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ASSESSMENT OF ECONOMIC LEAKAGE IN TOURISM SYSTEM OF THE SUNDARBANS (BANGLADESH)

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Abstract: The tourism industry employs the term 'economic leakage' to describe the phenomenon of tourism revenue of a destination leaving to outside economy from the destination of reference. This study aims to measure the economic leakage in the tourism system of the Sundarbans in Bangladesh. To address the research aim, a quantitative research methodology has been employed. A total of 22 participants were interviewed out of 190 tourism businesses offering tours in the Sundarbans. This research has found that 28% of economic leakage occurred in the tourism system of the Sundarbans. Imported products (e.g. food and beverage, fuel), imported services (e.g. advertising, foreign payments), and other issues (e.g. outside employee salaries, training and seminars, forest fees, government taxes) have been identified as contributing factors to economic leakage. Measuring the quantity and identification of the contributing factors of economic leakage can help policymakers to maximize the economic benefits of a destination by sourcing tourism products and services locally.

Key words: Economic leakage, tourism system, development, Sundarbans, Bangladesh

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INTRODUCTION

Economic leakage, in general, occurs when the income derived from a particular geographic location is drained off to external economies. Even, if money leaks from a local area to other economic regions within a country is also recognized as economic leakage (Spenceley & Meyer, 2017). Economic leakage, in case of tourism, is based on the funds or tourists' budget that is primarily expended by tourists, but all of the spent money does not persist in the tourist-receiving area (Rylance & Spenceley, 2017). It has a significant effect on tourist destinations because of the amplification of the outflow of monetary resources. According to Anderson (2013), economic leakage is taken place when sub-sectors of the tourism business such as accommodations, transportations, food services, and others are owned by non-local or international companies and when tourists spend on imported items.

Economic leakage not only decreases revenue of a tourism destination but also has detrimental impact on destination development. Tourism can bring an enormous economic and non-economic benefits if it is appropriately maintained. In absence of a well-defined policy, the economic advantages of tourism are not being retained within the local economy. For instance, there were 40% and 80% of economic leakage happened in Indian and Caribbean tourism systems respectively in the year 2015 which reduced their net revenue from tourism industry (Fonseca, 2022). Economic leakage is responsible for the reduction of multiplier effect in a tourism economy, therefore, the destination of reference does not receive the desired level of growth in tourism (Fletcher & Snee, 1989). It reduces reinvestment in local businesses and infrastructure development (Hughes, 1994). If a tourism destination can able to serve from local sources, it can ensure working opportunities for local people and hold the tourism revenue within the economy.

With 6517 km^2 of area, the Sundarbans is one of the most popular tourist destinations in Bangladesh. Being a well-known mangrove forest, the Sundarbans serve as a dividing line between the countries of Bangladesh and India. In 1997, UNESCO (the United Nations Educational, Scientific, and Cultural Organization) designated the area as a World Heritage Site (UNESCO, 2018). This location is well-known for its salt-tolerant mangrove forest, diverse animal and plant life, 260 bird species, and various trees such as the Sundari. The Royal Bengal Tiger, a subspecies of the Panthera Tigris, is famous all over the world. According to an extensive UNESCO study, the Sundarbans support millions of humans and animals with sustainable means of subsistence.

Annually, the Sundarbans receives a significant number of domestic tourists and some foreign tourists (Sachin, 2020). Before Covid-19, around 250,000 tourists visited in the forest, which is the greatest number to date (Bangladesh Post, 2021; Nobi, 2021). The biggest impact on tourism was observed during COVID-19, but it was flourished again in 2022 (Afroz, Hassan, & Ferdaus, 2022). The tourism in the Sundarbans has not been developed at a desired level in relation to the number of tourists visiting per year. The local economy of the Sundarbans region receives less government attention in terms of budgetary allocation (Bhuiyan, Islam, Haque, & Hassan, 2021). Despite having huge scope of employment, the tourism of the Sundarbans cannot offer considerable employment opportunities to the locals.

To reconfigure and rethink sustainability in the tourism industry, it is essential to examine and identify tourism leakage (Rylance & Spenceley, 2017). The primary aim of this research study is to quantify the economic leakage in tourism industry of the Sundarbans in Bangladesh. It further identifies the contributing factors to economic leakage in case of the study context. Tourists demand a range of products and services during their tours, but if those products and services are not sourced locally, there is a considerable risk of economic leakage, which would obstruct both economic development and tourism growth. The amount of economic leakage must be determined during the destination development phase in order to reduce economic leakage. Even though there have been many different sorts of studies on economic leakage around the world, there has not been much of it done in Bangladesh, particularly in the Sundarbans.

