Economic Impacts of Visitor Spending In Protected Areas in Developing Countries

A Tourism Economic Model for Protected Areas (TEMPA)

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Summary

Well governed and effectively managed protected areas, including national parks, are a proven method for safeguarding both habitats and populations of species and for delivering important ecosystem services[1]. Researchers estimate that global gross direct expenditure associated with visits to protected areas is approximately $600 billion/year worldwide.[2] If managed well, parks that attract tourists can also benefit local communities through visitor spending on accommodation, transport, goods and services during their visit, indirect supply-chain spending, economic activity induced by the presence of the park, and park operations themselves. However, in the absence of tools or metrics for quantifying tourism-related economic benefits, the true value of nature-based tourism and its relative importance can be overlooked. Conversely, careful measurement and clear display of information regarding the benefits of tourism expenditure for the local and national economy can help build the case for improvements in infrastructure for the park and surrounding area.

As part of a larger effort to assess the socio-economic impacts of GEF-funded Protected Areas, the Tourism Economic Model for Protected Areas (TEMPA) was developed to help guide project managers and others in the collection, analysis and display of tourism spending data using a simple spreadsheet-based tool, which is also provided. Despite de fact economic impact analysis has been applied in many countries, such as, USA, Canada, Australia, Finland, Namibia, and South Africa, this preliminary version of the tool and accompanying spreadsheet represents an initial step in a longer process of testing and refining TEMPA in a wide range of protected area categories globally. At present, the TEMPA has been tested only in one park in Southern Africa, and nationally for Brazil. Results show significant direct and indirect economic gains from parks at the local and national level. It is hoped that the widespread use of tools such as TEMPA can continue to build from this effort to highlight the important multi-faceted role that protected areas play in supporting nature and livelihoods.

A note on definitions

In this report, we use the terms “protected area,” “National park,” and “park” interchangeably. Officially, however, protected areas – defined as “A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” include several management categories including National park. National park is defined as “Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.”[3]

Introduction

In the early 21st century, protected areas, including national parks, are the main way by which an increasingly urban human population (3.7 billion) can connect with nature[4]. Protected areas receive more than 8 billion visits globally every year, with an overall economic value of US$ 600 billion[5]. In order to arrest the 6th extinction[6], it will be necessary to protect up to half the Earth's terrestrial surface area[7]. By the end of this century human population is projected to reach 11.2 billion[8] , with the greatest increases taking place in tropical developing countries, especially in Africa[9]. This will place extreme pressures on parks, many of which are located on marginal lands.

Highly successful parks, including those located in the United States, are often based on socio-economic gain and public accountability[10] . Parks that integrate local people as stakeholders have been shown to be more effective at achieving both biological conservation and socioeconomic development outcomes[11] [12].Consequently, precisely measuring the economic value and other values of parks (nationally, and in their local gateway communities), strengthens the case for nature conservation.

Agencies that manage national parks are accustomed to producing *financial* reports which deal with direct income and costs (including gate fees, concessions, resource royalties, etc.). However, this perspective fails to consider the wider *economic* effects of parks, including their monetary value and the employment they generate for regional economies,[13] which often amounts to many times the direct costs of running the park.

Parks provide value in many forms, including ecosystem services, biodiversity conservation, human enjoyment, and conventional activity. This manual and associated tools measures only the latter; the contribution of parks to national and local economies through visitor spending on accommodation, transport, goods and services during their visit, indirect supply-chain spending, economic activity induced by the presence of the park, and park operations themselves.[14] Narrow financial analyses significantly under-value parks in the eyes of decision-makers, businesses, the media and the general public, compared to the larger economy stimulated by tourism expenditure. To estimate the full value of parks and to raise greater public support, several countries have begun conducting economic analyses of wider park-related spending. These include Brazil,[15] the USA,[16] , Canada,[17] Australia,[18], Finland,[19] Namibia,[20] and South Africa.[21]

The STAP project "*Guidance on the Socio-Economic Impacts of Protected Areas*", presents two sets of tools for estimating the economic impact of park-based tourism and highlights the wider value of parks.

- **Tool 1:** A "Tourism Economic Model for Protected Areas (TEMPA)" uses a spreadsheet model to combine basic information on tourism numbers, expenditure and economic multipliers to estimate economic impact. The spreadsheet model is based on the Money Generation Model (MGM2), a system used by the US National Parks Service (NPS)[22]. It is modified to address the particular issues of developing countries and also to include country-specific multipliers, where available.

- **Tool 2:** A set of tourism and park business surveys provides bottom-up methods for assessing much the same information as TEMPA so are useful for cross-checking data. This tool takes longer to use but provides much more detailed information on visitor lodges, employment, the size and nature of local businesses, etc.

This manual describes the first tool - Tourism Economic Model for Protected Areas (TEMPA). This manual will help managers and consultants design a study for a specific park, gather the right information, and present the results. It:

- describes how to collect data to use the model;
- provides several sample survey instruments;
- explains how to use the spreadsheet and analyze the results; and
- outlines how to present and explain the results effectively.

The manual was designed to be used with different levels of information, depending on the budget, time, and capacity constraints that a park manager may face. Two case studies, one of a single park (South Luangwa National Park, Zambia, **Appendix A**), and another of a park network (Federal System of Protected Areas of Brazil, **Appendix B**) are presented to illustrate how the methodology can be applied.

TEMPA is limited to market values that can be easily measured and understood. It does not account for the value of ecosystem services, or for non-market benefits including option values and existence values[23] or for consumer surplus.

Economic multipliers

Visitors spend money in parks and gateway communities. This money cycles through the economy 'multiplying' the effects of the initial expenditure.[24] Visitor spending includes both direct "effects" (i.e. income, jobs, value added, taxes, etc.) as well as indirect and induced effects (i.e. multiplier effects):

- **Direct effects** are the first level visitor spending on businesses that sell directly to visitors (e.g., lodges, campgrounds, restaurants, grocery stores, etc.), plus sales to visitors by other businesses such as vegetables or crafts that are produced in the vicinity of the park.[25]

- **Indirect effects** are second (and third, etc.) level spending where lodges and tourism businesses buy goods and services from other businesses within the local region.[26]

- **Induced effects** are second (and third, etc.) level spending which occurs when the staff employed by lodges and tourism staff spend their wages and salaries locally. For example, when a lodge manager spends his or her salary on meals, gas, hardware, etc., this supports additional jobs in non-tourism businesses, and creates additional rounds of local spending across a broad range of economic sectors[27].

The total effect of visitor spending equals the sum of direct, indirect, and induced effects.[28] The secondary effect is the sum of the indirect plus the induced effects. Measuring and adding up these values can be complicated. Fortunately, they are captured by economic input-output models. These reflect the effects of spending by consumers and producers through regional economic multipliers.[29]

Multipliers are ratios by which direct effects are multiplied to give secondary or total effects. Multiplier values commonly range between 1.5 and 3.0, though may also fall outside these margins. The size of a multiplier is affected by the amount of *leakage* from the economy, which is the rate at which money brought into a region is lost through the purchase of imports. If there is little leakage, and most of the money circulates repeatedly through the economy, multipliers are high. If the money immediately leaves the local economy to buy inputs from elsewhere, multipliers are low. Small variations in multiplier values therefore lead to large variations in total effects estimates. Multiplier ratios are relatively imprecise so estimates of total or secondary effects should not be interpreted with the same level of precision as direct effects.

Estimating the economic effects of visitor expenditure

The basic calculations for calculating the economic effects of visitor expenditure are presented in this simple equation:[30] [31]

Economic Effects = Number of Visitors * Average spending per visitor * Economic multipliers

To complete the analysis, the researcher undertaking a park study needs to collect or estimate the following:

1. the **number of visitors** who visit the parks and surrounding area;
2. the **average spending** per visitor in the region, and;
3. apply **economic multipliers** to measure the ripple effects of expenditure within the region.

The TEMPA tool is a spreadsheet into which this data can be entered. This will be described in detail below.

Depending on available resources and the degree of accuracy desired, the study can obtain this data at three levels of rigor:

1. Subjective estimates of the variables made by expert judgment.
2. Secondary, or existing data, or economic models.
3. Primary, or original data, can be collected, and in such a way that each of the variables will be represented by actual measurements.

A decision box **(Table 1)** illustrates how the three levels of rigor apply to each of the three input variables. The number of visitors is the most important piece of information, followed by visitor spending, and finally, economic multipliers[32] [33]. If resource constraints apply, managers should focus on reliable visitor numbers first and have confidence in expenditure estimates. Sector-specific generic multipliers may then be found on the accompanying spreadsheet.

Table 1: Decision box for selecting the appropriate level of information and rigor (adapted from Stynes *et al.*, 2000).

