It is required to know the challenges and the difficulties that women encounter in the field of Blue Economy so that proper strategies can be implemented. Therefore, the outcomes of this study are useful for policy makers, industries, and NGOs on how to generate and provide required conditions and policies that will make women participate in the blue economy. Further, the research explores the socio-economic determinants that affect women's participation in the blue economy. Thus, these strategies will enhance the development and stability of the sector as well as the accomplishment of the goals of sustainable development concerning gender equality.

LITERATURE REVIEW

The role of women in the blue economy has become a critical factor for the development and growth of the global economy. It can be observed that females are also involved in different activities in the blue

economy including fishing, aquaculture, tourism, and coastal management. According to the Food and Agriculture Organization of the United Nations – FAO (2020), a significant number of women are engaged in the fishing and aquaculture industries in some areas of the world. According to FAO (2015), the involvement of women is more in the activities of processing and selling of fish, management of fisheries, and conservation of aquatic resources. Further, the literature highlighted that woman play an important role in the blue economy. However, several challenges affect women's participation and economic power in the blue economy. Some of these challenges are poor financial instruments, weak property rights, gender pay gap, and gender-based violence in the maritime and coastal areas (UN Women, 2020; World Bank, 2019). According to the United Nations Development Programme – UNDP (2018), cultural prejudices limit women's opportunities to obtain leadership positions and participate in decision-making in the blue economy.

The options and strategies for women's economic advancement in the blue economy have been discussed in the literature. The International Union for Conservation of Nature – IUCN (2016) highlights that the required measures have been taken to improve women's capacities and vocational education. Further, enterprises have enabled women to participate in sustainable fishing, conservation of marine resources, and eco-tourism. Thus, some of them have adopted successful strategies for implementing women's leadership in coastal resource management and enhancing their coping strategies for environmental and economic fluctuations (Rohe et al., 2019). The United Nations Sustainable Development Goals (SDGs) especially SDG 5 on Gender Equality and SDG 14 on Life Below Water address the issue of gender equality and sustainable use of the oceans and marine resources (UN, 2021). The United Nations Convention on Biological Diversity (UNCBD) and the United Nations Convention on the Law of the Sea (UNCLOS) also have shown that there should be a balanced representation of gender in the management of marine resources and conservation (UNCBD, 2020). Governments, international organizations, and other stakeholders can design gender balance approaches and policies that increase women's contributions to the best use of aquatic resources globally. Women are involved in both production and post-harvest activities in the fisheries and aquaculture subsectors worldwide.

The literature shows that women are engaged in fish processing, marketing, and trading activities and they play an important role in value chains (FAO, 2020). The women who work in small-scale fisheries in Sri Lanka are engaged in fishing net repair, fish sorting, and fish processing for the market (Rohe et al., (2019). It is necessary to introduce programs that assist in skills development in environmentally friendly fishing, employment and marketing opportunities, business development, and financial management. These programs increase women's participation and decision-making power in the blue economy (UN Women, 2020). Tourism through conservation and the involvement of the local people in the tourism sector has given women an opportunity to be trained in customer relations, culture, and tourism conservation (IUCN, 2016). These opportunities not only bring income but also cultural interchange and women's initiatives in the protection of the environment in the coastal areas. The IUCN has highlighted the necessity of gender balance in marine conservation work (IUCN, 2021). The blue economy presents renewal energy as one of the most promising fields for women, especially in offshore wind, tidal energy, and marine biofuels. Women are now more involved in research, engineering, and project management positions in the field of blue economy (United Nations Educational, Scientific and Cultural Organization - UNESCO, 2019). Appropriate measures are required to improve the females' enrollment in science, technology, engineering, and mathematics (STEM) education. It enhanced gender equality, sustainable development, and inclusive growth in coastal communities. This shows that improvements in the levels of education and

vocational training enable women to work in marine science, fisheries management, and marine conservation (Rohe et al., 2019).

