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Technical Guidelines for Evaluating the Impacts of Tourism Using Simulation Models

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Abstract

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The purpose of this guideline is to make praticioners aware of simulation approaches for the evaluation of tourism projects. Simulation approaches are particularly useful when experimental or economic approaches for project evaluation are not feasible. For example, it usually is not possible to roll out a tourism-promotion program for a randomly chosen "treatment group" while excluding the program's benefits for a "control group" at the tourist destination. The guideline explains why a simulation approach is useful for tourism impact analysis, what a simulation model for the economic analysis of tourism impacts looks like, and data requirements. With the help of an illustrative two-island model, the guideline shows how to construct different kinds of simulation models and how to use simulations to quantify the costs and benefits of tourism and tourism projects. The guideline concludes by discussing some specific IDB projects in which this methodology has been used for tourism impact analysis. The primary goal of this paper is to make development practitioners aware of simulation approaches for tourism impact analysis and of how to integrate these approaches into their project proposals, budgets, and terms of reference for expert consultants.

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1. Preface and Introduction

In 1998 the Inter-American Development Bank (IDB) asked me to provide a frame of reference for understanding how the economy of Ecuador's Galápagos Islands works and to analyze various steps that might be taken to improve the environment, regulate economic activities and strengthen economic institutions on the islands. One of the specific goals of that study was to create an economic model to quantify the likely evolution of the islands' main economic activities, especially tourism, if specific policies and regulations were implemented, as well as the likely implications for migration from the mainland to the islands.

The first step in doing this study was to scour the literature for existing methodologies to understand the impacts of tourism on local economies. The best known economic study of tourism impacts had, in fact, been done in the Galápagos. It consisted of interviewing tourists about the expenditures they had made during their trip, then estimating the amount of money that an average tourist injected into the local economy (de Miras, 1995). The study found that most of the cost of a typical trip to the Galápagos was on airfare and tourism packages on ships. Only 7 cents out of every tourist dollar actually entered the Galápagos economy.

I visited the Galápagos for the first time at the beginning of the project, expecting to find a poor island economy bypassed by most of the benefits of tourism. To my surprise I found a thriving tourist economy, instead. Puerto Ayora, the commercial center on the island of Santa Cruz, reminded me of a Greek island town. People complained that most foreign tourists stayed on the yachts and small cruise ships that filled the Puerto Ayora harbor, agreeing with the research finding that little of the economic benefit of tourism made its way into local businesses and households. There was a disconnect between the dynamic local economy that I saw, on one hand, and the perceptions of researchers and locals, on the other. There was no way that 7-cents-on-the-tourist-dollar could explain the economic vibrancy that had made the Galápagos Islands Ecuador's highest income province.

There were other indicators of positive economic impacts of tourism. The islands' population was growing rapidly, fed by new migration from mainland Ecuador. Despite the high immigration rate, wide wage and income disparities separated the Galápagos from the rest of Ecuador, suggesting excess labor demand on the islands outstripping that on the mainland.

The impacts of tourism were clear to environmental researchers. As the Economic Study of the Galápagos was getting underway, there was growing concern about the compatibility of growth and conservation in the archipelago. The World Wildlife Federation reported:

> *Human population growth, invader species and commercial fishing threaten to destroy the fragile ecological balance in the world famous Galápagos islands… Although 97 percent of the island's land area has National Park status, the population of the Galápagos islands has more than doubled in the last 10 years, mainly due to migration from the Ecuadorian mainland. With this migration, many foreign plant and animal species are being introduced. Their estimated numbers have grown from about 77 in 1971 to more than 260 today.*[1]

The broadcaster-naturalist Sir David Attenborough, famous for putting together the BBC's *Life* series, called Galápagos tourism "a necessary evil."[2] In 2009, UNESCO voted to retain the Galápagos Islands on its List of World Heritage in Danger, citing "continued threats... arising from very rapid growth of land based tourism and from invasive alien species."[3]

In short, impact analyses based on tourist expenditures seemed to miss most of the story of how tourism affected economic and population growth in the Galápagos Islands. This had important consequences for the design of economic as well as environmental policies.

A simulation approach to tourism-project impact evaluation highlights the direct and indirect impacts of tourism, which create income and demographic multipliers at tourist destinations. These impacts generally are both larger and more complex than those suggested by tourist expenditure studies or conventional cost-benefit analysis.

These guidelines discuss simulation approaches for the evaluation of tourism projects. The methods presented here provide a way to quantify the impacts of proposed projects involving a series of investments and targeting a specific geographic region within a country for tourism promotion. They might be equally useful for studying the impacts of a general tourism marketing program, or a project with scattered investments around a country, data permitting. In

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[1] Environmental News Network (2002) http://www.enn.com/enn-news-archive/1997/07/071897/07189711.asp.

[2] http://www.telegraph.co.uk/earth/earthcomment/4593725/Sir-David-Attenborough-Galápagos-Islands-need-tourism-to-survive.html

[3] United Nations Educational, Scientific and Cultural Organization Convention Concerning The Protection of the World Cultural and Natural Heritage World Heritage Committee, Thirty-third session, Seville, Spain, 22-30 June 2009. Report of Decisions. WHC-09/33.COM/20. http://whc.unesco.org/en/decisions/1983. The Galápagos have been removed from this list, but the concerns that put it there persist.

the latter case, the geographic scope of the simulation model would have to be extended to encompass all of the regions covered by the project, or alternatively, a subsample of them. Disaggregated simulation models like the ones presented here have been created for entire regions.

Simulation approaches are particularly useful when experimental or economic approaches are not feasible. For example, it usually is not possible to roll out a tourism-promotion program for a randomly chosen "treatment group" while excluding the program's benefits for a "control group" at a tourist destination.

Three types of data are required to carry out simulation analysis of tourist-project impacts: data from surveys of tourists, businesses, and households in potential tourism-impacted areas.

These guidelines are organized around the following concrete questions:

1. Why invest in tourism projects?
2. Why is a simulation approach useful for tourism impact analysis?
3. What does a simulation model for the economic analysis of tourism impacts look like?
4. What are the data requirements to estimate a tourism-impact simulation model?
5. How is the model constructed?
6. How is the model used to explore the impacts of tourism and projects affecting tourism?
7. What are some of the major budgetary considerations in doing tourism impact simulations?

The primary goal of the guidelines is to make development practitioners aware of simulation approaches for tourism impact analysis and of how to integrate these approaches into their project proposals, budgets, and terms of reference for expert consultants.

2. Why Invest in Tourism Projects?

Asking why countries should invest in tourism projects is an important starting point for these guidelines, because the answer will point to the kinds of metrics that are needed to evaluate the desirability and success of these projects. What might a country hope to get out of this type of investment? How might tourism bring about "development," particularly with regard to poverty alleviation?

From an economic development perspective, we are interested not only in the increased tourist receipts that result from a project, but also in the employment and income they generate, particularly for the poorer segments of society. The public sector invests in tourism-related infrastructure, tourism products, tourism marketing, etc., often with the assistance of multi-lateral lenders like the IDB. Evaluating the impacts of such interventions requires answering two questions. The first is how the project affects tourism or tourism receipts. The second is how the increase in tourism or tourism receipts affects the outcomes of interest to the project, including incomes and employment of target groups. Each of these questions involves serious analytical challenges.

The major challenge concerning the first question is how to project (*ex ante*) and attribute (*ex post*) observed changes to the project. The main analytical challenge regarding the second question is how to model both the direct and indirect impacts of changes in tourism on the outcomes of interest.

These guidelines address the first question but focus primarily on the second one. They offer a methodology to quantify the direct and indirect benefits and costs of increased tourism on economies in the zone of influence of tourism projects. The methodology proposed here can assist in designing interventions in ways that increase the flow of likely benefits to specific socioeconomic groups, including the poor, and to identify obstacles to the spread effects of projects on welfare. This requires quantifying the linkages between tourism investments and tourism receipts, as well as between tourism receipts and the incomes and welfare of target social groups.

Tourism is the largest industry on earth, and eco-tourism is the fastest growing sector of this industry. Many countries see tourism as an important source of new income and foreign exchange, a way to create incentives for local populations to conserve their environment and cultural heritage, and a means to include new socioeconomic groups in the benefits of economic

growth. Despite concerns over countries' ability to balance tourism growth with environmental and cultural conservation and social equity objectives, one can expect the demand for tourism project funding to grow in coming years.

Methods will be needed to assess the costs and benefits of tourism projects and to design these projects so as to maximize development benefits and minimize negative environmental impacts. Simulation models help us learn how tourism impacts flow through an economy, from the businesses that cater to tourists to economic actors who have no contact whatsoever with tourists but nevertheless are affected by them. Knowing this, they can help us design projects that are more likely to accomplish their objectives.

3. Why Does a Simulation Approach Make Sense for Tourism Impact Analysis?

Simulation methods may be useful—indeed critical—for impact analysis when experimental or econometric approaches are not feasible or practical, or when one is interested in measuring things that simply cannot be revealed by other methods. Given the popularity of experimental and econometric methods for impact evaluation, it is helpful to begin by asking when such methods are not feasible, and when the best alternative is to use a simulation approach. As we shall see, experimental and econometric methods are particularly problematic for studying the impacts of tourism and tourism-related projects.

3.1 Why do Tourism Experiments Tend to be Impractical?

The classic experimental approach for project evaluation requires a randomized treatment and clearly defined outcome of interest. Consider, for example, the health project in Kenya examined by Miguel and Kremer (2004). It administered a clearly defined treatment for intestinal helminthes (worms) to children in a randomly selected sample of schools (the treatment group) but not in other schools (the control group). The outcome of interest was school attendance. The *ex post* research question was whether or not the treatment for worms increased children's school attendance. There are many other examples of experimental approaches, including a series of studies of Mexico's PROGRESA (now called OPORTUNIDADES) program. PROGRESA included a clearly defined treatment (income payments to low-income women, conditional upon their children being enrolled in school and in local health clinics) and a randomized roll-out, making it amenable to analysis using experimental methods.

Two critical features of an experimental approach are (i) the random (or quasi-random) selection of a treatment and control group and exclusion of the control group from the treatment, and (ii) a clearly defined treatment and outcome of interest. Both are problematic when doing tourism impact evaluations.

3.1.1 Where are the Treatment and Control Groups?

If we are interested in quantifying the impacts of tourism, the treatment, in effect, is the project; the treatment group is the entire population in the zone of influence with the project; and the control group is the same population but without the project. It is not possible to make tourism happen for one group of people but not others at the same tourist destination. Nor is it politically

feasible to prevent tourists from visiting some randomly selected sites but not others. One might argue that a tourism project could be implemented at some sites but not at others. However, by definition tourist destinations are unique (hence the reasons tourists want to go there). This makes it impossible most of the time to come up with a reasonable alternative location as a control group (i.e., a site that is identical to the "treated" site except for not getting the treatment). In short, the uniqueness of tourist places makes using nearby places as counterfactuals impossible most of the time. They simply do not represent the region without the project.

How to exclude a control group from a treatment is frequently a problem even in the most carefully designed experiments. Miguel and Kremer (2004) found that a conventional experimental approach doubly underestimated the benefits of the worms treatment, because the control group (kids at untreated schools) benefited from reduced transmission of the disease when kids at the treated schools got treated. Ironically, the fact that the control group also benefited made it difficult to identify a positive effect of the treatment by comparing the treatment and control groups. A similar problem occurred in Mexico's PROGRESA experiment. The program was rolled out in a random fashion; however, members of the control group (villages that did not get the first round of PROGRESA transfers) soon realized that they, too, eventually would receive payments under the program, and their behavior changed accordingly. Because of this, it became increasingly difficult to measure PROGRESA's impacts as differences between the treatment and control groups. This is commonly referred to as the problem of control-group contamination.

Tourism represents an extreme case, in which a control group cannot be excluded from the effects of the tourism treatment. While some groups (e.g., tour operators, hotels and restaurants, and souvenir shops) benefit directly from increased tourism, they almost immediately transmit the benefits to other groups, including wage workers and input suppliers, as described below. Thus, even if it were feasible to create a tourism treatment and control group, market linkages would make it impossible to avoid control-group contamination. In fact, ever since Hirschman's (1977) and Mellor's (1976) seminal work, fostering growth linkages has been a focus of economic development.

When a policy or project cannot be implemented in a randomized way, there is no clean experiment, but sometimes econometric methods can be use to model the outcome of interest as

the result of a "quasi experiment." The clearest example of this is a natural event (e.g., an earthquake or hurricane). When a disaster strikes, all members of the impact zone are likely to be affected. However, the impact of the event may be estimated by comparing an outcome of interest (e.g., income, employment, or poverty) before and after the event strikes, provided the data are available. This is what Halliday (2006) did to estimate the impact of the 2001 earthquakes in El Salvador on migration to the United States. The shock might be socio-economic instead of natural; an example is Yang's (2008) estimate of the impact of exchange rate shocks on international migration from the Philippines. For analytical purposes, the critical things are that the event is random and before-and-after data are available.

In most cases, projects and policies are not rolled out in a randomized way and in many cases individuals choose whether or not to participate. In such situations, the treatment is said to be endogenous. Propensity score matching is an econometric method that may be useful in such cases, enabling researchers to study a project's or policy's impact as if the project or policy were implemented in a random fashion (Rosenbaum and Rubin, 1983; Becker and Ichino, 2002). Other methods include regression discontinuity design and instrumental variable approaches.

There are three drawbacks to using econometric methods to estimate the impacts of tourism and tourism projects. First, rarely do we have access to the necessary data before and after tourism or the project occurs. (Project designers must make sure that we do; see below.) Second, changes in tourism are not random events like hurricanes or earthquakes; similar variables, observed or unobserved, may simultaneously affect both tourism and the outcomes we wish to measure. Difference-in-difference methods, using information on changes in the outcomes at other sites, might offer a way of dealing with this problem, but only if data spanning the same time period are available from other comparable sites. Third, if the purpose of the impact analysis is to determine whether or not a tourism project is implemented, there is a timing problem: We cannot observe the outcome of the tourism project unless it is implemented, yet we require the results of the impact analysis in order to decide whether or not the project should be implemented, usually within a relatively short period of time.

3.1.2 What is the Outcome of Interest?

In the worms treatment experiment there was a clearly defined treatment (for worms) and outcome of interest (children's school attendance). In the case of tourism or many other kinds of

project or policy impact analysis, there are likely to be multiple, interrelated interventions and outcomes of interest. Interventions might include public investments in tourism infrastructure, private investments in tourism-related enterprises, human capital investments, promotion, or other initiatives. Outcomes are complex and often indirectly affected by these interventions. Do we wish to estimate the impact of tourism on total income? On the incomes of particular social groups? On employment? Poverty? It is often the case that tourists have little direct economic contact with poor people. Does this imply that tourism does not affect poverty? (Probably not.) The impacts of tourism projects, like most projects and policies, are almost certain to be heterogeneous, with winners and losers. Is it important to quantify the impacts on winners (e.g., tourism operators) and losers (e.g., fishermen who lose access to a marine reserve)? Noneconomic (e.g., environmental) outcomes might also be of interest.

Experimental and econometric methods, even if they are feasible, are likely to be problematic when a treatment produces multiple and interrelated outcomes. Tourism impacts generally are too complex to capture in experiments or econometric models. A large part of the economic impact of tourism projects is bound to be indirect—that is, on entities not directly affected by the project. The structure of the economy and the heterogeneity of economic actors at the tourist destination shape these impacts. To design policies and projects, it is not enough to know what the likely impacts are, but also why and how to influence them.

3.2 Economy-wide Analyses of Tourism Impacts

Modeling the economy-wide impacts of tourism is not new (for an excellent review see Dwyer, et al., 2004). However, most models have been at the national level or are too aggregated to be of much use for project analysis. This is particularly true for projects that target specific localities or regions within countries or specific activities within a region, and when a project goal is to raise the income of a particular household group, e.g., the poor.

For a number of years, economists used input-output (IO) models, involving only a few production sectors, to estimate partial production multipliers from tourism. The purpose of those models was to quantify the direct effects of tourist expenditures on the tourism-related sectors and, through these, on other production activities with which they are directly linked. A few examples include Frechtling (1999), Crompton, Lee, and Shuster (2001), Tyrrell and Johnston (2001), and Dwyer and Forsythe (1998). An advantage of such models is that they can be

constructed from data in tourism satellite accounts now available for many countries (United Nations, 2008). The chief limitations of an IO approach are twofold: first, it captures only the direct effects of tourism on tourism and related activities; and second, it assumes linear responses and highly elastic supplies of goods, services and factors, including labor. (The limitations of linear multiplier models are discussed below.)

Social Accounting Matrix (SAM) multiplier models vastly expand the scope of tourism-impact analysis by capturing both direct and indirect income linkages in the economy. These include linkages between production sectors and households, which are absent in IO models. Fixed-price SAMs share the limitations of IO models with respect to linearity and elastic supplies. Nevertheless, nonlinearity assumptions can be relaxed in SAM multiplier models by replacing average with marginal budget shares (Pyatt and Round, 1985), and constrained SAM multipliers can be obtained by incorporating inelastic supply responses for some sectors (Lewis and Thorbecke, 1992) or beyond particular output levels (Parikh and Thorbecke, 1996). SAM multiplier models, given these potential modifications and their comprehensiveness (they include all sectors, factors and households in the economy of interest), represent a significant advance over partial IO models. However, with only a few exceptions, they are aggregate and have not been used to evaluate tourism projects focusing on particular regions, sectors and households. (For arguments in favor of using SAM models for tourism analysis see Wagner (1997).)

Computable general equilibrium (CGE) models make it possible to control for nonlinear responses, resource constraints, and price changes when analyzing tourism impacts. Dwyer, et al. (2004, p. 1) argue that CGE modeling is "the preferred technique in analyzing the economic impacts of tourism." A CGE model is no more comprehensive than a SAM multiplier model: both represent the behavior of all actors in an economy, and a SAM is the basic data input for any CGE. However, CGEs are more flexible in terms of the way in which responses are modeled and the indirect effects they can capture (i.e., via price changes). Aggregate CGEs have been used to analyze tourism in some countries and states, including Australia (see review by Dwyer, et al., 2004), Brazil (Blake, et al., 2008), and Hawaii (Zhou, et al., 1997). However, with few exceptions (e.g., Taylor, et al. (2003)'s Galápagos study and Haddad's (2010) study of tourism in the state of Rio de Janiero), they have not been used to model the impacts of tourism in smaller economies or at a micro level.

Evaluating tourism projects is different from assessing the aggregate impacts of policies. Project evaluation requires the capacity to quantify costs and benefits on a smaller scale. Most projects are localized and aggregate models of regions or nations are not likely to provide a reliable basis for quantifying direct and indirect impacts within a project's particular zone of influence. This is particularly true when there are heterogeneous actors with different access to employment, product markets and capital. Both *ex-ante* and *ex post* evaluations typically are concerned with how projects affect specific groups of individuals (e.g., high and low skilled workers) and households (e.g., the poor) within the project's zone of influence. For this, a disaggregated or local economy-wide modeling approach is needed, supported by the collection of micro data through tourist, business and household surveys.

