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Economic development through the implementation of environment policies: An empirical study from the South-West coastal areas of Bangladesh

Wang Bing^a, K M Safiqul Islam^{b*}, Md. Miraj Hossen^c



^{a,b} College of Public Administration, Huazhong University of Science and Technology, Wuhan, Hubei, P. R. China.

^c Department of Management Studies, Jagannath University, Dhaka, Bangladesh.

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ABSTRACT

Climate change is a reality and, it affects the lives of poor and vulnerable people in developing countries like Bangladesh. In order to improve the livelihoods of vulnerable people, it is urgent to set up a link between environmental policy implementation and poverty reduction. In this article, a natural resource management research approach is suggested. It consists of two steps (1) Identifying the extents related to environmental sustainability and, (2) The role of the areas to the income generation process. Descriptive research design is used to achieve the objectives, and for the purpose of the research primary data is collected from 201 respondents in South-West coastal zone of Bangladesh with the help of a closed-ended questionnaire. The authors analyzed the data with the help of IBM SPSS-21 and, found that environmental sustainability is one of the most important precondition for economic development at the coastal zone in Bangladesh delta. It also found that the income generation process of the local people is significantly influenced by the environmental sustainability.

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Introduction

Nowadays, the growing environmental threats and degradation emphasize the urgent need to conserve the natural resources to safeguard our planet. Over the years, the international community has strived to address many environmental challenges. Though, the environmental degradation is not the only issue at the forefront of global affairs. A significant number of the global population still living on 2 dollars per day or less. So, there is a crucial need to take development initiative for poverty alleviation. The United Nations conference on the human environment (1972) was the first major international gathering on an environmental issue. Since then, many international conferences devoted to set out the key objectives of the global development agenda giving priority on environmental protection and poverty alleviation. Besides this, Researchers are giving their continuous effort to formulate new policies regarding sustainable environment management and poverty alleviation. These days the nations are facing a lot of similar challenges related to climate change phenomenon and try to learn from each other. The most important approach is to exchange the views among local, national and international level. From the viewpoints of policymakers, practitioners and academicians, there has been found high hopes on the ability to learn from their practice to stimulate the changes in the policies. According to Nagorny-Koring (2019) Though the enormous number of urban climate-governance innovation formatted through the best practice in all over the world, there has been a failure to convert the political ambitions embedded in these innovations into effective guidelines. In most of the cases, the climate-governance innovations only provide fragmentary solutions in lieu of transformative change (Bulkeley, Broto, & Edwards, 2014). In the last five decades, human interference to the terrestrial ecosystems has reached an exceptional level with the increasing of populations (Palmer & Di Falco, 2012). They also discussed the area under grain production needs to increase

* Corresponding author. ORCID ID: 0000-0002-1111-6645

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to meet the high consumption. The clear conceptual framework is needed to combine the two fields of environmental policies and poverty reduction (Adams et al., 2004). According to (Hassan, Scholes, & Ash, 2005), about a quarter of cultivable land already been occupied. It is well recognized that environmental quality and poverty are linked with each other (Dubois, 2011). According to the report of FAO-2011, there are 40% of degraded land in high poverty-stricken areas, 30% in a moderately weak area and 20% is in slightly poor regions. Therefore, two interlinked component poverty reduction and environmental sustainability ought to be tackled side by side to achieve sustainable development goals (Reardon & Vosti, 1995).

As Bangladesh is a lower-middle income country and the people of the south-west coastal part of this country are very much affected by different natural disasters and environmental issues. The Government gives more attention to improve the condition of the people of this area and most of the cases the country's environmental policies are formulated and implemented with considering the environmental sustainability and economic development of the country especially for the vulnerable affected coastal parts. The researchers feel motivation to conduct the present study considering the governmental initiatives and people's conditions; whether the environmental policies of the country can protect environmental sustainability and improve the economic condition of the people or not. The main objectives of the research are as follows:

- To determine the impact of different environmental policies (Environmental compliance management, creation of environmental culture, agricultural production management, natural capital and ecosystem service, and implementation of environmental laws) on creation of environmental sustainability of Bangladesh.
- To analyze the role of environmental policies on income generation and sustainable economic development of Bangladesh.