STEM education is very important for women who are planning to work in the field of blue economy because technical knowledge is very important in these fields (UNESCO, 2019). According to a study done by the Food and Agriculture Organization (2020), women-owned enterprises especially in the fisheries and aquaculture sectors struggle to access finance and investment capital. Limited collateral, prejudicial lending, and inadequate financial literacy limits women from expanding businesses, investing in equipment, or adopting green practices in the blue economy (UN Women, 2020). Offering micro-loans designed for women in business and offering access to financial education can improve women's economic stability and their roles in the blue economy (World Bank, 2021). According to UNDP (2018), legal rights and property ownership are some of the key social factors that determine women's ability to access and control marine resources and income-generating activities in the blue economy. Therefore, it is important to improve the legal frameworks for property rights including access to fishing and aquaculture resources as a way of enhancing women's power and sustainable natural resource management (IUCN, 2021). However, research has shown that women are still responsible for unpaid care work such as childcare, eldercare, and housework (Samarasinghe, 2018). At present, women face work-life conflicts and limited career growth in the fields of the blue economy (UN Women, 2020). The literature on socio-economic factors affecting women's participation in the blue economy highlighted that there is a necessity to develop and implement comprehensive plans that can remove barriers to education, improve access to finance, and increase legal literacy and capacity. Therefore, A proper policy and program will enhance women's status, prevent gender bias, and support the sustainable development of the coastal population.

RESEARCH METHODOLOGY

This research is descriptive, and the data was analyzed using multiple linear regression method. This statistical method is selected because it can assess the relationships between one dependent variable and multiple independent variables and provide a better insight into the determinants of women's participation in the blue economy.
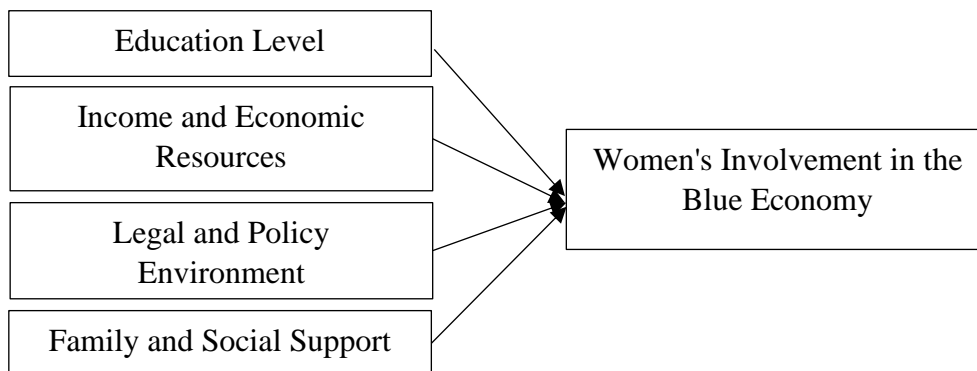
Figure 1: Conceptual framework of the study
Source: Developed by the authors (2024)

According to the conceptual framework of the study depicted in Figure 1, the independent Variables are Education Level, Income and Economic Resources, Legal and Policy Environment, Family and Social

Support and the dependent variable is Women's Involvement in the Blue Economy.

Table 1: Operationalization of the conceptual framework

Variable	Item	Scale of Measurement
Education Level	- Formal education attainment - Vocational training - Access to STEM (Science, Technology, Engineering, and Mathematics) education	Interval
Income and Economic Resources	- Income levels - Access to credit - Ownership of assets	Interval
Legal and Policy Environment	- Land and property rights - Fisheries management regulations - Policies promoting gender equality in the workplace	Interval
Family and Social Support	- Access to childcare - Social networks - Community organizations	Interval
Women's Involvement in the Blue Economy	- Participation rates in different sectors (e.g., fisheries, marine tourism) - Leadership roles held - Income levels derived from blue economy activities - Overall contribution to household and community development	Interval

Source: Developed by the authors (2024)

The independent variables (education level, income and economic resources, legal and policy environment, family and social support) are factors that determine women's engagement in the blue economy. These variables were quantified to determine the effect on women's involvement in the blue economy. Data was collected through a structured questionnaire. Each variable is measured using statements which are then rated on a Likert scale to facilitate the quantification of the respondents' perception and experience. The dependent variable, Women's Involvement in the Blue Economy, is also assessed to assess the level and type of their engagement. The sample includes 138 women who are, in one way or another, associated with the blue economy activities. The participants for this study were chosen using the judgmental sampling method often referred to as purposive sampling. The measures were

taken to clean the data collected from 138 women associated with the blue economy before the analysis of data. Missing data, extreme values, and errors were eliminated to ensure that the data was ready for the multiple linear regression analysis. The data gathered is then analyzed with the help of multiple linear regression analysis. This method enables the determination of the degree and direction of the effects of the independent variables on women's engagement in the blue economy. Thus, the analysis identifies the major factors that positively or negatively affect women's engagement in this important sector.

DATA ANALYSIS

Collected data were screened for detecting missing values, normality, and outliers before the analysis.