4. Simulation Models for Tourism Impact Analysis

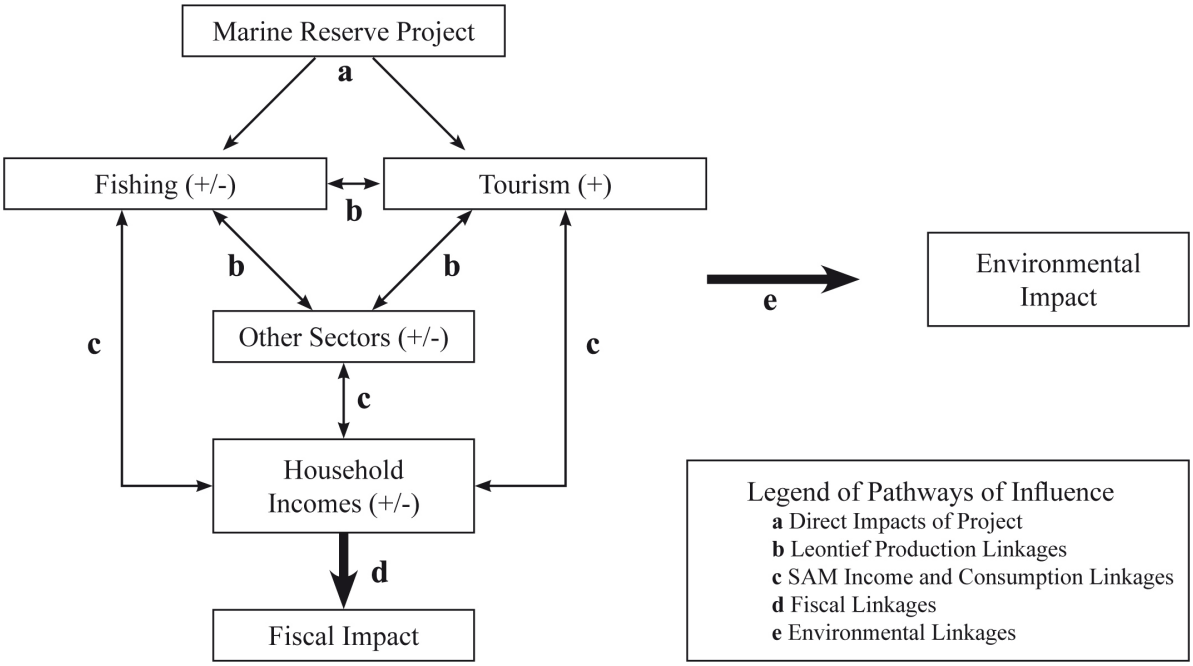
How might a tourism project create employment and income for particular socioeconomic groups, including the poor, within the project's zone of influence? To illustrate the paths by which a tourism project might affect income and employment, consider a project that would include creating a marine reserve and an eco-lodge that will be a magnate for new tourism. Fishermen will be adversely affected, while tourism activities will benefit. Figure 1 illustrates the paths by which this project might impact the local economy.

Arrows (a) represent the project's direct effects on fishing and tourism. The project will change the number and perhaps the quality of tourists. If it attracts more and higher-income tourists, the direct impact on the demand for tourist services (hotels, restaurants, diving, tours, etc.) will be positive. A survey of existing tourists, together with the anticipated effect the project will have on the number and types of tourists, make it possible to estimate this direct impact. A tourism impact analysis based only on tourist expenditures, as in the early Galápagos Island studies mentioned above, would stop here.

The project will also affect fishing. By closing down existing fishing grounds, it could have an adverse direct effect on fishermen's incomes. However, the preserve could enrich surrounding fishing grounds, raising takes there. The overall direct impact on fishing output therefore is ambiguous but could be negative.

If tourism activities expand while fishing contracts, these activities' demand for intermediate inputs will change, producing a first round of indirect effects in the local economy (Arrows (b) in Figure 1). For example, more tourists mean increased demand for restaurant meals, and therefore greater restaurant demand for everything from menu ingredients (meat, fish, fruits vegetables, etc.) to beverages and napkins. To the extent these inputs are supplied locally, the greater demand for restaurant meals will have positive linkage effects on the local economy. Inputs purchased from outside the project area will create positive linkages for other parts of the country. From a country point of view, both are likely to be important. If inputs are imported from abroad, the positive indirect linkages will leak out to other countries. An IO analysis would stop here.

Figure 1: Pathways of Influence of Marine Reserve Project



While tourist service activities expand, creating positive indirect impacts on the local economy, a contraction of fish production will have the opposite effect, to the extent fishermen purchase inputs locally. If fishing activities utilize fewer locally supplied intermediate inputs than tourist activities, the immediate indirect effects of the project on the local economy are likely to be positive.

All production activities in the local economy also generate incomes, in the form of wages and profits. In the Galápagos Islands, cruise ships (*hoteles flotantes*) are locally based, with crews drawn mostly from the Islands' population. Wages paid to crew members thus represent an important indirect effect on the local economy. Wages and profits accruing to local residents from tourist activities and from the activities that supply tourist activities flow into households, which in turn spend income in the local economy. The increase in household incomes and resulting stimulus to household demands for goods and services are represented by (two-headed) Arrows (d) in Figure 1. Of course, if fishing production contracts, the indirect income effects of fishing will be negative instead of positive. Not so, however, if fishermen can shift to new fishing grounds outside the protected area, or to new activities like providing tourists with boat or snorkeling tours around the preserve.

As local activities expand to supply new household demands, a new round of increased input demand, incomes, and household expenditures follows, creating still more increases in incomes and demand in the local economy. Successive rounds of impacts become smaller and smaller, and the total (direct and indirect) effect of the expansion in tourism eventually converges to an income multiplier that can be calculated using a Social Accounting Matrix (SAM) multiplier model. To obtain the total impact of the project on local income, any negative multiplier effect of reduced fishing must be subtracted from the positive multiplier effect of tourism.

A SAM multiplier or CGE model would encompass all of the effects represented by arrows a-d in Figure 1.

4.1 A Numerical Example of a SAM Multiplier

Imagine a simple island economy consisting of two production sectors, tourism and other goods and services; two factors of production, labor and capital; and two household groups, poor and rich. To simplify further, suppose tourists buy only from tourism activities. Other activities might include fishing (tourists generally do not buy fish directly from fishermen), retail activities serving local residents but not tourists, and various other non-tourism goods and services.

From surveys of tourists, businesses and households, we construct the Social Accounting Matrix for the tourism zone of influence in Table 1. (How to design surveys to construct SAMs is discussed below.) Although this is a simple, fictitious SAM, it is sufficient to illustrate the SAM multiplier method as well as the effects of tourism revenue, including on sectors from which tourists do not purchase goods and services.

Column G tells us that tourists from the rest of the world inject $100 into the island economy, through their demand for goods and services from island tourism activities (hotels, restaurants, tour packages, souvenirs, etc.). This represents the total (gross) income of tourism activities, which by definition must equal total expenditures by these activities. The expenditures of tourism activities are presented in Column A. In this economy, tourism activities buy $20 of inputs from other activities on the island, pay $40 in wages to island workers, purchase $20 in inputs from the rest of the world, and generate $20 in profits (returns to capital). Other activities on the island buy $40 in inputs from each other, pay $90 in wages, generate $45 in profits, and demand $85 of imported inputs.

All wages and profits in this example are channeled into households as income (see columns C and D). $90 of wages and $20 of profits go into poor households, while rich households get $40 of the wages and $45 of the profits.[4] Poor households, in turn, spend $100 of their income on goods from non-tourism activities on the island and $10 on goods bought directly off-island (column E). Rich households spend $55 on the island and $30 off-island.

Table 1. A Simple Stylized SAM for a Tourist Destination Economy

SAM Accounts	ACTIVITIES		FACTORS		HOUSEHOLDS		Rest of World	TOTAL
	Tourism	Other	Labor	Capital	Poor	Rich		
	A	B	C	D	E	F	G	H
Activities								
Tourism							100	100
Other	20	40			100	55	45	260
Factors								
Labor	40	90						130
Capital	20	45						65
Households								
Poor			90	20				110
Rich			40	45				85
Rest of World	20	85			10	30		145
TOTAL	100	260	130	65	110	85	145	750

The SAM flows matrix in Table 1 is converted into a SAM multiplier matrix by following three relatively simple steps:

1. A SAM coefficients matrix is derived, by dividing each internal element by its corresponding column total. Let A refer to the endogenous rows (i=1,…,I) and columns (j=1,…,J) of the shares matrix (production sectors, factors and households, in the present case, I=J).
2. The shares matrix is then subtracted from an identity matrix (i.e., a matrix with ones along the diagonal and zeros everywhere else) of the same dimensions, then
3. The new matrix is inverted to obtain the multiplier matrix, M:

$$M=(I-A)^{-1}$$

[4] The total payments in this example happen to be lower for rich than poor households, but this makes sense if there are more poor than rich households in the local economy, such that the average income of poor households is low.

In our simple example, M is a 6x6 matrix, the first column of which (multiplied here by 10, to depict a $10 increase in tourism revenue) is shown in Table 2. Its elements represent the total (direct plus indirect) effect of a $10 exogenous increase in tourist spending on the value of production, factor payments (or value-added), and household incomes on the island.[5]

Table 2. SAM Tourism Multipliers

Sub-Account	One-Island Model
	Island A
Production Activities	
Tourism	10.00
Other	15.60
Factors	
Labor	9.40
Capital	4.70
Households	
Poor	8.00
Rich	6.20

In this example, every $10 spent by tourists add more than one dollar to the island economy. In addition to raising tourism-sector production by $10, it increases other production by $15.60, even though tourists spend only 20 cents of every dollar on goods or services supplied by non-tourism activities. Wages increase by $9.40, even though Table 1 shows that only 40 cents on the tourism-sector dollar goes to wages. Profits rise by $4.70. Total household income on the island increases by $14.20, with $8.00 going to poor households and $6.20 to rich households. An impact study based only on a tourist-expenditure survey would conclude that the $10 of additional tourist income raises island production by $10 (instead of $25.60), and it would not be able to tell us the effect on household income. In short, it would provide a low and misleading estimate of the impacts of tourism on the island. It would also understate the benefits of a project that increased tourist expenditures in this economy.

[5] The other columns in the matrix would contain the multiplier effects of exogenous increases in income of the other five accounts in the SAM: Other production, the two factors, and the two households. Because the focus of these guidelines is on tourism impacts, only the columns associated with tourism are presented here and in the following tables.

4.2 A Spatial SAM

Now suppose there are two islands in the archipelago, and they trade with each other. For example, the second island (which we ingeniously call Island 2) could be a tourist destination but also supply fish to Island 1, while Island 1 might sell other types of goods or services to Island 2. (Such, in fact, is the case with the islands of Utila and Santa Cruz in the Galápagos chain.) We extend our surveys to Island 2, construct a second SAM, and stack the two island SAMs into a mega-SAM for the archipelago, as illustrated in Table 3. In this example, foreign tourists spend a total of $150 on the two islands: $100 on the first (as before) and $50 on the second.

Table 3. Two-island SAM

ISLAND	SAM ACCOUNTS		Island 1						Island 2						Inter-Island	ROW	TOTAL
			ACTIVITIES		FACTORS		HOUSEHOLDS		ACTIVITIES		FACTORS		HOUSEHOLDS				
			Tourism 1	Other 1	Labor 1	Capital 1	Poor 1	Rich 1	Tourism 2	Other 2	Labor 2	Capital 2	Poor 2	Rich 2			
			A	B	C	D	E	F	A'	B'	C'	D'	E'	F'	G		H
Island 1	ACTIVITIES	Tourism 1														100	100
		Other 1	20	40			100	55							45		260
	FACTORS	Labor 1	40	90													130
		Capital 1	20	45													65
	HOUSEHOLDS	Poor 1			90	20											110
		Rich 1			40	45											85
Island 2	ACTIVITIES	Tourism 2													30	50	50
		Other 2							10	20			35	20			115
	FACTORS	Labor 2							20	50							70
		Capital 2							10	25							35
	HOUSEHOLDS	Poor 2									50	10					60
		Rich 2									20	25					45
Inter-Island			10	20					5	10			15	15			75
ROW			10	65			10	30	5	10			10	10			150
TOTAL			100	260	130	65	110	85	50	115	70	35	60	45	75	150	1200

We can derive a new multiplier matrix for the archipelago, following exactly the same steps as before but with this larger matrix. Because inter-island trade is endogenous to the archipelago, it must be included in the coefficient matrix. However, tourism is shared by the two islands; thus, the new SAM coefficient and multiplier matrices are of dimension (12x12). The tourism columns of this new multiplier matrix for the archipelago are compared to that of the one-island SAM in Table 4.

Not only do we now have multipliers for both islands, but the multipliers for the first island have changed. Even though only Island 1 tourists increase their spending, by $10 as

before, our model now picks up the changes in Island 1's income that result from Island 1's trade linkages with Island 2. These inter-island linkages increase the tourism's multiplier effect on Island 1's poor households from $8 to $9.30. The multiplier for rich households rises from $6.20 to 7.20. Meanwhile, Island-2 poor and rich households' incomes rise by $1 and $0.80 because of the $10 increase in Island-1 tourism revenue.

Table 4. Comparison of One- and Two-island Tourism Multipliers

Sub-Account	One-Island Model	Two Island Model	
	Island A	Island A	Island B
Production Activities			
Tourism	10.00	10.00	0.00
Other	15.60	20.20	2.70
Factors			
Labor	9.40	11.00	1.20
Capital	4.70	5.50	0.60
Households			
Poor	8.00	9.30	1.00
Rich	6.20	7.20	0.80

Constructing SAMs is always a first step in carrying out simulation analysis using economy-wide models. Real-life SAMs would be more complicated than the one in this example. They would have more production activities (as many as the investigator wishes and has data on), instead of aggregating tourism and other activities into large categories. They might have more factors of production, for example, labor by skill level, gender, or other type; physical capital as well as land (for agricultural activities), and additional household groups. At a minimum, each household group adds a row and column to the SAM; this is the case when households differ in their expenditure patterns and income sources but share production technologies and market behavior. If household groups differ in fundamental ways with respect to their production technologies or market behavior (e.g., some are subsistence producers), each island SAM might be decomposed into several household SAMs. The household SAMs would be stacked along the diagonal inside each island SAM, just as our two island SAMs were stacked along the diagonal of the archipelago SAM. Trade among households on an island could be recorded on the same inter-island trade account as before, except that now it would be an intra-island trade account, as well.

4.3 Beyond SAM: Limitations of SAM Multipliers

Building a SAM is a useful first step for economy-wide simulation, because SAMs contain most of the data needed to construct any kind of economy-wide simulation model. Because the row and column total for every account in a SAM must be equal, arranging data in a SAM also ensures that we begin our study with a consistent set of accounts, and that there are not significant data errors or omissions that could affect study findings.

A SAM is simply an accounting framework; it is not a model. Once one has constructed a SAM, it is not difficult to perform the calculations needed in order to obtain SAM multipliers. This is the simplest economy-wide model that can be constructed using a SAM, and the multipliers derived from it give a sense of how large tourism linkages might be in an economy that satisfies the basic assumptions underlying the SAM multiplier. SAM multiplier analysis is often a reasonable approach for conducting tourism impact analysis. In effect, the SAM multipliers represent the simulated effect of an increase in tourist spending within an economy that satisfies the SAM multiplier model's assumptions. The assumptions underlying the SAM multiplier model include:

a) Perfectly elastic supplies of all goods, services and factors, so that increases in demand translate into increases in quantities, not prices. This assumption is violated when there are significant obstacles to increasing supply in tourism and non-tourism activities in the economy of interest.
b) Linear responses all around, including in production activities (that is, a Leontief production function with fixed input-output coefficients) and in household consumption (fixed budget shares). In other words, the share of an increase in income that a household spends on a given good (that is, the marginal budget share) equals the average budget share. If households shift their demand patterns when their income rises, this assumption will be violated. Similarly, average input shares (that is, the Leontief input-output coefficients) determine how an increase in production will translate into increased demands for intermediate inputs, labor and capital in a SAM multiplier model. This assumption is not defendable if there are diminishing marginal returns to inputs in production activities.
c) No price effects. In real life, increases in demand can put upward pressure on prices in addition to having real (i.e., quantity) effects in an economy. In this case, a SAM

multiplier, which assumes that prices do not change when demand increases, will overstate the real effect of increased tourism on the economy.

The assumptions behind a SAM multiplier model are easier to defend in some situations than in others. For example, in an economy with unemployed labor and other resources and where there is excess capital capacity, fixed input-output coefficients may reasonably represent technologies, and increases in demand may translate directly into increases in local production. Many tourism activities have fixed input-output relationships: tourists per room, rooms per chambermaid, tourists per bus or taxi, etc. If the local economy is a price taker in outside markets for inputs and outputs, higher demand should not put upward pressure on prices. And for relatively small changes in income, household demand patterns are not likely to change significantly as income goes up. In general, SAM multiplier analysis is more reasonable in economies with high unemployment and without severe capital constraints than in economies at full employment or where technological limitations on production are more severe.

If there is concern that an economy faces serious capital or technological constraints, it would behoove project designers to include a component in their project to address these constraints. An example might be micro-credit for capital investments in tourism or related activities, so that supplies from these activities can expand as demand increases. The effects of such constraints on tourism multipliers can be explored in constrained SAM multiplier models, which impose inelastic supplies for some (constrained) sectors or beyond certain levels of output (Lewis and Thorbecke, 1992; Parikh and Thorbecke, 1996). The multiplier effects of loosening these constraints can also be estimated. (To my knowledge, constrained multiplier analysis has not been used for tourism project evaluation, but it is not difficult to do.) There are also ways to incorporate marginal budget shares into SAM multiplier models, reflecting changes in household demand patterns at different income levels (Pyatt and Round, 1985). These modifications can make SAM multiplier models a much more realistic tool for evaluating tourism impacts.

4.4 General Equilibrium Simulation Models

In the case of the Galápagos, prices and production constraints appear to matter. Wages and prices of goods and services are significantly higher on the islands than on the mainland, suggesting that the islands are not entirely price takers in larger markets. Wages and prices of some goods are likely to change in response to changes in tourism; thus, they need to be in the

model. In fact, on the labor side, inasmuch as humans are not indigenous to the islands, most increases in labor demand must be satisfied by new migration from the mainland. Without new migration, increases in tourism, which intensify island labor demands, would result in higher island wages. A SAM multiplier model is not capable of simulating the impact of tourism on wages or other prices, and in the Galápagos case, it generally overstates the real impact of increased tourism on the island economy. This may set the Galápagos apart from tourist destinations that are better integrated with outside markets, for example, the Bay Islands or Tela Bay in Honduras, or a beach resort in Nicaragua.

Micro computable general equilibrium (CGE) models, constructed for the zone of influence of the tourism project, are required when an economy fails to satisfy the basic assumptions of the SAM multiplier model. Some of the fundamental differences between CGE and SAM multiplier models are summarized in Table 5. CGE models include more general (usually nonlinear) production and consumption functions; prices, which may be determined either outside the economy that is being modeled, as equilibrium prices within the economy, or as household-specific shadow prices, in the case of subsistence households; and a more flexible and perhaps realistic modeling of trade.