LITERATURE REIVEW

The information presented by Aldebert, Dang & Longhi (2011) indicates that the definition of tourism is difficult to pin down due to the extensive range of activities and experiences it offers. Two topics, namely economic leakage and economic linkage, are certainly connected to the functioning of the tourism economy. According to Anderson (2013), Hirschman first proposed the ideas of economic leakage and linkage in the 1950s under the umbrella term "activities-induced-activities". The terms refer to actions that stimulate other activities. It is almost clear that the concept of economic linkage in tourism operates similarly to a catalyst for synergistic effects. Economic linkage is the most significant issue, without the proper utilization of this, tourism sector faces leakage of economic resources (Lejárraga & Walkenhorst, 2010). Economic leakage acts as a barrier to the development and infrastructure-building phase. It is described as the amount or a portion of a tourist's travel cost that is lost from the tourist-receiving region or will never be able to be returned to this area (Rylance & Spenceley, 2017).

Economic leakage is broken down into three categories: internal, external, and invisible economic leakage (Anderson, 2013). Internal leakage occurs when tourists spend money on imported items and services and it causes major economic leakage (Meyer, 2006). Another argument is that when imported goods and services are provided tourists are interested in visiting a destination (Hemmati & Koehler, 2007). It creates a door for conducting import business to the people living in the neighborhood, that may create advantages for tourist destination. However, the goal of each destination is to put a stop to the flow of economic leakage by sourcing locally produced goods and services that meet tourists' demands. On other hand, external economic leakage is the additional cost of the tourism generating area that is taken place for the involvement of middlemen. External economic leakage refers to the difference between the amount paid by tourists and the amount received by host countries (Benavides, 2001; Diaz, 2001). The third and last type of economic leakage is known as the invisible leakage. It refers to the costs of resource deterioration such as offshore savings and informal money exchange (Meyer, 2006).

Economic leakage is further categorized as imported leakage, delayed leakage, and invisible leakage (Suryawardani, Bendesa, Antara, & Wiranatha, 2014). As per the statements of Anderson (2013) and Suryawardani, Bendesa, Antara, & Wiranatha (2014), there is no difference between the internal leakage and the imported leakage. Both internal and imported leakages are occurred in case of imported items and services. The second one is delayed leakage in which tax and foreign exchange costs are being included. The factors which are reasons for delayed leakage are known as delayed items. Invisible leakage (or unseen leakage) is difficult to quantify and measure. According to the concept presented by various authors (Suryawardani, Bendesa, Antara, & Wiranatha, 2014), invisible leakage would be occurred due to the deterioration of a destination's infrastructure, a detrimental impact on the local culture by tourists, or something similar.

The tourism multiplier occurs when a little change in the tourist business results in a significant change in the economic output of the sector (Hughes, 1994). It causes both economic leakage and economic connection. This is the most popular economic fact at current stage of the tourism and travel business. According to Fletcher & Snee (1989), tourism multiplier refers to a change that relies on four important factors: employment prospects, income sources, money inflow, and money outflow. The multiplier effect in the tourism sector can be observed through the economic leakage (Lejárraga & Walkenhorst, 2010). It happens when tourist spending money departs the local economy, resulting in a diminished multiplier effect. Due to the fact, tourist spending does not recirculate within the local economy. For example, if a tourist purchases food from an international fast-food chain restaurant, the revenue portion leaves the region and goes to the chain's corporate office.

The importance of supply chain and value chain analysis in the tourism sector has a significant impact on the overall stage of economic growth. The ideas of economy leakage and connectivity are related to the theories of supply chain and value chain management (Anderson, 2013; Hemmati & Koehler, 2007; Meyer, 2006). Considering supply chain management is essential

in preventing economic leakage by procuring goods and services locally to keep money in the economy (Hemmati & Koehler, 2007). Additionally, it develops tourist clusters to boost corporate and supplier innovation and collaboration, which supports the promotion of responsible tourism practices. Moreover, value chain refers as the customer-centricity approach in tourism (Rylance & Spenceley, 2017). The term customer-centricity indicates the practice of giving value to tourism products for fostering customer loyalty and overall tourism industry performance. Both the supply chain and value chain management analysis assist in minimizing economic leakage in tourism industry.