	Number of Visitors	Visitor Spending	Economic Multipliers	
Level 1	Estimate	Estimation based on judgment	Level 1a) Generic *aggregate* multipliers from studies of similar areas	
			Level 1b) Generic *sector-specific* multipliers from studies of similar areas	
Level 2	Total count (e.g. using gate records)	Secondary data from similar area or market (total or segmented)	Use an economic input-output model to calculate regional multipliers	Use the TEMPA spreadsheet model: Country and sector-specific multipliers generically downscaled to sub-national regions
Level 3	Segmented count (e.g. from records of air arrivals vs. ground arrivals, foreign vs. domestic visitors, etc.)	Survey of visitor spending	Survey-based approach to measure indirect and induced effects	

Variable 1: Number of Visitors

1. Estimate

For parks without controlled entrances and records of visitation, the number of visitors must be estimated. Estimates can be less elaborate if a fast evaluation is necessary, or more detailed in the case of a park with many entrances and large amounts of visitors. To learn more about estimation and public use measurement see Hornback and Eagles (1999).[34]

2. Total count:

Most park agencies collect visitation data; however, this data is not usually collected for the purpose of economic analysis. Agencies normally measure visits as entries to a park and do not differentiate between entries and unique individual visitors (i.e. when a single person makes multiple entries over a number of days) or between single visitors and those arriving in groups/parties. Because of these particularities, managers may need to adjust visitor entry data to arrive at the proper unit, which should correspond to the unit of measurement for the visitor spending data. The most common units for spending are *per visitor per day/night* [35] or *per party per day/night*. [36]

3. Segmented count:

Different types of visitors have different patterns. To reduce sample variance, it is best to count the number of visitors in each segment (i.e. treated as separate samples). Segmentation can be done on the basis of visitor origin (local or non-local), duration of stay (day trip or overnight stay), mode of arrival (air or ground), type of accommodation (camping, staying family/friends, budget accommodation, luxury accommodation, etc.), or

any other basis that is likely to affect spending patterns, and for which the annual numbers of visitors in each category can be determined.[37]

Variable 2: Visitor Spending

Visitor expenditures are the primary link between tourism activity and local economies. The quality of the study therefore is directly related to the reliability of the visitor spending data. Collection of this information should be guided by the accuracy desired and the resources available.[38]

1. Estimate spending profiles based on judgment:

Estimating visitor spending usually requires listing the services and goods that visitors typically purchase and pricing these components.[39] One may assume a certain average nightly rate for accommodation, and the average cost of a day's worth of meals, shopping, transportation, etc. It is also possible to use estimates of visitor spending to calculate what a theoretical future park could earn, to assess whether it is a good investment.

2. Secondary data from a similar area or market:

The second option is to use visitor spending profiles found in reports or literature for similar parks in similar regions and to assume that your visitor expenditures are comparable.

3. Survey of visitor spending:

The most reliable method of estimating expenditures is to directly survey visitors.[40] [41] Surveys can be conducted through in-person interviews at sites within or near to the park (e.g. local transportation hubs), or by distributing questionnaires that can be dropped off or returned by using pre-paid mail. It may also be possible to collect data remotely if e-mail addresses or phone numbers are obtained from visitors.

However, because visitors in certain markets are more likely to have purchased their trip as a package in which other destinations are bundled together into a single price by a travel agent, they may not be aware of the costs of the park portion of their trip. If this is the case, it may be necessary to conduct a survey of tourism businesses (see the section on the survey-based approach to improving the accuracy of multiplier estimates, below). Whatever the approach, it is important to test the survey strategy before investing in it fully.[42]

Variable 3: Economic Multipliers

This section describes different options for obtaining the appropriate multipliers depending on available resources for the study.

Input-Output Matrix are used to calculate multipliers. Input-output (I-O) matrices (and extended forms called "social accounting matrices") are models usually produced by government agencies that describe in a quantitative way the interactions between producers and consumers in a specific region and therefore provide more accurate estimates of secondary economic effects than the use of generic multipliers. For references on I-O methodology see Miller and Blair.[43] To find I-O tables for a specific country or region, the International Input-Output Association (https://www.iioa.org/io-data/io-data.html) and the

Eora MRIO database from Australia (http://www.worldmrio.com) provides a list of database resources.

1. Generic multipliers from similar studies or areas:

The use of generic multipliers was one of the first approaches used by the US National Parks Service (NPS)[44] and is still used in other countries, such as Finland.[45] "Generic" refers to the use of multipliers developed from a specific area, and then applied to a different area possessing similar attributes, or the averaging of multipliers from different areas. As such, they are less reliable than multipliers developed from a specific area, though may be more available.

There are two options for park managers in using generic multipliers.

a) Aggregate Multipliers

The first option, if other sources of economic data are lacking, is to use a set of aggregate multipliers as Stynes[46] describes for parks in the United States. As is evidenced in **Table 2**, parks that are located in rural areas tend to have higher job multipliers and lower economic multipliers than parks in more densely settled economic areas. This is mainly because goods will need to be imported into the area so the multipliers will occur where these goods are produced, rather than locally. After undertaking a large number of studies, Stynes *et al.*, (2010)[47] provided some generic guidance for calculating multipliers for direct economic effects of developed economies:

> "To derive direct effect, multiply total visitor spending by .8. For [output] multipliers, use 1.2 for small rural areas, 1.4 for larger rural areas, 1.5 for moderate size communities, and 1.7 for state or metro area analyses. To convert to full-time equivalent jobs and to income, national tourism average ratios for direct effects could be used (i.e., 20 jobs per $1 million in [output] or 16 jobs per $1 million of visitor spending). The income ratio is approximately 35% relative to [output] and 28% relative to spending. These ratios are averages. They will vary by sector, and job ratios are higher in rural areas and smaller in large metro regions." (in Crompton, 2010)[48].

b) Sector Specific Multipliers

The second option is to use sector-specific generic multipliers. Due to the complexities associated with computing multipliers, this requires some background in the methods of input-output matrices. Park and recreation professionals are not expected to possess this technical background, so a spreadsheet model has been developed to enable them to do this (see below). This spreadsheet includes generic multipliers.

So far, the model provides five set of multipliers that the user can select between (over time, this will be added to). To set the correct multipliers in the spreadsheet, the user needs to select:

(1) the type of country (s)he is working in and
(2) the relevant regional scale based on the size of the study area.

Because of the way TEMPA is constructed, the accuracy of multiplier effects estimates will usually be greatest at larger geographic scales (e.g. it is more accurate at regional or national

levels than immediately at the park level). Though TEMPA provides estimates of effects at smaller scales (e.g. rural localities), the default spreadsheet settings at these scales are conservative and will tend to underestimate economic values. With experience and expertise, survey-based approaches can be used to improve accuracy of multiplier estimates.

Table 2: Attributes of the generic regions (Stynes *et al*., 2000).

Rural Areas Rural communities with low population density (below 10,000) where economic development is limited. Production multipliers are low but job multipliers are higher than average.
Small Metro Areas Larger rural areas with population between 10,001 and 50,000. Production multipliers are low to medium and job multipliers are medium to high.
Larger Metro Area Moderate Size Communities with total population between 50,001 and 500,000. Production multipliers are medium to high and job multipliers are medium to low.
State or Province State or Metro regions with populations of 500,000 and above. Production multipliers are high and job multipliers are low.
National Multipliers National Multipliers consider the entire country. Production multipliers are high and job multipliers are low.

Data Collection

Running the TEMPA model requires data on tourism numbers and expenditure in each category of tourism. Data collection methods, including example questionnaires, and spreadsheets for analyzing this data are described in a sister manual for understanding a park using bottom-up data collection.

The spreadsheet model

The TEMPA spreadsheet model assists the manager with entering data and calculating the economic impact of a park. Setting up the calculations to estimate the economic effects of tourism expenditure may seem rather daunting, especially to people with little experience in economics and the analysis of economic data. Therefore, this manual comes with a spreadsheet model that will do most of the work for you, and is likely to surprise you with how easy it is to use. This model consists of five worksheets.

The **first worksheet** ("Welcome"), provides managers with a brief orientation on entering the data.

The **second worksheet** ("MAIN"), uses colored cells to indicate where data should be entered. There are five sets of data to enter:

1. A basic description of the park and its visitors. Entering the (type of) country and definition of the area in which the park is situated will link appropriate multipliers to the model[49],
2. A description of the different segments (kinds) of visitors using the park, and their numbers,
3. A breakdown of the expenditure of each kind of visitor,
4. Selection of the appropriate multiplier. The spreadsheet provides generic multipliers, but more specific multipliers can be used if available. In general, the gain from this compared to the amount of work may not be worthwhile
5. Information on taxes. This is relatively simple but important, because governments are seldom aware of how much tax parks generate.

The **third worksheet** allows the user to view the information in graph and pie chart format.

The **fourth worksheet** "SUMMARY" presents the final (which is formatted for printing).

The **fifth worksheet** ("MULTIPLIERS) is the engine room of the model. It is hiden on the spreadsheet. It is not necessary to fully understand this worksheet; however, it enables the analyst to examine the details of the calculations if needed. Nothing should be altered on this worksheet[50].

Collecting the data

As noted, there are five sets of data needed for the model.

1. Study area

This section is self-explanatory. The only real expertise required here is defining the character of the region in terms of whether it is rural, small metro, larger metro, or urban (see **Table 2**).

2. Visitor numbers and segments

Before entering data into the spreadsheet, it is necessary to first define the different kinds of visitors visiting the park. This is important because the various activities that they undertake, and therefore their different expenditure patterns, have a strong bearing on the economic calculation. For example, international visitors who fly in to high-end lodges have a very different holiday experience and spending profile to people visiting the park on overland trucks or to 4x4 travelers who are camping. When (1) defining visitor segments, it is necessary to be able to (2) count or estimate the numbers of visitor in each segment and (3) survey or estimate the daily expenditure of visitors in each segment.

2. Visitor spending

If this is the first time that the economic value of tourism is being assessed for a specific park, it is recommended that a visitor spending survey is conducted. This is a relatively simple process, and can also be used to collect additional data, such as tourism satisfaction. In general, the suggested sample size is 50-100 visitors in each segment. Examples of simple tourism expenditure surveys are provided in **Appendix A Questionnaire 1** and in the Brazilian case study (**Appendix B**). The questionnaire has several sections.

- **Visitor profile:** The first section establishes where a visitor is from. If a decision has been made to exclude locals from the survey, then the first question can be used to determine if it is appropriate to proceed with the questions. Additional questions in the first section also establish the purpose of a visitor's trip. This information may be useful for clarifying how important the park is in the decision of visitors to visit the area. The remaining questions on mode of transport and place of stay help to determine in what segment to place the respondent.