Table 2: Missing value analysis

	N	Mean	Std. Deviation	Missing Count	Missing Percent	No. of Extremes[a] Low	No. of Extremes[a] High
WOIBE	138	17.47	4.347	0	.0	0	0
EDULE	138	19.20	2.989	0	.0	5	0
INCER	138	18.90	2.863	0	.0	1	0
FASOS	138	16.65	4.264	0	.0	1	0
LEPEN	138	17.94	4.569	0	.0	0	0
a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).							

Source: Survey data (2024)

The boxplots were derived for each variable to check the outliers. Some of the outliers related to the variable 'Education Level' were treated before the analysis.
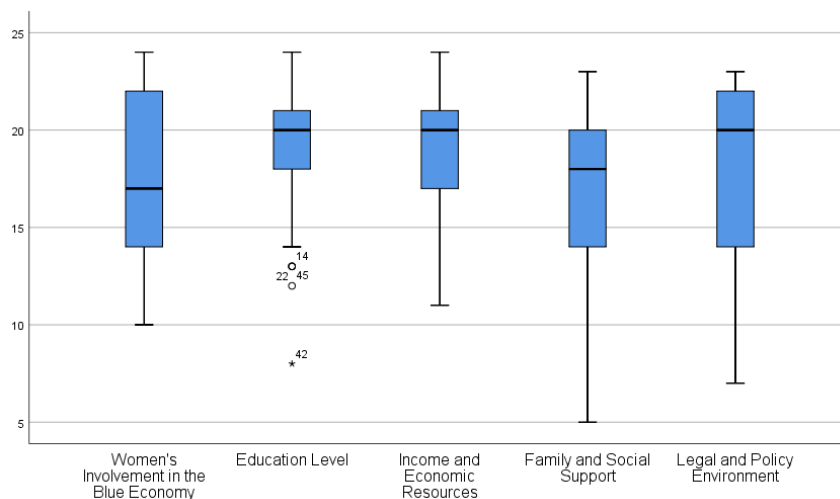
Figure 2: Boxplots for detecting outliers
Source: Survey data (2024)

Normal curves with the help of histograms were utilized for testing the normality of the variables of the model. Further, the correlation analysis was utilized to explore the association between the dependent variable and the independent variables. First, scatter diagrams were used to identify the association graphically. Then, the Pearson correlation coefficient was utilized to calculate the association between the

variables of the study. Table 3 depicts the correlation values between the variables of the model.

Table 3: Correlation between the variables of the model

		Women's Involvement in the Blue Economy	Education Level	Income and Economic Resources	Family and Social Support	Legal and Policy Environment
Women's Involvement in the Blue Economy	Pearson Correlation	1	.687**	.583**	.578**	.557**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	138	138	138	138	138
Education Level	Pearson Correlation	.687**	1	.534**	.336**	.352**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	138	138	138	138	138
Income and Economic Resources	Pearson Correlation	.583**	.534**	1	.236**	.515**
	Sig. (2-tailed)	.000	.000		.005	.000
	N	138	138	138	138	138
Family and Social Support	Pearson Correlation	.578**	.336**	.236**	1	.233**
	Sig. (2-tailed)	.000	.000	.005		.006
	N	138	138	138	138	138
Legal and Policy Environment	Pearson Correlation	.557**	.352**	.515**	.233**	1
	Sig. (2-tailed)	.000	.000	.000	.006	
	N	138	138	138	138	138
**. Correlation is significant at the 0.01 level (2-tailed).						

Source: Survey data (2024)

The multiple linear regression results in SPSS indicate that Education Level, Income and Economic Resources, Legal and Policy Environment, and Family and Social Support are good predictors of Women's Involvement in the Blue Economy. According to the output, all independent variables have a positive impact, highlighting the importance of these factors as a way of increasing women's enrollment in the blue economy. The coefficients table of the multiple regression analysis highlights the significance of the independent variables, Education Level, Income and Economic Resources, Family and Social Support, Legal and Policy Environment on the dependent variable, Women's Involvement on the Blue Economy.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.841[a]	.707	.698	2.389
a. Predictors: (Constant), Legal and Policy Environment, Family and Social Support, Education Level, Income and Economic Resources					

Source: Survey data (2024)

According to Table 4, the r-squared value of 0.707 indicates that 70.07 percent of the total variation of the dependent variable can be explained by the model. Therefore, the goodness of fit of the model is high.

Table 5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1829.472	4	457.368	80.154	.000[b]
	Residual	758.912	133	5.706		
	Total	2588.384	137			
a. Dependent Variable: Women's Involvement in the Blue Economy						
b. Predictors: (Constant), Legal and Policy Environment, Family and Social Support, Education Level, Income and Economic Resources						

Source: Survey data (2024)

According to Table 5, the F value is 80.154 and its p-value is .0000. A model is significant if the p-value is less than the alpha value of 0.05 under a 5 percent level of significance. Therefore, overall, the model is significant at a 0.05 level of significance.