APPROACHES TO ESTIMATING ECONOMIC LEAKAGE

The first phase for estimating economic leakage is to select an efficient sampling method. There are two major sampling methods which are probability and non-probability sampling method (Berndt, 2020). Probability sampling method indicates the random selection process of any population that has equal chance of getting selected as sample (Elfil & Negida, 2017). On other hand, non-probability sampling method indicates a non-random sampling phase in where sample is taken based on certain criteria (Tyrer & Heyman, 2016). Each type of sampling method has own criteria. In case of probability sampling, the biasness is relatively low. Non-probability sampling method has a biased based approach in which subjective judgement is applied.

The main strength of the probability sampling method is that it is easy to follow and viewed as fair. In addition, probability sampling method improves external validity of a research. There are some disadvantages such as the chance to miss an important population element to be included in the sample because of random selection. There is a statement about this disadvantage, in where most researchers stated that this may happen in phase of only systematic sampling (Berndt, 2020). On other hand, non-random sampling method assists researchers to justify selections based on analytical, logical, or theoretical grounds though there has biasness. Focus on the key criteria, this research has utilized probability sampling method which is bias-free and easy to measure.

The second phase of this research is to determine a sample size to make a reliable research outcome. Proper sample size can be calculated by estimation theory, cumulative method, Lahiri's method and a method proposed by Kish (1965). Estimation theory determines the number of sample size in which the population is defined as $\hat{Y}$ which is equal to $y_1 + y_2 + \cdots\cdots\cdots + y_N$ and N designates the value of a variable of interest for item i. This estimation theory is referred as the simplest form in where sample is formed from 'n' independent draws, besides that the probability is calculated by the key of pi that is equal to x_i/X, in where $X = x_1 + x_2 + \cdots\cdots\cdots + x_N$ (Hansen & Hurwitz, 1943). The ultimate formula of sampling of this estimation theory is:

$$\hat{Y}_{HH} = \sum_{i=1}^{n} y_i / (np_i) \quad (1)$$

In cumulation theory, the size of sampling is selected through the cumulated phase. In where, the numbers 1 to X1 are counted as the first unit and then the numbers (X1+1) to (X1+X2) and (X1+X2+1) to (X1+X2+X3) are counted as the second and third unit (Alam, Sumy & Parh, 2015). A number K that indicates the random phase is being chosen at random from 1 to X. If there select a random number as K, it can be seen from the cumulative total by that the sample size or range is selected. In Lahiri's method, the two keys M and N indicate the maximum of the sizes and the population size respectively. In a nutshell, to select desired samples, a pair of random numbers will be filtered in two steps as 'i', and 'j' firstly. After that, the first unit is selected through $1 \leq i \leq N$. Secondly, the sample is chosen by maintaining $1 \leq j \leq M$. Repeating this process until 'n' units have been chosen(Alam , Sumy, & Parh, 2015).

Another method is probability proportional to size which is the way of maintaining sampling from the finite population (Skinner, 2014). In where, 'i' = 1, 2, 3, ……..., N. Here N indicates the population size that is defined by xi as each population unit (i.e., each travel agency or tour operator). Through this opinion, the equation is: $n = N / \{(N. \alpha^2) + 1\}$. In this phase, there has an error number

and as per as the opinion by Sevilla et al. (1993), the maximum error (α) is 20%. This 20% can be tolerant in phase of social science and that is proved by their study. In this research, their method is chosen to select error number because it is easy to calculate and most reliable.

The third phase of estimating economic leakage is to find out a reliable formula that helps to figure out the leakage portion. To make a reliable research formula, it is necessary to compare and justify several formulas, as per as the research objectives and questions. According to the opinion by Ünlüönen, Kiliçlar & Yüksel (2011), the first step of calculating the economic leakage is:

TR = PE + PT

In where, TR indicates the term total receipts that is the total amount of PE (Personal Expenditure by tourists) and PT (Fees concerning Package Tour). Between the two terms of PE and PT, PE is calculated by the formula of:

$$PE = \sum_{i=1}^{n} et_i \tag{2}$$

Within this formula, 'et' indicates the expenditure type that includes each item paid by the inbound tourist with a region or tourist destination or nation. Another term is 'n' that is subject to change regarding the number of tourists. After calculating the tourist receipts, the economic leakage is calculated in two phases which are imported leakage and delayed leakage calculation. Imported leakage is calculated by maintaining the following formula:

$$L_{(imported)} = \sum_{j=1}^{m} \frac{Ti_j}{TD_j} td_j \tag{3}$$

In this imported leakage calculation process, Ti_j indicates the phase of direct and indirect import inputs from other sectors, TD_j refers to the demand of entire subsectors and td_j indicates the meaning of touristic demand. Here, j denotes spending varieties which is subject to change from 1 to m. Calculating imported leakage, the next step is calculating the delayed leakage formula by applying the formula:

$$L_{(delayed)} = TR\,[(ds/GDP) + \{(Ttf + VAT)/Tns\}] \tag{4}$$

In this formula, domestic saving refers to as the 'ds', gross domestic product is referred as GDP, taxes and funds are referred as the 'Ttf' and its 'value added tax' is shortly named as VAT. Another remaining term is 'Tns' indicates the total net sales. After calculating the delayed leakage, both the imported and delayed leakage are summed up to make total amount of economic leakage. In this leakage calculation, invisible leakage is not calculated because it is not possible for the phase of invisibility. This calculation format is too tricky to calculate. In where two different formats are used to calculate imported and delayed leakage that need more time to figure out and calculate. Due to high time and trickiness, this model is not utilized to determine the third phase of the current study.

Another method of calculating economic leakage is proposed by Suryawardani et al. (2014). The method has three steps in which the first step is to calculate the revenue section that is referred to as Y and the revenue calculating formula is:

$$Y = \sum_{i=1}^{n} Y_i \tag{5}$$

Y = Y1 + Y2 + Y3+ …….

After calculating the total revenue, the next step is formulating the portion of total leakage that is calculated by maintaining the formula:

$$L = \sum_{i=1}^{v} L_i \tag{6}$$

In this case, L stands for economic leakage and 'v' indicates the number of leakage items. After calculating the total leakage number, the percentage of leakage is calculating by the formula of:

$$\text{Percentage of leakage} = (\text{Total Leakage} / \text{Total Revenue}) * 100\% \quad (7)$$

This formula is suitable for this study because it is easy to calculate and understandable to a wide audience. Additionally, it enables the calculation of both leakage and revenue portions in a clear and accessible manner. Its straight-forward nature makes it an appropriate choice for this research, ensuring that the results are readable and easily comprehensible for all stakeholders.

RESEARCH METHODOLOGY

The aim of this study is centered on two things: firstly, investigating various travel agencies and tour operators as distribution channels. Secondly, calculating the amount of economic leakage caused by tourism in Sundarbans (Bangladesh). In order to address the research aim, data between the period of July 2021 to June 2022 has been utilized to analyze. Since, application of right research approach is essential for ensuring study validity and dependability, this section elaborates on how the study is conducted to address the research aim.

To conduct this research, a quantitative research design has been applied. The most significant sides of quantitative research are to work with statistical form and mathematical techniques (Mohajan, 2018) The main challenge of this research was to collect data through the questionnaire survey. Indeed, quantitative research is most appropriate for finding out the amount of economic leakage in tourism. For using the efficient research approach, there have planned to use a positivist research approach. This positivist research approach indicates the rationalist theory that holds the genuine knowledge to make a reliable research outcome (Bloomfield & Fisher, 2019). For these reasons, the positivist research approach is more suitable for conducting this research. The main beneficial side of this positivist research approach is that it analyzes the research area deeply to measure the result and then organizes the result for making it reliable (Mohajan, 2018). Following the positivists' philosophy, this research figures out the portion of economic leakage in the tourism sector of Sundarbans (Bangladesh).

Most of the information used in this study is gathered from primary sources, however, some secondary information is also utilized. When primary data is gathered by the researcher through fieldwork, it is more reliable and authentic (Islam, 2020). The questionnaire-based semi-structured survey method was selected for this study to gather all numerical data. This method also concentrates on and provides attention to participants for providing them with a comfortable communication environment. Secondary data (i.e., the number of visitors to the Sundarbans in Bangladesh) is gathered from a variety of publications such as journals and articles. Although secondary data sources are practical and economical, they have fewer concerns with reliability when compared to main data. To ensure accuracy and timely data, the primary data sources were used to obtain the majority of the data requirments in this study.

The quality of research data depends on the phase of selecting research participation and sampling. In case of Tourism of Sundarbans, there have near about 190 travel agencies according to the opinion of travel agencies and tour operators in Bangladesh. For conducting the research, participants were chosen among the 190 travel agencies and tour operators because they had knowledge about different items which are reasons for economic leakage. The sample size of the research is determined by using the formula of Skinner (2014) where N = 190 and the error (α) term is 20%.