- **Packaged expenditures:** The second section, on packaged expenditures, is only appropriate for those visitors who purchased their trip through a travel agent and are unaware of how much was spent on their behalf in the local area. Expenditures reported in this section should not be entered in the spreadsheet model, but may be summarized separately in order to characterize the nature of the local tourism market.

- **Itemized park-related expenditures:** The third section relates to categorized expenditures. Here, the respondent may wish to report only their own spending, or the spending of their entire travel group, if it is known. What is important is that the number of people that the reported expenditures represent is recorded and that it is consistent for all categories. The "all-inclusive" category refers to tourism businesses that bundle accommodation, meals, tours and/or other items together in a single price. The other categories are self-explanatory.

Again, this survey questionnaire is meant only as an example and not all visitor spending surveys need to be structured the same way.

3. Tax rates

The tax income from tourism highlights the direct importance of a park in funding the government and social services. Taxes and other compulsory payments that apply directly to tourism spending or income include sales tax, value added tax (VAT), corporate tax, taxes on employee wages or salaries, and certain non-wage benefits including contributions to health or pension plans. These taxes may be levied at the national, provincial, or even local level, and may vary depending on the category of spending.

If the various taxes or rates are not known, local businesses may be consulted to obtain a list of taxes paid and their rates. Some taxes may vary on the types of services offered even within a single category of spending, or may be applied on a sliding scale (such as with taxes on income).

Some taxes, like those on company profit, cannot be estimated by the spreadsheet model which does not differentiate profit from other value-added components.

Although travel visas are a form of taxation on tourism, this is not handled by the model because foreign visitors may have reasons for entering the country other than visiting the park.

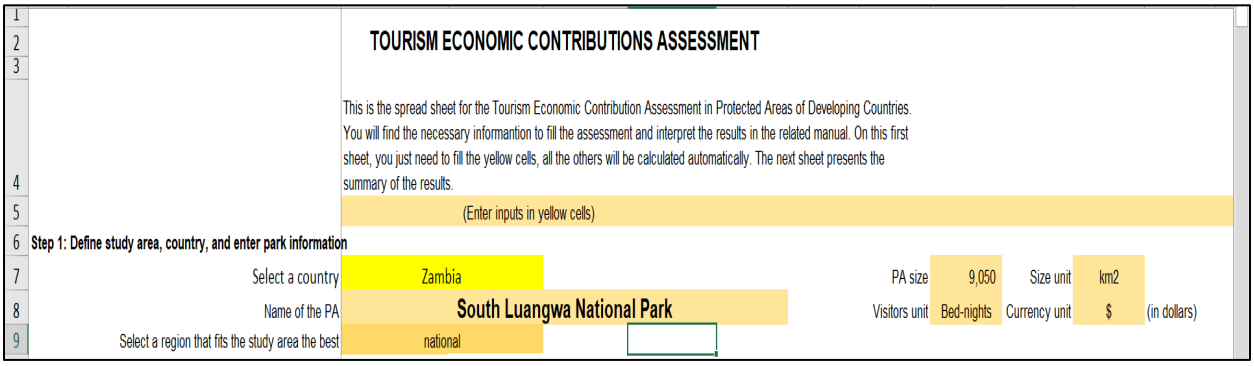
Entering the data

Step 1 - Basic Data (rows 7-9 in the MAIN worksheet)

Enter the following basic data into the top section of the spreadsheet model (rows 7-9):

- Select the name of the country that most closely matches the economy of the country in which the park is situated
- Name of park/s
- The size of the park in km^2
- The units that will be used to count visitors. This is usually done on a per night basis, but the unit must be aligned with how much a visitor spends
- The currency to be used for analysis
- The characteristics of the region in which the park occurs (see **Table 2**), because this affects spending and employment multipliers

Table 3: Basic data



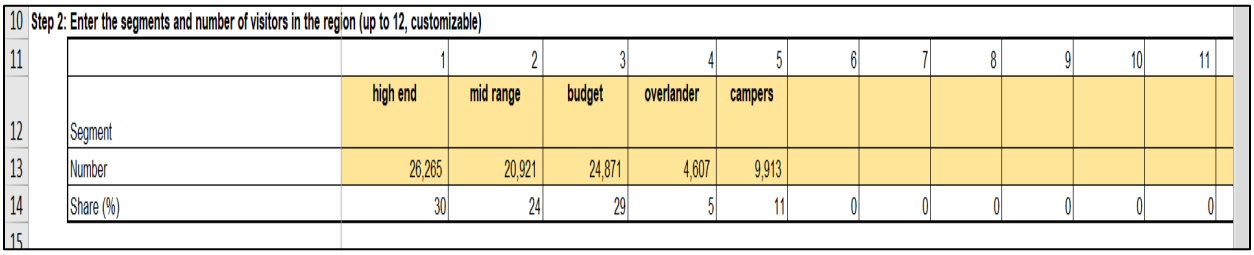
	TOURISM ECONOMIC CONTRIBUTIONS ASSESSMENT							
	This is the spread sheet for the Tourism Economic Contribution Assessment in Protected Areas of Developing Countries. You will find the necessary informantion to fill the assessment and interpret the results in the related manual. On this first sheet, you just need to fill the yellow cells, all the others will be calculated automatically. The next sheet presents the summary of the results.							
	(Enter inputs in yellow cells)							
Step 1: Define study area, country, and enter park information								
Select a country	Zambia			PA size	9,050	Size unit	km2	
Name of the PA	South Luangwa National Park			Visitors unit	Bed-nights	Currency unit	$	(in dollars)
Select a region that fits the study area the best	national							

Step 2 – Visitor segments (rows 12-13 in the MAIN worksheet)

- Enter the segment descriptions for the visitors that visit the parks (row 12). The spreadsheet accommodates up to 12 different segments (e.g. high end international, overlanders on trucks, 4x4 campers, etc.)

- Then enter the number of visitors for the year in question for each segment (row 13). It is extremely important to carefully match the number to the unit that will be used for visitor expenditure. The number of visits is usually reported on a per-night basis because this relates closely to expenditure. The spreadsheet will use this information to calculate the percentage share of visitation for each segment.

Table 4: Visitor segments



Step 2: Enter the segments and number of visitors in the region (up to 12, customizable)

	1	2	3	4	5	6	7	8	9	10	11
Segment	high end	mid range	budget	overlander	campers						
Number	26,265	20,921	24,871	4,607	9,913						
Share (%)	30	24	29	5	11	0	0	0	0	0	0

Step 3 – Visitor spending by expenditure category (rows 19-32 in the MAIN worksheet)

There are 14[51] different spending categories to enter data. From the tourism expenditure survey (see above) the average expenditure for each category of expenditure for each tourism

segment will have been calculated. Enter these averages into rows 19-32 as appropriate. The spreadsheet will automatically calculate the total spending per visitor segment and per spending category (rows 37- 53).

Table 5: Visitor spending

16	Step 3: Enter spending averages: On a per unit specified for each segment						
17	Average visitor spending per category	1	2	3	4	5	
18	Category	High End Tourism	Mid-range 2-3* STAR	Budget	Overlanders	Campers	
19	All inclusive packages	518.41	318.60	91.74			
20	Accomodation: Hotel, lodges, B&B, bushcamps,...			12.28			
21	Camping fees				10.00	11.26	
22	Meals: Restaurants, bars,...	0.29	6.37	7.26	8.17	6.92	
23	Groceries,			0.22	0.66	0.45	
24	Gas & oil			3.29	0.33	3.29	
25	Local transportation	57.08	57.00	0.46		0.06	
26	Admissions & fees (PA entry)		4.52	9.48	12.70	19.11	
27	Activities and Guided Tours (e.g. game drives)		2.67	4.58	37.87	11.02	
28	Souvenirs and other gifts	4.64	3.09	1.93	0.57	0.93	
29	Resource/Trophy Fees (purchase of resource, license, permits)						
30	Local dip, pack, taxidermy						
31	Gratuities and Tips	19.19	11.57	5.76	1.81	2.38	
32	Other expenses			0.14	0.40	0.48	
33	Total	599.61	403.82	137.14	72.51	55.90	0

Step 4 – Automatic calculation of effects of visitor spending

The fourth step is pre-configured to automatically calculate the effects of tourism expenditure including:

Direct effects (row 75-93 in the MAIN worksheet) include:

- Total visitor spending (calculated in row 93 column C), in this case $ 28,496 million.
- Capture Rate (row 94, column C) = the percentage of total tourism spending that is captured by the national economy (in this case 99.7%).
- Total value of sales captured locally (C95).

Once the capture rate is known (automatically calculated and presented in C94), the total value of sales captured locally can be calculated (C95). The reader can ignore “output” because it includes double counting but is necessary for calculations.