Literature Review

A brief review of related literature has been provided in this reasonable section advancement can be guaranteed through the asset compelled procedure (Jia et al., 2017). For this purpose, natural resources including water, minerals, fossil fuel and use of environmental resources should be reduced. Thus, the use of environmentally sound products and reducing the consumption of resources help towards ensuring long-run sustainability. The environmental policy and public awareness can help to reduce carbon-dioxide and upgrade the environmental sustainability as well as ensure people's occupational health, well-being, and national productivity (Chen, Hossen, Muzafary, & Begum, 2018). As a part of environment policy and practices e-business activities can ensure the environmental sustainability by following the 3D approach- De-materialization, De-carbonization, and De-mobilization in the daily activities of citizen of the country (Hossen, Uddin, & Hossain, 2014). Green management and environmental policies are the foundation of sustainable environment and economic development of any nation which should be started to practice from home to each part of state activities (Hossen, Begum, & Sultana, 2018). Environmental sustainability and poverty are part and parcel of modern civilization. (Agarwal & Narain, 2002) Assumed that ecological poverty must be unpainted to study the relationship between poverty and the environment. They defined "ecological poverty" as poverty resulting from various environmental conditions at the different region. If the natural resources are limited, the people can neither access sufficient ecological services which are severely needed for survival nor access healthy natural resources for viable development. The concept of ecological poverty is not always similar in a different region, especially mountainous and remote areas; there have less available natural resources. This resource-poor mountain ecosystem sometimes is unable to provide the least standard of living to its growing population (Samal, Palni, & Agrawal, 2003; Wunder, 2001). There is much component to confirm that poverty is a vital cause of environmental degradation (DFID).

Though a flow of data indicates that poverty has nothing to do with environmental degradation (Zhen, Fu, Lu, & Wang, 2014). In the article, they have discussed the contradiction views on the relationship between poverty and environmental degradation, and then elaborated the study progress of the ecosystem, which addressed the environmental protection and poverty reduction together. In developing countries, the ecosystem services are often essential to surviving livelihoods, communities and promoting human right (MEA, 2005). In spite of the importance of natural resources for social benefits, all kinds of natural resources are being lost around the world (Teytelboym, 2019). The economic production process is the main reason for the loss of natural capital which focuses on the output and ignores impact to the environment. This is especially exact for developing countries having huge natural resources, but they seldom rely on natural resources for revenue. (Naghavi et al., 2015). In those countries, the livelihoods of the remote area people are mostly dependent on natural resources (Buys, 2007). Since the economic growth was the precondition of availing ecological service and goods, the natural capital was not being used for a long time (Greenstone & Jack, 2015). The impact of payment for environmental service and protected area on environmental outcomes and local livelihoods are argumentative and have been widely debated.

The impact of Pay for Environmental Service (PES) on households well-being were related to the amount of fund provided. The two higher-paying market-linked PES programs had a significant positive impact. On the other hand, a lower-paying program targeted conservation of biodiversity had no significant effect on livelihoods though the positive environmental impact was there. (Clements & Milner-Gulland, 2015). The environmental Kuznets curve indicates the U shape relationship between economic growth and environmental quality (Stern, 2004). The empirical study has found that the theoretical support for the relationship between economic development and natural capital are sometimes deficient, though the Kuznets curve appealed restoring their relationship. (Pfaff & Robalino, 2017). Social impact evaluation focuses on net impact determined through single poverty measures; however, human well-being is complex (Agrawal & Redford, 2006; McGregor, 2007). Rigorous influence evaluation method are widely credited with

having renovated development policy or quantifying the role that specific interventions have made to the improvement of human well-being (Ferraro & Pattanayak, 2006). Most of the published documents have focused on measuring environment rather than social outcomes (Andam, Ferraro, Pfaff, Sanchez-Azofeifa, & Robalino, 2008; Arriagada, Ferraro, Sills, Pattanayak, & Cordero-Sancho, 2012). The study of (Andam, Ferraro, Sims, Healy, & Holland, 2010; Sims, 2010) has shown the precarious significance of making comparison with appropriate controls in order to avoid overestimating the effectiveness of interferences. Intervention with nominal effects on income may, however, contribute to less physical aspects of well-being such as access to natural resource and education. Besides this, there is also a need to disaggregate conclusions to understand the impact of conservation mediation on a different subsection of society (Daw, Brown, Rosendo, & Pomeroy, 2011). According to De Pourcq et al. (2017), Biodiversity conservation and poverty alleviation are the two key issues in the natural resource management (Adenle, Stevens, & Bridgewater, 2015; Chape, Harrison, Spalding, & Lysenko, 2005). Natural resources underwrite to conserve the biodiversity and shelter the biodiversity (Pimbert & Pretty, 1995). Sometimes the restriction on the use of natural resources may affect negatively after parsimonies of local communities (Brockington & Wilkie, 2015).

