



PRIMARY RESEARCH

# Economic Efficiency of Benapole Port and Socio-Economic Profiles in Surrounding Areas, Bangladesh: An Analytical Approach

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## Abstract

This paper attempts to examine the current profiles of socio-economic indicators of the inhabitants of the Benapole port surrounding areas in Bangladesh. This study was based on a face-to-face interview of 150 survey participants selected from local leaders and residents. The study was conducted in July 2016. Findings of our baseline survey suggested that Benapole port had contributed to the growth of the local agro-based industry through the supply chain management process from 2000 to 2016. The thriving agro-based industry generated significant employment opportunities and wage income for the local population. In turn, employment generation and income promoted educational attainment, increased the number of concrete houses and provided greater access to safe drinking water and electricity for residents. In addition, residents had access to better communication and internet facility. However, widespread drug abuse in the surrounding areas of Benapole port, especially among the youth, was identified as one of the unwarranted social impacts. Drugs accounted for the largest share of smuggled goods through the port.

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## INTRODUCTION

Different types of ports play a significant role in expediting the economic growth of a country (Kahraman, 2017). Depending on a country's geographical location, seaport, air-port, and land port play a substantial role in border and overseas trade (Ago & Yang, 2015). In Bangladesh, land ports play a vital role because India surrounds Bangladesh on the Western and Northern side and Myanmar on the Eastern side (Bangladesh Bureau of Statistics (BBS), 2011). The Bay of Bengal surrounds only the Southern part. It means land ports govern cross-border trade. Bangladesh has a total of 20 land ports (Bangladesh Land Port Authority (BLPA), 2014). Among them, BLP is the leading and biggest one. The majority of land ports have Letter of Credit (LC) facilities for trading. The total border

area of Bangladesh is 2,400 Km. India shares about 92% of this area, and the remaining 8% is with Myanmar. The Benapole-Petrapole Land Custom Station (BPLCS) exports all kinds of exportable goods to India by using road and rail services. On the contrary, India exports almost all types of goods except yarns to Bangladesh. The port process and handle commercial goods and pedestrian traffic in different degrees. The type of transaction at the port has a substantial impact on surrounding areas. Benapole port is located in Sharsha Sub-District under Jashore District in Bangladesh. It is also the most important immigration check post operated by Bangladesh Land Port Authority (BLPA) (2014) and Bangladesh Custom and Immigration Police (BCIP). The total land area of the port is 56.71 acres. The Petrapole custom station of India is lo-

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cated across the border in West Bengal since 1947. A large number of people have been using this land route to travel between Bangladesh and India. Due to the increasing volume of border trading, this port has got strategic importance for India. The BLP handles more than 80% of cross-border trade with India owing to its proximity to Kolkata. India uses this land route extensively for exporting goods in Bangladesh. Land ports and large seaports play a significant role in cross-border trade in every country. The economic efficiency of the seaport relies on the reduction of cargo handling costs. This would eventually raise producer surplus and consumer surplus for exporter and importer, respectively. It implies that economic benefits are very much contingent upon the activities of the port. Studies suggest that evidences of the economic impacts of ports in terms of aggregate income generation, value addition, and employment generation on the overall growth of the local economy are quite sparse (Goss, 1990).

Operations of different types of seaports realize favorable socio-economic outcomes. For example, port-related jobs have been created in the manufacturing, petrochemical, metallurgy, and food industries at Marseille-Fos port in France (Merk & Comtois, 2012). Backward linkages of a port determine the nature and extent of indirect economic benefits with other economic sectors. The multiplier value of the Marseille-Fos cluster was found to be greater than unity. Sectors that benefited the most were transport, communication, wholesale, storage, equipment, food, petrochemical industries, and retail trade. However, the water quality and air quality in the port areas were adversely affected (Merk & Comtois, 2012).