Table 6: Direct effects of visitor spending

74	**Step 4 - Computation of Direct Effects is automatically calculated**											
75	Computation of Direct Effects ($ 000's)	Spending, sales, income and value added in ($ 000's)										
76		Direct Sales	Retail Margin	Wholesale Margin	Local Production (% of goods produced locally)	Retail Margin captured	Wholesale Margin	Direct Output ("Sales Captured")	Direct Jobs	Direct Personal Income	Direct Value Added
77	All inclusive packages	22,563			100%	-	-	22,563	1,176	5,536	10,104
78	Accomodation: Hotel, lodges, B&B, bushcamps,...	305			100%	-	-	305	16	73	132
79	Camping fees	158			100%	-	-	158	8	38	68
80	Meals: Restaurants, bars,...	428			100%	-	-	428	22	103	184
81	Groceries,	13	25.3%	12.3%	88%	3	2	7	0	1	2
82	Gas & oil	116	22.3%	8.3%	80%	26	10	64	0	4.58	15.30
83	Local transportation	2,704			100%	-	-	2,704	146	687	1,288
84	Admissions & fees (PA entry)	578			100%	-	-	578	30	143	262
85	Activities and Guided Tours (e.g. game drives)	453			100%	-	-	453	24	112	206
86	Souvenirs and other gifts	246	25.0%	12.3%	61%	62	30	95	2	16	30
87	Resource/Trophy Fees (purchase of resource, license, p	-			100%			-	-	-	-
88	Local dip, pack, taxidermy	-			88%			-	-	-	-
89	Gratuities and Tips	921			100%			921	48	921	921
90	Other expenses	10			100%			10	1	2	5
91	Retail Margin captured	n/a			100%			91	5	35	49
92	Wholesale margin captured	n/a			100%			42	1	16	22
93	Total visitor spending	28,496				91	42	28,419	1,479	7,688	13,287
94	Capture rate	99.7%									
95	Sales captured locally	28,419									

The total effects of tourism expenditure are calculated automatically (row 99-115) in terms of jobs, personal income and value added (for each category of spending). South Luangwa National Park is a high-end destination and all-inclusive packages provide 3,543 jobs in Zambia, personal income of $16,674 million and create a total value of $38,372 million in Zambia.

Table 7: Total effects of visitor spending (at a national level)

96	**Computation of Total Effects is automatically calculated**			
97	Computation of Total Effects ($ 000's)	Spending, sales, income and value added in ($ 000's)		
98		Total Jobs	Personal Income	Total Value Added (Direct + Inidrect + Induced)
99	All inclusive packages	3,543	16,674	30,943.5
100	Accomodation: Hotel, lodges, B&B, bushcamps,...	53	248	459.9
101	Camping fees	27	128	237.4
102	Meals: Restaurants, bars,...	74	347	644.0
103	Groceries,	1	4	9.3
104	Gas & oil	0	34	71.2
105	Local transportation	354	1,668	3,102.7
106	Admissions & fees (PA entry)	88	413	767.2
107	Activities and Guided Tours (e.g. game drives)	69	324	601.6
108	Souvenirs and other gifts	6	52	98.1
109	Resource/Trophy Fees (purchase of resource, license, p	-	-	-
110	Local dip, pack, taxidermy	-	-	-
111	Gratuities and Tips	140	658	1,222
112	Other expenses	2	7	14
113	Retail Trade	13	83	138.1
114	Wholesale Trade	2	38	63.2
115	Total	4,371	20,681	38,372
116	Aggregate Total Effects Multipliers	2.96	0.73	1.35
117				

However, in order to measure the impact in and around the park, it is necessary to change the definition of the area of economic analysis from 'national' to 'rural' in cell C9. This reveals

that park-related visitor expenditure creates 2,100 jobs in and around the park (C115), personal income of $9,912 and Total Value Added of $17,237 million.

Table 8: Total effects of visitor spending (at a park and local level)

96	**Computation of Total Effects is automatically calculated**			
97	Computation of Total Effects ($ 000's)	Spending, sales, income and value added in ($ 000's)		
98		Total Jobs	Personal Income	Total Value Added (Direct + Inidrect + Induced)
99	All inclusive packages	1,676	6,318	13,763.5
100	Accomodation: Hotel, lodges, B&B, bushcamps,...	23	86	186.3
101	Camping fees	12	44	96.2
102	Meals: Restaurants, bars,...	32	120	260.9
103	Groceries,	0	0	0.7
104	Gas & oil	0	0	0.5
105	Local transportation	201	757	1,649.3
106	Admissions & fees (PA entry)	43	162	352.8
107	Activities and Guided Tours (e.g. game drives)	34	127	276.6
108	Souvenirs and other gifts	0	1	1.5
109	Resource/Trophy Fees (purchase of resource, license, p	-	-	-
110	Local dip, pack, taxidermy	-	-	-
111	Gratuities and Tips	68	258	562
112	Other expenses	1	3	6
113	Retail Trade	7	25	55.3
114	Wholesale Trade	3	12	25.3
115	Total	2,100	7,912	17,237
116	Aggregate Total Effects Multipliers	1.38	0.28	0.61
117				

Step 5 - Tax

It is strongly recommended that the Tax Computations are applied. Taxes are inserted at step 5 in the data entry process. Spreadsheet users need to insert the respective sales/VAT and income tax rates in rows 122-137, columns D, E, and F for the appropriate region for the tax amounts to be calculated. In some cases, judgement should be used to arrive at a first order approximation of the average tax rate for that category.

Normally, provincial/state and national governments are responsible for taxes, so this table is less relevant in estimating local effects. However, it provides valuable perspective on the importance of the park to the government's tax incomes. The spreadsheet calculates only taxes on the direct effects. Total tax income from direct sending is then automatically calculated and reported in cell J138.

This reveals that South Luangwa National Park generates $6,145 in taxes. This is an important figure. The government is reluctant to allow the park to retain the $ 3 million it earns in tourism entry fees (which is about half the true management requirements of the park). The fact that the park also generates $6,145 in taxes provides a strong argument for revenue retention and, indeed, for further government investment.

Table 9: Taxes from visitor spending

Step 5 - Tax Computations: Enter Tax rates in shaded area

Table T1. Tax Impacts of Direct Sales and Income ($ 000's)

		Tax rates			Tax Collections			
Taxes on Spending	Spending	national	state/provincial	local	national	state/provincial	local	Sales Total
All inclusive packages	22,563	17%			3,836	-	-	3,836
Accomodation: Hotel, lodges, B&B, bushcamps,...	305	17%			52	-	-	52
Camping fees	158	17%			27	-	-	27
Meals: Restaurants, bars,...	428	17%			73	-	-	73
Groceries,	13	17%			2	-	-	2
Gas & oil	116				-	-	-	-
Local transportation	2,704				-	-	-	-
Admissions & fees (PA entry)	578				-	-	-	-
Activities and Guided Tours (e.g. game drives)	453	17%			77	-	-	77
Souvenirs and other gifts	246				-	-	-	-
Resource/Trophy Fees (purchase of resource, license, p	-				-	-	-	-
Local dip, pack, taxidermy	-				-	-	-	-
Gratuities and Tips	921	17%			157	-	-	157
Other expenses	10				-	-	-	-
Total Taxes on Spending	28,496				4,223	-	-	4,223
Taxes on Direct Income (wages, salaries)	7,688	25%			1,922	-	-	1,922
Total Direct Taxes					6,145	-	-	6,145

NOTES: Tax receipts are computed on direct sales and income using the tax rates
Tax rates are applied to direct spending and income estimated in previous tables
Income tax rates reflect an average tax accounting for normal deductions

Box 1: Common measures of economic impact and their relevancy for reporting (adapted and modified from Driml and McLennan, 2010).

Measure (cell location in spreadsheet) Explanation Relevancy for reporting

Direct Effects Refers to the measures below, when considering only the tourism sector and associated businesses (see explanation in next section).

Total Visitor Spending (P33) Spending by visitors in the region of interest. To report the actual amount spent by visitors.
Also used to estimate value captured or leaked

Direct output (C95) The portion of visitor spending in the region that is captured in the region by the tourism sector and associated businesses. Not very meaningful as a measure in and of itself. Direct output is necessary to estimate, because other measures (e.g. value added, income, jobs, etc.) are calculated as multiples of direct output.

Direct value added (L93) The immediate value created in the region by tourism. It is equivalent to the sum of wages, salaries, profit, rent, local production, and taxes (less subsidies) in the tourism sector. An important indicator that shows how much value was added in the local area.

Direct personal income (K93) The amount of personal income (wages & salaries of staff and proprietor, and other staff benefits) received only by the tourism sector. An important indicator that may be reported to show how personal income in tourism compares with other sectors in the study area or with the tourism sector in other regions.

Direct employment (J93) The number of people employed in the tourism sector and associated businesses only (including part time and seasonal workers). To report the number of people in the study area population working in tourism and related businesses, and to calculate average income per-employee.

Total Effects Refers to the measures below, when considering not just the tourism sector, but the non-tourism industries that experience indirect effects of visitor spending, and spending by wage-earners as well.

Total output (I115) Direct output plus the value of additional captured sales in non-tourism industries through multiple rounds of business and consumer (wage-earner) spending. Not a very meaningful measure, however it is commonly reported and so may be used for comparative purposes.

Total added value (E115) Direct value added plus value added in non-tourism industries through multiple rounds of business and consumer (wage-earner) spending. A primary indicator that may be reported to show a comparative advantage of tourism over other industries and to show the returns to the economy from government investment in tourism.

Total income (D115) Direct income plus income in non-tourism industries through multiple rounds of business and wage-earner spending. A primary indicator that should be reported to show the total income to the study area that results from visitor spending.

Total employment (C115) Direct employment plus employment in non-tourism industries through multiple rounds of business and consumer (wage-earner) spending. To report the total number of jobs created in the study area by visitor spending.

Data interpretation

The "SUMMARY" worksheet presents the results of the economic effects analysis in a table series that can be copied into a report, a presentation, or printed. These results are illustrated for a single park (South Luangwa) but also for the Brazilian Protected Area system.[52]

Basic tourism and expenditure statistics are summarized in rows 4-14 in the worksheet, showing that the average spending of 86,577 bed nights in South Luangwa NP is $329 per night.

Table 10: Summary of tourism in South Luangwa

2	**South Luangwa National Park**							
3	SUMMARY OF RESULTS							
4	Spending data set		Size:	9,050	km2			
5	Year of spending data		2015					
6	Multipliers		Rural					
7	Visitor Units	Bed-nights	86,577					
8	Average spending per unit		$ 329.14					
9								
10	Visits in Bed-nights							
11		1	2	3	4	5	6	Total
12	Segment	High End Tourism	Mid-range 2-3*	Budget	Overlanders	Campers	0	
13	Number	26,265	20,921	24,871	4,607	9,913	-	86,577
14	Share (%)	30	24	29	5	11	0	100

Direct Effects

Direct Effects summarizes the effects of park tourism expenditure only after the first round of spending. It usually represents only about half (or less) of the overall impact of tourism expenditure.
The Direct Effects are extracted from the SUMMARY worksheet, rows 17-36.

