

Assessing the Economic Impact of Tourism in Protected Areas on Local Economies in Zambia

Heng Zhu, Anubhab Gupta, Edward Whitney, Urvashi Narain, Iretomiwa Olatunji, Hasita Bhammar, Ngao Mubanga, Phoebe Spencer and J. Edward Taylor



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1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

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Executive Summary

Zambia is a country richly endowed with natural resources, and home to a substantial protected area network. Approximately 40 percent of the country's land area enjoys some form of protection, with globally significant biodiversity. This combination of protected areas and rich biodiversity is equally a major tourism asset, in an industry which world over attracts eight billion visitors a year to protected areas, provides one-in-ten jobs globally, and contributes up to 10 percent of global GDP.

But the potential of Zambia's protected area network, and its contribution to economic development in the country, is yet to be fully realized. This situation mirrors that of many countries in which governments see protected areas as key to addressing biodiversity conservation but often overlook these natural assets in economic development plans. This oversight is of great concern, as countries, globally, struggle to contain unprecedented biodiversity losses while trying to address development setbacks

inflicted by COVID-19. Awareness is growing that these two challenges – precipitous declines in global biodiversity, and the imperative for a green recovery from the pandemic – must be addressed as one: neither problem can be solved without solving the other.

Additionally, these challenges must be met in poor and often isolated rural areas in which many of Zambia's biodiversity-rich protected areas are located. Through the economic benefits it generates, protected area tourism is moreover one of the few avenues through which governments can help support livelihoods, stimulate economic development, while cultivating local community support for conservation in these rural communities. In this context, the importance of protected area tourism cannot be overstated, because of its potential to address losses to economies, promoting recovery, addressing longstanding development challenges, all the while supporting biodiversity conservation.

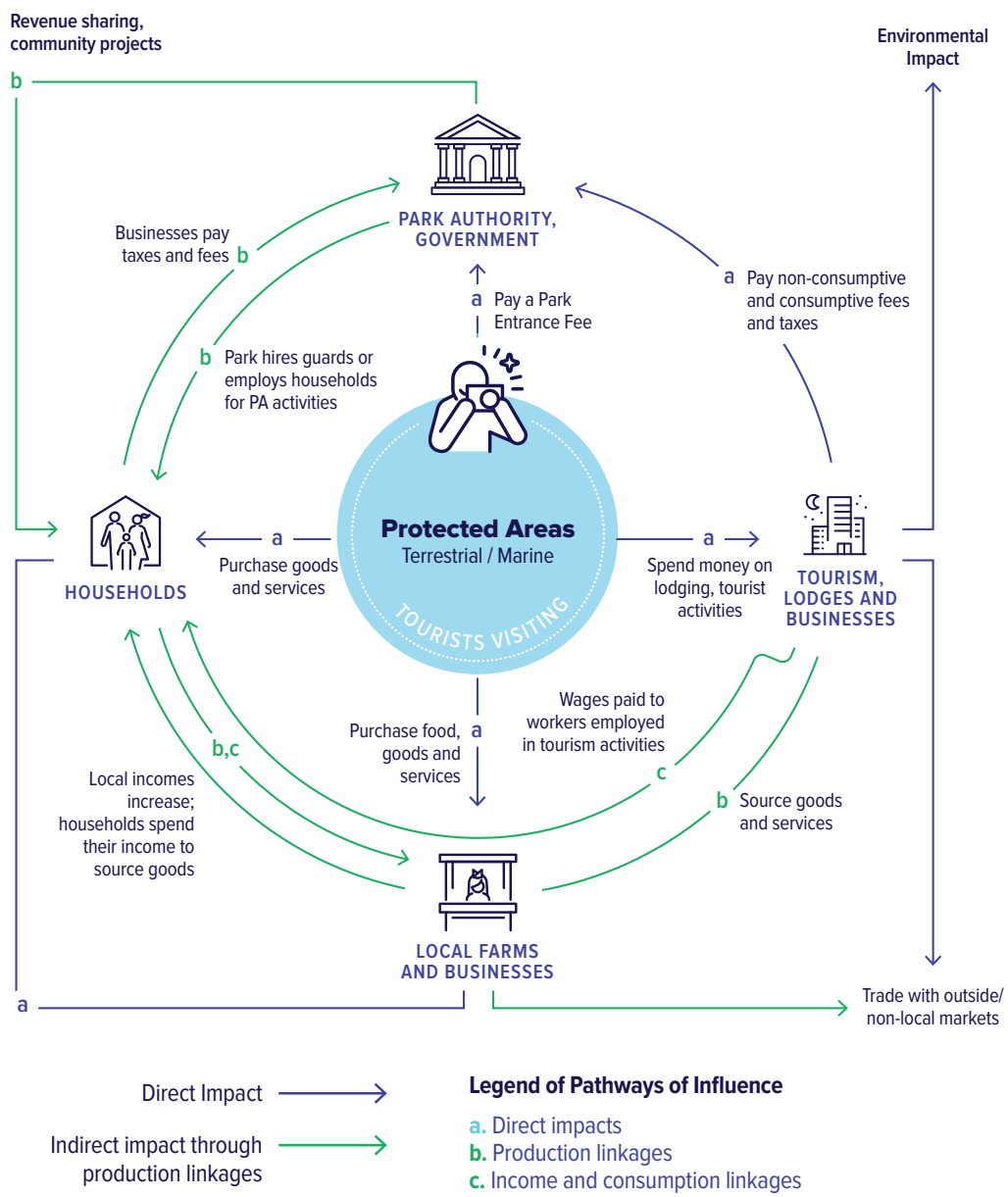
This study therefore set out to strengthen the economic case for Government of Zambia to promote sustainable and inclusive tourism in its protected areas by estimating the direct and indirect benefits to local economies from protected area tourism.