In the early 70's Europe was at the apex of the World's port operations, followed by North America and Asia. This scenario was changed by 2009. More than 50% of port activities in Asia, particularly the Chinese, Indian and Korean ports, grew quite rapidly (Merk, 2013). The noticeable social impacts of ports were changes in lifestyle, villages' relocation, and cultural traditions in local communities. The governance of port cities is largely reliant on trade corridors. Integration of port systems in multimodal transportation networks could facilitate market access and fluidity of trade. The effectiveness of port operations is related to their linkages in the global Supply Chain Management (SCM) process (Merk, 2013).

Existing literature has various studies regarding the economic and social impacts of seaports. However, probably not a single study is available to examine the socio-economic outcomes of land ports in a developing country. To the best of our knowledge, existing literature has ex-

tremely limited information about the socio-economic conditions of the inhabitants around the BLP in Bangladesh. This has motivated us to undertake this study to explore the impacts of the land port operation on the socio-economic scenario of the people in the study area. The study was based on a field survey from 150 participants from different occupational backgrounds. The survey responses were analyzed for qualitative and quantitative assessment of the socio-economic advantages and disadvantages of the respondents.

Our findings reveal that the operational activities at the BLP have facilitated the expansion of local agro-based activities and SCM. These activities have contributed to the creation of employment opportunities. This has improved the socio-economic conditions of the residents in terms of educational attainment, ownership of concrete houses, communication facilities, small-scale business activities, and road transportation networks.

## LITERATURE REVIEW

### Supply Chain Management System (SCMS)

The SCMS manages the movement of commodities and services and includes all processes that convert raw resources into final products. It represents an endeavor by suppliers to expand and execute supply chains that are as resourceful and efficient as possible. The SCMS of the port could provide a powerful and strong platform and support for logistic integration to surrounding companies and industries via a partnership in strategic decision making and cooperative arrangements (Alamouh, Ballini, & Dalaklis, 2021; Botti, Monda, Pellicano, & Torre, 2017; Troisi & Tuccillo, 2014). The findings of a study depict that the major outcomes such as cost, resilience, environmental performance, innovation, etc., could be positively affected by the integration of dry port in the SCM (Khaslavskaya & Roso, 2019). Recent empirical study manifests that the SCM process of sea-land has substantially improved because of digitalization (Di Vaio & Varriale, 2020). Previous studies confirmed that electronic transportation management systems had yielded substantial advantages from economic and ecological perspectives. Authorities could contribute to the growth of the sea-land circular SCM process to ensure sustainability (Mańkowska, Kotowska, & Pluciński, 2020).

The port operates as an intermodal transport hub and logistics center for ensuring the flow of goods and passengers (Bichou & Gray, 2004; Parola, Risitano, Ferretti, & Panetti, 2017). The port is considered a third-party logistics supplier and plays an important role in different stages of SCM (Tan & Taeihagh, 2020). Study shows that new port mea-

surement indicators yield greater transparency within the port environment and across the transport chain, thereby facilitating better integration of all supply chain logistics elements (Paixao & Marlow, 2003; Peykani, Mohammadi, Emrouznejad, Pishvae, & Rostamy-Malkhalifeh, 2019). Inter-organizational relationships among port actors and other players play a pivotal role in improving port competitiveness (Carbone & Martino, 2003; Chang, Shin, & Lee, 2014; Munim & Schramm, 2018; Munim, Saeed, & Larsen, 2019). SCMS analysis from the port's service providers and user's perspective is also reported (Hosseini et al., 2019; Tongzon, 2009). A general framework of port value creation was proposed recently (De Martino, Marasco, & Morvillo, 2011; Sakalayan, Chen, & Cahoon, 2017). De Martino et al. (2011) identified port as a network of actors, resources, and activities by co-producing value by encouraging several interdependencies among the supply chains through the port.

### Human Development Indicators in Developing Economies

Income level does not comprehensively evaluate the measurement of the living standard of a population (Anand & Sen, 1994). Income level alone is unable to capture individual differences in morbidity, mortality, and disability. Living standard assessment includes access to public goods such as the environment, electricity, infrastructure, transport and communication facilities, and epidemiologic protection. The human development approach values capabilities related to health, nutrition, and basic education, and income level is a means to achieve these. However, the human resource development approach emphasizes investment in human capital, including health, nutrition, and education. Aggregative human development indicators are based on averaging individual circumstances. Any type of development work is an indicator of social development. For example development of a transport system and infrastructure significantly improved the local economy of a region and the country. Public activities influence economic growth also (Cigu, Agheorghiesei, Toader, et al., 2019).