For South Luangwa National Park:

- The **Output** of $28,419 million indicates that of the total amount spent (not shown), this is what was captured by the Zambian economy after the first round of spending.
  1.
- **Jobs.** Visitor spending results directly in the employment of 1,479 people.
  2.
  3.
- **Personal Income** of $7,688 million implies that of the $28 million in output, $7,688 million was earned as wages and salaries in businesses where visitors spent money.
  4.
- **Valued added** of $13,287 million means that of the $28 million in output, the amount that was earned as wages and salaries, plus the amount of profit, plus taxes, totals $13,287 million.
  5.
  6.
  7.
  8.

Table 11: Direct effects of visitor spending in South Luangwa across all expenditure categories

Table 1. Economic Impacts of Visitor Spending : Direct Effects				
	Direct Effects			
Sector/Spending category	Output $ 000's	Jobs	Personal Income $ 000's	Value Added $ 000's
All inclusive packages	22,563	1,176	5,536	10,104
Accomodation: Hotel, lodges, B&B	305	16	73	132
Camping fees	158	8	38	68
Meals: Restaurants, bars,...	428	22	103	184
Groceries,	7	0	1	2
Gas & oil	64	0	5	15
Local transportation	2,704	146	687	1,288
Admissions & fees (PA entry)	578	30	143	262
Activities and Guided Tours (e.g. g	453	24	112	206
Souvenirs and other gifts	95	2	16	30
Resource/Trophy Fees (purchase	-	-	-	-
Local dip, pack, taxidermy	-	-	-	-
Gratuities and Tips	921	48	921	921
Other expenses	10	1	2	5
Retail Trade	91	5	35	49
Wholesale Trade	42	1	16	22
Total	28,419	1,479	7,688	13,287

For Brazil, these data are provided for visitor spending in nearly 320 Parks in the Brazilian Protected Area System.[53] **(Table 12)**

- The **Output** of $347 million means that of the total amount spent (not shown), this is what was captured by the Brazilian Economy after the first round of spending.
  9.
- **Jobs.** Visitor spending results directly in the employment of 23,813 people.
  10.
- **Personal Income** of $153 million means that of the $347 million in output, $153 million was earned as wages and salaries in businesses where visitors spent money.
  11.
- **Valued added** of $195 million means that of the $347 million in output, the amount that was earned as wages and salaries, plus the amount of profit, plus taxes, totals $195 million.

Table 12: Direct effects of visitor spending in the Brazilian park system across all expenditure categories

Economic Impacts of Visitor Spending: Direct Effects in Brazilian Protected Areas Analysis (US$)				
	Direct Effects			
Sector/Spending category	Output	Jobs	Personal Income	Value Added
Accommodation	$84,310,383	5,193	$37,939,672	$48,900,022
Meals	$76,042,342	5,838	$31,177,360	$38,021,170
Gas & oil	$64,984,842	3,947	$29,893,027	$41,590,299
Local transportation	$36,875,676	1,481	$12,906,486	$16,594,054
Activities and Guided Tours	$64,745,257	6,106	$32,372,628	$36,904,796

Retail Stores	$16,523,036	1,004	$7,600,596	$10,574,743
Other expenses	$4,384,808	244	$1,585,838	$2,002,395
Total	$347,866,345	23,813	$153,475,610	$194,587,482

Total Effects

Total Effects measures the full effect of tourism expenditure, and is much larger than Direct Effects because of second, third, etc. round spending on the economy.

Total Effects are extracted from **Table 2:** under the SUMMARY worksheet on rows 40-47.

For South Luangwa National Park:

- The **Output** of $84,676 million means that of the total amount spent (not shown), this is what was captured by the Zambian economy including all multipliers (as noted, this is not a meaningful figure).
  12.
- **Jobs.** Visitor spending results in the employment of 4,371 people, with 2.96 additional jobs for every direct job in tourism.
  13.
- **Personal Income** of $20,682 million was earned as wages and salaries, 2.69 times as much as the direct income where visitors spent money.
  14.
- **Valued added** of $38,372 million is the total amount earned through tourism, including wages and salaries, business profits, and taxes.

Table 13: Direct and total effects of visitor spending in South Luangwa on Zambian economy

Table 2. Direct and Total Economic Impacts of Visitor Spending

Economic measure	DIRECT EFFECTS $	Multiplier	TOTAL EFFECTS $
Output/Captured Sales	$ 28,419	2.98	$ 84,676
Personal Income	$ 7,688	2.69	$ 20,681
Value Added	$ 13,287	2.89	$ 38,372
Jobs	1,479	2.96	4,371
Total Visitor Spending ($ 000's)		28,496	
Capture rate		99.7%	
Effective spending multiplier		2.97	

For the Brazilian protected area system, the column "Total effects" in **Table 14** shows the sum of direct, indirect and induced effects.

- The **Output** of $1,294 billion means that of the total amount spent (not shown), this is what was captured by the Brazilian Economy including all multipliers.

15.

- **Jobs.** Visitor spending results in the employment of 43,602 people, with 0.83 additional jobs for every direct job in tourism.

16.

- **Personal Income** of $343 million was earned as wages and salaries, 2.23 times as much as the direct income where visitors spent money.

17.

- **Valued added** of $474 million is the total amount earned through tourism, including wages and salaries, business profits, and taxes.

Table 14 also reports aggregate multipliers, which is the amount by which the direct impacts of tourism spending need to be multiplied to reflect the total impact on the income and value added (for jobs, the multiplier is applied to the direct number of jobs).

Table 14: Direct and Total Economic Impacts of Visitor Spending in Brazilian Protected Areas Analysis (US$)[54]

Economic measure	DIRECT EFFECTS	Multiplier	TOTAL EFFECTS
Output ($ 000's)	$347,866,344	3.72	$ 1,293,975,644
Personal Income ($ 000's)	$ 153,475,610	2.23	$ 342,872,972
Value Added ($ 000's)	$ 194,587,482	2.43	$ 473,691,260
Jobs	23,812	1.83	43,602
Total Visitor Spending ($ 000's)		$347,866,344	
Capture rate		100%	
Effective spending multiplier		3.72	

Marginal Effects

Marginal Effects measures the effects on wages, value added, and jobs for every $1,000 of visitor spending, and also for every 1,000 bed nights (for individual visitor or parties of visitors).

Marginal Effects are extracted from under the SUMMARY worksheet on rows 52-57. The summary table on the same worksheet allows quick estimates of the change in impacts from a change in spending or visitation.

Opportunity costs in the third column represent the loss in value for every square kilometer of the park hypothetically converted to an alternative land use. For example, according to **Table 15**, if one square kilometer of South Luangwa National Park was converted to farm land, any economic benefits from agriculture on that land would have to be compared to the loss of $850 in direct personal income, or $1,468 in value added. Opportunity costs are not to be interpreted literally, as the relationship between area and marginal effects is not linear (e.g.

tourism actually takes up less than 25% of South Luangwa National Park), but as averages they serve as a basis for extrapolating hypothetical loss in value over large areas.

Table 15: Example of national level marginal effects per dollar of spending and per 1,000 bed-nights at South Luangwa National Park, Zambia.

Table 3. Marginal Impacts per currency of spending, per 1,000 visit units and PA size

	change per $1,000 of visitor spending	change per 1,000 of Bed-nights	opportunity cost of tourism per km2
Direct personal income	$ 270	$ 88,868	$ 850
Direct value added	$ 466	$ 153,379	$ 1,468
Direct jobs	0.052	17.1	0.163
Total personal income	$ 726	$ 238,956	$ 2,285
Total value added	$ 1,347	$ 443,352	$ 4,240
Total jobs	0.153	50.5	482.946

Tax Effects

Tax Effects refer to the total tax income that park-based tourism provides to the government. Tax Effects are extracted from under the SUMMARY worksheet on rows 61-66.

For example, in Zambia **(Table 16):**

- approximately $4,223 million in tax revenue is generated for the national government in the form of a value added tax on sales to visitors.
  18.
- Another $1,922 million is generated from a tax on employee income.

This is an under-estimate of total tax revenue. Tax revenue generated on income to companies is not reported because this depends on the level of profit, which is not disaggregated from value added in the model. Importantly, the tax revenues reported in the table are a component of direct value added, and should not be interpreted as additional to direct value added.

Table 16: Example of Tax Impacts of Direct Sales and Income at South Luangwa National Park, Zambia.

61	**Table 4. Tax Impacts* of Direct Sales and Income**			($ 000's)
62		**Sales**	**Income**	**Total**
63	Federal	4,223	1,922	6,145
64	State	-	-	-
65	Local	-	-	-
66	Total	4,223	1,922	6,145
67	* Taxes are a component of direct value added so the amounts in the table above should nc			
68				

Presenting results

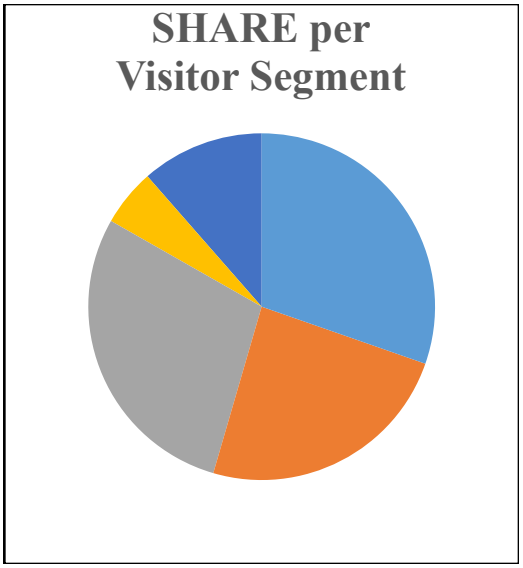
Basic tourism data

Figures and examples can be used to facilitate public understanding. The worksheet tab "GRAPHS" creates basic graphics including:

- Share per Visitor Segment (Pie Chart) (**Figure 1**)
- Average Spending per Visitor Segment per Visitor Unit (Bar Chart)
- Total Visitor Spending per Visitor Segment ($ 000's) (Bar Chart)
- Average Spending per Expenses Categories (Horizontal Bar Chart)
- Total Spending per Expenses Categories ($ 000's) (Horizontal Bar Chart)

19.