HOW WAS THE STUDY DONE?

Working in South Luangwa and Lower Zambezi National Parks, and using survey data collected from communities living in the vicinity of the Parks, from tourism and other local businesses, and from tourists to the two Parks, the study traced and quantified the economic pathways through which protected area tourism stimulates local economies. A general equilibrium model for local economy-wide impact evaluation (LEWIE) was used to describe direct and indirect impacts of tourism by integrating models of

actors (businesses and households) within a local economy. Direct impacts refer to monies spent directly by tourists in protected areas, while indirect impacts describe the knock-on effects of this spending, via production linkages which grow to support expanding tourism markets, and consumption linkages, through which wages and profits trigger fresh rounds of spending which ripple through the local economies (Figure ES-1).

FIGURE ES-1. Economic Impact Pathways of Protected Area Tourism



WHAT DID THE STUDY FIND?

Public investment in protected areas pays off, generating per-kwacha economic returns on government spending of approximately 28.2 kwacha in South Luangwa National Park and about 16.7 kwacha in Lower Zambezi National Park. Tourist spending strongly infiltrates local economies, while government revenues from park fees exceed investments in the two parks,

generating a net of 16.17 million kwacha, and establishing these protected areas as sources of revenue, rather than financial burdens.

Tourism in Zambia's two protected areas generates significant income multipliers, defined as the change in local household incomes per kwacha of fresh infusion of cash into the economy through tourist spending. These multipliers apply to households directly tied to the tourism sector, but also those which are not, and in both poor and non-poor households alike, as indicated by the estimates shown in Figure ES-2, which show the distribution of income gains for poor and non-poor households. Each kwacha spent by visitors at Lower Zambezi National Park raises household incomes around the park by 1.82 kwacha and around South Luangwa National Park by 1.53 kwacha, reflecting the penetration of tourist spending into local economies. Additionally, when normalized by population, as shown in Figure ES-3, multiplier shares per resident are revealed as comparable between poor and non-poor populations both within and outside of protected areas, showing that the impacts of protected area tourism are equitably beneficial to communities.