### Comparison of Socio-economic Indicators among Developing Countries

Socio-economic indicators may include different criteria, e.g., income level, expenditures, and demographic characteristics. The higher-income level is not always a reliable indicator for evaluating economic inequalities in health for developing countries. Occupation and education are the proxies for income, but such proxies often divide the population into different sizes. Especially in comparing coun-

tries where the distribution of people across occupational status and income level are varied substantially. Such problems have been corrected by turning to consumption as an indicator of economic status. People often are unable to keep a record of their pattern of expenditures in developing countries. The development of observational techniques and survey questions are capable of dealing with this issue. Readily identifiable household characteristics could produce an index that represents the same results as the expenditure indicator does. Demographic and health service programs were surveyed by considering seventy-five countries in Africa, Asia, Latin America, the Middle East, and the former Soviet Union (Gwatkin et al., 2007). The survey questionnaire focused on fertility, maternal health, child health, materials used for house floors, walls and roofs, sources of water, and possessions of durables such as fan, radio, bicycle, and other attributes of economic status. A wealth index score was constructed for each household. The scores were transformed into a standard normal distribution. It might be difficult to establish a direct causal relationship between wealth index and health. Other important factors like education or ethnic background, water, and sanitation are also related to asset ownership and health (Gwatkin et al., 2007).

### Socio-economic Status of the Inhabitants in the Study Area

The average literacy rate in Sharsha Sub-District is 49.8%, and the total population is 3,41,328 (BBS, 2011). There are 126 primary schools, 46 secondary high schools, 10 Islamic schools, and ten intermediate schools. Agriculture is the predominant occupation. Paddy, jute, potato, wheat, mustard, lentil, and vegetables are the main crops grown. Other noteworthy professions are wage laborers and clearing and forwarding activities. Women mostly stay at home due to social norms, but sometimes they are engaged in small-scale trading when needed.

Our survey explored three basic income groups, e.g., wealthy, middle income, and poor. Generally, the wealthy group has more than 3 acres of land. They lease their lands or use in commercial purpose. A landowner who belongs to a middle-income group owns approximately 2-3 acres of land, predominantly used for rice cultivation. Sometimes, farmers are engaged in sharecropping. The poor group does not have landholding, and they work as daily wage laborers. Public health facilities and services are inadequate in the nearby port area. The area does not have a registered public health care center. Local village physicians are available in the BLP area for medical treatment at the primary level. At the secondary level, people consult private prac-

titioners in the nearby Upazila Health Complex. For tertiary level treatment, people need to visit Jashore town or the capital city. Islam is the dominant religion, followed by Hinduism. There were some mosques and very few temples in the study area. The major sources of drinking water are tube-wells and dug-wells. Sanitation problems are more acute in the BLP area than the problem of safe drinking water which is in agreement with Jashore Municipality (M. R. Shaibur, Anzum, Rana, & Sarwar, 2019).

### Role of Port as Regional Connecting Point

There is a good railway network between Benapole and Khulna (the City Corporation) for daily transport. Additionally, the Benapole port plays an important role in maintaining an inter-regional communication system in the country. Petrapole–Benapole via Jashore–Dhaka to Brahmanbaria–Sylhet–Tamabil with connection to Akhaura–Agartala route could be utilized by road transporters to carry valuable and perishable items (Rahmatullah, 2009). Multi-axle vehicles should be introduced to maintain the road infrastructure. If it is practiced, Bangladesh could earn considerable road transport charges and transit fees as a foreign exchange from India. On the other hand, India could save the travel distance between Kolkata and North East India by 60% (Rahmatullah, 2009).

## METHODOLOGY

### Study Area

The study was conducted in the Benapole port area at Sharsha Sub-District under Jashore District in Bangladesh (Figure 1 a, b, c, d). Benapole is located at 23°41'19" N, 88°08'55" E. Sharsha occupies an area of 336.28  $Km^2$ .