Sample size is:

$n = N / \{(N. \alpha^2) + 1\}$

$= 190 / [\{190* (.2)^2\} + 1]$

$= 22$

From the total 190 tour operators and travel agencies, 22 travel agencies and tour operators were included in the sample for survey. The sampling frame of this research is listed in Table 1which shows the demographic information about the research participants.

Table 1. Sampling Frame of Research
(Source: Fieldwork)

NO	Participants' Organization Name	Organization Type (self-recognized)	Survey Location	Gender	Target Customers
1.	Trail n' Tent	Travel agency	Over phone	Male	Domestic and inbound
2.	Perfect Holidays	Travel agency	Dhaka	Male	Domestic
3.	AS Travel	Tour operator	Dhaka	Male	Domestic and inbound
4.	Path Friend	Tour operator	Dhaka	Male	Domestic and inbound
5.	Bangladesh Travel Agency	Travel agency	Online	Male	Domestic
6.	Bangladesh Expeditions	Travel agency	Online	Male	Domestic
7.	Sopnodana	Travel agency	Dhaka	Male	Domestic
8.	Tourism Window	Tour operator	Dhaka	Male	Domestic and inbound
9.	Fly Far Ladies	Travel agency	Dhaka	Female	Female tourists only
10.	Holidays Shopping Lines	Travel agency	Khulna	Male	Domestic and inbound
11.	Dhaka Dinner Cuisine	Tour operator	Dhaka	Male	Domestic and inbound
12.	Naria Travel and Tours	Travel agency	Dhaka	Male	Domestic and inbound
13.	A-One Tourism	Tour operator	Dhaka	Male	Domestic
14.	Ever Youth Tourism	Travel agency	Khulna	Male	Domestic and inbound
15.	Gontobbyo	Tour operator	Dhaka	Male	Domestic
16.	Sundarban Tourism	Travel agency	Khulna	Male	Domestic and inbound
17.	TourLink BD	Travel agency	Khulna	Male	Domestic and inbound
18.	Travelers Link BD	Travel agency	Khulna	Male	Domestic and inbound
19.	New Rainbow Tours Sundarbans	Travel agency	Khulna	Male	Domestic and inbound
20.	Blue Bee Holidays	Travel agency	Dhaka	Male	Domestic and inbound
21.	Ruposhi Bangla Tourism	Travel agency	Dhaka	Male	Domestic
22.	Bangladesh Tour and Travel	Travel agency	Dhaka	Male	Domestic

ESTIMATION OF ECONOMIC LEAKAGE

To ensure overall development of a tourist destination, one of the primary steps is to find out the economic leakage and then to initiate steps for reducing the economic leakage. For calculating economic leakage of tourism in the Sundarbans, several factors are needed to be assumed to create reliable and authentic research outcomes. Those assumptions are:

- Imported goods and services indicate those products, items, and services that are purchased from outside of the local area. These were not produced in economic system in the Sundarbans, Bangladesh.
- Conducting marketing and promotional activities outside of the local area by tourism businesses (i.e., travel agencies and tour operators) are counted as money outflow in the leakage calculation.
- Tourism businesses save a portion of their profit and reinvest the savings outside of the local area of Sundarbans is a reason for money outflow.

In this study, the calculation is conducted by considering several factors like imported goods, services, wages and salaries for employees who are outside of the local area, savings of tour operators and travel agencies, tax, and others. Variables of this economic leakage calculation are outlined in Table 2.

Table 2. Related indicators responsible for economic leakage
(Source: Authors)

No	Research Indicators (Expenses)	Variables
1.	Imported foods	Snacks
2.	Imported beverage	Soft drinks Glucose Energy drinks
3.	Imported goods	Fuels for ship
4.	Imported service	Promotion and marketing Advertising Loyalty program Foreign payment
5.	Payment for outside of the Sundarbans area	Commissions to travel agencies and tour operators Government tax Forest fees Bank payment Management fees
6.	Employees payment	Amount employment payment outside of the area
7.	Foreign owner's saving	Amount to pay to owners outside of the Sundarbans
8.	Educational cost	Training program Seminar cost