Figure 1: Expenditure by visitor category in South Luangwa National Park (SLNP)



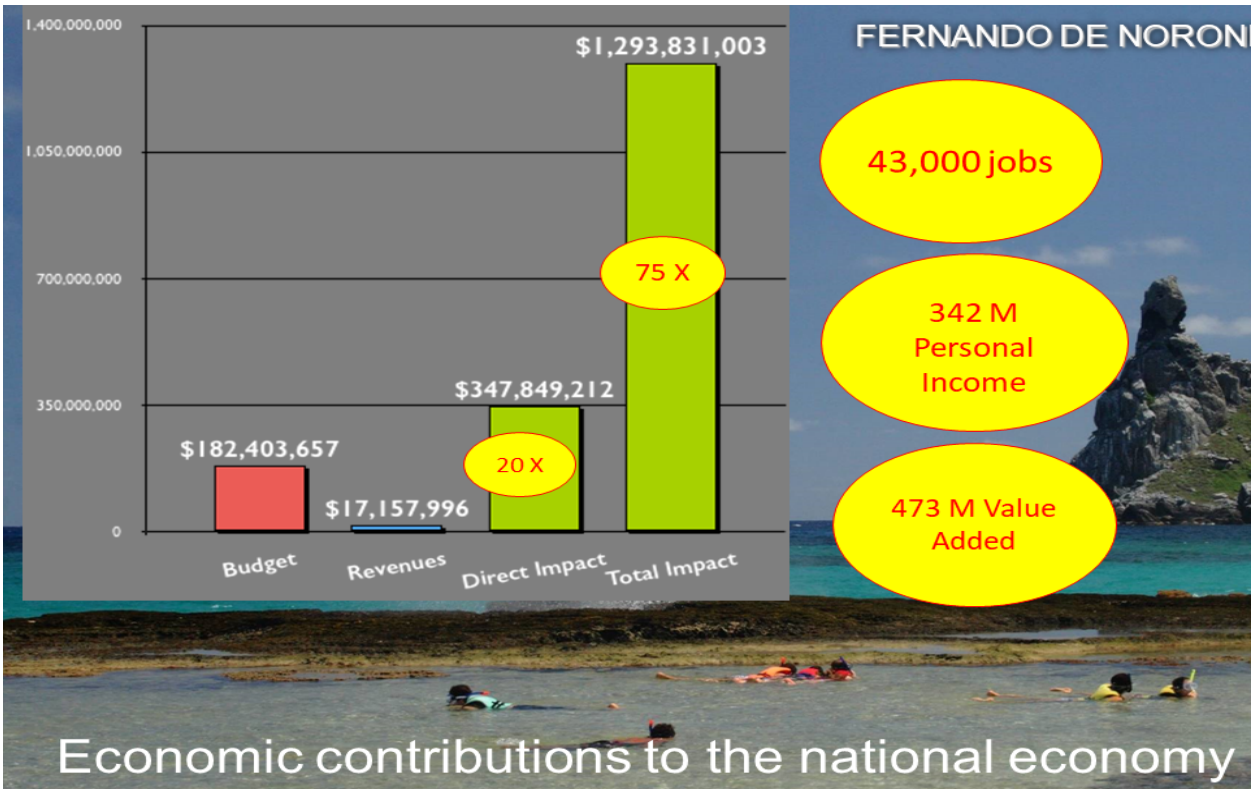
Making the economic case for protected areas using this data

It is important to emphasize the total economic value of the park or park system relative to the expenditure on it.

An example of how to make the economic case for a protected area system is presented in **Figure 2** using the data from Brazil.

- Financially, the parks earn $17 million against an expenditure of $182 million, and are not financially viable.
  20.
- Economically, however, visitors to Brazil's protected area system spend $347 million (**Table 14**). This adds value of $473 million to the economy, creates 43,602 jobs, and generates wages of $343 million.
  21.
-

Figure 2: The economy of the protected area system in Brazil.



A similar case can be made for South Luangwa National Park, but using an inverted pyramid. This data is validated and complemented by collecting the same information from the ground-up tool. The financial and economic case for South Luangwa is as follows **(Box 2).**

- Financially, South Luangwa covers its costs, earning $ 2.9 million in park fees, against an expenditure of $2.91 million. (However, this expenditure is heavily skewed towards salaries, leaving too little for operations, and also falls well short of the requirements for a 9,050 km^2 savanna park).

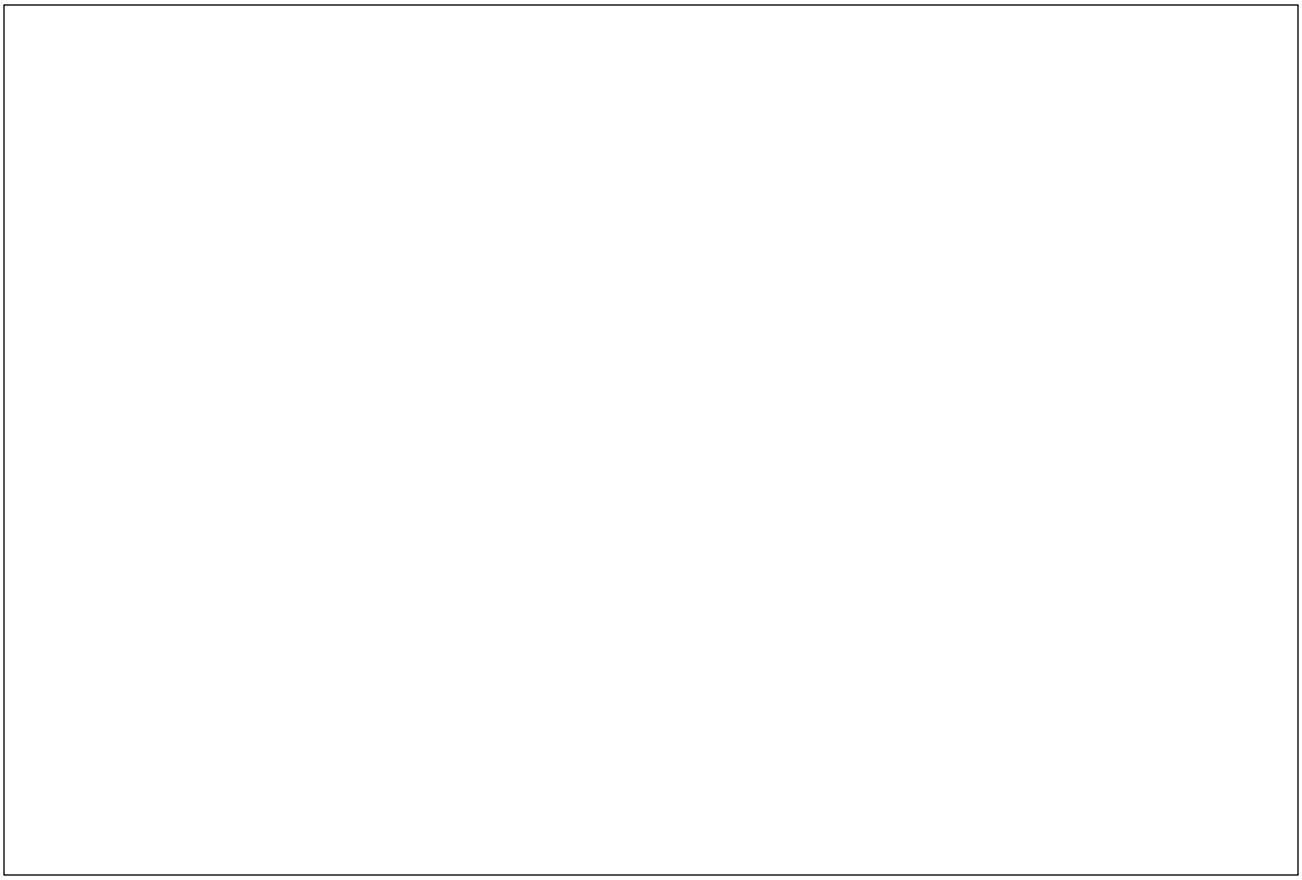
- Economically, tourism in South Luangwa adds value of $14.8 million in the immediate area of the park and nearby communities. This provides 1,583 direct jobs.

- At a national level, South Luangwa adds value of $38.2 million ($14.8+$23.4), and some 3,500 jobs in total.

- The government earns $6.2 million in tax revenues ($2.6m + $3.6m). This does not include the company taxes on a total private sector profit of $8.3 million ($2.5m + $ 5.7m).

However, the inverted pyramid shows that the $38 million tourism economy can quickly fall over if there is insufficient investment in the park. As it is, tourism operators are providing $835,000 annually for anti-poaching and community development. Furthermore, we know that this economy is based on 550 tourism beds. Therefore, an investment of $50m in road expansion to provide access for a further 200 beds will quickly pay for itself. The return on investment can be calculated by multiplying added value, jobs, taxes and park income by 200/550. The annual returns on a $50 m investment is therefore $13.8 value added, $2.25 m in taxes, 575 local jobs and 1,275 jobs in total, and $1m in park fees.