### Study Technique

The methodology applied in this study was qualitative and quantitative. We conducted face-to-face interviews with 150 participants of diverse occupational and educational backgrounds. The respondents were community leaders and residents of surrounding areas. The interview was conducted in July 2016. Prior to conducting the survey, a structured questionnaire was designed and prepared. Secondary data were collected from published and unpublished sources of government and non-Government offices.

Structure of the Sample Respondents: Questions were asked to adults aged 18-60 years. Percentages of male and female respondents were 90% and 10%, respectively.

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Questions were asked to adults' age ranged between 18 to 60 years. Percentages of male and female respondents were 90% and 10%, respectively.

### Statistical Analysis

We collected the information by using a simple random sampling method. The data were analyzed by using MS Excel software.

## RESULTS AND DISCUSSION

### Survey Findings and Interpretation

#### Occupation

The majority of the participants were engaged with farming, followed by business (Table 1). This finding adheres to the fact that BLP has contributed to the growth of agro-based activities. It implies that the port facilitates the SCMS needed for growing agro-products. This finding is in line with the SCMS process of fertilizer at the seaport of South Vietnam (Lundstead & Stenberg, 2000). Besides, many people were involved with small businesses for continuing their livelihood.

Around one-fourth of the respondents were working as laborers in local industries. As Benapole is situated near the border of India, we surmise that agro-technology was introduced there from India and people were motivated for their involvement in agricultural farming, especially with a mixed cropping system. Many people believed that BLP increased the job market. However, it was also suspected a lot of people may lose their jobs if the technology is introduced in different sections in the office (Esser, Sys, Vanel-slander, & Verhetsel, 2020). Technology reduced the demand for manpower. In order to maintain quality in job recruitment, training programs must include new skill like Information and Communication Technology (ICT) and other skills like teamwork and communication. Special attention is needed to motivate and host females and non-natives in the job market (Esser et al., 2020).



**FIGURE 1.** Map of the study area (a) Map of Bangladesh (b) Map of Jashore District (c) Map of Sharsha Sub-District and (d) Map of Benapole port

### Education and Performance of Secondary Examination

Our results manifested that about 40% of the participants were illiterate and around one-third of them were able to write their names (Table 1). We presented the performance of the Secondary School Certificate examination of students who were enrolled in Benapole High School from

2011-2015. Findings suggested that the percentage of students who had passed the major public examination increased from 76% to 92% (Table 1). Therefore, there is a positive impact on educational attainment, as this is evidenced by the increasing percentage of student's enrolment at primary and secondary levels.

**TABLE 1.** Occupational, educational status, and performance of secondary examination of the people in the study area

Occupation, Education and Public Examination					
Occupation (%)		Education (%)		Year Wise Performance of Secondary Examination (%)	
Farmer	32.0	Illiterate	40.0	2011	76.0
Business	30.0	Sign only	32.0	2012	83.0
Laborer	24.0	Primary and secondary	18.0	2013	83.0
Service	10.0	Tertiary	10.0	2014	85.0
Others	4.0			2015	92.0

Source: [www.edu.jashore.com](http://www.edu.jashore.com)

Occupation and education reflect the total population and the performance of the Secondary Examination reflects the students attended the examination in the study area.

About 40% of respondents were illiterate, and 32% of people could write only, indicating that most of the people were involved with other activities beyond studying. Therefore, the government should implement necessary actions and policies for promoting the number of schools going children. Otherwise, young people might be involved with dubious activities which could deteriorate the social environment.

### Socio-economic Indicators

Ownership of earthen houses declined from 52% to 7% (Table 2). At the same time, ownership of concrete (brick-built)

houses increased considerably by more than four times (from 15% to 65%), indicating that people could afford to have more concrete-made houses. Similarly, we observed that a greater proportion of sampled households could afford to have their own tube-wells, which was likely due to higher nominal income. This higher nominal income might also increase the affordability of the respondents to own concrete houses (Table 2). The present result indicated that the land port developed the economic condition of the surrounding areas, which is supported by a recent study. The report showed that the port significantly developed the eco-

conomic condition of the port city (Cong, Zhang, Wang, Xu, & Li, 2020). Other reports also found that ports and logistics supports developed significantly which ultimately developed the local economy of the region of Chinese city (Han, Wang, & Li, 2019). By using the Structural Equation Model (SEM), it was proved that quality improvement of port in-

frastructure significantly contributed to the economy of the port region (Munim & Schramm, 2018). A study from South Africa showed that the growth potential and development of African countries depend on the development of logistic support and improvement of infrastructure (Chakamera & Pisa, 2020).