Table 5. Some Basic Differences between SAM Multiplier and CGE Models

	SAM Multiplier	***CGE model***
Production	***Leontief production function:*** *$Q = Min((L/a),(K/b))$* *Where Q = quantity produced, L and K are quantities of labor and capital inputs, a and b are constants*	***More general production function:*** *$Q = F(L, K)$* *Most common: Cobb-Douglas:* *$Q = AL^aK^b$* *(Intermediate input demand usually is modeled using Leontief input-output coefficients)*
Household Demand	*Fixed budget shares:* *$X_i=c_iY$* *Where X_i is the quantity demanded of good i, Y is household total expenditure, and c_i is the average budget share for good i*	*More general demand equations, usually linear expenditure system (from Stone-Geary utility function):* $X_i = d_i + \frac{c_i}{p_i}\left(Y - \sum_J d_j p_j\right)$ *Where p_i is the price of good i, c_i is the marginal budget share, and d_i is the subsistence minimum of good i as perceived by the household. When $d_i=0$, this reduces to the generalized Cobb-Douglas function.*
Prices	*None*	*Determined in outside markets* $p_i = \bar{p}_i^w$ *By local market equilibrium conditions* $p_i = p_i^e$ *Or by internal household equilibrium, in the case of subsistence* $p_{i,h} = \rho_{i,h} = \mu_{i,h} / \lambda_h$ *Where* ρ_{ih} *= Household shadow price* ϕ_i *= Shadow value (Lagrange Multiplier) on subsistence constraint* p_i^w *= Outside (e.g., world) price* p_i^e *= Equilibrium market price*
Trade	*Exports are exogenous; imports are a fixed share of production and household demands*	*Market equilibrium in the economy determines net exports (for tradables) or prices (nontradables)*

4.4.1 Constructing a Micro CGE for Tourism Simulations

General-equilibrium (GE) models are somewhat more difficult to construct than SAM multiplier models, because the relationships within them are nonlinear and their market-clearing conditions determine prices as well as quantities. Nevertheless, with a well constructed SAM in hand, an experienced researcher can construct a GE model for tourism simulations in relatively little time, perhaps a week or two. By far, most of the effort and cost of conducting tourism-impact simulations involves the construction of SAMs. Once the SAMs are completed, there is little reason, from a budgetary or time point of view, not to construct a GE model, if the project context calls for it.

To illustrate how a SAM can be used to construct a micro CGE model, let's revisit the simple SAM for a fictitious island economy presented in Table 1. Under the assumption of profit maximization, the exponents of Cobb-Douglas production functions for the tourism and other activities are the shares of the corresponding factors in total value-added. These can easily be calculated from the SAM; for example, in the tourism activity, the labor share is 0.67 (40/60), and the capital share is 0.33 (20/60). The production functions for tourism and other production, then, are respectively:

$$Q_{tourism} = 3.15 L_{tourism}^{0.67} K_{tourism}^{0.33}$$

$$Q_{other} = 3.57 L_{other}^{0.67} K_{other}^{0.33}$$

The first-order conditions for profit maximization are:

$$p_{tourism}\left(\frac{\partial Q_{tourism}}{\partial L_{tourism}}\right) = \frac{p_{tourism} 0.67 Q_{tourism}}{L_{tourism}} = w$$

$$p_{other}\left(\frac{\partial Q_{other}}{\partial L_{other}}\right) = \frac{p_{other} 0.67 Q_{other}}{L_{other}} = w$$

$$p_{tourism}\left(\frac{\partial Q_{tourism}}{\partial K_{tourism}}\right) = \frac{p_{tourism} 0.33 Q_{tourism}}{K_{tourism}} = r_{tourism}$$

$$p_{other}\left(\frac{\partial Q_{other}}{\partial K_{other}}\right) = \frac{p_{other} 0.33 Q_{other}}{K_{other}} = r_{other}$$

If output prices, wages and capital inputs are given, these five equations can be used to solve for the two sector outputs, the two sector labor demands, and the rental rate (marginal value product) of capital in each sector. If tourist demand is exogenous, so is tourism output, and

only the first-order conditions are needed to obtain the tourism labor demand and rental rate on capital.

In this simple model, household income is the sum of labor value added and capital value added (or profits) accruing to each household group. The value added shares for each factor and household group can be calculated from Columns C and D in the SAM as:

Household	Factor Value-added shares	
	Labor	Capital
Poor	0.69	0.31
Rich	0.31	0.69

Thus, the incomes of the two household groups are:

$$Y_{poor} = 0.69w(L_{tourism} + L_{other}) + 0.31(r_{tourism}K_{tourism} + r_{other}K_{other})$$

$$Y_{rich} = 0.31w(L_{tourism} + L_{other}) + 0.69(r_{tourism}K_{tourism} + r_{other}K_{other})$$

Once we know incomes and prices, we can derive the consumption demands. Using the Cobb-Douglas form of the linear demand system and calculating budget shares from Columns E and F of the SAM, the household demands can be represented by:

$$X_{other}^{poor} = 0.91Y/p_{other}$$

$$X_{Rest\ of\ World}^{poor} = 0.09Y/p_{Rest\ of\ World}$$

$$X_{other}^{rich} = 0.31Y/p_{other}$$

$$X_{Rest\ of\ World}^{rich} = 0.69Y/p_{Rest\ of\ World}$$

$$X_{tourism}^{poor} = X_{tourism}^{rich} = 0$$

These are the core equations of this simple model, under the assumption of exogenous capital, prices and wages. If the price of "other" production is endogenous, then instead of fixing it in the model, we would add a market clearing constraint to determine the equilibrium output

and price. If the economy is at full employment, we free the wage and add a labor market-clearing constraint, which determines the market wage, given a total labor supply that is fixed.[6]

The equations in this simple base model can be solved by hand; however, for models involving more sectors, factors and households, some kind of nonlinear programming software is needed. GAMS (General Algebraic Modeling System) is a convenient and relatively easy to use package developed specifically for this purpose. Using GAMS to solve the base model, above, we reproduce the numbers in the original SAM:

$$Q_{tourism} = 100$$

$$Q_{other} = 260$$

$$L_{tourism} = 40$$

$$L_{other} = 90$$

$$Y_{poor} = 110$$

$$Y_{rich} = 85$$

$$X^{poor}_{tourism} = X^{rich}_{tourism} = 0$$

$$X^{poor}_{other} = 100$$

$$X^{poor}_{Rest\ of\ World} = 10$$

$$X^{rich}_{other} = 55$$

$$X^{rich}_{Rest\ of\ World} = 30$$

We can now use this simple model to simulate the impact of a $10 increase in tourism revenue on the economy under various market assumptions, using the base model saved in GAMS. Table 6 compares the CGE model results to the results of the single-island SAM

[6] A somewhat more elaborate approach would be to explicitly model the labor-leisure trade-off, such that the total labor supply could change along with the allocation of labor between activities. For simplicity, in this illustration we treat the total labor supply either as perfectly elastic (corresponding to a scenario of high unemployment in the project area) or perfectly inelastic, that is, fixed (full employment). The truth almost certainly lies somewhere in between. In impact evaluation studies, regardless of the approach used, it is always important to attempt to ascertain which end of this spectrum characterizes the study area's markets for labor and other goods, and where inelastic supplies are likely, to address them in the project design.

multiplier model, which for convenience are reproduced in Column A. Column B presents the tourism simulation results when all prices are exogenous, Column C, when the price of "other" goods is endogenous, and Column D, when both the price of "other" goods and the wage are endogenous.

From the table it is clear that a SAM multiplier model gives the most optimistic assessment of the impacts of the tourism increase on production and incomes in this economy. All of the increase in tourist spending translates into a real expansion of the economy. The CGE model with all prices exogenous (Column B) gives the least optimistic results. When prices are fixed, they cannot transmit the impacts of higher tourism demand to other sectors of the economy. It may seem curious that "other" output does not change in Column B, despite the fact that both tourism activities and household consumption demand output from this sector. However, in an open economy with exogenous prices, none of the first-order conditions for "other" production change when tourism demand increases. Any change in tourism or household demand for "other" output is satisfied through trade at prices set in outside markets.

When the price for "other" activities is endogenous (Column C), higher tourism and household demand pushes up the price (by 2.8%) and stimulates production in this sector. Now, the increase in production is similar to that in the SAM multiplier model ($14, compared with $16), and the impacts on household nominal incomes are slightly higher ($9.20 and $8 for poor and rich households, respectively). However, in real terms, households are hurt by higher prices for "other" goods.

We can use the island CGE model to estimate how much income would have to be transferred to each household group to leave it no better or worse off than they were prior to the increased tourism. The negative of the transfer represents a CGE analogue to a compensating variation (CV); however, it is different from a conventional CV by taking into account the economy-wide adjustments to the tourism shock. The bottom two rows in the table report this welfare measure. It is higher when the price of "other" goods is endogenous (Column A) than when none of the prices change (Column B). However, it is much higher in the multiplier model, in which there are no resource constraints on growth or price inflation to erode household purchasing power.

Table 6. A Comparison of SAM Multipliers and CGE-Simulated Impacts of a $10 Increase in Tourism

Outcome	Dollar Impact of 10% Increase in Tourist Demand			
	Model			
	SAM Multiplier	CGE		
		All Prices Exogenous	Endogenous Price of "Other"	Endogenous Wage
Production				
Tourism	10	10	10	10
Other	16	0	14	6,53
Labor Demand	9	4	11,5	0
Household Income				
Poor	8	3,2	9,2	12,93
Rich	6	2,8	8	11,31
Prices				
Labor (wage)	NA	0	0	12,10%
Other	NA	0	2,80%	16,20%
Household Walfare				
Poor	8	3,2	3,8	2,8
Rich	6	2,8	3,5	3,7

Column D reports the CGE model results when both the price of "other" production and wages are endogenous. This is a very restrictive scenario, because it fixes the total labor supply at the base level; that is, it assumes full employment of labor. Any increase in labor demand in this scenario translates into wage inflation. The economy adjusts by shifting to less labor-intensive activities in an effort to save labor when wages increase, but there is no change in total labor demand. Both the prices of "other" goods and wages increase sharply. Household incomes rise sharply in nominal terms, but the welfare effect on poor households, which spend the largest part of their income on "other" goods, is significantly smaller than in the other three scenarios. Rich households do relatively well, benefiting from higher profits while spending more of their income on imports, the price of which does not change.

Overall, the impact of the $10 increase in tourism on household income ranges from $6 in Model B to more than $20 in Models A and D. The CVs, which provide a more accurate

indicator of welfare impacts, range from 2.8 to 3.8 in the CGE models but are approximately double this in the SAM multiplier model, in which by assumption prices do not change.

4.5 How to Choose a Model

In light of these results, it is reasonable to ask what model is most appropriate to evaluate the impacts of tourism on a developing economy.

The answer is, "it depends." If the economy really is characterized by high unemployment and few resource or technological constraints (or if the project can effectively address these constraints), a SAM multiplier model might be appropriate. Otherwise, it is important to ascertain where the constraints on tourism-driven economic expansion in the economy might lie. If there are uncertainties about the latter, multiple models can provide useful brackets on the range of tourism impacts, as they do in Table 3. If the benefits of the project are imperiled by inelastic supplies of labor or other goods, this should be addressed explicitly in the project's design.

As the example above illustrates, two key questions that should be considered when choosing a simulation modeling framework are: How closely integrated is the project area with outside (e.g., national or even international) markets? And, how responsive are local businesses and households likely to be to increases in the demand for the goods/services they produce or the labor they supply? The answers to these questions undoubtedly will vary among sectors. For example, food might easily be brought into the project area (diminishing the multiplier effect of tourism on local food production) if markets are efficient, but other goods and services will always be nontradable (imagine house construction, restaurant meals, hotel stays and haircuts). Large differences between local prices and prices in outside markets for tradable goods can be a signal that markets are not working efficiently and that a SAM model (or CGE with high market transaction costs) is appropriate.[7] Similarly, low local wages compared to other parts of the country could signal an excess supply of local labor, consistent with a SAM model.

A middle ground between fixed-price SAM and CGE-based simulation models is to modify the SAM multiplier analysis by incorporating inelastic supply responses in some sectors. This requires knowing which, if any, sectors of the regional economy cannot increase their supplies of goods or services in response to changes in demand created by higher tourism. If

[7] High prices for tradables could also reflect well functioning markets but high transportation costs, which could favor local producers.

such sectors can be identified a priori, the method proposed by Lewis and Thorbecke (1992) can be used to perform this constrained multiplier analysis. If there is excess capacity in a sector but only up to a certain output level, beyond which new investments are needed, Parikh and Thorbeck's (1996) modification of the SAM multiplier model can be used.

In light of these considerations, a market analysis can be a useful component of tourism impact evaluation. So can a micro-enterprise study, to help determine whether and to what extent tourism or other activities in the region of interest have a limited ability to expand supplies in response to increases in local demand. Information from these kinds of ancillary studies is useful not only for constructing simulation models, but also for contemplating and designing measures to complement the tourism project or policy by addressing bottlenecks that can limit the spread of benefits in the project area.

4.6 Limitations of Simulation Models

Simulation models have become increasingly important for policy and project evaluation, particularly when impacts are complex, linkages among diverse economic actors are important, and experimental and econometric approaches are not feasible. As with any modeling approach, it is important to recognize the limitations of simulation models. Three types of limitations will be briefly discussed here: those related to data requirements, modeling assumptions, and confidence in simulation results.

4.6.1 Data Limitations

Compared with some other approaches, simulation methods entail heavy data demands. For example, a truly randomized experiment requires information only on the membership of the treatment and control group and the outcome of interest, and most econometric models require data on only a few key (dependent and explanatory) variables. A simulation approach, on the other hand, requires sufficient information to parameterize all of the equations in the model.

A SAM for the project area generally can be considered as the minimal data requirement for simulation modeling. No additional information is required for SAM multiplier-based models or CGE models with relatively simple functional forms (e.g., Cobb-Douglas production and household utility functions). More complicated functional forms (e.g., constant elasticity of substitution (CES) production functions or almost ideal demand systems (AIDS) to model household expenditures) include some parameters that cannot be obtained from the data in a

SAM. Often, however, more complicated functional forms do not result in appreciably different simulation results in CGE models, at least for relatively small income shocks.

Usually, surveys of visitors, businesses and households are required to construct a regional SAM. Sometimes input-output coefficients from existing SAMs (e.g., national ones) can be borrowed to construct some of the activity accounts in regional SAMs, if there is reason to think that the technologies used in local activities do not differ substantially from those reflected in the SAM that is available.

For our ex-ante analysis of the possible impacts of the Nicaragua Tourism Plan, limited time and funding made new surveys infeasible. However, some of the data needed to construct a SAM for the project region was available from a technical note published in 2009 by the Nicaraguan Tourism Satellite account (Cuenta Satélite de Turismo de Nicaragua-CSTN, 2009) and a 2000 SAM for the Nicaraguan economy provided to us by GTAP (Global Trade Analysis Project, also described in Sánchez, Cantillo and Vos (2005)). The rest (particularly household demands and income) were assembled from the 2005 EMNV (Encuesta Nacional de Hogares sobre Medición de Niveles de Vida (INEC, 2005)). Putting together this patchwork of data sources made it possible to obtain estimates of the approximate total impacts of changes in tourism and tourist expenditures in the project area. However, new data collection will be needed to make this SAM useful as a baseline to measure project impacts. The *ex post* evaluation plan thus calls for a new targeted survey of tourists, households and businesses in the project area prior to the Plan's implementation. The Galápagos, Bay Islands and Tela Bay studies all required new surveys, because data to create SAMs were not available. These surveys are discussed in the case studies, below.

4.6.2 Model Assumptions

Assumptions underpin all models. Experimental models assume randomized treatment and minimal control-group contamination. Econometric models assume functional forms and error distributions. Simulation models embody assumptions about functional forms as well as about how prices are determined (see above), commonly referred to as model closure.

Just as good experimental and econometric studies take care to spell out and, whenever possible, test their assumptions, simulation modelers can take steps to minimize the assumptions they have to make and to test the sensitivity of simulation results to these assumptions.

Many aggregate CGE and partial equilibrium modelers have to work with assumed parameters in their models' equations. It is not uncommon to encounter assumed elasticities or parameters borrowed from other models, often models of other countries. An advantage of working with micro survey data is that simulation model parameters can be calculated from data in SAMs or estimated using econometric methods. The bottom up calibration of simulation models goes a long way towards minimizing modeling assumptions while giving modelers more confidence in their results (see "Confidence of Simulation Results," below).

Whenever researchers are unsure about a parameter, functional form, or market-closure assumption in their model, it is important to test the robustness of their simulation results to these assumptions. If a parameter cannot be estimated with confidence, simulations can be repeated for a range of values the parameter could reasonably take on. Sensitivity analysis can also be performed for different forms of production or household demand functions, or as illustrated in Table 6, for different market closure assumptions. The results of these sensitivity analyses often can be used to establish reasonable bounds on the impacts of projects or policies simulated using the model.

4.6.3 Confidence in Simulation Results

A widely perceived advantage of experimental and econometric methods is that, when done properly, one can assign confidence bounds on coefficient estimates and model predictions. This is much more difficult to do for complex simulation models. Monte Carlo methods can be used to construct confidence intervals around simulation outcomes; however, it quickly becomes infeasible to do this the more complex the interactions and outcomes in the simulation model become, at least given the current state of our modeling technology. Sensitivity analysis (described above) can go a long way towards raising one's confidence in simulation results. So can the econometric estimation of model parameters using micro survey data. Even if confidence intervals cannot be constructed around simulation model results, they can be constructed around econometrically estimated parameters. These parameter confidence intervals can provide a basis for sensitivity analysis.

5. Data Requirements to Estimate a Tourism-Impact Simulation Model

As the example just given illustrates, the data requirements to simulate tourism project impacts using a micro CGE or a SAM multiplier approach are similar, and they may be identical, depending upon how production and consumption demands are modeled. In our simple example above, the same data were used to create the SAM and all three versions of the micro CGE.

The basic data input for micro economy-wide simulation models is a SAM, or for models with interacting regions and/or households, a SAM for each region and/or household group. A baseline SAM is needed in order to perform ex-ante analysis of tourism projects and also as a benchmark for *ex post* analysis. A second SAM, constructed with data gathered following the project's implementation, is required for *ex post* analysis.

The basic form of the SAM or SAMs should be sketched out before assessing data availability and determining the need to collect additional data, through surveys or other means. Existing data are used to fill in as much of the SAM as possible, and new data collected as part of the evaluation project are used to fill in the rest.

In the case of tourism impact evaluations, the SAM should include three critical components:

(1) A tourism component (one column for each category of tourist, e.g., international and domestic), which takes total expenditures by tourists in the project area and allocates them across activities inside and outside of the impact zone

(2) An activities component (one column for each activity in the impact zone), which takes the gross revenue of each activity (production sector) and allocates it to expenditures on:

a. Intermediate inputs produced in the project impact zone
b. Intermediate inputs obtained from markets outside the impact zone ("imports")
c. Factors of production: labor, capital, and others (if applicable)

(3) A household component (one row and column for each household group in the impact zone). The household rows collect value added (wages and profits) and income from other sources (e.g., government transfers), such that the row totals are total income for each household group. The columns allocate this income to household expenditures on goods and services supplied inside the project zone (activities rows, household

columns), goods and services obtained outside the project zone, and other expenditures, e.g., savings.

Often, tourism projects include spending by governments or by the project, itself, on local infrastructure or on other items. In this case, it is important for the SAM to include a column for government or project, which allocates the total budget across expenditures on locally produced goods and services (activities), factors (labor and capital), and imports. Government and/or project budgets should provide the data to fill in these accounts.

The following three sections discuss the collection of tourism, business and household data, respectively. Sampling theory does not give us a cut-and-dry method of determining optimal sample sizes for any of these surveys, given the large number of variables the survey data are used to calculate, the lack of *a priori* knowledge about the distribution of these variables in the population, and other considerations. In general, a sufficient sample size is needed such that when additional tourists, businesses or households are surveyed, the estimated accounts of the SAMs do not change significantly; that is, the SAM accounts converge to a relatively stable set of input-output coefficients. This might require oversampling some types of businesses, households, or even visitors. Sampling strategies are discussed in the context of each of the surveys, below.