FIGURE ES-2 Income Multipliers for an Additional Kwacha of Tourist Spending

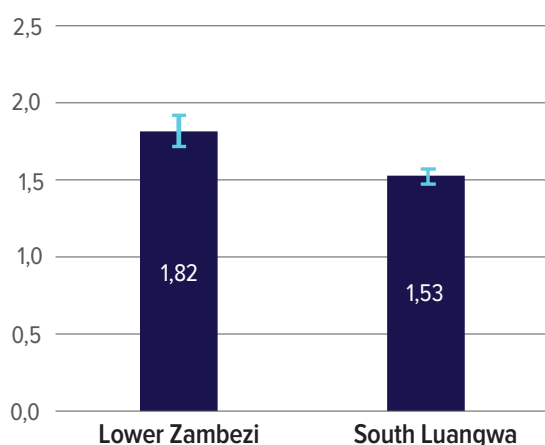
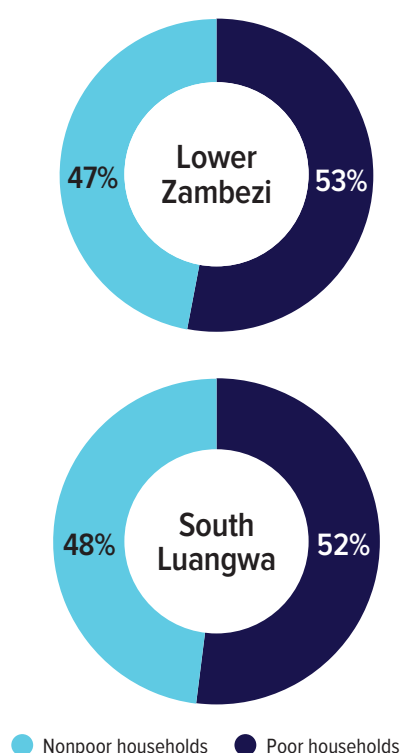


FIGURE ES-3. Distribution of Multiplier across Poor and Non-Poor Populations



Tourism in protected areas also creates significant job opportunities. The study estimates that protected area tourism supports approximately 7,463 full-time equivalent jobs around Lower Zambezi National Park and 28,210 jobs around South Luangwa National Park, equivalent to 14 and 30 percent of the populations around the two parks, respectively. Jobs are created directly through tourism activities. Additional jobs are supported when businesses such as tourism operators and tourism employees purchase supplies and services from other local businesses, thus creating indirect effects of visitor spending surrounding the park.

While the economic benefits of protected areas are strong, the costs to local communities must be managed. Human-wildlife interactions around protected areas occur mostly in the form of crop losses, and have negative impacts on household incomes, with wild animal movements on farms reducing crop yields by 11–14 percent according to household surveys. These direct impacts, and indirect impacts through production and income linkages amount to income losses in the local economy of approximately 23.7 million kwacha (US\$1.8 million) at Lower Zambezi and 16.3 million kwacha (US\$1.2

million) at South Luangwa. These figures are important in that they underpin arguments in favor of compensation, which both mitigates these losses, and retains the needed support of local communities.

The study also points to the need to address losses suffered by the sector following the COVID-19 pandemic. The study shows that the pandemic has led to substantial losses in tourism and tourism incomes. A complete loss of tourist revenue around the two parks

reduces local real GDP by 17.6 million kwacha (US\$ 1.26 million) per month at Lower Zambezi and 53 million kwacha (US\$ 3.78 million) per month at South Luangwa, and these losses also negatively affected retail, livestock, agricultural production, and various service sector outputs. These impacts indicate the extent to which support for protected areas will be needed to offset these losses and to realize the potential of these areas to support a green economic recovery.

WHAT LESSONS CAN POLICY MAKERS DRAW FROM THE STUDY?

With over 40 percent of its land area under some form of protection, including 20 national parks, there is great potential for protected areas in Zambia to contribute to development goals and to maintain the country's rich biodiversity. In order to realize this potential, the report recommends enhanced protection of Zambia's natural assets, growing and diversifying the tourism sector, and sharing benefits with local communities. These approaches form the three pillars of a strategy to jointly address biodiversity loss, development challenges, and a green, post-COVID recovery.

1. Protect the natural asset base. To support conservation and secure the natural assets that draw visitors to Zambia, the protected area network needs to be better managed. To achieve this, specific recommendations from the study are to (i) increase public investment in protected area management; (ii) build capacity of protected area managers; and to (iii) assess and monitor the impacts of visitor spending.
2. Diversify and grow the tourism sector. The Zambian tourism sector needs to expand and diversify beyond the five parks currently visited by tourists. This requires that the country's protected areas be assessed, and ranked by their tourism potential in order to select priority sites for development. A strong commercial services/concessions program will be needed to develop the new sites, draw tourists and generate revenue.