**TABLE 2.** Comparative distribution of socio-economic indicators of households

Description	Year 2000	Year 2016
Household structure		
(a) Earthen	52.0	7.0
(b) Semi-concrete	29.0	25.0
(c) Concrete	15.0	65.0
(d) Others	4.0	3.0
Drinking water facility		
(a) Self-owned tube-well	48.0	68.0
(b) Public tube-well	12.0	22.0
(c) Neighbor's tube-well	30.0	10.0
(d) Others	10.0	0.0
Monthly income (BDT)		
(a) <5,000/-	34.0	8.0
(b) 5,000 – 10,000/-	26.0	22.0
(c) 10,000 – 15,000/-	20.0	24.0
(d) 15,000 – 20,000/-	12.0	26.0
(e) >20,000/-	8.0	20.0
Access to electricity		
(a) Yes	20.0	95.0
(b) No	80.0	5.0

This data reflects the total population (%) in the study area

The respondent strongly believed that the BLP contributed greater opportunities for employment creation for nearby populations (Table 1). For local people, access to electricity increased considerably from the year 2000 to 2016. About 95% of participants acknowledged the present access to electricity was due to development in various sectors in the study area. It was found that income levels below 5,000 BDT per month declined from 34% to 8%, concurrently in-

come levels greater than 20,000 BDT increased by almost 2.5 times (Table 2). Most people believed that the reason for increasing nominal income was most probably due to the improvement of infrastructure (Han et al., 2019) along with increasing income earning facilities (Gripaios & Gripaios, 1995). This facilitated the transportation network and hence expedited the trading volume of agro-products.

**TABLE 3.** Comparative distribution of socio-economic indicators of households

Communication		Agriculture		Social Benefits	
Items	% User	Condition	% Satisfied	Contribution	%
Mobile user	96.0	Very good	10.0	Employment generation	60.0
Television user	78.0	Moderately good	80.0	Infrastructure development	24.0
Newspaper user	38.0	Poor	10.0	Local commerce	16.0
Internet user	26.0				
Radio user	20.0				
Motorbike user	10.0				

**TABLE 4.** People's perception regarding the negative impacts of Benapole port on the surrounding area

Activities		Smuggling Items	
Items	Involved (%)	Item	Involved (%)
Smuggling	60.0	Drug	36.0
Drug addiction	26.0	Cow passing	27.0
Crime activity	10.0	Readymade garments	23.0
Others	4.0	Medicine	6.0
		Gold bar	4.0
		Fruits and others	4.0

This data reflects the population (%) involved in smuggling and bad activities in the study area.

### Communication

The majority of respondents (over 96%) got access to mobile phones for communication purposes. This was followed by television, which accounted for 78%, and newspaper reading around 40% (Table 3). Around one-fourth of the participants had access to an internet facility, followed by the use of radio and motorbikes (Table 3). The greater percentage of the ownership and use of motorbikes was the result of improved road networks and highways. Overall, the socio-economic profiles have improved in the surrounding areas as local people are accustomed to applying advanced communication technology. Increasing purchasing power of the people has enhanced their social standing. We surmise that over the years (2000-2016), the cost of living has not increased in a higher percentage than the percentage increase in nominal income. Therefore, we could draw the inference that the purchasing power of the inhabitants has increased over the period.