Box 2. Using an inverted pyramid to describe a park economy, and its vulnerabilities



Errors and Assumptions

Numerous assumptions are relied upon in any study of economic effects. Some assumptions are inherent in the model, while other assumptions are necessary in sampling. Each assumption unavoidably introduces a certain amount of error to the ultimate results. It is impractical to quantify this error, but it will be least with estimations of direct effects and greatest with total effects. What matters, however, are not the exact values, but their relative magnitudes.

Conclusion

Protected areas are a critical strategy for conserving biodiversity and for connecting people with nature. Many protected areas – especially National parks – attract tourists who spend money to experience nature and wildlife at close range. Some countries such as the United States regularly quantify the benefits of these parks on the local and national economy, highlighting the important role that they play in sustaining incomes and providing jobs. This type of analysis is less common in developing countries, causing many to overlook or to underestimate the vital contribution that parks with tourism potential have on the economy. This report introduces a tool – the Tourism Economic Model for Protected Areas (TEMPA) that can be used by park managers, consultants and others to address this lack of information in developing countries. Conducting this relatively simple spreadsheet - based analysis can produce new information that will help to garner support for some protected areas, as a way to simultaneously promote conservation and support economic development.

Appendix A: Socio - Economic Impacts of South Luangwa National Park in Zambia

Alex Chidakel and Brian Child

South Luangwa National Park (SLNP) in Zambia has 550 tourism beds clustered around the park gate where significant investments in roads and an airport (by FAO/UNDP and Norway) allow all-weather access to a small but prime wildlife area. In 2015, there were 21,214 visitors to the park including overlanders (9%), campers (12%) and people staying in low-end (37%) mid-range (23%) and high-end lodges (19%).

Tourism expenditure: Combined, these visitors spent $25,691,340 which supported 1,450 direct jobs (lodges, park managers) and 375 indirect jobs with total wages of $6.3 m within the immediate area of the park.

Local added value: This reflects an added value (sales price – cost of sales) of $14.8m locally.

National added value: Although tourism has increased the number of businesses from 1 in 1983 to over 180 now, the majority of goods and services (to the value of $23.4m, of which $17.2m is salaries) are still obtained from distant manufacturing and farming areas in Zambia. This adds $23.4m in value, of which $17.2m is salaries.

Global impact: A conservative estimate (not provided by the TEMPA model) is that visitors to South Luangwa spent at least $10m or more on air-travel, booking fees and other purchases outside Zambia. The model also does not calculate global added value in the form of vehicles, fuel, durable goods and food that are purchased from abroad.

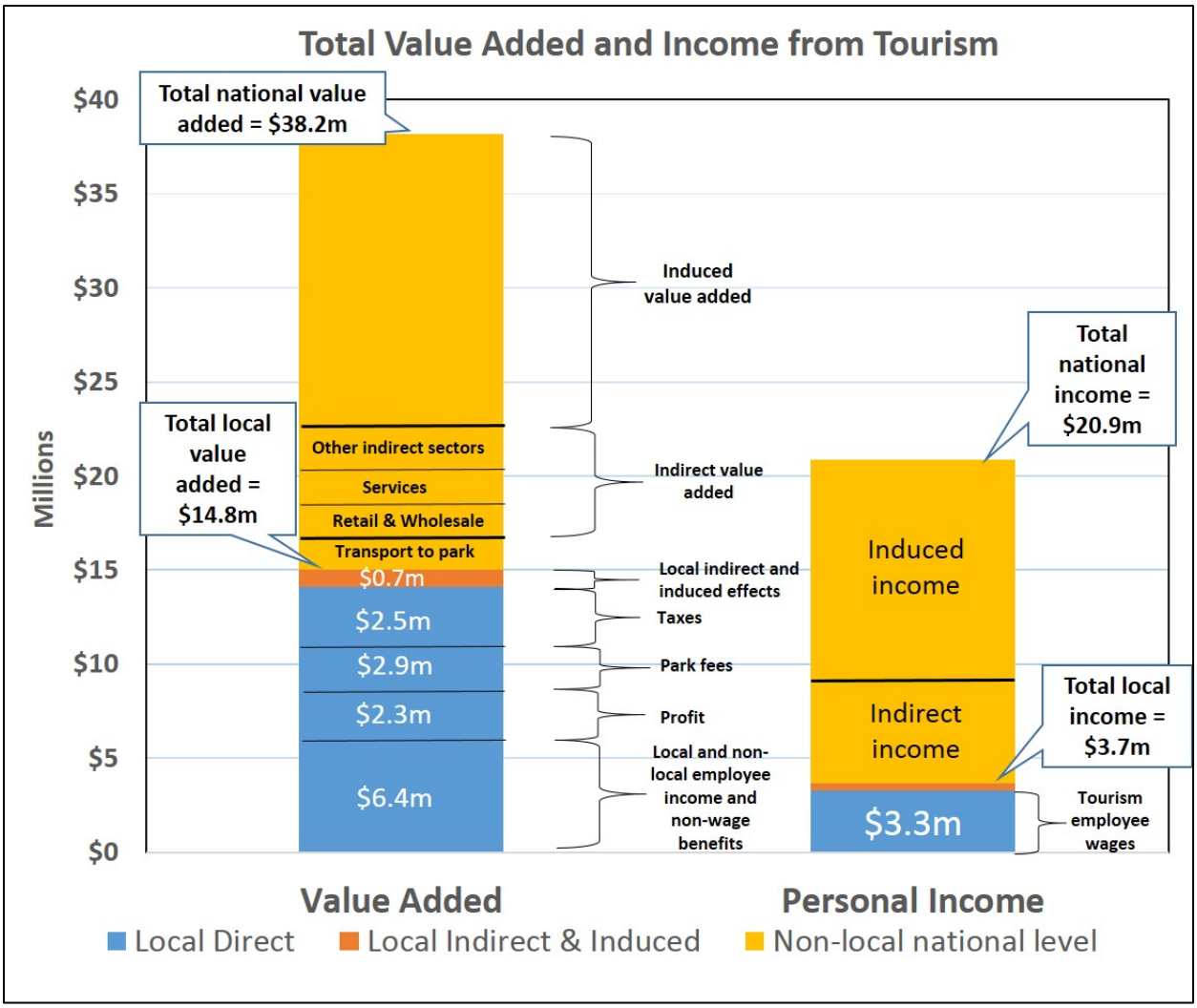
Total economic value: The TEMPA model demonstrates that South Luangwa National Park generates $38m of added value in Zambia annually, of which $23m accrued in wages, salaries and fees including 1,825 local jobs

Table 17: Total Economic Value of South Luangwa National Park to the Local and Zambian Economy (excluding international value added).

Value added	Examples	Value Added	Wages, salaries and fees
Global	Agents fees, airfares, clothing, cameras	$10m+	??
National (excluding local) (Zambia)	Supplies, services, transport, food and beverage, hotels, travel, etc.	$23.4m	$17.2
Local (South Luangwa)	Accomodation and guiding services, park access	$14.8m	$3.7
TOTAL		$48m+	$20.9m+

A more detailed breakdown of total economic value (Figure 3) shows that tourism earns the government $5.4m locally, of which $2.9m is park fees.

Figure 3: Total value added from tourism in South Luangwa National Park.



This information is summarized as a "Protected Area Value and Vulnerability Pyramid." **(Box 2)** The total national ($23.4) and local ($14.8m) economic value of South Luangwa National Park depends on re-investment in park management of $2.91m, propped up by a further $835,000 spent on road maintenance and anti-poaching by lodges and NGOs. If this re-investment is inadequate, or mismanaged, the entire economic pyramid is vulnerable. Note that government earned $9.1m from South Luangwa ($2.9 park fees + $2.5m in direct taxes + $3.6m in induced taxes), of which it reinvested $2.91 directly in park management. This was a return on public investment of better than 3 to 1.

Appendix B: National Case Study - Economic Impacts of Tourism in Protected Areas of Brazil

Thiago do Val Simardi Beraldo Souza

The Chico Mendes Institute for Biodiversity Conservation (ICMBio) is the federal agency responsible for the management of the Federal Protected Areas in Brazil. ICMBio manages a system of 325 federal protected areas comprising 79 million hectares (ICMBio, 2016). Federal protected areas of Brazil were assessed using the Tourism Economic Model for Protected Areas (TEMPA), which is an updated version of the Money Generation Model (MGM2) methodology[55] along with modifications to address issues particular to a developing country context.

Methods

TEMPA requires three inputs: number of visitors, visitor expenditures, and multipliers, all of which were collected from different sources. Box 3 highlights the survey that was used to assess tourism expenditure.

A - Number of visitors

From the 8 million visitors in 2015, national parks and forests received 93% of the total. We collected data from 58 national parks (NP) and 36 national forests (NF) managed by the federal agency Chico Mendes Institute for Biodiversity Conservation (ICMBio)[56]. The Protected Areas (PAs) were divided into three categories by recreation use: Extensive, Intensive and Highly Intensive.

B - Visitor Expenditures

Visitor spending data was collected via two different techniques: on-site interviews and e-mail[57] during January-February of 2016. The study collected data in three PAs, one of each recreation class, to develop average visitor spending profiles.[58] [59] The three selected PAs were: São Franciso de Paula National Forest, Chapada dos Guimarães National Park and Tijuca National Park.

C – Multipliers

Multipliers and ratios were developed for the Brazilian economy from the Input-Output (I-O) Table of 2013 - 68 sectors[60]. The data were formulated from National Accounts based on the methodologies described in Guilhoto et al. (2005)[61] and Guilhoto et al. (2010)[62].