5.1 Tourism Data

A survey of tourists, together with data on the total number of tourists visiting the project area in the previous year, are necessary to fill in the tourism columns of the SAM. Fortunately, tourist surveys are relatively simple to design and carry out, because expenditures by tourists tend to be concentrated in a few services (hotels, restaurants and bars, tours, recreational services, etc.) and because tourists usually leave the project area or country through a few designated points (e.g., ports or airports). For example, almost all tourists travel to and from the Galápagos Islands by air, and all day visitors from cruise ships return to their vessels through the dock before the whistle blows. We chose a random sample of flights and administered the Galápagos tourist survey to everyone on those flights while waiting in the departure lounge of the Baltra and San Cristobal airports. In the Bay Islands and Tela Bay projects, the survey was administered at airports as well as ports, and a separate (simpler) questionnaire was administered to day visitors

from cruise ships. With few exceptions, travelers were happy to fill in the survey forms, which were offered in multiple languages.

Tourist surveys ask about travelers' country of origin, number in party, length of trip, sites visited, the total per-person cost of the trip, and amounts spent by expenditure category (hotels, restaurants, etc.), on tour packages, airfare, etc. If tourists visit multiple sites of interest to the study, expenditure data can be gathered for each site (e.g., expenditures on each major island of the Bay Islands or Galápagos). The surveys also gather selected socio-demographic data about tourists, including education levels and incomes (by category). It is designed in such a way that tourists know that their participation in the survey is appreciated but optional, and that if a person does not feel comfortable answering a particular question (e.g., about income), s/he does not have to. The most sensitive questions should always appear at the end of the questionnaire.

Other questions may be included, depending on the project's goals. For example, the Bay Islands tourist survey included questions about visitors' willingness to pay for conservation of the reef, which is the Islands' primary attraction. Information from this component of the survey was instrumental in determining the visitor tax implemented as part of the Management Plan for the Islands. Appendix A provides a copy (in Spanish) of the tourist questionnaire from the Bay Islands project.

The expenditure data from the tourist survey are used to calculate the average tourist's expenditure shares on each good or service as well as the average total expenditure per tourist. The total number of tourists visiting the project area in the previous year is then used to blow this up to a column of annual totals.

If we were only interested in estimating average total expenditures per visitor, a large sample size would not be necessary for the tourist surveys. However, different types of tourists (domestic versus international, multi-day versus cruise ship) have different total spending as well as different patterns of spending across sectors (day tours, bars and restaurants, hotels, rental of cars and other items, souvenirs, etc.). A given project will generally affect different types of tourists differently. Because of this, it is usually a good idea to include a separate account (row and column) in the SAM for each tourist type, and it is critical to have a sufficiently large sample size to be able to identify the differences in total spending and spending patterns by tourist type, ideally on the order of 150 to 200 surveys per type. Given the importance of tourist spending

information for any tourism project analysis and the relative ease of interviewing tourists, it does not pay to skimp on sample size when it comes to tourist surveys.

Ideally, researchers can target different tourist types through a judicious choice of survey sites and times. For example, on the island of Roatan, two docks are used by international cruise ships, whose passengers are overwhelmingly international. One is used by ferries, whose passengers include many domestic travelers. At the airport, both international and domestic flights can be targeted to obtain information on a mix of international and domestic travelers. Official counts of passengers entering Roatan through each of these modes are available, and they can be used together with the survey results to calculate total tourist expenditures, by tourist type as well as spending category.

5.2 Data on Production Activities

To fill in the Activities columns of the SAM, information is needed on the gross revenue of each activity in the project impact area as well as input-output coefficients, or the shares of gross revenue spent on intermediate inputs supplied within the project area, wages, taxes, imports (that is, intermediate goods acquired outside the project area), and other items. In rare instances, an input-output matrix is already available for the project area. Otherwise, the impact evaluation must include a survey of businesses. An example of a business survey questionnaire (used in the Bay Islands tourism impact study) appears as Appendix B. It was designed to anticipate many different types of income and cost, as well as the seasonality common to tourism economies.

In the tourism impact studies in which I have participated, most businesses were willing to share information with project teams, particularly if they were aware that the project could benefit them. Occasionally, however, privacy or time considerations make some business owners unable or unwilling to participate in the full-fledged business survey. As project leader, I have met with these business owners and obtained the bare minimum of data needed to complete the SAM, assuring them of the anonymity of their responses. I have found that business owners generally know and are willing to divulge the shares of each dollar of gross revenue that go to pay wages and buy critical inputs inside and outside the project area. In most cases, they are also willing to reveal total annual sales, or gross revenue. With this information, it is generally possible to complete the activity accounts in the SAM.

It is always more reliable, particularly in the baseline model, to carry out a series of targeted surveys of multiple firms in each sector. An advantage of tourism activities is that they tend to have relatively linear and homogeneous technologies: tourists per berth or tour bus, cooks per meal, rooms per chambermaid, gear per diver, etc., do not vary a great deal from one establishment to another (although prices, and therefore input-output relationships in value terms, may). The more variable the relationships between inputs and outputs, the larger the business survey sample size need to be in order to reliably construct the activity accounts in the SAM.

If many businesses are household-firms, there will be an overlap between business and household surveys. In such cases, given the relative simplicity of many tourist-destination economies, it may be possible to reliably construct SAM activity accounts with 100 or fewer targeted business surveys. Business surveys are significantly more difficult and costly to administer than surveys of tourists, in part because of the high degree of seasonality in tourism activities, which must be explicitly addressed in the business questionnaire.

It should be emphasized that these surveys must not be limited to tourism-related businesses, but rather, must represent all types of businesses in the project area. Otherwise, indirect linkages between tourism and income growth in the economy cannot be estimated. Lists of businesses from chambers of commerce or other entities are helpful to provide a sampling frame for selecting businesses to survey.

5.3 Data on Households

The critical household data needed to construct a SAM include income from supplying labor or capital to production activities in the project area, other sources of income, and the shares of income or expenditures spent on individual goods and services inside and outside the study area. The correspondence between the activity accounts and the household expenditure categories is critical: For every category of household expenditures on locally supplied goods and services, there must be a corresponding sector in the activity accounts. Purchases outside the project area are lumped together as “imports” from the rest of the country outside the project area or the rest of the world. Savings and investments are allocated to a capital account (row). A corresponding capital (investment) column allocates investments to the demand for investment goods from inside and outside the project area, and it allocates savings to wherever the relevant financial

institution might be (usually outside the project area). If the households pay direct taxes, these are allocated by the household columns to the government row. If households receive government transfers, they appear as a payment by the government (column) to the household (row). Migrant remittances are transfers received by the household (row) from the rest of the world in which the family migrant works (column). The latter may be the rest of the country, in the case of internal migration, or rest of world, in the case of international migration.

Household surveys are the most difficult and costly of the three survey types needed to construct models for tourism impact analysis. This is particularly the case if households are heterogeneous, with multiple sources of income and varied expenditure patterns. In general, the more heterogeneous the household sector, the larger the sample size needed to reliably construct the household accounts in the SAM. The required sample size increases if separate SAMs are constructed for different household types or subregions of the economy of interest (e.g., islands of an archipelago). The tourism impact studies in Honduras and the Galápagos, discussed in detail below, required surveys of around 300 households, carefully distributed across islands (in the case of the Bay Islands and Galápagos studies) or villages (in the case of the Tela Bay project). Census information, if available, can provide a sampling frame for the household surveys. Lacking reliable census lists of households, in the Bay Islands project we used satellite images to select a sample of households, scattered across the three islands.

An example of a household survey carried out for tourism impact analysis appears (in Spanish) in Appendix C.

5.4 Other Data that May Be Needed to Carry Out the Tourism Impact Analysis

Data to construct government accounts usually are available from government agencies. Depending upon the government's role in carrying out the tourism project and the research interest in understanding the fiscal impacts of the project, it may be critical to include these accounts in the SAM. For example, a tourism project or policy might generate new tax revenue (e.g., from a tax paid by tourists or by tourism activities), which in turn might fund new projects in the region of interest. A concrete example is the environmental tax on day visitors from cruise ships in Roatán, Honduras, which is used to fund environmental and tourism-related projects conducted by ZOLITUR, a government agency on the island created for this purpose. The employment and income created by ZOLITUR's expenditures represents a potentially important

fiscal linkage from tourism. The Galápagos National Park (PNG) operates in a similar manner, in the sense that it collects entry fees and spends them in the local economy.

In the SAM, the row corresponding to government (or to a particular government agency, like ZOLITUR or the PNG) collects taxes and other revenue from tourists and/or activities (e.g., indirect taxes), factors (payroll taxes), and households (direct taxes). The column corresponding to the government account summarizes the government's demand for goods and services inside and outside the project area. Some studies include multiple accounts representing diverse public-sector actors, including municipal, state and federal governments, water agencies, the park service, and others. Data on revenues and expenditures of public agencies should be available from the agencies, themselves.

5.5 Deciding What to Simulate

A fundamental piece of information that is required to quantify the economy-wide impacts of tourism or a tourism-related project or policy is, of course, what to simulate. Two key questions arise when deciding what simulations to perform with the model. The first is whether the analysis is *ex ante* or *ex post*. The second is how to link a particular project or policy to changes in tourist flows and spending.

An *ex post* analysis has the advantage of being able to make use of actual changes in the numbers of tourists. This, combined with surveys of tourist expenditures before and after the project or policy change, makes it possible to estimate the total (direct plus indirect) benefits of observed changes in tourism for the economy of interest, using the economy-wide model. If the main interest is in knowing how tourism affects outcomes of interest (e.g., household incomes) at a site, then observed or hypothetical changes in tourist numbers and expenditures are the things to simulate.

But what if the question of interest is how a tourism project or policy might affect the outcome of interest, via its effect on tourism? In this case, an additional question needs to be answered: How does the project or policy affect tourist numbers or spending? In the case of the Galápagos (see case studies, below), it was clear what to simulate, because the critical tourism policy was the quota on visitors admitted to the islands; thus, the relationship between tourism policy and the number of tourists was straightforward. In other cases, it is more difficult to attribute changes in tourism to project interventions.

5.6 The Attribution Problem: How does the Project Affect Tourists' Behavior?

One of the most vexing problems in evaluating the impacts of projects on tourism benefits concerns attribution. Would the increase in tourism revenue and its impacts have happened without the project? How much value did the project really add to the economy?

There are many reasons why attribution is usually difficult to ascertain. A project's impacts are complex. They depend on how the program was implemented as well as how this translates into observed changes in tourism and tourist spending. In order to influence tourism, the project must do things that people can see and are aware of. Anticipated impacts may be long-term—well beyond the period covered by a project evaluation. Such was the case in the Bay Islands: Even if the Environmental Management Program did not produce an observable improvement in the quality of the reef in the short run, it may be successful if it arrests the degradation of the reef and produces sustainable tourism revenue over the long run. In this sense, the most one can hope for in a short-run study of program impacts is to capture some, but not all, of the benefits from the program.

Even in the Galápagos there was not a direct relationship between changes in tourist quotas and tourist spending, because the quality (that is, spending levels and patterns) of tourists changed. A comparison of tourist spending patterns between 1999 and 2005 reveals a shift in spending by both foreign and domestic tourists in favor of island-based activities. One cannot say with certainty that it was the quota that altered the quality of Galápagos visitors. However, the shift in favor of island-based activities almost certainly reflected the policy's focus on restricting quotas on cruise-ship berths but not on island hotel construction. There was also a shift in foreign tourist expenditures in favor of tour packages purchased abroad (increasingly via the internet). Between 1999 and 2005, the part of the average tourist budget spent on packages abroad increased 65%, from $1,271 to $2,098, while average total expenditures by foreign tourists increased from $3,677 to $4,180. These changes had far-reaching implications for economic growth in the Galápagos (Taylor, Hardner and Stewart, 2008).

Surveys of visitors can sometimes be used to help link particular policies to tourism outcomes. The 2010 update of the evaluation of the Bay Islands Environmental Management Program is a good example (see case study, below). A visitor survey was carried out in 2002 as part of the planning for Phase II of this Program. That survey, in addition to asking visitors about their spending on the islands, elicited the willingness to pay for programs to protect the Bay

Islands marine environment. This contingent valuation study was the basis for an environmental tax now paid by all day visitors from cruise ships and planned for collection at the Roatán Airport. It demonstrated a clear willingness to pay to protect the reef, implying that environmental protection is an important factor in tourists' decisions.

In September 2010, as part of the Phase II *ex post* evaluation, a novel contingent behavior approach was used to more directly test the relationship between the environmental program and tourists' decisions about visiting the Bay Islands.[8] Slightly less than one in four multi-day visitors interviewed had heard or read about the program. Of these, 45% of foreigners and 61% of Hondurans answered "Definitely Yes" or "Somewhat" to the question, "Did this program influence your decision to come to the Bay Islands?" The survey found that return tourism was important: 37% of foreigners and 67% of Honduran tourists reported that they had visited the Islands previously.

Visitors were asked how likely they were to return if the environmental programs continued and if they did not. An econometric analysis of responses to this question found that visitors were 21 times more likely to say "Likely" relative to one of the other responses if the program continued. They were 17 times more likely to give either a "Likely" or "Somewhat Likely" response. At the other extreme, they were 93% less likely to say "Unlikely."

Ex-ante analysis of projects can take many forms, depending on the project. In the 2002 Bay Islands project, the economy-wide model was used to estimate the value of the Bay Islands environment, in terms of the income it generated via tourism. The high present value of future economy-wide income flows from environment-based tourism underlined the importance of implementing the environmental protection program. In other cases, projections of a projects' effect on tourism are needed as an input for the ex-ante analysis to justify the project. Song and Witt (2000) present econometric methods to forecast tourism and the factors shaping it. The Ex-ante Analysis of Nicaragua's National Tourism Plan (see case studies, below) made use of econometric methods to model trends in tourist arrivals. The analysis showed that tourism had been increasing, though its growth rate had slowed in recent years. Predictions of future tourist flows using this model provide a "without project" or "business as usual" scenario. In the future, an *ex post* econometric analysis could test whether the trend indeed shifted up when the policy

[8] Although contingent valuation studies are common, contingent behavior studies are rare. A notable exception is Grijalva, et al.'s (2002) study of changes in rock climbers' behavior when policies restricted access to some sites in Texas.

was implemented. However, ex-ante, we lack the information to accurately predict the policy's impact on tourism. The modelers used the model to ask what would happen if the project succeeded in arresting the recent decline in the tourism growth rate, by expanding the project area's capacity to absorb visitors. Although still speculative, this approach is at least grounded in an analysis of actual tourism trends.

Our ex-ante analysis of the possible impacts of the project took this a step further, by asking how much the trend would have to increase in order to justify the cost of the project in an economy-wide cost-benefit analysis. Because of the large local economy-wide effects of tourism on incomes, the program would only have to increase the growth rate of total tourist expenditures by 0.41% (to 1.41%) under the recession scenario and 0.26% (to 4.26%) under the baseline scenario in order to be economically feasible at a 12% interest rate. Both of these growth rates are considerably lower than the increase in growth predicted by the econometric model.

In summary, the problem of attribution does not have a simple answer. It takes different forms in different projects, and it may not lend itself to rigorous statistical tests of cause and effect. Different projects are likely to call for different attribution strategies. Because of this, a strategy that attempts to ascertain the links between projects and observed outcomes should be included in the planning stage of any project. Moreover, it is imperative that project budgets include the resources needed for on-going data collection and monitoring of project impacts. Once projects have been carried out, the ability to test whether observed changes in tourism are attributable to specific project interventions is limited by whatever information happens to be available and/or can be collected *ex post* (e.g., through contingent behavior surveys like the one described above). The prospects for doing this in a very rigorous way are likely to be dim for projects involving a number of different types of interventions with little prior planning with regard to *ex post* attribution.

5.7 The Timing of Data Collection

Impact evaluation is an important component of new tourism-related projects and, as such, should be part of project budgets. A reliable *ex post* impact evaluation requires an integrated data collection effort in the short run, prior to the intervention, in order to establish a pre-project baseline, then a post-project follow-up round of data collection, using identical survey instruments. In each round of data collection, it is most efficient to carry out the different types

of data collection (from tourists, businesses, households) at the same time; typically, the same team of enumerators can be used for all three surveys.

If there is sufficient lead time and resources are available, both *ex ante* and *ex post* analysis can be carried out, each using simulation methods. The first can provide insights into the likely costs and benefits of a project, under various scenarios and with respect to specific project objectives. If such an analysis can be carried out in advance, it can be an ingredient for proposals and project design. A well constructed baseline model can not only simulate the likely benefits of a project, but also identify possible interventions that can make the project more likely to accomplish its specific goals, for example, raising incomes and employment for vulnerable population subgroups. The *ex post* analysis can also play multiple roles, evaluating the impacts of the project while possibly facilitating the design of future interventions to influence tourism and its effects on the welfare of various socioeconomic groups in the project area.

6. From Impact Evaluation to Cost-Benefit Analysis

The results of tourism impact simulations represent the direct plus indirect economic benefits of a program or policy that increases tourist revenues, given the assumptions implicit in the model. These benefits, appropriately discounted and summed up over the time horizon of interest, can be compared with the project or policy costs to obtain the net benefits of the project or policy, following standard cost-benefit accounting procedures. It should be emphasized, however, that conventional cost-benefit accounting does not capture all of the indirect benefits highlighted by simulations using economy-wide models. Cost-benefit analysis using simulation methods can be carried out either ex ante or *ex post*.

Calculating future benefits requires an assumed discount rate (12% is often used for IDB projects) and time horizon (e.g., 15 years). The growth in tourist spending with and without the project compounds over time. The formula for calculating the discounted net benefits of a project, relative to the baseline without the project, is:

$$NPV = \sum_{t=0}^{15} \left(\frac{Y_t^p - Y_t^{np}}{(1+r)^t} - I_t \right)$$

Where $Y_t^p (Y_t^{np})$ denote benefits with (without) the project, r is the discount rate, and I_t is the project cost in year t. Depending on the type of project being considered, it might be assumed that all project costs are incurred in the base year (t=0) but that it takes a certain amount of time (say, 5 years) for the benefits of the project to materialize; thus, $Y_t^p - Y_t^{np} = 0$ for years 1 through 5. The stream of discounted benefits beginning in year 6 can be compared with the cost of the project.

Table 7. Results of Cost-Benefit Analysis of Nicaragua National Tourism Program (thousands of córdobas)

Year	Project Costs	Net Discounted Benefits			
		Scenario			
		Pessimistic		Baseline	
		Without Project (1%)	Without Project (3%)	Without Project (4%)	Without Project (9,5%)
0	210,000				
1					
2					
3					
4					
5		65,606	217,093	303,785	933,541
6		59,163	199,648	282,086	912,703
7		53,352	183,605	261,937	892,330
8		48,112	168,851	243,227	872,412
9		43,387	155,283	225,854	852,939
10		39,126	142,805	209,721	833,900
11		35,285	131,329	194,741	815,286
12		31,818	120,776	180,831	797,088
13		28,693	111,071	167,915	779,295
14		25,875	102,146	155,921	761,900
15		23,333	93,937	144,783	744,894
Total	210,000	453,748	1,626,545	2,370,800	9,196,288
*Assumen discount rate:			12.00%		12,00%
Net Present Value of Project			962,797		6,615,488
Internal Rate of Return on Project			37.64%		71,89%
Tourism Growth Rate of Return			1,41%		4,26%

In a recent analysis of Nicaragua's National Tourism Program (NTP), the cost of the proposed project was US $10 million, or 210 million córdobas, assuming an exchange rate of 21 córdobas per dollar. Three different cost-benefit metrics were calculated, focusing on changes in gross regional product in the study area. They were the net present value (NPV) of the project, the internal rate of return (IRR), and the minimum increase in tourism growth (MITG) that would have to result from the project in order for it to be economically feasible.