The impact of Natural resources on poverty and the per capita income of local communities are controversial. Some study indicates it does not have a positive effect (Clements, Suon, Wilkie, & Milner-Gulland, 2014; Miranda, Corral, Blackman, Asner, & Lima, 2016). Natural Resources also found to intensify the poverty of local peoples (Adams et al., 2004; Cernea & Schmidt-Soltau, 2006). (Adams et al., 2004; Cernea & Schmidt-Soltau, 2006). (Vedeld, Jumane, Wapalila, & Songorwa, 2012); Wang and Yamamoto (2009) discussed that the primary goal of natural reservation is to protect the ecological system but not the alleviation of poverty. According to him conservation policies focus more on organic conservation and ignore the economic impact on local inhabitants. There have also been found that Natural preserver have optimistic impact on poverty reduction (Roe, Mohammed, Porras, & Giuliani, 2013). Protected area system reduces both poverty and deforestation of costa Rica (Andam et al., 2008). Andam, Ferraro, Sims, Healy, & Holland, (2010) also discussed that those Natural reserver established before 1980 reduced approximately 10% poverty in Coata Rica. It also restrained with a poverty index that netted resident’s demographic information in addition to domestic appliance and success use of information. Natural reserver may bring some positive effect like financial assistance (Environmental Protection Fund), employment (Forest ranger, Forest worker), and others (training on green breeding technology) (Baird, 2014; Clements & Milner-Gulland, 2015; Miller, 2015). In the literature it is well being discussed about the impact of natural reserver on poverty alleviation (Ferraro & Hanauer, 2014; Job & Paesler, 2013).

Observing the country’s prevailing situation and reviewing the existing literature the authors have proposed the following research model and hypotheses.

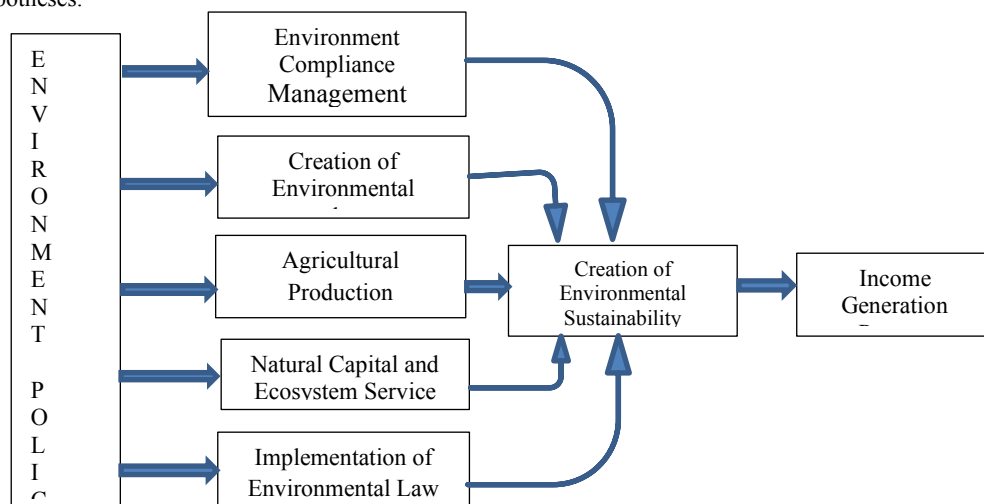


Figure 1: Research model for environmental policy and income generation

The following hypotheses were formulated to investigate the relationships among the variables.

- H1: Environmental compliance management has a positive effect on sustainability.
- H2: Creation of environmental culture plays a positive effect on sustainability.
- H3: Agricultural production management has a positive effect on sustainability.
- H4: Natural capital and ecosystem service have a positive effect on sustainability.
- H5: Implementation of environmental law has a positive effect on sustainability.
- H6: Sustainability has a positive effect on income generation.

Research and Methodology

Data Source and Methods of Data Collection

The study is mainly descriptive in nature with some quantitative analysis by using both primary and secondary data. The researchers followed the suggestions of Mugenda (2003) who told that descriptive survey design helps a researcher to gather, summarize, present and interpret information for the purpose of clarification. For secondary data the researchers have reviewed many articles from different databases such as Sage, Taylor and Francis Online, Elsevier, Springerlink, ScienceDirect, JSTOR, Wiley Online Library, and Emerald with environmental sustainability and economic development. The primary data were collected through both face to face and online survey using a well-structured questionnaire following a 5-point Likert scales (ranging from 1- strongly disagree to 5- strongly agree), and the collected data were analysed by using IBM-SPSS 23 version.