Results

Tourism Economic Contributions and Impacts - National Effects

Table 18 summarizes the result of this study. Visitor expenditure generated total direct sales of $348 million, but this expanded to $1.3 billion as this money cycled through the economy. Likewise, 23,813 people employed directly in park-based tourism earned $153m, but this almost doubled once multiplier effects were considered, to 43,602 jobs and $342 million in income. Park tourism added $195 in direct value, and $473 million in value added to the GDP.

Box 3: Survey used to assess tourism expenditure in Brazil.

Economic Significance Questionnaire - Tijuca National Park

We are developing this study to measure the economic impacts of tourism in protected areas. We are interested in finding out the approximate amount of money you and other visitors in your immediate group will spend. We understand that this is a difficult question, but please do your best because your responses are very important. The survey will take around 5 min. There are no anticipated risks, compensation or other direct benefits to you as a participant in this study. You do not have to answer any question you do not want to. You are free to withdraw your consent to participate and may discontinue your participation at any time without consequence.

If you have any questions about this research protocol, please contact Dr. Brijesh Thapa, University of Florida Professor via email bthapa@hhp.ufl.edu or Thiago Souza, ICMBio Analyst and University of Florida PhD Candidate via email at thiago.beraldo@icmbio.gov.br. Questions or concerns about your rights as a research participant rights may be directed to the IRB02 office, University of Florida, Box 112250, Gainesville, FL 32611, USA; (1) 352 392-0433.

Will you participate in this study? [ ]Yes [ ]No

Thank You!

1. What is the City and State at your home address if you are Brazilian or what country are you from? _____

2. How many days did you stay or are you going to stay during this visit

a. In the National Park? _____

b. Altogether in the National Park and in the city of Rio de Janeiro? _____

3. How many people is in your family or group (counting you)? [ ]

4. Have you spent/Will you spend money on in the national park or its region while on this trip (see area on map)?

yes (please answer the following questions)	[ ]	no (move on to question 7)	[ ]

5. In the next question, we will estimate your total expenses, please tick the box that indicates whether you are estimating:

Your personal expenses and/or your share of your group's joint expenses	[ ]	The total expenses of your family or group	[ ]

6. Indicate below (points A–G) your total expenses for this trip in the national park and its region. Write 0 (zero) in the column if you have not spent any money on the activity in question)	
A - Fuel or other purchases from service stations (auto, boats, RV)	
B - Local transportation (bus, rental car, taxi, etc.)	
C - Retail shopping (clothing, souvenirs, gifts, etc.)	
D - Meals (restaurants, bars, night clubs, groceries, etc.)	
E - Accommodation (hotel, motel, camping, etc.)	
F - Organized activities and recreational services (eg. entry fees, guided tours and exhibitions)	
G - Other expenses (e.g. permits, equipment hire, etc.)	
H - Tourism Package (respond question below)	
Your estimates are in Dollars or Reais	

7. Which of the following were included in the package tour(s) as part of your visit? Please mark all that apply.					
Local air transportation		Meals		Local lodging	
Local ground transportation		Guide services		Fees	

8. Would you have come to the region at this time even if the national park was not here? Yes [ ] No [ ]

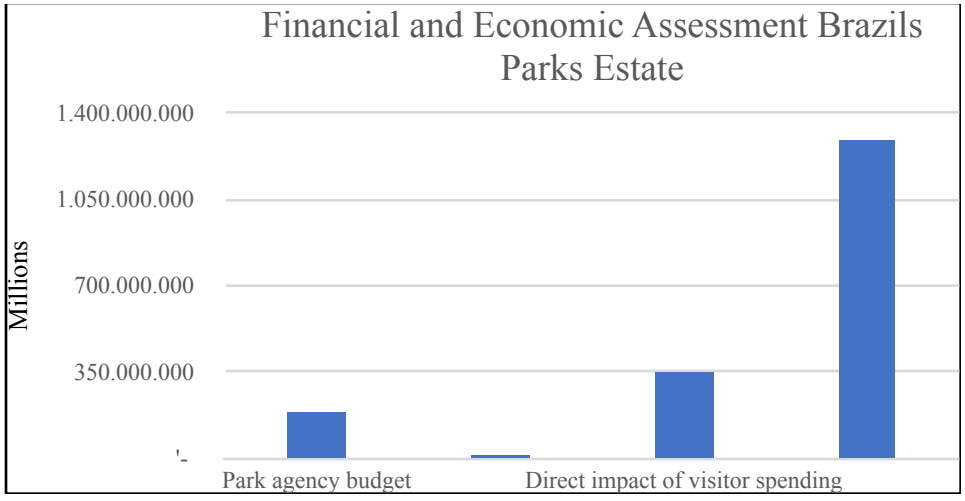
9. Circle the number below that best describes how important the national park was in your decision to visit the region on this trip, where 0 indicates it had no influence and you would have come to the area anyway and 10 indicates that this national park/ forest is the decisive reason for visiting the region on this trip.

0	1	2	3	4	5	6	7	8	9	10
↑					↑					↑
None: I would have come to the area anyway					Half of my reason for coming to the area.					My only reason for coming to the area.

Table 18: Economic contributions of visitor spending to Brazil's national economy

Spending Category	Sales Captured	Jobs	Personal Income	Value Added
Accommodation	$84,310,383	5,193	$37,939,672	$48,900,022
Meals	$76,042,342	5,838	$31,177,360	$38,021,170
Gas & oil	$64,984,842	3,947	$29,893,027	$41,590,299
Local transportation	$36,875,676	1,481	$12,906,486	$16,594,054
Activities and Guided Tours	$64,745,257	6,106	$32,372,628	$36,904,796
Retail Stores	$16,523,036	1,004	$7,600,596	$10,574,743
Other expenses	$4,384,808	244	$1,585,838	$2,002,395
Total Direct Effects	**$347,866,345**	**23,813**	**$153,475,610**	**$194,587,482**
Secondary Effects	$946,109,299	19,789	$189,397,361	$279,103,778
Total Effects	**$1,293,975,644**	**43,602**	**$342,872,971**	**$473,691,260**

Figure 4: Financial and economic assessment of Brazil's Parks Estate.



Conclusion

Figure 4 confirms that Brazil's Protected Areas operate at a financial loss, with direct income of $17 million (mainly in park fees) compared to a budget of $ 182 million. However, from an economic perspective, the direct economic impact of Brazil's parks is $ 348 million and this increases to $ 1,294 billion once this money cycles through the economy. Thus, each dollar invested in park management generates $7 for the economy, even before the value of biodiversity conservation and ecosystem services are considered. Moreover, many parks are located in remote areas, generating economic benefits for local communities that have a higher household dependency on the surrounding natural resources.

Figure 5: Analysis of the economic return on investment in improving tourism facilities in Brazil's Parks Estate.

	Spending category	Sales Captured	Jobs	Personal Income	Value Added
Current scenario	Total Direct Effects	$347,866,345	23,813	$153,475,610	$194,587,482
	Total Effects	$1,293,975,644	43,602	$342,872,971	$473,691,260
With $220m investment in park management and facilities	Direct Effects	$ 621,680,792	42,725	$ 274,734,880	$ 347,625,218
	Total Effects	$ 2,821,185,706	94,180	$ 752,935,141	$ 1,045,872,259

We also calculated that an investment of $220 million in judiciously improving park management and facilities (using models to assess where they were the factors limiting park tourism growth) would pay for itself several times over in terms of job creation and its economic impacts. Investments in PAs are necessary to ensure the conservation of the ecosystem services and quality of visitors' experiences. (**Figure 5).**

Overall these results highlighted the importance of tourism in PAs and the adjacent regions for the Brazilian economy, and provide a persuasive argument to increase the budget allocation for parks to stimulate the local and national economy.

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[29] Camargo et al., 2018.

[30] Economic analysis, however, can become more complex. This manual offers two general practices which can be used to analyze the economic contribution and economic impact of parks. The **'economic contribution'** captures the gross economic activity generated in the regional economy by all visitors to the protected area, including local visitors. **'Economic Impact'** analysis estimates the net changes on the regional economy generated by new money brought into the local economy by non-local visitors. Economic impacts exclude spending by local visitors based on the assumption that if they decide not to visit the park, they would spend the money on another recreational activity within the local region (Cullinane *et al.*, 2014).

[31] Ibid – Stynes, 2001.

[32] Multipliers are coefficients that convert spending into associated income and jobs to reflect the direct and secondary effects of visitor expenditures as spending circulates within a regional economy.

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[42]For additional information on visitor surveys, including short samples, refer to Crompton (2010).
For more information on sampling and respondent approach techniques, safety issues, ethics, etc., refer to Driml and McLennan (2010).

See **Appendix A** for a more comprehensive questionnaire for visitors to South Luangwa National Park (SLNP), Zambia.
See **Appendix B** for a questionnaire based on Crompton (2010) that was used to collect data for a national study on parks in Brazil.

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[48] Ibid - Crompton, J., 2010.

[49] The spreadsheet will provide a reasonably accurate set of multipliers once you have:
(1) selected the country of analysis that most closely matches your situation and
(2) defined the area in which your Park is situated according to whether it is rural, or urban using population size as a rough proxy for the complexity and connectedness of the economy as described in **Table 2.** All calculations are automatically performed.

[50] At this stage "Brazil" has been used to approximate for a middle income and/or Latin American country, and Zambia to approximate for a lower income and/or African country. Multipliers have also been included for South Africa.

[51] Two categories are specifically for consumptive tourism (i.e. resource/trophy fees and dip, pack and taxidermy) because trophy or sport hunting is a primary source of tourism in many community-conserved areas and private conservation areas, especially in Africa.

[52] Ibid - Souza, T.V.S.B., 2016.

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