The NPV is given by the above equation; it is the difference in the future discounted streams of income generated, directly and indirectly, by tourism with and without the project, minus the project cost. The IRR of the project is the interest rate (r) that solves the above equation for $NPV=0$. It represents the "break even" interest rate at which the project becomes

economically viable, or theoretically, the maximum interest rate the country would be willing to pay to have the project. The MITG is the increase in the tourism growth rate that would have to result from the project in order for the total discounted benefits to equal the project cost, assuming a discount rate of 12%. The simulated direct and indirect impacts using the economy-wide model provide the benefit estimates for this calculation.

The results of the cost-benefit analysis of the National Tourism Program appear in Table 7. Four scenarios were compared: A baseline growth rate of total tourist spending equal to 4%, a recession growth rate of 1%, and growth rates with the project of 9.5% (if on top of the baseline growth) and 4% (if on top of the recession growth rate). Under a growth rate with the program of 9.5%, the total net present value of the program is 6,615.5 million córdobas. Under the recession scenario it is 962.8 million. The internal rate of return is 71.9% if the project is implemented on top of baseline tourism growth and 37.6% if implemented on top of recession growth. Both are considerably higher than the 12% interest rate used for economic analysis at the IDB. In light of this high rate of return, the program would only have to increase the growth rate of total tourist expenditures by 0.41% (to 1.41%) under the recession scenario and 0.26% (to 4.26%) under the baseline scenario in order to be economically feasible at a 12% interest rate.

7. Extensions

Flexibility is an attractive feature of impact simulation models. The models proposed in these guidelines and the SAMs on which they are based can easily be extended to focus on specific outcomes of interest, socioeconomic groups, or post-intervention uses, including learn lessons about different types of approaches to tourism promotion. Models might vary depending on the type of project—some may be more interested in maintaining the natural resource base, others in generating employment for poor and unskilled workers, etc. The approach outlined above can be thought of as a basic model that can be extended to address particular concerns or circumstances. The first step in extending the basic model is to ask how the underlying SAM needs to be reconfigured to accomplish a particular objective.

In order to be useful, the SAM for the project area of interest needs to be comprehensive. This means that incomes and expenditures by all actors—production activities, factors, households, government, and other entities—in the project area must be counted in the SAM. Not all of these actors need to be represented explicitly in the SAM, however. Similar actors may be combined into larger accounts, provided that their behavior can reasonably be represented by that of an aggregate actor and they are not of particular interest individually to the project. For example, the SAM might include a "services" sector that is an aggregate of diverse activities, from grocery stores to photocopy shops, mechanics, phone-call centers and internet cafes. It generally would not make sense to include farmers or fishermen in this account, because their production activities are vastly different from those of service activities—as reflected in input-output coefficients and linkages with other sectors in the SAM. It also would not make sense to include hotels in this sector, even though they are a service activity, because they are of particular interest to tourism-project evaluation and a target of tourist expenditures. It would be more reasonable to allow hotels to have their own account in the SAM, or else combine them with other activities in which tourists spend their money: bars and restaurants, tour agencies, recreational rentals, souvenir shops. As these examples illustrate, the structure of the SAM reflects both the economic environment at the project site and the priorities of the impact analysis.

Factor and household accounts also must be comprehensive, in the sense that all factor incomes (wages and profits) need to be accounted for, they must be channeled into the households supplying labor and capital to production activities, and households must exhaust

their income on expenditures on goods and services, taxes, and savings. If there is interest in how value added from tourism and other activities gets distributed among factors (e.g., between wages and profits, or between wages for males and females, low and high skilled workers, etc.), the factors of interest need to be represented explicitly in the SAM. Similarly, the impact of tourism projects on the income of a particular household group (as opposed to total household income), such as poor households, can be estimated only if the household group is explicitly represented in the SAM. The SAMs constructed for each of the Galápagos Islands explicitly included fishing and agricultural households (along with three other household groups). On the factor side, they included family factors (important for fishing and farming), both high and low skilled wage labor, land, and physical capital. This detailed factor and household breakdown made it possible to examine questions related to the effects on different socio-economic and worker groups of creating fishing reserves, expanding tourist quotas, permitting migration by low-skilled workers, and even restricting the purchase of food from the mainland (which has been proposed as a way of reducing the risk that harmful species will be introduced into the fragile ecosystem). The SAMs for the Bay Islands included a disaggregation of households by ethnicity of household heads, which was critical to the goal of understanding how tourism affects different ethnic groups.

Once the SAM has been designed to reflect the economic reality of the project site and the goals of the project, the surveys need to be designed to ensure that the data needed to fill in the extended SAM are available. Larger and more complex SAMs may require larger survey samples to reliably fill in a larger number of SAM cells.

Given modern-day computer technology, a larger and more complex SAM is not likely to make a simulation model significantly more complicated. It will, however, make the analysis of project impacts richer, with a heightened focus on how impacts are distributed across activities, factors (e.g., workers), and household groups. This opens up the possibility of using the simulation model to test specific sets of hypotheses about not only the size of project impacts (e.g., the change in total income or welfare in the project area) but also how the project affects different segments of the population, including vulnerable groups. It also makes it possible to use the model as a tool to simulate alternative interventions to shape the distribution of project impacts, for example, training programs to bring new workers (from new household groups) into

the labor market, or microcredit programs to make firms more responsive to changes in demand created by a tourism project.

8. Three Applications of Micro Economy-wide Simulation Approaches

This section of the guidelines summarizes three projects that used simulation methods to evaluate the impacts of tourism or tourism projects. They include: (1) Impacts of tourism in Ecuador's Galápagos Islands; (2) Ex-ante analysis of a proposed tourism project in the Tela Bay area of Honduras; and (3) Valuation of the Bay Islands marine environment, as an input into a tourism-related environmental management program. Each includes a description of the year, the surveys carried out for the project, the approximate costs, a description of the project, the model, and the results of the analysis.

8.1 A SAM/CGE Study of the Impacts of Tourism in the Galápagos Islands

Year: 1999

Surveys: 514 tourists at the Baltra and San Cristóbal airports; 89 businesses and additional targeted surveys of cooperatives and government and environmental agencies; and 267 households on the islands of Santa Cruz, San Cristóbal, and Isabela. Additional information was collected from the National Park Service and all government and conservation agencies on the islands.

Approximate Cost: $85,000

Project Description: The Estudio Económico de Galápagos (EEG) was carried out for a project whose objective is to reverse environmental degradation trends in the Galápagos Islands through measures of environmental protection, regulation of fishing in the marine reserve zone, and strengthening of municipal and regional institutions. The government of Ecuador, in collaboration with the IDB, was preparing this project.

The central objective of the EEG was to provide a coherent frame of reference on the functioning of the Galápagos Island economy as a basis to analyze a variety of measures that might be proposed for environmental conservation, regulation of local economic activities, and institutional development. One of the specific goals of this study was to provide quantitative evidence on the likely evolution of the islands' principal activities (tourism, fishing, the public sector, agriculture and livestock) as a result of different regulatory actions, as well as the potential impact on migration to the islands. In light of the economic linkages on and among the islands, this implies a detailed study of the islands' economic activities separately as well as the inter-relations among them, including:

- Between domestic (mostly land-based) and international (largely ship-based, supposedly with little demand for locally supplied goods and services)
- Among the three principal islands (Santa Cruz, San Cristóbal, and Isabela), whose economies differ and are affected differently by both tourism and alternative regulatory actions.
- Within each of the islands, between urban and dispersed zones (zonas dispersas, in which the majority of agricultural households are found). Agricultural households play a critical role in the supply of consumption goods to island residents and tourists, and they are intimately connected to the environment. Their economic and environmental role might be promoted by pressures to limit the introduction of new damaging species to the island environment, via restrictions on agricultural and livestock imports.
- Between fishing and other activities, and within the fishing sector, among exploited species, commercial or illegal. The relationships among different types of fishing may be affected differently by different fishing regulations. Legislation distinguishes between artisanal and commercial fishing; however, it is evident that there are strong interrelationships between them (e.g., via the provision of labor) and between them and prohibited fishing activities. There are also linkages between fishing and some tourism activities; for example, some fishermen seek to transition from fishing to tour guides or diving instructors.
- Between water availability from diverse sources and other public services (e.g., energy). On some islands, the availability of public services could limit the expansion of economic activities. Inasmuch as there are various water sources, it is important to disaggregate the supply and demand of water by source to explore the impacts of changes in water supply by source might have on the supply of water in the local economy. This could help decide upon the eventual construction of costly sea-water treatment facilities.
- Between production factors, including between skilled and less skilled labor. In the past, increases in labor demand on the islands has been satisfied through migration. Given the central role of tourism, the rapid population growth on some of the islands has been linked to increases in ceilings on the number of tourists admitted to the Galápagos Islands each year. Based on environmental conservation worries, recent

legislation seeks to restrict migration to the islands. Migration controls impose restrictions on the local economy, limiting the supply of both skilled and less skilled labor. At the same time, it exerts upward pressure on wages, benefiting some island residents, adversely affecting island businesses, increasing pressures for new migration from the mainland, and thus possibly making the enforcement of the new migration law more difficult.

Model: A SAM was constructed for each of the three populated islands (Santa Cruz, San Cristobol and Isabela; see Taylor and Yúnez-Naude, 1999). The three SAMs were then integrated into a mega-SAM for the Galápagos Islands and used to calibrate a micro-CGE model for each of the three main islands and for the archipelago as a whole.

Results: This was the first use of SAM and CGE methods to quantify the economy-wide impacts of tourism, in the Galápagos Islands or elsewhere. Table 8 summarizes the simulated impacts of a 10% increase in tourism on the economies of the three islands using the CGE model, as reported in Taylor et al. (2003). Household incomes increase sharply, from 3.3% to 4.7%, on the main commercial island of Santa Cruz; less sharply (between around 1% and 1.5%) on the poorer and more isolated island of Isabela; and less sharply still (between around 0.5% and 1%) on San Cristobal, where public sector activities are concentrated. It is noteworthy that fishing households on Santa Cruz benefit the most from increased tourism, even though the tourist surveys revealed that tourists do not purchase fish directly from island fishermen. The simulations reveal that international tourists have a larger stimulative impact on island incomes than domestic tourism, even though most international tourist stay on cruise ships instead of in island hotels. The cruise ships are locally based, and wages paid to ship crews enter islands' households, which then spend this money on goods and services from local businesses. Understanding these indirect linkages solves the mystery of a vibrant economy even though international tourists spend only a small share of their budgets in hotels, restaurants, souvenir shops, and other island businesses.

Two versions of this model were used to explore the effects of tourism on migration, labor and wages. One version corresponds to an open-migration environment, in which additional migration is permitted to satisfy new labor demands on the islands. This was the case prior to the implementation of migration controls. The other version corresponds to the new legal environment, in which migration to the islands is restricted. As the table shows, in an open-

migration environment, the 10% increase in tourism increases migration by an amount equal to 5.02% of the existing island labor force. If this new migration is not allowed, island wages increase by 6.7% for lower skilled workers and by 9.2% for high skilled workers.

Table 8. Simulated impacts of a 10% increase in tourism in Ecuador's Galápagos Islands

	Island		
Variable	*Santa Cruz*	*San Cristobal*	*Isabela*
Household Real Income			
Agricultural	3.94	0.99	1.46
Fishing	4.69	0.93	1.52
Self Employed	3.47	0.85	0.98
Privated Salaried	3.84	0.49	1.43
Public Salaried	3.29	0.47	1.43
Net Imports from Rest of Ecuador	3.93	0.83	131
Migration	5.02	1.28	1.71
Wage Labor	5.72	1.51	1.57
Family Labor	4.83	1.21	1.76
Wage (without Migration)			
Silled Woekers	9.16	0.00	2.61
Unskilled Workers	6.72	2.75	2.67

Source: Taylor, et al. (2003).

8.2 A SAM for a Tourism Project in the Bahia de Tela, Honduras

Year: 2004

Surveys: Surveys of 320 tourists at the two commercial airports serving the Honduras north coast, the dock of La Ceiba, the Mayan ruins of Copán, the Rió Cangrejal (Cangrejal river), and Bay Islands; 247 households and 65 non-household businesses in the City of Tela and 17 smaller communities in the project area. Information on public revenues and expenditures were obtained from Tela government agencies and local governments.

Approximate Cost: US$98,000.

Project Description: Usually, tourism impact analyses are intended to study the effects of existing tourism on the zone of influence, with the intention of ascertaining the benefits and costs of increases in tourism that might occur as a result of a project being considered. In 2004 a project was carried out to estimate the possible impacts of a new eco-tourism resort on localities around the Bahia de Tela, Honduras. This was a fundamentally different sort of study, because at the time of the study the resort did not exist and ecotourism was limited.

Model: The study utilized a three-stage approach (Taylor, et al., 2004). First, a series of SAMs, one for each of the main localities in the project impact area, were constructed from surveys of businesses and households. Accounts for existing tourism were constructed based on visitor surveys carried out at the local airport and port, and government accounts were added by obtaining information on taxes and government spending in the project area. The locality SAMs, integrated into a "mega-SAM" for the project area, provided a socio-economic profile of the structure of the economies in the project area, which were little understood prior to this study. Projected budgets for the new resort, including wages, were then introduced into a hypothetical account (column) in the SAM. A micro-SAM multiplier analysis was used to estimate the economy-wide impact of the resort in the project area. A SAM rather than a CGE methodology was chosen because of the high unemployment in the project area and the region's easy access to labor markets in other parts of the country, both of which imply an elastic supply of labor to the project and linked activities. However, attention was given to the ability of local businesses to expand their production in response to increased local demand, as well as to the need to train local workers for jobs in the tourism industry. If obstacles to either of these exist, the SAM multiplier analysis will overstate the project's likely impacts, and measures to support local businesses (e.g., microcredit) and train workers will need to be included in the project.

Results: Tables 9a-b summarize the simulated impacts of the resort on the local economy, under two sets of assumptions concerning how wages will be distributed across localities. The first assumes that wage income will accrue to localities in proportion to their household populations. This would be the case if all localities had the same access to new jobs, almost certainly requiring targeted training programs. Currently, wage income is concentrated in the city of Tela. The second scenario assumes that wage income under the new tourism project will be distributed in the same way as existing wage income across the localities.

Table 9. Multiplier effects of a proposed eco-tourism resort in Tela Bay, Honduras

a. Direct effects of salaries paid by the proposed resort

Region	Distributon of wage income by region as a proportion of...	
	Household Population	Current wage income
La Costa	1,546,738	81,570
El Triunfo	2,541,926	95,991
La Carretera	4,583,260	778,547
La Compañía	1,366,885	215,767
La Laguna	1,333,911	49,792
Tella	19,508,081	29,659,133
Total	30,880,800	30,880,800

b. Total (direct plus indirect) effects of salaries paid by the proposed resort

Region	Distributon of wage income by region as a proportion of...	
	Household Population	Current wage income
La Costa	1,626,752	173,342
El Triunfo	2,792,609	222,911
La Carretera	5,164,120	1,119,827
La Compañía	1,338,144	211,231
La Laguna	1,674,095	124,319
Tella	24,726,146	35,690,981
Total	37,321,867	37,542,610

Under both scenarios, the total income generated by the project (over 37 million lempiras) is more than 20% higher than the wages paid by the ecotourism resort (30.88 million). The difference reflects economic activity in the project area that is stimulated by resort wages. Because Tela has a relatively open economy, in which most goods come from other parts of Honduras, many of the project's impacts leak out into the rest of the country, creating benefits there.

8.3 Valuing a Reef: Tourism Impacts in the Honduras Bay Islands

Year: 2002

Surveys: Visitors survey implemented at the Roatan airport, the port of Coxen Hole (Roatan), and hotels in Roatan and Utila, and surveys of 100 businesses and 315 households on the islands of Roatan, Guanaja and Utila. These were supplemented with information from 17 interviews with selected industry experts.

Approximate Cost: $109,000.

Project Description: The Economic Study of the Bay Islands (ESBI) was carried out in support of the second phase of the Environmental Management Program for the Bay Islands (EMPBI) funded by the Inter-American Development Bank (IDB; HO-0198). The EMPBI required a study to identify the economic structure of the Islands and the main factors behind the rapid population growth of the last decade.

The modeling and analysis had three major objectives:

(1) To provide a comprehensive diagnostic of how the Bay Islands economy works, including income linkages among production sectors, households, government, and outside markets, similar to what was done on the Galápagos Islands.

(2) To create economic instruments that could be used to facilitate the design of alternative environmental management projects and identify financing mechanisms.

(3) To explore and quantify the likely economic and fiscal impacts of changes in key economic activities, especially those related to the islands' unique marine ecosystems.

The Bay Islands, located approximately 50 kilometers from the North Atlantic coast of Honduras, are ringed by coral reefs of the Mesoamerican Barrier Reef System that are the foundation of a thriving tourist industry dedicated to diving and snorkeling. Tourism is one of three activities that dominate the economy of the archipelago. The other two are fishing and real estate. The Bay Island economy is less isolated than the Galápagos Islands'. It is relatively easy for workers to migrate from mainland Honduras to fill labor demands for tourism, real estate development and other activities. The United States and Europe are a source of entrepreneurship and capital for diving and other tourist activities. Nearly all of the goods consumed on the islands, with the exception of fish and water, are shipped in from the nearby mainland. Nearly all

buyers of island real estate and fish are foreigners. In short, the Bay Islands economy is intimately tied to national and global markets for goods, labor and capital.

Tourism, fishing, and real estate channel income into households and businesses of the three main islands of Roatán, Utila and Guanaja. Spending by these households and businesses, in turn, creates a demand for goods, services, and labor. Even though most goods come from off-island sources, many services and most workers are based on the islands. Through these services and workers, the impacts of tourism, fishing and real estate are transmitted to others on the islands, creating income multipliers. The islands' economic activities also generate income for mainland Honduras and for businesses in the United States, by demanding goods there, and they create tax revenue for the municipal and federal governments, as well.

Model: A SAM multiplier model was used to explore how a decrease in tourism, caused for example by a deterioration of the marine ecosystem, would affect the Bay Island economy. The Bay Islands' natural resources, particularly the coral reefs, form the foundation for most of the economic activities of the islands by supporting tourism, fishing, and most real estate business. The precise relationship between preserving the natural resource base and these three activities was not known prior to this study. Simulations with the model reveal the economic importance of the Bay Islands' reef-based activities, both directly and indirectly through the many income linkages in the economy.

Results: Table 10 reports estimated Bay Island economy-wide impacts of a conservative reduction of 10% in the influx of tourists, spread among the three tourist groups in the same proportion as their share of total tourist expenditures. Continued degradation of the natural resource base most likely would have a much larger-than-10-percent impact on the tourism industry, possibly with a catastrophic drop-off associated with declining diving opportunities. It also would adversely affect production in fisheries related to the coral reef and would reduce the demand for real estate. These last two effects were not included in the simulation, making it an even more conservative estimate of tourism's effects.