Table 6: Estimated Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-8.378	1.566		-5.351	.000
	Education Level	.575	.084	.395	6.860	.000
	Income and Economic Resources	.242	.093	.159	2.614	.010
	Family and Social Support	.354	.051	.348	6.909	.000
	Legal and Policy Environment	.242	.053	.254	4.591	.000
Dependent Variable: Women's Involvement in the Blue Economy						

Source: Survey data (2024)

The confident values and the related probability values in Table 6 show that a one-unit increase in 'Education Level' increases the coefficient estimate for Women's Involvement in the Blue Economy by 0.575 units on average while controlling for the other variables. The positive coefficient and high significance level ($p < 0.000$) show that educational level has a positive influence on Women's Involvement in the Blue Economy. The standardized coefficient (Beta= 0.395) means that the Education Level is quite strong relative to other independent variables that were used in the model. As per the coefficient values and the related probability values in Table 6, it can be stated that the independent variable 'Income and Economic Resources' causes a change of 0.242 units of Women's Involvement in the Blue Economy keeping all other factors in the model constant. This positive correlation is also statistically significant at 0.010, which means that improved economic assets enhance women's engagement in the blue economy. The standardized coefficient value of 0.159 (Beta = 0.159) explains that it has a lesser impact than 'Education Level' and 'Family and Social Support'. As per the coefficient values and the related probability values in Table 6, a one-unit change in 'Family and Social Support', ceteris paribus, leads to a change of 0.354 in 'Women's Involvement in the Blue Economy'. It can be observed that This relationship is statistically significant since the p-value is 0.000. Therefore, this result highlights the importance of social support networks. The standardized coefficient (Beta = 0.348) shows that it is a significant predictor, and as important as Education Level.

The coefficient values in Table 6 show that for every one-unit change in 'Legal and Policy Environment', 0.242 change is caused in the dependent variable (Women's Involvement in the Blue Economy) when all other variables in the model are kept unchanged. This positive relationship is statistically significant at $p < 0.000$, therefore it can be concluded that legal and policy dynamics have a positive effect on women's engagement. It can also be seen from Table 6 that the standardized coefficient (Beta = 0.254) is also quite high thus indicating that it is also a significant predictor. These findings are crucial for policymakers and stakeholders who are interested in the improvement of gender equity and economic diversity in the maritime industry.

CONCLUSION AND RECOMMENDATIONS

The study shows that all four dependent variables are statistically significant predictors of Women's Participation in the Blue Economy. Education Level and Family and Social Support are most influential as measured by their higher coefficient (Beta) values for women's involvement. The findings of the research show that women's education enhances their chances of engaging in maritime economic activities. Women can gain the knowledge, skills as well as the confidence to participate and succeed in the Blue Economy through formal education. Also, the support from family and social relations enables women to acquire the necessary encouragement to become active in this field. Further, it was observed that the Income and Economic Resources and the Legal and Policy Environment are also positively correlated with women's involvement in the Blue Economy. However, that is to a lower level than Education Level and Family and Social Support. Economic resources also lead to income which enable women to participate in the available economic activities in the blue economy such as business, training, and other maritime activities. The findings revealed that legal and policy frameworks support women's participation in the Blue Economy. Also, the findings of the research highlighted that the improvement of education, economic opportunities, social connections, and legal framework can increase women's involvement in the blue economy. Girls and young women can be promoted for education in the fields of science, technology, engineering, mathematics (STEM), and related fields in the maritime industry. It is

important to recognize the professionals in the blue economy and organize a mentorship program that will allow female students to meet and interact with professionals. Also, it is possible to set up women's support groups for women engaging in the blue economy or those who have the readiness to work in the blue economy. It is required to promote the development of community-based activities to help in the promotion of women's engagement in the blue economy. The authorities can offer economical credit services and required business management skills to women interested and already engaged in entrepreneurship in the blue economy. The negotiation power of the women can be improved through accumulating resources by developing the women's co-operatives and associations. The sectors including ecotourism, aquaculture, and marine resource management should be promoted to support income generation of the women in the blue economy. National and regional strategies should be developed to enhance women's participation in the blue economy. Further, it is necessary to encourage women's commitment to decision-making and policymaking in the maritime sector. Also, public awareness programs can be organized to increase the awareness of women's rights in the blue economy.

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