Study Area

The researchers had chosen one of the most vulnerable geographical parts of Bangladesh because frequently this area faces different types of natural disaster. The South-West coastal part consists of three districts name as Khulna, Bagerhat, and Satkhira. The UNESCO World heritage Sundarbans is located at this part. Most of the coastal people are farmer and fisherman and always fighting against natural disasters to survive.

Participants and Procedure

The researchers choose sample respondents from different professions and segmented them into five broad categories like as-government officials, non-government service holders, businessmen, teachers, journalist. From these segments, total 250 sample respondents were randomly selected and getting their responses. After collecting the data about 49 questions were found somewhat incomplete or inconsistent and decided to drop those questionnaires. Finally, 201 set of questionnaire were used for this study which indicates the response rate is about 80.4%. Here the authors adopt Cochran (1963) suggestion to determine sample size – ‘when there is a large population but the variability in the proportion is unknown then at 5%, 7%, and at 10% precision level the sample size should be considered at least as 400, 200, 100 accordingly’. Here, we considered 7% percent precision level and use 201 sample (suggested at least 200) for our study. Among the respondents the highest number about 57.21% were from non-government officials (N = 115) the second large number of respondents were the mid-level government officials about 24.38% (N = 49) who are working at the different policy-making position of the government. Other respondents were from teaching profession, businessmen, and journalists about 10.95% (N =22), 3.98% (N = 8), and businessmen about 3.48% (N = 7) accordingly.

Variables and Measures

The variables considered in the proposed research model were measured by using conventional means. The researchers have used five items to measure Environment Compliance Management (ECM) which were adopted from Tweneboah (2009), and Nieblas-Ortiz, Arcos-Vega, and Sevilla-García (2017), seven items were used from Tweneboah (2009) to measure Creation of Environment Culture (CEC), nine items were used to measure Natural Capital and Ecosystem Service (NCES) and adopted from (Ehrlich, Kareiva, & Daily, 2012), seven items were used to measure the Creation of Environmental Sustainability (CES) which were developed with the help of Basiago (1998). Besides, six items for Agricultural Production Management (APM), three items for Implementation of Environmental Law (IEL), and eight items for Income Generating Process (IGP) were developed by the authors and used for this study.

Finally, the following linear regression model was used for the study:

$$y = \gamma_0 + \gamma_1 x_1 + \gamma_2 x_2 + \gamma_3 x_3 + \dots + \gamma_n x_n + e$$

Here,

x_1 -Environment Compliance Management	x_5 -Implementation of Environmental law
x_2 -Creation of Environment Culture	x_6 -Achieved Environmental Sustainability
x_3 - Agricultural Production Management	y is Income generation process
x_4 - Natural Capital and Ecosystem Service	e - Error term

And γ_0 is constant whereas γ_1 γ_2 γ_3 , and γ_n are coefficient to estimate.

Result and Discussion

Descriptive Statistics

Before directing the total analysis, the researchers have tested the quality of the data following the suggestions of Dabholkar and Bagozzi (2002), ‘it is obvious to test the quality of data before testing the hypothesis’. Here, the researchers have tested the value of Cronbach’s Alpha to assess the data reliability and presented in Table-1 which indicates that, all the variables are reliable and they all have higher values than minimum standard value for Cronbach’s Alpha is 0.6 according to ((Price, 1972) and 0.70 according to (Kline, 1999) and the descriptive statistics represented by the table-1 shows that all the average (mean) values are greater than 4 except 3.77 for the agricultural production Management (APM) variable that also related with the minimum standard deviation \pm 0.46.

Table 1: Descriptive Statistics for Variables

Variable	Mean	Std. Deviation	Cronbach α
ECM	4.3599	0.57481	0.721
CEC	4.1848	0.48820	0.750
APM	3.7786	0.61535	0.701
NCES	4.1598	0.46835	0.788
IEL	4.3483	0.57764	0.714
CES	4.0917	0.47662	0.712
IGP	4.0771	0.48457	0.761

Here, ECM- Environment Compliance Management, CEC-Creation of Environment Culture; APM- Agricultural Production Management, NCES- Natural Capital and Ecosystem Service; and IEL- Implementation of Environmental Law and IGP- Income Generation Process.