### Agricultural and Social Benefit

Agricultural productivity and its economic benefits were acknowledged by 90% (10% + 80%; Table 3). This suggests that BLP contributed to thriving agro-based industries in surrounding areas. Around 60% of people believed that BLP contributed to employment generation and one-fourth believed that the port had a positive impact on infrastructural development, especially the noticeable improvement of road condition (Table 3). Finally, 16% of people perceived that the land port facilitated small local commerce and trading activities. The BLP contributed significantly for employment generation, predominantly in agricultural farming, followed by trading business and wage income in local industries (Table 1). This finding is in line with a technical report on seaport management (World Bank, 1999). As a multimodal transport system, seaport could contribute to developing urban cities, generating employment opportunities, and expanding industrial activity.

Large seaports expedite the growth of seed industries and are conducive to the promotion of prone distribution enterprises. Karimpour, Ballini, and Ölcner (2019) have examined a case study on Copenhagen – Malmö port. They infer that maritime and port industries have considerable potential to realize advantages by applying the circular business economy model to expedite competitiveness and economic growth. Another study by Bloom (2019) confirms that the thriving fishing industry in the surrounding area of Mossel Bay seaport could optimize business potential and generate employment opportunities. It is also reported that the development of some societal structures (M. R. Shaibur, Husain, Shamim, & Shamsunnahar, 2018), social-agriculture (M. Shaibur, Husain, Mollah, & Mow, 2019), and environmental works (M. R. Shaibur, Husain, & Arpon, 2021) expedited the development of the economy of the particular place which ultimately contributed to the growth of the economy of the country.

### Detrimental Impacts of Benapole Port

The study identified a handful of adverse impacts of Benapole port on surrounding areas. Among the people involved in smuggling and bad activities, about 60% were actively involved with smuggling. This was followed by drug addiction and different types of criminal activities. Among the smuggled items, the drug was in the leading position, followed by cow passing and illegal trading of readymade garments (Table 4). Other smuggled items were medicine, gold bar, fruits and others, which accounted for 6%, 4%, and 4%, respectively.

The present study revealed that about 18% of people attended and completed primary and secondary education, and only 10% completed tertiary education (Table 1). It means most of the people were either illiterate or could sign only. Therefore, the inference could be drawn that most illiterate people might get involved with illegal trading. To generate awareness, emphasis should be given to formal ed-

ucation, which could promote local development in terms of improved socio-economic indicators. The study suggests that government should implement appropriate policies for controlling smuggling for the wellbeing of the people. This eventually could improve the social environment and ensure the sustainability of local economic welfare and social development.

## CONCLUSION

The findings of the study confirmed that from 2000 to 2016, BLP had made noticeable contributions to agro-based activities through the supply chain management, which enhanced the purchasing power of the local residents, including farmers. This, in turn, contributed to their improved standard of living. Over this period, people could afford to have concrete houses and got access to safe drinking water. Respondents experienced a rise in nominal income and greater access to electricity and improved communication facilities. Increased purchasing power could afford to spend more on the secondary level of education. The study also found that 'smuggling of drugs' as an unwarranted social activity that had risen over the study period, affecting the social lives of the youth. To promote national economic welfare, the government should adopt and implement the right policies for BLP. These policies could adhere to the sustainable growth of the port industry in Bangladesh. The sustainable growth of port industries would definitely have a favorable impact on improving the socio-economic profiles of local residents.

The study suggests that the government of Bangladesh should come forward to improve 'port governance' of the busiest, largest, and strategically important BLP. The capacity constraint should be overcome through the develop-

ment of port infrastructure. To improve logistics capabilities, port management and to ensure efficient port services, there must be a right balance between the public and private interests for efficient allocation of the resources.

## LIMITATIONS AND RECOMMENDATIONS

The current research has a number of bottlenecks. The sample size was relatively smaller, and the study was basically employed with a qualitative approach. The samples failed to include all types of respondents equally from diverse occupational backgrounds. Future research could focus on econometric modeling of principal facts to scrutinize the impact of land ports' operations on residents' socio-economic aspects in adjoining areas in Bangladesh. Bangladesh authority should consider the enlargement of strategic plans for the development of BLP.

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## Compliance with Ethical Standards

**Funding:** This study has not received any external fundings.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Ethical Approval:** The paper does not contain any data or information or anything that needs ethical approval.

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