The left-hand column of the table reports the direct effects of a reduction of the 10% decrease in tourism receipts on the islands.[9] The sum of this column represents 10% of total annual tourist expenditures in the islands. The right-hand panel of the table presents total (direct

[9] Spread proportionately across the three tourist groups. that is, in proportion to the three tourist groups' shares of total tourist expenditures.

plus indirect) economy-wide impacts. It includes the effects of tourism on non-tourist activities, as a result of income and demand linkages on the islands. As a result of the 10 percent decrease in tourism, the Bay Islands' gross island product (GIP) would fall by an estimated US$3.1 million. Tax receipts would fall by $391,639, and the demand for goods from the rest of Honduras would decrease by $1.1 million each year.

Although it is difficult to imagine the Bay Islands without tourism, real estate development, or artisanal fishing, the SAM model can be used to estimate the full (direct plus indirect) contribution of each of these activities to total gross island product by simulating the island economy-wide impacts of the disappearance of revenues from these activities. Each would represent a huge shock for the island economy. For example, if tourism were to disappear from the Bay Island landscape, a large part of the Bay Island economy would disappear with it. On one hand, one might argue that economies adjust to large income shocks in ways that cannot be picked up by a model. On the other hand, it is not clear what other activities would compensate for lost tourism, real estate and fishing income in the Bay Islands. In modern times, these have been the raison d'être for human settlement on the islands. One could argue that, without these three key activities, other parts of the economy would dry up in ways that are not captured by the linkages in our model.

Table 10. Bay Islands Economy-wide Multiplier Effects of a 10% Decrease in Tourism Receipts

Sector	Impact of 10% Decrease in Tourism Receipts,çBay Islands (thousands of US$)	
	Direct	Total
Actividades:		
Agricualtura		-38,556
Ganadería		-151,884
Pesca Artesanal	-10.201	-237,367
Pesca Industrial		
Hoteles	-476,816	-486,578
Restaurantes	-500,165	-546,128
Buceo	-420,110	-420,110
Paquetes	-2,649,127	-2,649,127
Transporte	-238,306	-336,456
Construción		-136,242
Pulperías	-328	-295,824
Supermercados		-239,442
Gasolineras		-376,737
Tiendas Varias	-527,178	-1,054,638
Agua en Botella		-34,359
Otra Agua		-22,681
Empacadoras		-147,491
Electricidad		-161,472
Comunicaciones		-100,556
Bienes y Raices		-315
Factores:		
Trabajo		-1,021,567
Capital		-1,996,670
Renta		-93,448
PIB Total		-3,111,685

Table 11 presents estimated total contributions of tourism, real estate, and artisanal fishing to the Roatán Island economy in 2002. These estimates can only be obtained using economy-wide modeling techniques. Tourism accounts for an estimated US$25 million annually in value added, or 30 percent of the Roatán Island total gross island product. This is much higher than the direct payment of value-added by tourism services, reflecting substantial income linkages from tourism. The value-added attributable to real estate is estimated at US$9.3 million,

or 11 percent of gross island product. This figure does not include income from real estate transactions paid directly to island households, which would add another US$11.7 million to the total. Artisanal fishing generates, directly or indirectly, an estimated US$8.4 million annually in value added on Roatán Island, or 10 percent of the gross island product. Together, these three environment-sensitive activities generate, either directly or indirectly, an estimated US$42.8 million annually, or 52 percent of Roatán's gross island product. They also stimulate $19.1 million annually in demand for goods and services from the rest of Honduras (tourism, $10.8 million; real estate, $5.9 million; and artisanal fishing, $2.4 million).

Table 11. Estimated Total Contributions of Tourism, Real Estate and Artisanal Fishing to Roatán Island Gross Island Product

	Total Contribution to Gross Island Product	
Activity	Absolute (US Dollas Per Year	As % of GRoss Island Product
Tourism	25,051,800	30.1%
Real Estate	9,319,799	11.2%
Artesanal Fishing	8,430,071	10.1%
All Three Activities	42,801,670	51.5%
Total Gross Island Product	83,131,083	100.0%

These simulation results were folded into a conventional cost-benefit calculation of the present value of the Bay Islands' environment—that is, the (discounted) value of the stream of island economy-wide value added created by these three key environment-related activities. At a 5 percent interest rate and assuming a 30 year time horizon, the present economic value of the Bay Island environment, including its direct and indirect linkages with other island activities, equaled approximately US$657 million in 2002. This number does not include the income multipliers created by trade with the Bay Islands in the rest of Honduras or the nonuse values of the Bay Islands reef system.

A 2010 update of the Roatán island model (Cost: $75,000) documented sharp increases in tourism between 2002 and 2010 and, consequently, a significant increase in the present

economic value of the Roatán environment, to approximately $1.25 billion.[10] Because of the unexpectedly sharp increase in tourism between 2002 and 2010, this number is considerably higher than the 2002 valuation, which for the island of Roatán was $393.5 million. It is conservative, because it does not assume continued growth in tourism revenues. If tourism revenue continued to grow at the rate of the past eight years (7.81% annually), the value of the Roatán environment, in terms of the income generated by tourism, would rise to $3.45 billion.

[10] This calculation assumes a 5 percent discount rate and a 30 year time horizon.

9. Conclusions

Simulations using micro economy-wide models are valuable tools to estimate the possible impacts of tourism projects in local economies. Experimental methods usually are of limited use for tourism impact evaluation, because it is generally not feasible to create treatment and control groups, and market linkages transmit the impacts of tourist spending throughout the local economy. Econometric methods are of limited use for the same reasons in addition to data limitations, including the lack of detailed information before and after the arrival of tourists. Conventional cost-benefit studies, which focus on tourists and sometimes the businesses that sell goods and services to them, miss many, perhaps most, of the local economy-wide impacts of tourist expenditures. They may grossly understate the likely benefits of projects that increase tourist receipts in a project area.

The micro economy-wide approaches described and illustrated in this report are designed to capture both the direct and indirect economic impacts of tourism. The examples provided here, from the Galápagos Islands, Tela Bay and the Bay Islands, illustrate the far-reaching impacts of tourism in local economies, as well as the limitations of conventional approaches to measure these impacts. Simulations using micro economy-wide models reveal many influences that cannot be picked up using more traditional cost-benefit, experimental and econometric approaches.

When deciding which project evaluation method to use, it is important to consider both the costs and benefits of different analytical approaches. Experiments may be relatively simple and inexpensive to carry out for projects in which randomized treatment and control groups can be created and in which control-group contamination can be avoided or controlled for. However, as mentioned above, this generally is not the case for tourism projects. Econometric approaches require before-and-after data and/or instruments to control for endogenous treatment. If the required data are available, econometric impact analysis might be a relatively low-cost approach to evaluate the impacts of projects or policies. Outcomes of interest, e.g., household income, employment, or welfare, can be compared before and after the project or policy is implemented. Propensity score matching can be used as an econometric substitute for randomized experiments when treatments are endogenous. If the data to support econometric project evaluation methods are not available, they must be obtained through surveys. However, econometric approaches are likely to run into a fundamental timing problem: Before and after data are only available if the

project is actually implemented. If the objective of the study is to help determine whether or not the project ought to be implemented, an econometric or experimental approach thus may be infeasible. Moreover, if the project (or tourism, itself) potentially affects many or all individuals in the zone of influence, propensity score matching, like other experimental methods, will not be applicable, because it will not be possible to identify a treatment and control group.

Micro economy-wide simulations can be carried out at any time before, during or after the implementation of a project or arrival of tourists to the region of interest. A carefully designed simulation model can capture both the direct and indirect effects of tourism globally, as well as the effects on specific economic sectors or actors (e.g., households or regions). It can be used to quantify the likely impacts of a project that has not yet been implemented, provided that the project, itself can be simulated in the model. For example, in our example from the Tela Bay, the budget of the proposed ecotourism resort was incorporated as a hypothetical account in a SAM then used to simulate the impacts of the resort's operations on local incomes and employment.

Most of the costs of doing micro economy-wide simulations are associated with the collection of data to construct SAMs for the zone of influence that is of interest to the study. The costs of carrying out surveys of tourists, businesses and households, constructing SAMs, and then carrying out tourism or other simulations, usually are reasonable compared to size of project budgets. They averaged around $100,000 for the cases presented in this report. Moreover, most of the data needed to construct SAMs also would be needed to carry out an econometric-based project evaluation, if such an approach were, indeed, feasible. Thus, while offering substantial advantages in terms of timing and the analytical insights it can provide, the micro-economy-wide simulation approach is not likely to be significantly more expensive than other approaches. A cost-benefit calculation using a micro economy-wide approach is more likely than traditional cost-benefit analysis to justify projects in which many of the generated benefits are indirect. This is almost always the case for tourism and tourism development projects.

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Appendix A

Questions in Bay Islands Visitor Survey

Preguntas generales

1.) Fecha de llegada a Islas de la Bahía: _____/_____/_____

(día) (mes) (año)

2.) ¿Dónde originó su vuelo a Islas de la Bahía? _____

3.) Fecha de salida de Islas de la Bahía: _____/_____ /_____

(día) (mes) (año)

4.) ¿Cuántas personas están viajando en su grupo en este viaje? _____personas

5.) ¿Cuántas personas hay en su residencia?_____ personas

6.) ¿Cuál es su nacionalidad? (Por favor indicar su país de residencia si es diferente.)

Nacionalidad:_____

País de residencia (si es diferente):_____

7.) Es usted un residente de Honduras?

SÍ. ----------→ **Favor pase a la pregunta 11.**

NO. ---------→ Favor continúe con la pregunta 8.

8.) ¿Ha estado antes usted en Honduras?

NO. ---------→ **Favor pase a la pregunta 10.**

SÍ. ---------→ Favor continúe con la pregunta 9.

9.) ¿Ha estado antes usted en Islas de la Bahía?

NO. ---------→ Favor pase a la pregunta 10.

SÍ. ---------→ ¿Cuántas veces? _____veces

Favor continúe con la pregunta 10.

Sobre su experiencia y gastos en Islas de la Bahía

10.) Por favor señalar el cuadro con la frase que usted esté de acuerdo:

Las islas Islas de la Bahía son:

El factor decisivo de su viaje a Honduras. (Esto es, si usted no vendría a Honduras si las islas no estuvieran aquí.)

□ Una de las razones para su venida a Honduras. (Usted vendría a Honduras, aún cuando las islas no estuvieran aquí.)

□ No es realmente una razón importante para su venida a Honduras.

11.) ¿Cuál es su principal razón para visitar Islas de la Bahía? (seleccione una)

□Vacación y turismo

□Negocios e investigación

□Visitar amigos o familiares

□Otras (favor describirlas)_____

12.) ¿Son las islas Islas de la Bahía el destino principal de su viaje?

□ **SÍ.**

□ **NO.**

13.) ¿Está usted visitando las islas Islas de la Bahía como parte de un paquete turístico?

□ **NO**. ----------→ **Favor pase a la pregunta 15**.

□ **SÍ.** Favor continúe con la pregunta 14.

14.) Favor conteste las siguientes preguntas acerca de su paquete turístico.

- ¿Dónde compró su paquete turístico? _____
- ¿Cuánto costó su paquete turístico por persona? _____por persona

  En US $/lempira/otro (cual?) _____
- ¿Esto incluye el costo del vuelo desde su casa?

□ **SÍ.** ---------→ Aproximadamente cuanto es la porción del costo del pasaje aéreo en el costo del tour por persona? _____por persona

□ **NO.** ------→ ¿Cuánto por persona cuesta el vuelo redondo desde su lugar de origen? _____por persona

- ¿Aparte de Islas de la Bahía, su tour ha incluido otros destinos turísticos?

  □ **NO.**

  □ **SÍ.** ----→ ¿Cuáles?_____

  ¿Por cuántos días?_____días

  Si usted lo conoce, ¿cuánto más ha gastado por persona para visitar otras áreas en el Honduras?_____

- En general su visita a Islas de la Bahía ¿justificó el costo? □ **SÍ.** □ **NO.**
- ¿Usted recomendaría a sus amigos viajar a Islas de la Bahía? □ **SÍ.** □ **NO.** ¿Porqué?_____

15.) Favor conteste las siguientes preguntas sobre su viaje:

- ¿De qué ciudad o país usted ha salido para visitar el Honduras?

  _____

- ¿Cuál fue su sitio de arribo al Honduras? _____
- ¿Cuánto tiempo duró su viaje a Honduras?

  _____horas o _____días

- ¿Cuáles otros lugares en Honduras visita en este viaje?

  _____

- Aproximadamente ¿cuánto gastará en total para alojamiento, comida, recuerdos, etc., en estas otras partes del Honduras? _____
- ¿A qué ciudad o lugar usted irá cuando salga de Honduras?

  _____

- Si compró un crucero para visitar a Islas de la Bahía, ¿dónde lo compró? y ¿cuánto le costó por persona?_____

16.) ¿Fue Honduras su destino final?

□ **NO.** ---→ ¿Si usted conoce, cuánto costó para ir a Honduras?

_____por persona.

□ **SÍ.** ----→ ¿Cuánto ha costado su vuelo redondo a Honduras por persona?

_____por persona.

17.) ¿Cuántas noches usted ha pasado, durante su visita en las Islas de la Bahía?

¿En el Barco o Yate de crucero?_____ ¿En cuál embarcación? _____

¿En La isla de Roatán ?_____

¿En Utila ?_____

¿En Guanaja ?_____

¿Algún otro lugar? (favor indicarlo)_____

18.) A fin de ayudarnos a conocer el flujo de los desembolsos de los visitantes en la economía local, solicitamos a usted contestar las preguntas que se detallan a continuación. Si su visita fue arreglada con un paquete turístico, **incluya solamente aquellos gastos que no han sido cubiertos por el costo de su tour.** Por favor indique el monto en lempira o dólares.

Aproximadamente ¿cuánto en total, fuera del costo de su paquete turístico si lo compraría, gastó en su visita a las islas Islas de la Bahía? _____

Durante su estadía en Islas de la Bahía, usted visitó:

¿La isla de La isla de Roatán? □ SÍ □ NO

Mientras estuvo en La isla de Roatán, cuánto gastó en:

Hotel o alojamiento:_____en lempira/dólares

Alimentos y bebidas: _____

Artesanías o recuerdos:_____

Buzeo:_____

Botes/Tours (favor no incluya su paquete turístico):_____

Alquiler de equipos_____

Otros gastos (Favor descríbalos.):_____

¿La isla de Utila? □ SI □NO

Mientras estuvo en Utila, cuánto gastó en:

Hotel o alojamiento:_____en lempira/dólares

Alimentos y bebidas:_____

Artesanías o recuerdos:_____

Buzeo:_____

Botes/Tours (favor no incluya su paquete turístico):_____

Alquiler de equipos:_____

Otros gastos (Favor descríbalos.):_____

¿La isla de Guanaja? □SÍ □NO

Mientras estuvo en Guanaja, cuánto gastó en:

Hotel o alojamiento: _____en lempira/dólares

Alimentos y bebidas:_____

Artesanías o recuerdos:_____

Buzeo:_____

Botes/Tours (favor no incluya su paquete turístico):_____

Alquiler de equipos:_____

Otros gastos (Favor descríbalos.):_____

(Si sale por aire) Mientras usted estuvo en el aeropuerto, cuanto gastó en:

Artesanías o recuerdos:_____

Otros gastos (Favor descríbalos.):_____

Por favor use el espacio de abajo para cualquier comentario o explicación adicional.

Sus opiniones

19.) ¿Cuánto fue su tarifa de entrada al Parque?

□Yo estuve exonerado del pago de entrada al Parque.

□US $ 6 dólares americanos

□US $ 25 dólares americanos

□US $ 50 dólares americanos

□US $ 100 dólares americanos

□Otra cantidad: US $ _____

20.) ¿Es usted miembro de alguna organización ambientalista?

□ **SÍ.**

□ **NO**.

21.) Durante su estadía en Islas de la Bahía, ¿realizó alguna donación o contribución para cualquier causa ambiental, además de su pago por entrada al Parque?

□ **SÍ.** ¿Cuánto? _____ □ Lempira

□US $

¿Para qué causa?_____

□ **NO.**

22.) El aislamiento geográfico de Islas de la Bahía ha sido uno de los principales factores para la evolución de la flora y faunas endémicas de estas islas. Las características únicas de Islas de la Bahía han atraído muchos turistas a las islas y a fin de mantener el estado actual de los ecosistemas, cuidadosas prácticas de manejo necesitan ser fortalecidas y continuadas. Se ha considerado que la implementación de algunos programas de conservación, ayudarían a asegurar que el estado actual del medio ambiente insular sea preservado. Un camino para financiar estos programas de conservación es mediante el incremento de las tarifas de ingreso al Parque.

Recordando la experiencia que usted recientemente ha tenido, si la tarifa de entrada (y el costo total de su viaje) se incrementa en US $ _____ , usted ¿todavía realizaría este viaje?

□ **SÍ.** ----→Usted ¿todavía realizaría el viaje si la tarifa de ingreso al Parque se incrementa a US $ _____?

□ **SÍ. ----→ Favor pase a la pregunta 23.**

□ **NO**. --→ **Favor pase a la pregunta 23.**

□ **NO. ---→ Favor continúa a la pregunta B.**

Usted ¿todavía realizaría el viaje si la tarifa de ingreso al Parque se incrementa a US $ _____?

□ **SÍ. ----→ Favor pase a la pregunta 23.**

□ **NO**. --→ **Favor continúa a la pregunta C.**

Usted ¿todavía realizaría el viaje si la tarifa de ingreso se incrementa por 1 US$?

□ **SÍ. ----→ Favor pase a la pregunta 23.**

□ **NO**. --→ **Favor continúa a la pregunta D.**

Si usted contestó "NO" a la pregunta C, por favor explique el porqué:

□ No creo que la gente debería pagar más.

□ No vale más.

□ No tengo suficientes ingresos.

□ Otros (Por favor díganos.)

_____

23.) ¿Cuál de las siguientes categorías mejor describe su ocupación?

□Profesiónal o Gerente (incluye maestros y médicos)

□Técnica, Ventas, Apoyo administrativo (incluye técnicos, vendedores y secretarias)

□Empleados (incluye porteros, criadas, y meseros)

□Reparadores, Artesanos, Laboradores (incluye mecánicos)

□Agricultor o Pescador

□Estudiante

□Jubilado

□Otros (¿Qué?)

24.) ¿Cuál el mayor nivel de educación obtenido por usted?_____ Años **O** el mayor título académico alcanzado.

□Bachiller de escuela secundaria

□Licenciado

□Tecnológo o Técnico

□Título universitario (Ingeniería, Ciencias Sociales, Naturales, Económicas o Medicina).

□Maestría en Ciencias de Ingeniería, Sociales, Naturales o Económicas.

□Doctorado

25.) Para una mejor comprensión de los ingresos de los turistas a Islas de la Bahía, mucho apreciaremos contestar a la siguiente pregunta. Por favor, tomar en cuenta que esta encuesta es estrictamente ANÓNIMA.

¿Cuánto es su ingreso anual aproximado en dólares americanos?

□bajo $5,000 □$40,000 - $49,999

□ $5,000 - $9,999 □ $50,000 - $59,999

□ $10,000 - $14,999 □ $60,000 - $69,999

□ $15,000 - $19,999 □ $70,000 - $79,999

□ $20,000 - $24,999 □ $80,000 - $89,999

□ $25,000 - $29,999 □ $90,000 - $99,999

□ $30,000 - $34,999 □ más de $100,000

□ $35,000 - $39,999

Si usted ha estimado el equivalente en dólares, favor indique el valor del cambio usado_____.