In this Table 2, all these variables are responsible for economic leakage. Another variable is necessary to calculate the percentage of economic leakage, which is revenue. Here, total revenue indicates the selling price of a tour package by the tour operators and travel agencies. For analyzing the collected data, a modified model in light of the formula developed by Suryawardani et al. (2014) has been used here. In addition, the idea of research variables has been taken by the concept of Ünlüönen, Kiliçlar & Yüksel (2011) to estimate economic leakage of tourism in the Sundarbans. The numerical equation model for the research is:

$$L = \sum_{i=1}^{v} L_i \tag{6}$$

In where,
L = Total leakage in a particular economy
L_i = Leakage items

The number of leakage items is listed below-
L_1= Total payments for goods for consumption
L_2= Total payments for fuel
L_3= Total payments for licenses, technological issues, and loyalty programs
L_4= Total payments for foreign currency, foreign and national bank account services
L_5= Total payments for foreign employees and employees from outside of the local area
L_6= Total payments for training and seminars
L_7= Total payments for marketing and promotion
L_8= Total payments for tax and government attributes
L_9= Savings for outside investors
L_{10}= Total payments for foreign tour operator group

In order to calculate economic leakage, total revenue from tourism sector needs to be determined. In this research, tourism revenue is calculated based on the formula given by Suryawardani, Bendesa, Antara, & Wiranatha (2014). In the Table 3, the tourism revenue of the Sundarbans is calculated by summing up the revenues received from local and foreign tourists. Item-wise economic leakage of tourism system is exhibited in Table 4.

Table 3. Revenue earned by different tourism businesses in the Sundarbans
(Source: Primary data analysis)

Sl. no	Participating Organizations Name	Revenue from National Tourists	Revenue from Foreign Tourists	Total Revenue
1	Trait n' Tent	4165000	185000	4350000
2	Perfect Holiday	472500	0	472500
3	AS Travel	22176000	7410000	29586000
4	PathFriend Tour Operator	6664000	3705000	10369000
5	Bangladesh Travel Agency	2035000	0	2035000
6	Bangladesh Expeditions	976500	0	976500
7	Sopnodana	2287500	0	2287500
8	Tourism Window	3000000	1202500	4202500
9	Fly Far Ladies	435000	0	435000
10	Holidays Shopping Lines	22187500	6412500	28600000
11	Dhaka Dinner Cuisine	9975000	3712500	13687500
12	Naria Travel and Tours	570000	200000	770000
13	A-One Tourism	529000	0	529000
14	Ever Youth Tourism	5043500	715000	5758500
15	Gontobbyo	2242500	0	2242500
16	Sundarban Tourism	4620000	1311000	5931000
17	TourLink BD	3980500	424000	4404500
18	Travelers Link BD	9614000	609500	10223500
19	New Rainbow Tours Sundarbans	3276000	225000	3501000
20	Blue Bee Holidays	2437500	255000	2692500

21	Ruposhi Bangla Tourism	1044000	0	1044000
22	Bangladesh Tour and Travel	344540	0	344540
	Total =	108075540	26367000	134442540

Table 4. Item-wise economic leakage calculation for the tourism in Sundarbans
(Source: Primary data analysis)

Sl. no	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Economic Leakage
1	45020	376000	48000	770	600	0	15000	693000	0	1700	1180090
2	4427	40000	9900	50	20000	4000	600	54000	23625	0	156602
3	57510	2208000	48000	6920	40000	8000	6000	5418000	1479300	22100	9293830
4	54286	360000	56000	500	200000	4000	9000	1835400	518450	74100	3111736
5	17106	120000	15000	500	8000	0	4000	180000	0	0	344606
6	11199	80000	8000	630	50000	4000	9000	111600	0	0	274429
7	22305	184000	15000	570	64000	2000	500	219600	114375	0	622350
8	31819	184000	16000	2304	120000	6000	12000	922500	210125	24050	1528798
9	3618	40000	7500	50	10000	500	500	36000	21750	0	119918
10	280400	1768000	50000	10119	0	6000	15000	4732500	0	0	6862019
11	96032	696000	15000	6069	95000	0	500	2215500	684375	0	3808476
12	8386	72000	7500	850	0	2000	400	177000	38500	4000	310636
13	5542	40000	7500	50	0	0	2400	55200	12000	0	122692
14	65447	512000	15000	2143	0	0	5620	754800	0	8500	1363510
15	38508	184000	7500	630	4500	0	4000	234000	97500	0	570638
16	60940	440000	10500	3037	0	750	3000	1037400	0	8500	1564127
17	52209	400000	15000	1706	0	0	1620	757025	0	0	1227560
18	124065	920000	17500	1984	0	660	0	1455900	0	6095	2526204
19	21567	280000	15000	1408	0	0	1620	420600	0	0	740195
20	24583	200000	15000	1002	25000	0	300	344000	80775	7650	698310
21	7815	80000	7500	50	0	0	0	104400	41760	0	241525
22	5542	40000	7500	50	2000	0	0	55200	10336	0	120628
	Total economic leakage =										**36788879**

Based on the calculation (see Table 5), the average percentage of economic leakage is 28%, calculated by dividing the total economic leakage by total tourism revenue of the sample.