Correlation Analysis

The table 2 represents the relationship among all variables taken into consideration for this study. The result shows that, all the variables (dependent, independent and mediating) are positively correlated with each other and are significant at 1% significant level. The highest level of correlation ($r=0.984$) found here between IEL and ECM, while the lowest level ($r=0.431$) is in APM and IGP.

Table 2: Correlation Coefficient (the value of r) for Variables

Variables	ECM	CEC	APM	NCES	IL	CES	IGP
ECM	1						
CEC	0.876**	1					
APM	0.516**	0.571**	1				
NCES	0.834**	0.969**	0.515**	1			
IEL	0.984**	0.866**	0.499**	0.829**	1		
CES	0.718**	0.923**	0.479**	0.976**	0.715**	1	
IGP	0.684**	0.872**	0.431**	0.957**	0.681**	0.985**	1

** Correlation coefficient are significant at 0.01 level (two-tailed).

Here, ECM- Environmental Compliance Management, CEC-Creation of Environmental Culture; APM-Agricultural Production Management; NCEC-Natural Capital and Ecosystem Service; IEL-Impose Environmental Law; and CES-Creation of environmental Sustainability.

Regression Analysis

Table 3 signifies the linear regression analysis which indicates the effects of the independent variables on dependent variable (Income Generation Process). The regression table illustrates that Creation of Environmental Culture (CEC), Agricultural product Management (APM), and Impose Environmental Law (IEL) have negative effect, though Environmental Compliance Management (ECM), Natural Capital and Ecosystem Service (NCES), and Creation of Environmental Sustainability (CES) have positive effect on income generation process. Besides, it also can conclude that except APM ($\beta = -0.001$, $P > 0.05$; not significant) all the variables ECM ($\beta = .100$, $P < 0.05$; CEC ($\beta = -.611$, $P < 0.01$); NCEC ($\beta = -0.759$, $P < 0.01$); IEL ($\beta = -0.082$, $P < 0.05$) and CES ($\beta = 0.837$, $P < 0.01$) had significance effect on income generation process.

Table 3: Analysis of Regression Coefficients

Model Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for β	
	β	Std. Error	B			Lower Bound	Upper Bound
1 (Constant)	-0.018	0.034		-0.532	0.596	-0.085	0.049
ECM	0.100	0.040	0.118	2.485	0.014*	0.021	0.179
CEC	-0.611	0.037	-0.616	-16.507	0.000***	-0.684	-0.538
APM	-0.001	0.007	-0.001	-0.139	0.889	-0.016	0.014
NCES	0.759	0.084	0.733	9.058	0.000***	0.594	0.924
IEL	-0.082	0.037	-0.098	-2.228	0.027*	-0.155	-0.009
CES	0.837	0.059	0.823	14.084	0.000***	0.719	0.954

a. *Dependent Variable: IGP*

*Significant at less than 0.05 level, ***Significant at less than 0.1% level.

Here, ECM- Environmental Compliance Management, CEC-Creation of Environmental Culture, APM-Agricultural Production Management, NCEC-Natural Capital and Ecosystem Service, IEL-Impose Environmental Law, CES-Creation of environmental Sustainability.

Multiple linear regression analysis of Income Generation Process (IGP)

Table 4 represents the moderated multiple-linear regression analysis on IGP. In model-1 two control variables- education, and energy consumed have a positive effect on IGP whereas the other variables have negative effect. Among the control variables the effect of energy consumed, gender, and drinking water is significant at 5% level of significance. In model-2, the independent variables are added. The presented values reveal the variable ECM, CEC and IEL have negative effect on IGP, and oppositely APM, NCEC have positive effects on IGP. As reported in the table 4 (model 2), the effect of CEC, and NCEC on IGP are significant at 0.1% level and H2 and H4 are accepted. In addition, the mediating variable creation of environmental sustainability (CES) is incorporated in model 3, which has a positive and significant effect on the income generation process (IGP). Thus the hypothesis H6 also is accepted. Oppositely, the hypotheses related to the variables ECM, APM, and IEL (H1, H3, H5) are rejected as their p-value exceed the accepted level ($P \geq 0.05$).