3. Share benefits with local communities.

Zambia's protected area regulations require sharing of revenues with local communities, but experience indicates that mechanisms to this effect need to be more timely, equitable, and transparent. Additionally, while tourist-spend income multipliers for local households are significant, opportunities exist for governments to raise these multipliers through their policies, and these opportunities need to be explored.

In conclusion, and in the wake of the COVID-19 pandemic, Zambia needs to address losses to its protected area tourism sector in order to regain benefits to park-adjacent communities and to secure the conservation status of its significant natural assets. To do this, Zambia should champion sustainable and inclusive tourism in protected areas. It should increase public and private investment in protected areas on the growing evidential basis for attractive and far-reaching returns which support both conservation and sustainable development strategies. Finally, in response to a pandemic which has caused development setbacks, Zambia's protected area tourism sector should enact mechanisms to distribute its benefits fairly in the face of poverty and losses incurred by local communities.



1

Introduction



BOX 1 Definition of protected area categories

Protected Areas are clearly defined areas, 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 (Dudley, N. 2008). They range from Category I to Category VI on a decreasing scale of level of regulation.

National Parks are classified under Category II of protected areas. They are defined as large natural or near-natural areas set aside to protect large-scale ecological processes, along with complementing species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities. In Zambia, national parks cover ~20 percent of the country's land area.

Game Management Areas (GMA) are a category of protected areas in Zambia that are mostly customarily owned lands designated as buffer zones between national parks and open areas under Section 28 of the Zambia Wildlife Act, 2015. They currently cover ~22 percent of the country's total land area. Human settlement is allowed in designated areas, as are agriculture, forestry and mining, as defined by the GMA's General Management Plan (a document that sets forth the basic management and development philosophy for a protected area and provides land use strategies to address problems and achieve management objectives over a set time period). Three types of hunting are permitted within GMAs: (i) safari hunting; (ii) resident hunting; and (iii) bona-fide hunting*. Additionally, photographic tourism is permitted in a few GMAs. Community Resource Boards (CRB) are identified by the Zambia Wildlife Act of 2015 as institutions legally mandated to co-manage and benefit from wildlife in GMAs. The Chief of an area is regarded as the patron of the CRB.

* According to the Zambia Wildlife Act, "*bona fide client*" means a licensed non-Zambian hunter who is a client of a hunting outfitter that has a hunting concession or owns an unfenced private wildlife estate;

Zambia created its first protected area in 1920. Since then, Zambia has increasingly dedicated land to conservation. Currently, approximately 40 percent of the land area is under some form of protection, giving Zambia one of the highest proportions of land under protection in Africa (see Map 2). Conservation efforts by the Government of Zambia (GoZ) aim to maintain species populations and promote the provision of ecosystem services such as water, food, and carbon storage.

Protected areas in Zambia also attract tourists who visit parks for wildlife tourism and contribute to the country's economy. Moreover, tourists visit Zambia predominantly for nature and wilderness (MoTA 2016). Contributions to the economy are direct in the form of visitor spending on park fees, hotels, lodges, transport, leisure, and recreation services. This results in local job creation, with additional jobs and economic activity supported when tourism operators and employees purchase supplies and services from other local businesses, thus creating indirect effects of visitor spending surrounding the park. As per estimates provided by the World Travel and Tourism Council, travel and tourism contributed 7 percent of the GDP in 2019, supporting 7.2 percent of employment in the country (WTTC 2019).