The analysis reveals that the total payments for government attributes are the source of the largest leakage factors. Generally speaking, the government set a per-trip cost of 1200 Taka for Bangladeshi tourists and 11,000 Taka for foreigners. That means government tax is the highest reason for economic leakage in Sundarbans' tourism system (Figure 1). In terms of transportation-related economic leakage, fuel for ships is ranked the second. 500 liters of oil are required for a single engine, while 900 liters are required for a double engine.

Table 5. Individual business-wise Economic Leakage in relation earned revenue by Sundarbans tourism business
(Source: Primary data analysis)

Sl. no	Participating Organization's Name	Economic leakage	Revenue earned	% of economic leakage
1	Trait n' Tent	1180090	4350000	27%
2	Perfect Holiday	156602	472500	33%
3	AS Travel	9293830	29586000	31%
4	PathFriend Tour Operator	3111736	10369000	30%
5	Bangladesh Travel Agency	344606	2035000	17%
6	Bangladesh Expeditions	274429	976500	28%
7	Sopnodana	622350	2287500	27%
8	Tourism Window	1528798	4202500	36%
9	Fly Far Ladies	119918	435000	28%
10	Holidays Shopping Lines	6862019	28600000	24%
11	Dhaka Dinner Cuisine	3808476	13687500	28%
12	Naria Travel and Tours	310636	770000	40%
13	A-One Tourism	122692	529000	23%
14	Ever Youth Tourism	1363510	5758500	24%
15	Gontobbyo	570638	2242500	25%
16	Sundarban Tourism	1564127	5931000	26%
17	TourLink BD	1227560	4404500	28%
18	Travelers Link BD	2526204	10223500	25%
19	New Rainbow Tours Sundarbans	740195	3501000	21%
20	Blue Bee Holidays	698310	2692500	26%
21	Ruposhi Bangla Tourism	241525	1044000	23%
22	Bangladesh Tour and Travel	120628	344540	35%
		36788879 (Total economic leakage of the sample)	**134442540** (Total tourism revenue of the sample)	**28%** (Average leakage)

According to the data, imported consumer items, which include food and drink, are the third most important variable. High levels of economic leakage were primarily caused by these three factors in Bangladesh's Sundarbans. On other hand, for some tour operators and travel agencies, profit transfers or savings for outside investors caused a 9% of economic leakage of Sundarbans Tourism, Bangladesh.

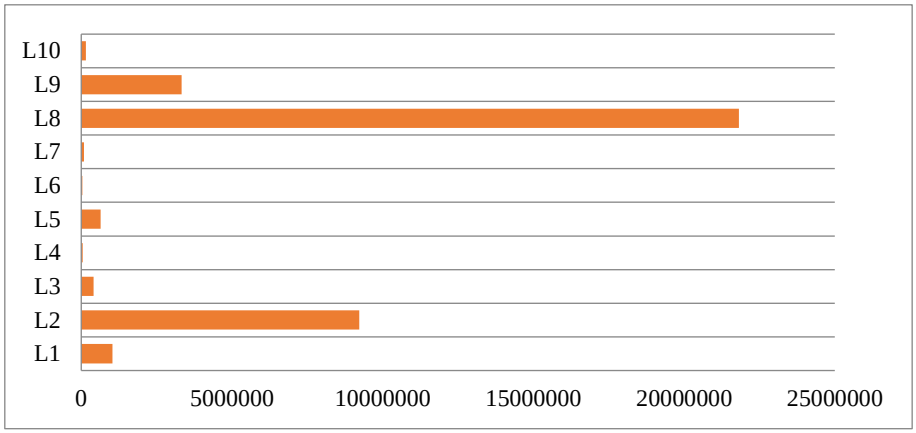

Figure 1. Item-wise leakage of tourism system in the Sundarbans
(Source: Fieldwork data)

The percentage of tourism that is being leaked for each tour operator and travel agency is also shown in Figure 2. Between July 2021 and June 2022, tourism's economic leakage at Naria Travel & Tours is responsible for 40%. This is not a local travel agency; it is situated in the capital of Bangladesh. Following Naria Travel & Tours, 36% and 35% of information were leaked from Bangladesh Tours and Travels and Tourism Window, two businesses that are not based in the Sundarbans area.