GRACIAS POR SU AYUDA Y COOPERACIÓN CON NUESTRO ESTUDIO!

Si usted quisiera conocer más sobre nuestro estudio o los resultados, puede escribir su nombre y su dirección o su dirección electrónica en el espacio abajo.

Appendix B.

Business Questionnaire BAY ISLANDS ECONOMIC SURVEY

Name of Business: _____ Location: _____

Type of Business: _____

Name of Owner: _____Car Neg Mor Lat Gri

Income

High Season - Months are _____

Goods or Services Sold (Describe)	Total Revenue Per Month	Percent of Sales to…									
		Tur	Households					Bus	Gov	ROH	ROW
			Car	Neg	Mor	Lat	Gri				

Low Season - Months are _____

Goods or Services Sold (Describe)	Total Revenue Per Month	Percent of Sales to…									
		Tur	Households					Bus	Gov	ROH	ROW
			Car	Neg	Mor	Lat	Gri				

Other Income (e.g., rent of space to others, etc.)

Source of Income (Describe)	Total Per Month	Percent of Income from…									
		Tur	Households					Bus	Gov	ROH	ROW
			Car	Neg	Mor	Lat	Gri				

Do you have an operating permit? ____ yes _____no If yes, when was it issued? _____

Who issues it? _____ How long is it valid? _____

How much does it cost? _____ initial _____renewal

Expenses:

Salaries

Type of Employee (Managers, Drivers, Clerks, Cleaners, etc.)	Number Employed		Salary per Month		Commission (% if Applicable)		Benefits, Meals, etc. (Value per month)		Origin / Ethnicity of Employees (Car Neg Mor Lat Gri)
	high	low	high	low	high	low	high	low	

Variable Inputs

	Cost per wk/mo – high season	Cost per wk/mo – low season	Source of inputs	
			Direct from Producer %	Intermediary %
BI Produced (itemize):				
…Fish				
…Fruits and Vegetables				
…Meat				
…Other Local Goods:				
Rest of Honduras (don't have to itemize):				

Variable Inputs (continued)	Cost per wk/mo – high season	Cost per wk/mo – low season	Source of inputs	
			Direct from Producer %	Intermediary %
Rest of World (don't have to itemize):				

Other Inputs:	Cost per wk/mo – high season	Cost per wk/mo – low season	Where Purchased/Paid to… (%)		
			BI	ROH	ROW
Electricity					
Telephone					
Advertising					
Machinery					
Gasoline, Diesel					
Oil					
Taxes					
Insurance					
Water					
Provisions					
Other (what?)					

Do you Rent or Own the Property where this business is carried out?

□ Own When did you obtain the property? _____

What did you pay for it? _____

The person you bought it from is: Car Neg Mor Lat Gri

What is it worth today? _____

What is your monthly payment on this property? _____

□ Rent How long have you been renting the property? _____

Rent per month ? _____

The person you rent it from is: Car Neg Mor Lat Gri

Capital Inputs

	Cost – new £ / $	Current value £ / $	Useful Life	When purchased	Where purchased from
Boats					
Refrigerators					
Freezers					
Cars					
Pick-ups					
Large Trucks					
Heavy Machinery					

Capital Inputs (Continued)

	Cost – new £ / $	Current value £ / $	Useful Life	When purchased	Where purchased from
Rental Equipment (describe):					
Office Equipment:					
Computers, etc.					
…Furniture					
Other:					

Maintenance in the last 12 months

	Labor Cost	HH type	Cost of materials	Source of materials
Boats, Cars				
Equipment				

HH type = Car Neg Mor Lat Gri Source of materials = BI ROH ROW

Have you done any construction / new investment / renovation in the last 12 mos? If yes:

Project	Total Cost (essential!)	Labour costs	Source of Labor (BI, ROH)	Cost of materials	Source of materials (BI, ROH, ROW)	Transport costs

If applicable, note cost of permits, planning costs, etc.

Comments:

Appendix C.

CUESTIONARIO A HOGARES
ISLAS DE LA BAHÍA, HONDURAS

Cuestionario Número: _____, Fecha de la entrevista: _____

Nombre del Encuestador: _____.

Ubicación del lote, predio, edificio de departamentos o vivienda.

Isla _____ Municipio _____ Comunidad _____Barrio _____

No. de la vivienda, del lote o del predio en el mapa: _____

Dirección del lote, predio, edificio de departamentos o vivienda

_____

Si haya multiples hogares en este dirección >>>>

¿Cuántos hogares o departamentos hay en el lote, predio, edificio de departamentos o vivienda? _____

Nota al encuestador: si hay más de un hogar en el lote, predio, edificio de departamentos o vivienda, numerarlos y seleccionar sólo a uno de ellos
Número del hogar o departamento seleccionado _____

Nombre del Encuestado:_____

Nombre del Coordinador:_____ Nombre del digitador:_____; Fecha de captura:_____

Observaciones:

Grupo o tipo de hogar _____ Car Neg Mor Lat Gri

Introducción:
Estamos visitando a personas en las Islas de la Bahia, para elaborar un diagnóstico de la economía local.

Este diagnóstico se usara para un programa de desarrollo sustentable de las Islas, que tome en cuenta a todos los grupos en las islas: habitantes, pescadores, turistas, residentes temporales y empresarios.

Intentamos comprender como se gana la vida la gente aquí. Quisieramos hacerles algunas preguntas sobre sus ingresos y gastos para entender los flujos de dinero entre diferentes sectores.

Somos investigadores de varias universidades, de Honduras, de México, y de California, y nuestra contribución es proveer consejos y análisis a un proyecto local que se llama el Proyecto de Manejo Ambiental de las Islas de la Bahía (PMAIB), de las Naciones Unidas para el Desarrollo y el Banco Interamericano de Desarrollo (BID)

A. EL HOGAR O LA FAMILIA (INFORMACIÓN GENERAL)

1. Pedir la siguiente información sobre:

a) El jefe de la familia; b) La esposa, c) Los hijos; comenzando con el mayor y d) Otras personas que habitan en la casa.

Nombre	Parentesco al Jefe	Edad	Sexo F / M	Actividad Económica Principal	Lugar de Nacimiento	Años en esta isla	Años en Islas de la Bahia	Escolaridad Nivel y Grado*		Que Idiomas Habla?			De Estos, Cual es su Lengua Materna? (Ingles, Español, Garífuna u Otra)	Cuantos de los últimos 12 meses vivio con Uds.
										Ingles	Es-pañol	Gari-funa		
1	JEFE **HOGAR**													
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														

*(K) Kinder, (P) Primaria, (C) Colegio o Secundaria, (T) Escuela Técnica, (U) Universidad, (O) Otros, especifique: _____

B. MIGRACIÓN

B.1 ¿**En los últimos 10 años,** alguien del hogar migró a esta Isla, desde Tierra Firme o del Extranjero?

□ Si □ No

¿**En los últimos 10 años**, alguien del hogar migró a esta Isla, desde Otra Isla (Roatan, Guanaja, Utila)?

□ Si □ No

Nombre de los miembros del hogar que migraron a la isla	Lugar de residencia anterior (País, Departamento, Localidad)	Fecha de llegada	¿Cuál fue el motivo (trabajo, establecer negocio, visita)	Actividad(es) que desempeñaba en su lugar de origen los últimos 2 años	Cuántas lempiras ganaba antes de llegar a la Isla por (hrs-día, días-semana, etc.)	¿Con qué recursos migró? (propios, ayuda familiar, ambos, otro apoyo, especifique)	¿Cuánto dinero trajo?	Hasta cuándo piensa permanecer en la isla (año, siempre)
1				1. 2.				
2				1. 2.				
3				1. 2.				
4				1. 2.				

¿Ud. tiene hermano(s), padre(s), cuñado(s), o suegro(s), o hijos que viven FUERA DE LAS ISLAS?

□ ***Si*** □ ***No*** (detalles de remesas en la pagina 4)

Parentesco	Lugar donde viven	Años que llevan alla	Ellos Mandan dinero a Uds?	Uds Mandan dinero a ellos
				□ Si □ No

B.2. **SI MIGRO EN LOS ULTIMOS 10 ANOS, ¿DESPUÉS DE USTED VINO ALGÚN OTRO FAMILIAR O AMIGO MÁS?**

Si No

¿AYUDÓ USTED A ALGÚN FAMILIAR O AMIGO A MIGRAR A LA ISLA?

Si No

Nombre de las personas (parentesco)	Lugar de Residencia anterior del migrante	Fecha de llegada a las Islas	Monto de la ayuda (LE)	Permanece aún en la isla	Fecha de salida de la isla y motivo	Dónde radica actualmente (especifique)	Actividad que realiza	Actividad que realizó a la llegada
1	$							
2	$							
3	$							
4	$							

B.3. ¿*En los últimos 12 meses****, alguien del hogar emigró de la Isla a otra Isla, a tierra firme o al extranjero?***

Si (llenar el siguiente cuadro) No (Saltar este cuadro)

Nombre del miembro del hogar que emigró	¿A dónde emigró? (País, Departa-mento, Localidad)	Motivo de la emigración	Fecha de salida	¿Qué trabajo hace allá? (asalaridado y actividad, negocio propio y giro del negocio	¿Con qué recursos migraron? (propios, de la familia, ambos u otros)	¿Cuánto dinero se llevó?	¿Cuánto le costó el viaje?	Hasta cuándo piensa permanecer fuera de la isla (año, siempre)
1								
2								
3								

C*)* <u>TRABAJO</u>

C.1) TRABAJO FUERA DE LAS ISLAS DE LA BAHIA (En Honduras o Fuera de Honduras)

0. ¿Alguien en la pag. 1 trabajo *FUERA DE LAS ISLAS en los últimos 12 meses*?
   ☐ Si (llenar el siguiente cuadro) ***☐ No (Saltar este cuadro)***

¿Quién o quiénes? (Señale Nombre y quién vive aún fuera)	¿Dónde? País, Provincia, y Localidad	Actividad desempeñada fuera	Fecha:	¿Cuánto le costó el viaje?	Ayuda del migrante al hogar **(semana, mes o al año, señale)** en: ESPECIE	DINERO	Ayuda del hogar al migrante **(semana, mes o al año, señale)** en: ESPECIE	DINERO
1			DE: A:			$ $EU LEM		$ $EU LEM
2			DE: A:			$ $EU LEM		$ $EU LEM
3			DE: A:			$ $EU LEM		$ $EU LEM
4			DE: A:			$ $EU LEM		$ $EU LEM
5			DE: A:			$ $EU LEM		$ $EU LEM
6			DE: A:			$ $EU LEM		$ $EU LEM

C.2. Remesas de Migrantes

¿** En los últimos 12 meses**, envió alguna ayuda a algún familiar o amistad afuera de la Isla (referirse a la B.1 en página 3)?

¿** En los últimos 12 meses**, recibió alguna ayuda de algún familiar o amistad afuera de la Isla (referirse a B.1 en página 3)?

Nombre de las personas y relación (tipo de parentesco o amigo)	Lugar de residencia (País, Departamento, Localidad)	Ayuda del hogar (semana, mes o al año) ESPECIE (valor)	DINERO	Ayuda al hogar (semana, mes o al año) ESPECIE (valor)	DINERO
1			$ - £		$ - £
2			$ - £		$ - £
3			$ - £		$ - £
4			$ - £		$ - £
5			$ - £		$ - £

C.3 <u>TRABAJO ASALARIADO QUE DESEMPEÑAN EN LA ISLA</u>.

¿Algún miembro del hogar (pag. 1) trabajó por un salario y en esta ISLA *en los últimos 12 meses*?

□ Si (llenar el siguiente cuadro) ***□ No (Saltar este cuadro)***

NOTAS:

1) Se refiere al trabajo asalariado que desempeñan diario o por temporadas (ejemplos: empleado de oficina o domestica, recamarera, mesera(o)

2) De haber desempeñado más de un trabajo, iniciar por el más importante.

3) De haber hecho el mismo trabajo, pero en dos negocios distintos, separarlos.

4) Hay un cuadro aparte para la pesca industrial –

¿Quién? Nombre: ____

¿Qué trabajo hizo?	¿En qué localidad?	¿Cuántos dias al mes ocupo en este trabajo?	En que meses hizo este trabajo? (Esp meses)	Pago o Salario	Por tiempo: día, semana, mes, año	Propinas	Por: día, semana, mes, año	Hay Gastos en transporte u alimentos? Cuanto?	¿Cuánto logra llevar a casa?	Por tiempo: día, semana, mes, año

¿Quién? Nombre: ____

¿Qué trabajo hizo?	¿En qué localidad?	¿Cuántos dias al mes ocupo en este trabajo?	En que meses hizo este trabajo? (Esp meses)	Pago o Salario	Por tiempo: día, semana, mes, año	Propinas	Por: día, semana, mes, año	Hay Gastos en transporte u alimentos? Cuanto?	¿Cuánto logra llevar a casa?	Por tiempo: día, semana, mes, año

¿Quién? Nombre: ____

¿Qué trabajo hizo?	¿En qué localidad?	¿Cuántos dias al mes ocupo en este trabajo?	En que meses hizo este trabajo? (Esp meses)	Pago o Salario	Por tiempo: día, semana, mes, año	Propinas	Por: día, semana, mes, año	Hay Gastos en transporte u alimentos? Cuanto?	¿Cuánto logra llevar a casa?	Por tiempo: día, semana, mes, año

¿Quién? Nombre: ____

¿Qué trabajo hizo?	¿En qué localidad?	¿Cuántos dias al mes ocupo en este trabajo?	En que meses hizo este trabajo? (Esp meses)	Pago o Salario	Por tiempo: día, semana, mes, año	Propinas	Por: día, semana, mes, año	Hay Gastos en transporte u alimentos? Cuanto?	¿Cuánto logra llevar a casa?	Por tiempo: día, semana, mes, año

D-1: Trabajo en Pesca Industrial Nombre_____

				Captura promedio por viaje			Compensación promedio por viaje		
Tipo de Pesca	Número de viajes	Duración de viajes (en promedio)	En que meses	Máximo	Mínimo	Promedio	Pagos en salario	Porcentaje de la captura	Cantidad de compensacion
Langosta									
Camarones									
Caracoles									
Pesca de Alta Mar									

GASTOS: Usted tenia que comprar equipo para el viaje?

Descripción	Cantidad	Costo Inicial	Fecha de compra	Lugar de Compra, Reparación, o Mantenimiento	¿Cúanto valdría ahora?	¿Cúantos años en total puede durar?
Equipo de Buceo		£/$			£/$	
Anzuelos y lineas		£/$			£/$	
Cuchillos		£/$			£/$	
Garfio		£/$			£/$	
Otro (¿Qúe?)		£/$			£/$	
		£/$			£/$	
Comida		£/$				

No Comercial: ¿Cuanto les dan de la captura para compensación o su gasto? De esta cantidad – regalaron a otras familias? Vendieron?

Especies	Cantidad en Total		Consumo Familiar	Regalo	Ventas	
	Cantidad (lb)	Que valor tendria	Cantidad (lb)	Cantidad (lb)	Cantidad (lb)	Precio
Langosta						
Camaron						
Caracoles						
Pesca de Altura						

D-2: Trabajo en Pesca Industrial Nombre_____

				Captura promedio por viaje			Compensación promedio por viaje		
Tipo de Pesca	Número de viajes	Duración de viajes (en promedio)	En que meses	máximo	mínimo	Promedio	Pagos en salario	Porcentaje de la captura	Cantidad de compensacion
Langosta									
Camarones									
Caracoles									
Pesca de Alta Mar									

GASTOS: Usted tenia que comprar equipo para el viaje?

Descripción	Cantidad	Costo Inicial	Fecha de compra	Lugar de Compra, Reparación, o Mantenimiento	¿Cúanto valdría ahora?	¿Cúantos años en total puede durar?
Equipo de Buceo		£/$			£/$	
Anzuelos y lineas		£/$			£/$	
Cuchillos		£/$			£/$	
Garfio		£/$			£/$	
Otro (¿Qúe?)		£/$			£/$	
		£/$			£/$	
Comida		£/$				

No Comercial: ¿Cuanto les dan de la captura para compensación o su gasto? De esta cantidad – regalaron a otras familias? Vendieron?

Especies	Cantidad en Total		Consumo Familiar	Regalo	Ventas	
	Cantidad (lb)	Que valor tendria	Cantidad (lb)	Cantidad (lb)	Cantidad (lb)	Precio
Langosta						
Camaron						
Caracoles						
Pesca de Altura						

E) NEGOCIOS Y ACTIVIDADES: ACTIVIDADES ECONÓMICAS FAMILIARES distintas al trabajo asalariado

1. ¿ Ud. o algún miembro del hogar tuvo un actividad se auto-empleo *en los últimos 12 meses***?**
   ☐ ***Si*** ☐ ***No***

2. ¿Participó Ud. o algún miembro del hogar en alguna **actividad económica** aparte del trabajo asalariado? ☐ ***Si*** ☐ ***No***

Como renta de cuartos, guía de turistas, cocinar, enseñar o dar clases, costura, otros servicios,

Nombre de los miembros del hogar que participan en el negocio o actividad	Tipo de negocio o actividad	Ingresos de la actividad	Por Semana, mes, año	Que tipo de clientes – locales otro hondureños Extranjeros	Insumos a la actividad			Fuente de insumos:
								Isla, Honduras Extranjero

Si tiene un negocio, que queda aparte de la casa, o que tiene empleados, favor de usar la forma para Negocios

¿Alguien del hogar tuvo algún otro ingreso en los últimos 12 meses? ☐ ***No***

¿Cuánto?	¿De qué actividad?(Especifique)	¿Dónde la hizo?(Especifique)
$		

F) <u>PRODUCCIÓN DEL SOLAR</u>:

¿Tuvieron Uds. ***ÁRBOLES FRUTALES EN EL TRAS-PATIO en los últimos 12 meses?***

□ Si (cuadro1) □ No

¿Tuvieron Uds. ***ANIMALES EN EL TRAS-PATIO en los últimos 12 meses? □ Si (cuadro 2) □ No***

1. Producción de Frutales:

Tipo de plantas **FRUTALES**	Nª de Plantas	Período de producción	Producción			Ventas				Auto Consumo		Insumos			
			Cantidad y unidad		Por: día, sem., mes..	Cantidad y unidad		Precio	Donde	Cantidad	Valor Aprox.	Mano de Obra Pagado	De Donde	Químicos o Fertilizantes	De Donde
1.-															
2.-															
3.-															
4.-															
5.-															

2. Animales

Tipo de Animal p.ej Gallinas, Puercos, Ganado	Nº de Animales	Comprado en último año			Ventas			Auto Consumo		Insumos					
		Cantidad	Precio	Donde	Cantidad	Precio	Don-de	Canti-dad	Valor Aprox.	Mano de Obra Pagado	De Donde	Alimen-tos	De Donde	Medi-cinas	De Donde
1.-															
2.-															
3.-															
4.-															
5.-															

Ventas de Productos: Habia ventas de los productos de los animales? Como carne o huevos?

