

Co Management Health and Economic Development Indexes: Grand Strategy for Health Development in the Madura Island-Indonesia Coast through Mangrove planting

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Abstract

Poverty in Indonesia's coastlines is currently an unresolved national issue. This study aims to analyze the mangrove co-management in the economic and health development in the coasts, as an effort to tackle poverty. This research uses the qualitative and quantitative methods, analyzed using the SEM WarpPLS. The research results show that in the coastlines of Madura Island, the Instructive Co-Management is most dominantly applied in managing mangroves. The mangrove co-management has positive and significant effects towards the economic and health development of the coastlines. The economic development of Madura Island's coasts is marked by the increase of the people's income, the creation of new job fields, and also the increase of health conditions, in line with the increase of mangrove preservation quality and quantity.

Keywords: *Co-management, Mangrove, Development, Economy, Health, Coastlines.*

Introduction

The development of the economy as well as the health quality in the coasts of Indonesia are still crucial national issues which require special attention. Some problems in the coastlines include the weak education, the low-quality human resources, the lack of access, the low rate of life expectancy and health, the lack of technological access and network, and also the deteriorating natural resources. Kunarjo¹ stated that the root cause for poverty is the low income, which affects the education and health conditions, causing low productivity. Muqtafa and Nadila² and Imron³ stated that other factors causing the poverty of fishermen are more complex, such as the destruction of the coastal ecosystems and destructive exploitation of natural resources. Such environmental destruction has decreased the fishermen's income.⁴

The natural resources in the coasts of Madura Strait have experienced a worsening decrease of quality and quantity, due to the demographic pressures, industrial

waste, and developmental demands, as stated by Kusnadi.⁵ Many fishermen shift to seek jobs on land, as fishing no longer becomes a reliable source of income. Thus, to guarantee the welfare of the people as well as to preserve the natural resources of the coasts, there needs to be a comprehensive developmental policy combined with structured steps to achieve it.⁵

The terrible destruction of the coastal ecosystem further affects the quantity of the fish catch. The issue of the coastal people's poverty is basically multidimensional, thus there needs to be an integrated social engineering to resolve it, instead of partial solutions.

Because of that, there needs to be some efforts to save the fishermen from poverty. One of the ways is by developing the diversification of off-fishing economic ventures. There needs to be integrated economic and ecologic management of the coastal resources to achieve sustainable coastal development. To support it, there

needs to be the increase of health facilities which are subsidized by the government, the optimization of ecosystem conservation potentials, and the preservation of environmental functions.^{6,7}

Mangroves are one of the natural resources with high potential which are not yet optimally explored. The mangrove forest ecosystem has highly crucial values for human life. The mangroves can provide various environmental products and services for economic gain. They even support the health of the people by fulfilling some of their needs. These potentials may give the hope of fulfilling the needs and the welfare of the society. Thus, the coastal areas become a crucial part of the economic and developmental activities.

Indonesia has a wide area of coastlines and mangroves. Indonesia has 293.464 hectares of seagrass and it boasts 3,5 million hectares of mangrove. But the mangrove management so far is still partial, with the orientation of “work project” and with “sectoral ego” of policies. These things inhibit the objective of development.

There needs to be a balance between the ecologic, social, cultural, governmental, and economic aspects in integratedly managing the coastlines. An important concept in this management is the *co-management*, where the local society has an active role in determining the policies and in utilizing the coastal areas, bringing positive impacts. Pomeroy and Williams⁸ found that the co-management approach requires the division of responsibilities between the related parties, such as the government and the society, in managing the existing resources and the environment.

The co-management principle is manifested in the form of the fishery natural resource ownership right transfer to the society. This concept may accommodate the interests of the society and other users. Co-management is used to manage the mangrove ecosystem in an integrated manner in the economic and the health

development of the coastal communities.⁸

The research results will then yield a good mangrove co-management model which may be applied in the society. Based on this framework, it is crucial to carry out an analysis on the mangrove co-management’s effects towards the economic development of the coastlines in Madura Island.

Research Methods

The research was carried out along the shorelines of Madura Island, East Java Province, Indonesia. This is a quantitative research combined with a profound qualitative analysis. The sampling of location and respondents are carried out purposely. The data is collected through observation, profound direct interview, and giving out questionnaires to respondents. This study is carried out at four regencies, which are the Bangkalan, Sampang, Pamekasan, and Sumenep Regencies. There were 170 samples which consisted of communal groups, governmental institutions, academia, environmentalists, health facility workers, non-governmental organizations, and CSRs. This research analyzes the relations between co-management and the economic development of the coastal areas. The data is analyzed using the Structural Equation Model (SEM)-Partial Least Square method. Then, the quantitative results are interpreted and combined with the qualitative data.