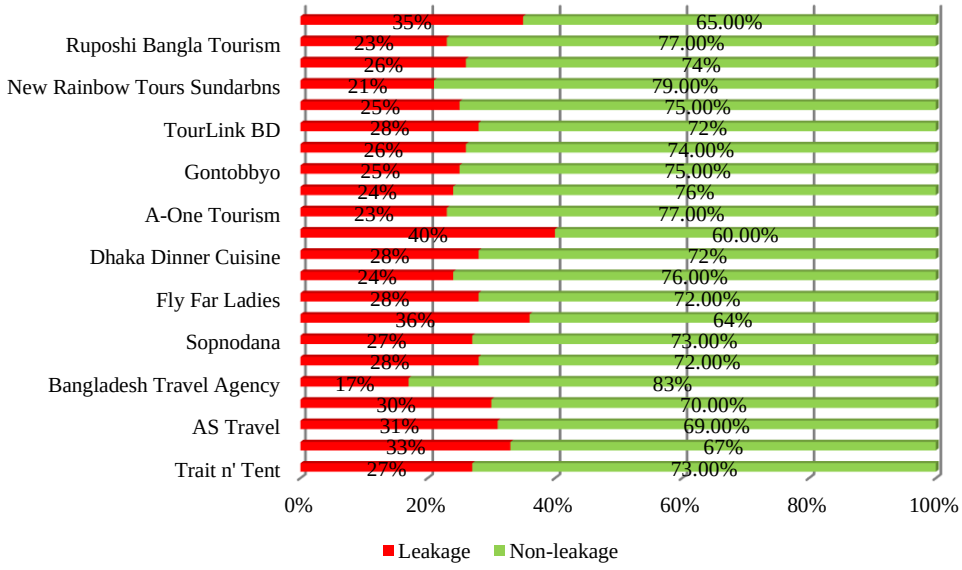

Figure 2. Tourism business-wise leakage and non-leakage portion in the Sundarbans
(Source: Fieldwork data)

These results indicate that: (i) there will be less leakage if travel agents and tour operators are run locally and (ii) there's a significant amount of government tax that is to blame for excessive leakage (Figure 2). According to the findings, as tourism is one of the main drivers of tourism growth in the Sundarbans, the more taxes the government collects, the less money from tourism would be given directly to the local community people.

CONCLUSION

In the process of calculating tourism leakage in the Sundarbans, this research finds that the highest percentage of tourism leakage is happened due to the government tax. After that, the logistics sector of the transportation industry accounts for the second biggest amount of leakage. According to the research finding, the percentage of economic leakage in Sundarbans (Bangladesh) is 28%. The findings of the research further indicate that the tourism businesses that are investing from outside of locality of the Sundarbans are more responsible for economic leakage. Subsequently, the more leakage, the less revenue will exist in the local area for the overall development of the Sundarbans. Therefore, for future development of tourism in the Sundarbans, priority should be given to all local communities to maximize their benefits.

In this study, research findings address the research objectives by using an appropriate methodology, in where quantitative research approach was used. By using this result, policymakers can create or modify new policy to minimize the economic leakage to hold the tourism revenue within the economy. Conducting this research, there were a few limitations. Firstly, lack of access to information – participants often were not comfortable to provide proper financial information. Secondly, the information of government tax was controversial. To calculate taxes, the information given by tourism business stakeholders was considered (note: this research found a discrepancy in tax amount between survey participants' information and information available in published materials).

In order to address the research aim, this research utilized a modified formula for calculating economic leakage in tourism. The leakage calculation formulas have been adapted based on the research by Suryawardani, Bendesa, Antara & Wiranatha (2014) and Ünlüönen, Kiliçlar & Yüksel (2011). The information needed in the formula to calculate economic leakage was easier to access. Future researchers may follow the approach and procedure utilized in this study. Even though the study's focus is only on the Sundarbans' tourism industry, which makes up a small portion of Bangladesh's overall tourism market, it still contributes to reducing economic leakage from the industry and strengthening capacity of local entrepreneurs and tourism businesses to provide tourists with topnotch services.

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