Ventas Cantidad	Ventas Unidad	Ventas precio	Ventas donde	Cada Tiempo – Semana o Mes	Meses del Año

G) OTROS INGRESOS Y EROGACIONES DEL HOGAR EN LOS ÚLTIMOS 12 MESES
(ingresos no salariales y préstamos para el hogar)

1. ¿Tuvieron Uds. algunos otros ingresos? ☐ ***Si (***¿qué?_____) ☐ ***No***

2. ¿Pidieron ( ) ó prestaron ( ) dinero? ☐ ***Si*** ☐ ***No***

¿Cuánto?	¿De dónde? Especifique	¿Para qué?
$		

3. ¿Pagaron ( ) y/o les pagaron ( ) algún préstamo? ☐ ***Si*** ☐ ***No***

¿Cuánto?	¿De dónde? Especifique	¿Para qué?
$		

4. ¿Ahorró dinero en los últimos 12 meses? ☐ ***Si*** ☐ ***No***

¿Cuánto?	¿De dónde? Especifique
$	

5.¿Sacaron Uds. dinero de sus ahorros en los últimos 12 meses? ☐ ***Si*** ☐ ***No***

¿Cuánto?	¿Dónde lo tiene? En la casa o en alguna institución (especifique)	¿Para qué lo saco?
$		

6. ¿***Compró Ud***, alguna propiedad o pertenencia (***terreno, casa, lancha, automóvil***) en los últimos 12 meses? ☐ ***Si*** ☐ ***No***

¿ ***Vendió Ud***, alguna propiedad o pertenencia (***terreno, casa, lancha, automóvil***) en los últimos 12 meses? ***Si*** ***No***

Descripción	Compró	Vendió	Fecha de compra o, venta	Precio	Forma de pago	Pago inicial	¿Cuánto paga al mes?	¿Cuándo termina de pagarlo?
				$		$	$	
				$		$	$	
				$		$	$	

7. ¿Recibió Ud. algún apoyo en dinero o en especie (medicina y alimentos), de Instituciones Públicas u Organismos Privados? ***Si*** ***No***

¿ Donó Ud. algún apoyo en dinero o en especie (medicina y alimentos) a otro individio, a Organismos Privados o a su Iglesia? ***Si*** ***No***

Recibió	Donó	En especie (especifique)	En dinero	Número de veces al año
			$	
			$	
			$	

8. ¿Compró o cobró algún Seguro en los últimos 12 meses?

Si (llenar cuadro) ***No (saltar cuadro)***

Tipo de Seguro	Compró el seguro	Cobró el seguro	Cantidad	¿En qué fecha?
			$	
			$	

H) GASTOS DE VIVIENDA Y OTROS GASTOS PARA LA CASA.

1. ¿Es propia la casa que habita? ☐ ***Si*** la están pagando? ☐ ***Si*** ☐ ***No*** Cuanto pagan?_____.. al mes o Al ano

¿Compró la casa en el año pasado? ☐ ***Si:*** ☐ ***No*** ¿Cuánto le costó? _____..

¿Dónde vive la persona que le vendió la casa?_____

Tienen titulo de su predio? ☐ *SI* ☐ *No*

Ha recibido titulo de la municipalidad despues del 1997? ☐ *Si* ☐ *No*

☐ ***No*** Renta mensual _____,

¿Dónde vive el dueño del hogar que Ud. renta?_____.

Si vive en la isla, es: Car Neg Mor Lat Gri

2. Tiene algun otro terreno, casa o propiedad?

Tipo de propiedad	Genera ingresos, como renta?	Hay gastos en mantenemiento, impuestos	Otros Gastos

3. ¿Construyó vivienda nueva o hizo mejoras o ampliaciones? ☐ ***Si (llenar cuadro)***

☐ ***No (saltar cuadro)***

Descripción Del tipo de trabajo	Materiales			Mano de Obra		
	Costo	$EU o Lempiras	Donde Compro	Costo	$EU o Lempiras	Donde Compro
Firma Constructora:						
Arquitectos:						
Planos:						
Costo Total de Mejoras, etc.						

I) <u>COSTO DEL AGUA</u>

Cuántos litros de agua consume:

TIPO DE AGUA	Cantidad (litros)	Por día o semana	Costo (Lempiras)	Por (especifique la cantidad)	¿Dónde compra o paga? (Supermercado, pulpería, vendedor ambulante, directo al productor)
Agua embotellada			$		
Salobre Municipio			$		
Agua lluvia (comprada)			$		
Agua lluvia (propia)			$		
Otros			$		

Deshechos y aguas negras

Que clase de baño tiene Ud. ☐ Letrina basica, ☐ Sanitario, ☐ Letrina sobre el mar ,

Tiene una fosa séptica?

Si no -a donde van las aguas del baño?_____

Si si tienen, cada cuanto bombean (vacían) la fosa séptica?

Cada ____ anos, o _____ veces por ano

¿Cuánto paga para vaciar la fosa?_____

J) BIENES PARA LA CASA QUE OBTUVIERON en los últimos 12 meses

Tipo de bienes	Comprado por la familia en los últimos 12 meses			Regalados por otras personas en los últimos 12 meses		
	¿Quién lo compró?	Precio	¿Dónde compró? Especifique	¿Por quién?	Valor	¿Dónde compró? Especifique
Para la Cocina:						
Cocina		$			$	
Microondas		$			$	
Refrigerador		$			$	
Ollas		$			$	
Licuadora		$			$	
Otros:		$			$	
		$			$	
Para el Resto de la Casa:						
Muebles		$			$	
Cama, colchones y sábanas		$			$	
Otros:		$			$	
Herramientas de trabajo para el hogar		$			$	
Bicicletas		$			$	
Otro:		$			$	

Tipo de bienes	Comprado por la familia en los últimos 12 meses			Regalados por otras personas en los últimos 12 meses		
	¿Quién lo compró?	Precio	¿Dónde compró? Especifique	¿Por quién?	Valor	¿Dónde compró? Especifique
Aparatos Eléctricos:						
Televisión		$			$	
Equipo de Sonido		$			$	
VHS		$			$	
Ventilador		$			$	
Lavadora		$			$	
Cámara Fotográfica		$			$	
Computadora		$			$	
Otros:		$			$	
Ropa:						
De hombre		$			$	
de mujer		$			$	
de niños		$			$	
Zapatos:						
de mujer		$			$	
de hombre		$			$	
de niños		$			$	

K) PRODUCTOS DE LAS ISLAS QUE CONSUMIAN

¿Cuantas veces por mes consumían Uds (durante *los últimos 12 meses...*)?
Consumen comidas **producidas aquí en las islas de la Bahia** – *de producción local*

Producto de la Isla	**Cuantas veces a la semana**	**Canti-dad/ vez**	**Uni-dad (libra)**	**Meses/ año**	**Canti-dad Propio**	**COMPRADO**					
						Vendedores Ambulantes		**Carniceria**		**Directo del Productor**	
						Veces /semana	**Costo /vez**	**Veces /semana**	**Costo /vez**	**Veces /semana**	**Costo /vez**
Pescado											
Langosta											
Caracol											
Camarón											
Carne de puerco											
Carne de res											
Frutas y legumbres											
Leña											
Iguana											
Otro											

Otros son cashews, guinea, cangrejo....

L) OTROS GASTOS REGULARES O PARA EL AÑO

¿Cuánto gastaban Uds. en cada uno de los siguientes durante los últimos 12 meses?

OJO: No incluyan gastos de productos locales ya enumerados en la página 19.

La numeración de página se refiere al cuestionario original.

Tipo de Gasto	**Monto del Gasto**	**Por: sem, mes, *año***	**Comentarios**
Compras y Comidas			
Pulperías	***$ $EU LEM***	***sem mes año***	
Supermercados	***$ $EU LEM***	***sem mes año***	
Restaurantes y bares	***$ $EU LEM***	***sem mes año***	
Automóvil Propio:			
Gasolineras	***$ $EU LEM***	***sem mes año***	
Reparaciones/servicio/refacciones	***$ $EU LEM***	***sem mes año***	
Seguro de automóvil	***$ $EU LEM***	***sem mes año***	
Pagos de préstamo de automóvil	***$ $EU LEM***	***sem mes año***	
Lancha Propia (no de pesca):			
Combustible	***$ $EU LEM***	***sem mes año***	
Reparaciones/servicio/refacciones	***$ $EU LEM***	***sem mes año***	
Seguro para lancha	***$ $EU LEM***	***sem mes año***	
Pagos de préstamo de lancha	***$ $EU LEM***	***sem mes año***	
Otro Transporte Local:			
Buses	***$ $EU LEM***	***sem mes año***	
(Water Taxis) Taxis de Agua	***$ $EU LEM***	***sem mes año***	
Taxis terrestres	***$ $EU LEM***	***sem mes año***	
Tipo de Gasto	**Monto del Gasto**	**Por: sem, mes, *año***	**Comentarios**
Viajes dentro de las islas de la Bahia:			
Pasajes de Yachte	***$ $EU LEM***	***sem mes año***	
Aviones	***$ $EU LEM***	***sem mes año***	
Hoteles y Comida	***$ $EU LEM***	***sem mes año***	
Viajes fuera de las islas de la Bahia:			
Pasajes de Yachte	***$ $EU LEM***	***sem mes año***	
Aviones	***$ $EU LEM***	***sem mes año***	
Hoteles y Comida	***$ $EU LEM***	***sem mes año***	
Luz, etc.			
Luz	***$ $EU LEM***	***sem mes año***	
Gas	***$ $EU LEM***	***sem mes año***	
Cable	***$ $EU LEM***	***sem mes año***	
Teléfono propio	***$ $EU LEM***	***sem mes año***	
Teléfono de caseta	***$ $EU LEM***	***sem mes año***	

Tipo de Gasto	**Monto del Gasto**	**Por: sem, mes, *año***	**Comentarios**
Impuestos (predial)	***$ $EU LEM***	***sem mes año***	
Salud			**¿Dónde está el doctor/la farmacia?**
Farmacias	***$ $EU LEM***	***sem mes año***	
Médicos	***$ $EU LEM***	***sem mes año***	
Dentistas	***$ $EU LEM***	***sem mes año***	
Otros gastos últimos 12 meses:	***$ $EU LEM***	***sem mes año***	
	$ $EU LEM	***sem mes año***	
¿Tiene Ud. algunos empleados domesticos (jardinero, limpiadora)?	***Salario***		¿Qué etnia tiene?
	$ $EU LEM	***sem mes año***	Car Neg Mor Lat Gri
	$ $EU LEM	***sem mes año***	Car Neg Mor Lat Gri
	$ $EU LEM	***sem mes año***	Car Neg Mor Lat Gri
	$ $EU LEM	***sem mes año***	Car Neg Mor Lat Gri

M) GASTO EN LA EDUCACIÓN DE LOS HIJOS

¿Tuvieron Uds. gastos de educación en los últimos 12 meses?

¿Quién? Nombre	¿Dónde Estudia? Especifique	Matrícula costo por		Materiales y útiles escolares costo por		Uniformes y zapatos costo por		Alojamiento costo por		Transporte Interno costo por		Otros gastos y Coopera-ciones
1		$		$		$						
2		$		$		$						
3		$		$		$						

N) FIESTAS Y CELEBRACIONES

¿Gastaron en Fiestas y celebraciones?

☐ Si ☐ No (Ya Terminó)

Celebración	***¿Cuánto Gastó?***	***¿Dónde lo gastó?***

COMENTARIOS ADICIONALES:

Appendix D

BAHÍA DE TELA, HONDURAS

MATRIZ DE CONTABILIDAD SOCIAL AGREGADO (miles de lempiras)

Cuenta		La Costa				El Triunfo/ Ensenada				La Carretera			
		Produc-ción	Facto-res	Hoga-res	Aho-rro	Producción	Fac-tores	Hogares	Ahorro	Produc-ción	Facto-res	Hoga-res	Aho-rro
BAHÍA DE TELA	Producción	12,091	0	16,745	5,001	0	0	0	0	0	0	786	0
	Factores	8,495	0	0	0	0	0	0	0	0	0	0	0
	Hogares	0	21,152	-103	0	0	0	0	0	0	0	0	0
	Ahorro	403	0	7,618	0	0	0	0	0	0	0	0	0
	Producción	0	0	0	0	14,461	0	32,535	5,023	0	0	197	0
	Factores	0	0	0	0	25,419	0	177	0	0	0	0	0
	Hogares	0	0	0	0	0	32,818	355	0	0	0	0	0
	Ahorro	0	0	0	0	147	0	12,632	0	0	0	0	0
	Producción	0	0	402	0	0	0	402	0	1,529	0	22,636	14,188
	Factores	0	0	0	0	0	0	0	0	21,093	0	134	0
	Hogares	0	0	0	0	0	0	0	0	0	62,731	516	0
	Ahorro	0	0	0	0	0	0	0	0	0	0	23,595	0
	Producción	0	0	0	0	0	0	0	0	0	0	0	0
	Factores	0	0	0	0	0	0	0	0	0	0	0	0
	Hogares	0	0	0	0	0	0	0	0	0	0	0	0
	Ahorro	0	0	0	0	0	0	0	0	0	0	0	0
	Producción	0	0	0	0	0	0	0	0	0	0	2,275	0
	Factores	0	0	0	0	0	0	0	0	0	0	0	0
	Hogares	0	0	0	0	0	0	0	0	0	0	0	0
	Ahorro	0	0	0	0	0	0	0	0	0	0	0	0
	Producción	23,748	0	24,950	2,692	39,268	0	42,147	3,594	30,919	0	33,928	6,704
	Factores	0	0	0	0	0	0	0	0	0	0	0	0
	Hogares	0	0	0	0	0	0	0	0	0	0	0	0
	Ahorro	0	0	0	0	0	0	0	0	0	0	0	0
RESTO DE HON-DURAS	Turismo Nacional	0	0	0	0	0	0	0	0	0	0	0	0
	Remesas internas	0	0	0	0	0	0	0	0	0	0	0	0
GOBIER- NO	Gobierno	95	0	-19	0	442	0	-73	0	120	0	326	0
	Otro RDH	2,471	0	818	306	1961.928	0	1584.232	1822.21	8659.801	0	1837.36	1913.1
RESTO DEL MUNDO	Turismo Extranjero	0	0	0	0	0	0	0	0	0	0	0	0
	Remesas Internacionales	0	0	0	0	0	0	0	0	0	0	0	0
	Otro RDM	2,634	0	564	23	0	0	2719.08	2340	6591.2	0	924	789.6
TOTALES		49,937	21,152	50,975	8,022	81,699	32,818	92,477	12,779	68,913	62,731	87,154	23,595

Cuenta		La Compañía				La Laguna				Tela			
		Producción	Factores	Hogares	Ahorro	Producción	Factores	Hogares	Ahorro	Producción	Factores	Hogares	Ahorro
BAHÍA DE TELA	Producción	0	0	804	0	0	0	10	0	1,647	0	4,047	0
	Factores	0	0	0	0	0	0	0	0	5,468	0	0	0
	Hogares	0	0	0	0	0	0	0	0	0	0	0	0
	Ahorro	0	0	0	0	0	0	0	0	0	0	0	0
	Producción	0	0	201	0	0	0	2	0	912	0	789	0
	Factores	0	0	0	0	0	0	0	0	3,261	0	0	0
	Hogares	0	0	0	0	0	0	0	0	0	0	1,770	0
	Ahorro	0	0	0	0	0	0	0	0	0	0	0	0
	Producción	0	0	402	0	0	0	766	0	4,448	0	322	0
	Factores	0	0	0	0	0	0	0	0	21,416	0	0	0
	Hogares	0	0	0	0	0	0	0	0	0	0	1,729	0
	Ahorro	0	0	0	0	0	0	0	0	0	0	0	0
	Producción	189	0	8,239	2,549	0	0	0	0	0	0	0	0
	Factores	2,470	0	0	0	0	0	0	0	2,522	0	0	0
	Hogares	0	42,464	0	0	0	0	0	0	0	0	0	0
	Ahorro	0	0	10,882	0	0	0	0	0	0	0	0	0
	Producción	0	0	2,275	0	8,464	0	11,399	2,496	1,821	0	0	0
	Factores	0	0	0	0	16,915	0	16	0	0	0	0	0
	Hogares	0	0	0	0	0	18,976	-5	0	0	0	0	0
	Ahorro	0	0	0	0	1	0	6,921	0	0	0	0	0
	Producción	4,706	0	19,904	3,924	13,407	0	5,067	1,171	228,636	0	494,752	144,669
	Factores	0	0	0	0	0	0	0	0	558,583	0	9,736	0
	Hogares	0	0	0	0	0	0	0	0	3,324	676,578	3,004	0
	Ahorro	0	0	803	0	0	0	0	0	16,440	0	274,562	0
RESTO DE HONDURAS	Turismo Nacional	0	0	0	0	0	0	0	0	0	0	0	0
	Remesas internas	0	0	0	0	0	0	0	0	0	0	0	0
GOBIERNO	Gobierno	4	0	5	0	10	0	10	0	16,052	0	4,149	0
	Otro RDH	3582.611378	0	5771.251	3989.57	8171.605	0	1454.86	3254.16	505,370	47,497	15,441	147,137
RESTO DEL MUNDO	Turismo Extranjero	100.812	0	0	0	0	0	0	0	0	0	0	0
	Remesas Internacionales	0	0	0	0	0	0	0	0	0	0	0	0
	Otro RDM	0	0	840	420	0	0	762.45	0	150,997	266	37,679	0
TOTALES		11,052	42,464	50,126	10,882	46,969	18,976	26,403	6,921	1,520,898	724,342	847,979	291,805

	Cuenta	RESTO DE HONDURAS			RESTO DEL MUNDO				
		Resto de Honduras				Resto del Mundo			
		Turismo Nacional	Remesas internas	Gobierno	Otro RH	Turismo Extranjero	Remesas internacionales	Otro RM	Ingreso no atribuido
BAHÍA DE TELA	Producción	1,896	0	2,741	3,785	386	0	0	0
	Factores	0	0	3,826	3,118	0	0	244	0
	Hogares	0	656	0	0	0	2,959	0	26,312
	Ahorro	0	0	0	0	0	0	0	0
	Producción	12,662	0	4,040	2,298	8,579	0	0	0
	Factores	0	0	3,039	831	0	0	92	0
	Hogares	0	236	0	0	0	17,185	0	40,114
	Ahorro	0	0	0	0	0	0	0	0
	Producción	0	0	0	23,819	0	0	0	0
	Factores	0	0	20,047	40	0	0	0	0
	Hogares	0	6,758	0	0	0	8,584	0	6,836
	Ahorro	0	0	0	0	0	0	0	0
	Producción	0	0	0	75	0	0	0	0
	Factores	0	33,925	2,761	786	0	0	0	0
	Hogares	0	1,560	0	0	0	6,102	0	0
	Ahorro	0	0	0	0	0	0	0	0
	Producción	8,410	0	1,609	8,220	0	0	0	0
	Factores	0	0	1,461	585	0	0	0	0
	Hogares	0	567	0	0	0	6,769	0	95
	Ahorro	0	0	0	0	0	0	0	0
	Producción	54,719	0	53,595	235,907	52,492	0	0	0
	Factores	0	0	133,898	22,124	0	0	0	0
	Hogares	0	21,945	0	0	0	143,128	0	0
	Ahorro	0	0	0	0	0	0	0	0
RESTO DE HONDURAS	Turismo Nacional	0	0	0	77,687	0	0	0	
	Remesas internas	0	0	0	65,647	0	0	0	
GOBIERNO	Gobierno	0	0	0	205,895	0	0	0	0
	Otro RDH	0	0	0	0	0	0	0	
RESTO DEL MUNDO	Turismo Extranjero	0	0	0	0	0	0	61,355	
	Remesas Internacionales	0	0	0	0	0	0	184,727	
	Otro RDM	0	0	0	112,226	0	0	0	
TOTALES		77,687	65,647	227,016	763,043	61,456	184,727	246,418	73,357