Results and Discussion

The Importance of Mangrove Co-Management for the Health and Economy

The hypothesis test is a reflection of the relations between the examined variables in this research, as shown in Table 1. A model has a discriminant validity if the AVE root for each construct is greater than the correlation between one construct and another. The test results are shown as follows:

Table 1. The Validity and the Reliability Tests

No	Variable	A.K.AVE	Composite Reliability	Cronbach Alpha
1	Mangrove Co-Management(Y1)	0.516	0.020	0.885
2	Economic and Health Development (Y2)	0.615	0.777	0.713

Source: Data Processing Results using WarpPLS 5.0

Table 1 shows that the square root value of the average variances extracted (AVE) of every construct is greater than the correlation value between constructs. These values show that the research instrument in the form of questionnaires for all variables are valid. The coastal economic development variable has the highest

AVE (0,615), which is then followed by the mangrove co-management (0,516). These results show that all variables measured by the chosen indicators are valid. It also shows that there is a link between the mangrove co-management and the economic and health developments.

The analysis of the mangrove co-management types shows that the *instructive co-management* is most dominating, as shown in the table below.

Table 2. Indicator Factor Loading of Every Variable

Indicator Factor Loading of Every Mangrove Co-Management Variable (Y1)				
Variable	Indicator/Form	Item	Factor Loading	P value
Mangrove Co-Management (Y1)	Instructive Co-Management	Y1.1	0.765	<0.001
	Consultative Co-Management	Y1.2	0.434	<0.001
	Cooperative Co-Management	Y1.3	0.722	<0.001
	Advocative Co-Management	Y1.4	0.701	<0.001
	Informative Co-Management	Y1.5	-0.433	<0.001
Indicator Factor Loading of Every Economic Development Variable (Y2)				
Variable	Indicator	Item	Factor Loading	P value
Economic Development (Y2)	Increase of Income	Y2.1	0.908	<0.001
	Increased Work Opprotunities	Y2.2	0.886	<0.001
	Mangrove Preservation	Y2.3	0.487	<0.001

Source: Data Processing Results Using WarpPLS 5. 0

Table 2 shows that the most dominant type formed or reflected in the co-management variable is the instructive co-management, with the factor loading of 0.765. Thus, this type of co-management is most dominantly applied in the coasts of Madura Island, where the government gives information on the determined decision, then the society applies it. Such type of program is an effort to

revive the degrading mangrove condition in Madura.

The research results show that the mangrove co-management has significantly positive effects towards the economic development of the coastal areas. The table below presents one of the evidences of the mangrove co-management’s effects towards economic development.

Table 3. Results of the Hypothesis Test

No	The Relationship Between Variables (Explanatory variable à Response Variable)		Path Coefficient	P value	Significance
1	Co-management (Y1)	Coastal Economic and Health Development (Y2)	0,212*	0,012	Significant

Note: * = significant at $\alpha = \leq 0.05$ (5%).

Source: Data Processing Results Using WarpPLS 5. 0

The table above shows that the hypothesis tested in this research is the effect of co-management towards the economic and health development of the coastal areas. The analysis results using the WarpPLS yields the path coefficient value of 0,212 and the p-value of 0,012, which is significant at $\alpha = \leq 0,05$ and with the error rate of merely hanya 5%. Thus, this hypothesis is valid. The path coefficient value is positive and this value shows the tendency that the better the co-management, the better economic development of the coastal areas.

During the New Order Era, the developmental policies rest on the paradigm of “growth first and distribution later” and “growth and redistribution”, which are actually proven to fail in bringing this nation to achieve welfare. An approach which has prioritized the economic sector as the commander of development has resulted in poverty, unemployment, lack of access to health facilities, and various inequalities, such as that between groups of society, between sectors and between regions.

Influence of the Mangrove Co-Management towards the Coastal Economic and Health Development

There is a shift from the economic growth-oriented developmental approach towards income equality and social justice, or the developmental framework which emphasizes the society’s capability in controlling the condition and the environment. The research results show that economic and health developments are necessities which are relevant to the developmental policies of coastal areas and villages in the regional autonomy era, which aims to tackle unemployment and mass poverty. The greater the roles of the government and

the stakeholders, the better the economic developments of coastal communities. The results of this research’s analyses show the mangrove co-management’s influence towards the coastal economic developments in Madura are as follows:

Increase of Income and Health Access

Basically, integrated regional developmental strategies require a synergy of sustainable social and economic development. The objectives are not limited to increasing income and social welfare, but also to encourage the increase of community participation in economic activities to develop all of their potentials.

The research results and the empirical facts show that the people of Madura coastlines have succeeded in obtaining extra money from the result of managing mangroves in the area, including from the sales of mangrove seeds, crabs, coffee, tea, and mangrove honey. They also profit from mangrove ecotourism. This results in the increased welfare of the society; thus, they are able to access health services and facilities. This shows that the mangrove co-management is effective in increasing the society’s income. It is an indication of a good coastal economic growth.

New Job Opportunities

The research results show that the mangrove co-management increases the job opportunity indicator, with the factor loading of 0,886. This value shows that the availability of job opportunities is an important factor and is an indicator of the coastal area’s economic development. The Madura Island coastal communities which have managed the mangroves have new job

opportunities. This surely has positive impacts towards the people’s income and economy.