Table 4: Multiple Linear Regression Analysis of IGP

Variable	Model	Model 1	Model 2	Model 3
Control variables				
(Constant)		4.475***	0.035	0.023
Gender		-0.188*	-0.016	-0.015
Age		-0.045	-0.003	0.002
Education		0.033	-0.008	-0.010
Occupation		-0.026	-0.000047	0.003
Drinking water		-0.296*	0.047*	0.020
Energy consumed		0.128*	-0.044*	-0.015
Independent Variables				
Environmental Compliance Management (ECM)			-0.092	0.089*
Creation of Environmental Culture (CEC)			-0.668***	-0.611***
Agricultural Production Management (APM)			0.011	0.003
Natural Capital and Ecosystem Service (NCEC)			1.855***	0.755***
Impose Environmental Laws (IEL)			-0.100	-0.071
Mediator				
Creation of environmental Sustainability (CES)				0.836***

Note. N= 201, Entries are standardized regression coefficients.

Dependent variable: Income Generation Process (IGP).

*** $P \leq 0.1$, ** $P \leq 0.01$, * $P \leq 0.05$ (two tailed).

Moreover, the study clarifies outcomes and decisions regarding the formulated hypotheses:

Table 5: Summary of the Hypotheses Tested Results

Hypotheses	β	P	Accept or rejection decisions
H1: ECM has a positive effects on CES	-0.092	0.108	Hypothesis rejected
H2: CEC has a positive effects on CES	-0.668	0.000***	Accepted at 0.1% significance level
H3: APM has a positive effects on CES	0.011	0.351	Hypothesis rejected
H4: NCEC has a positive effects on CES	1.855	0.000***	Accepted at 0.1% significance level
H5: IES has a positive effects on CES	-0.100	0.072	Hypothesis rejected
H6: CES has a positive effects on IGP	0.836	0.000***	Accepted at 0.1% significance level

Source: Compiled by authors

From the result analysis of this research, we can conclude that environmental policy implementation plays a vital role in income-generating process (IGP). Here, discussed five independent variables and one mediating variable have a direct effect on the income-generating process.

Conclusions

The authors of the present study found that there is a significant effect of CEC, and NCEC on CES, whereas CES has also a significant effect on IGP. There are many other components such as ECM, APM, IEL etc. which have positive role to create environmental sustainability. The sustainable environmental management can save the livelihood of the common people from sufferings, and also plays key role to save expenditure in different components of mass people in the rural areas. To establish the linkage between environment and poverty a lot of components should be included in national policy making process. The income generation process should be initiated through various steps like as integrated disaster management, scientific agricultural production management, environmental pollution control, natural resource management, Plantation of medicinal trees etc. (Sanchez, 2000). The motivation behind the natural resource degradation must be tapped in national development education program. Moreover, the Government and policy makers must have to reach the common people of the country and let them well informed about the environmental policies, so that they can also be the part of policy implementation process which will surely help them to lives in a good environment with better health and good economic condition. Considering more component in the environmental management system, the government and policymakers can help to improve the earning capability of local poor and vulnerable people and thus the economic development can be bust-up. Though, there may be a number of possibilities, under the socio-economic condition of Bangladesh, the following areas should be considered by the policy makers- effective policy and legal framework, sufficient Funding, environment education, community participation, and stakeholder’s capacity building etc.

Session of the study

The data was collected from the study area in first week of August,2019. The researcher phiqually visited the area and took part into the focus group discussion,finalized the questionnaire and collected data. In September 2019 the data was compiled and analyzed, and finally interpreted the results.

Limitations of the Study and Future Direction

This research presented the scenario of environmental policy implication. To the managers, policy makers, community leaders it can be a source of information’s. Nevertheless, it has some confines which may lead to future agenda for research. Firstly, there are a lot of components related to environment management but the researchers had taken only five components. Other components could potentially explain to assess the impact of environmental policies. Secondly, this research executed an empirical investigation collecting data from a single upozilla (sub-district) of each districts of the South-West coastal zone of the country. Future researchers can continue in the same study expanding the areas in coastal zone. Thirdly, this study applied a well-structured questionnaire with covering only 201 sample respondents which somewhat limits the respondents’ views and narrow down the overall findings. So, future researchers can use different techniques (such as- focus group discussion, interview method, and covering extensive number of people) to collect the data from respondents which can give more reliable and different findings. Last but not least, the study analysis is mainly based on the statistical software IBM SPSS-23, in future IBM AMOS, Smart PLS or other tools can be used to know more insights of the research. Moreover, the present study on the role of environmental attitude and values of Bangladeshi people has brought to the fore a lot of issues that should be dealt with. Besides this, the future researchers should find out the opportunities and threats regarding environmental management to improve the status quo.

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