Mangrove Preservation

The integrated coastal area development approach is a developmental policy which aims to achieve sustainable usage of coastal and marine resources and to protect them from destruction. This approach is also used to analyze developmental implications. Kusnadi⁵ stated that a systematic developmental policy framework is required to resolve poverty of fishermen. It must also depend on the resources which are easily-accessible.

The mangrove preservation indicator has the factor loading value of 0,487. This shows that it is a crucial indicator of the coastal people’s economic development. The condition of the mangrove forests in the coasts of Madura Island has improved in several areas, especially those which are managed by community groups. The increase of the environmental quality means that the people’s health conditions will increase, as environmental health is highly beneficial to society.

The statistical analyses show that the mangrove co-management has positive and significant effects towards the coastal economic developments if carried out by integrating the ecology, the human resource quality, the institutional roles, and the technological accesses. Other researches which support the link between co-management and natural resource and environmental management include Jentoft⁹, Pomeroy and Williams⁸, Tulungen¹⁰, Indrawasih.¹¹

In this research, the co-management variable is measured using five indicators, which are the Instructive, Consultative, Cooperative, Advocative and Informative co-managements. The empirical facts from the field show that the mangrove management in the coasts of Madura Island has improved and the society’s income has increased. This proves that the co-management has positive effects towards the economic developments of the coastal communities. The analysis results are presented in the Figure 1 below:

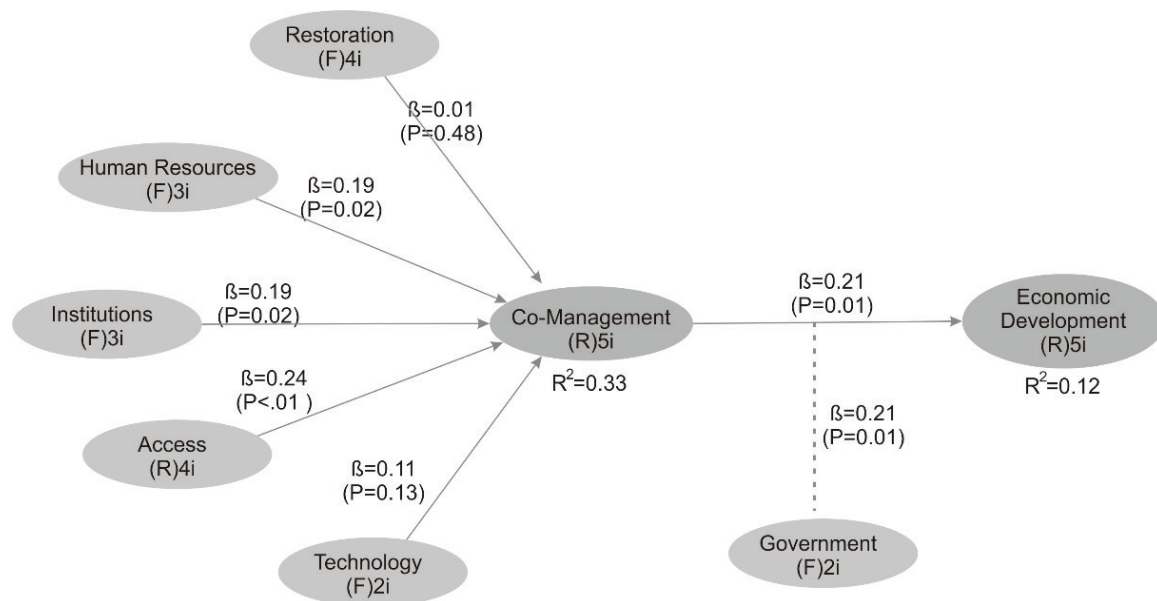


Figure 1. Model Testing Results using the WarpPLS 5.0

Source: The study’s conceptual framework

In this research, the coastal economic development variable is tested with the affecting factor, which is the mangrove co-management. The analysis results show that the mangrove co-management has positively significant effects, with the value of 0,212. Thus, the

co-management concept carried out in the coasts of Madura Island has strong effects towards the coastal communities’ economic and health developments.

The co-management model’s success is highly

influenced by the government's willingness to decentralize the responsibility and authority to the society and the stakeholders¹². Thus, this co-management requires support from the government and the society.

The main elements which must be paid attention to in the mangrove co-management are: the delegation of responsibilities and authorities in mangrove management; social, cultural, economic, and health objectives; also, the sustainable mangrove management. The indicators of the coastal communities; economic development include the increase of the society's income; the availability of new job opportunities, and the increase of mangrove conservation. This condition is experienced by the coastal communities of Madura Island who have managed the mangrove ecosystem.

Conclusion

Based on the tests and the analyses on the hypothesized effect, it can be concluded that:

1. There are some forms of mangrove co-management in the Madura Island coasts, sequentially written as follows: instructive, cooperative, advocative, consultative, and informative co-managements.

2. Mangrove co-management has positively significant effects towards the development of health and economy in the coasts. If it is carried out in a good and an integrated manner, the condition of the coastal economic development will also improve.

3. The economic development of Madura Island's coasts through the mangrove co-management is marked by the increase of the people's income, the availability of new job opportunities, and also the improving mangrove condition, with better quality and quantity.

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Conflict of Interest : No

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