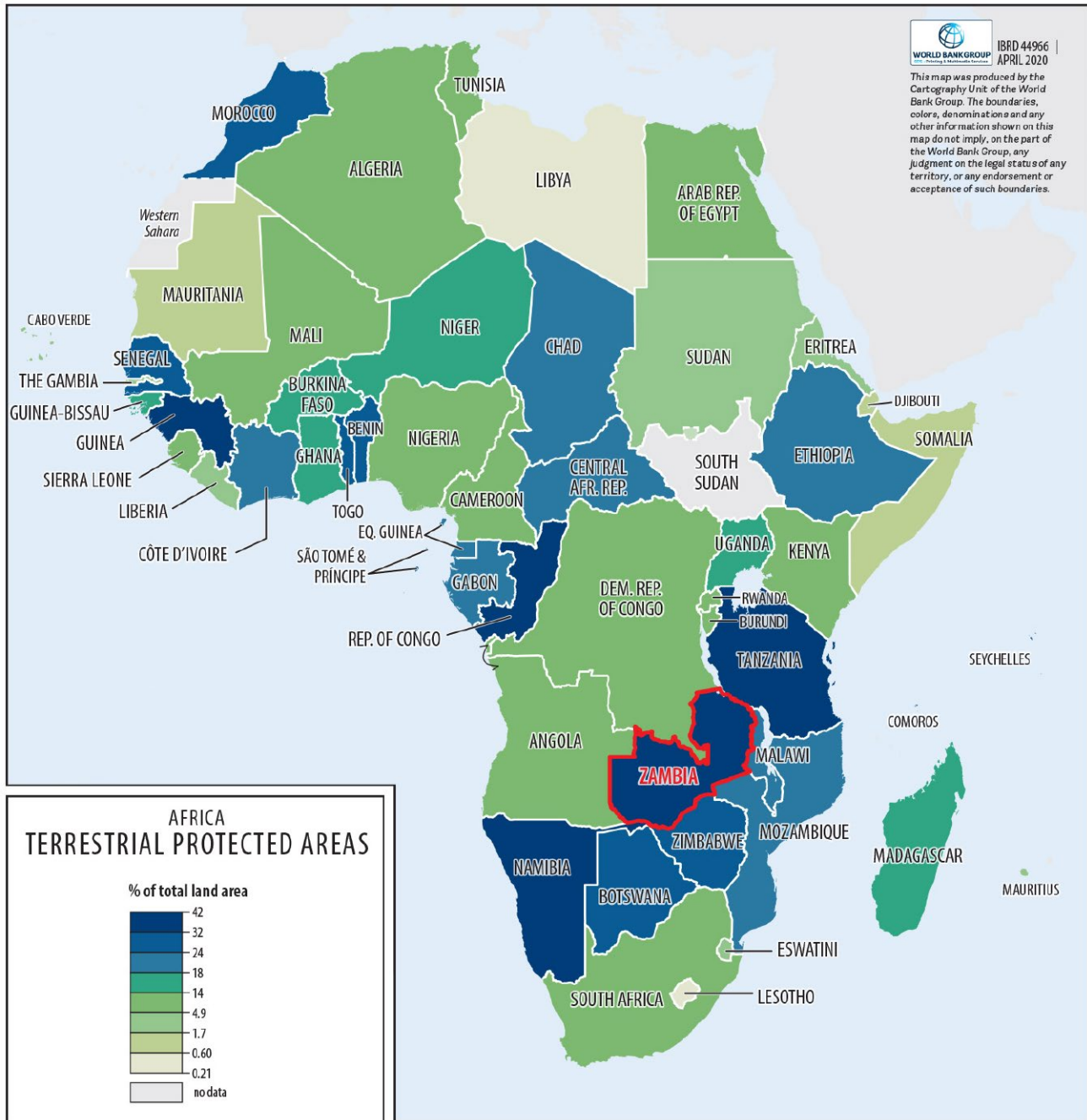
Despite this economic value, Lindsey et al. 2014 found that Zambia's protected areas are ecologically, economically, and socially underperforming, and face challenges including poaching, ecological threats from development, and ineffective management¹ (Lindsey et al. 2014).

Poor regulation, open access, population growth, poverty, fuelwood harvesting and agriculture encroach on protected areas, advancing deforestation around major roads at a rate of up to 2 kms² per year toward national parks, and habitat fragmentation which threatens the integrity of protected areas.

Communities have had little incentive to prevent encroachment, poaching, and other threats to nearby protected areas as they have received little benefit from conservation in the past. Rather than benefitting from conservation and tourism, Zambian protected area neighbors have suffered from human-wildlife conflict. One of the few ways in which communities have benefited is game hunting, where the law allows for 45 percent of hunting revenues to flow directly to communities via CRBs in GMAs. However, hunting revenues intended to be shared with communities have fallen short of their promise in the past, and used instead to bridge budget shortfalls in the Department of National Parks

¹ Unless otherwise stated, this section on factors constraining effective protected area management draws on two World Bank project appraisal documents - the Transforming Landscapes for Resilience and Development Project (P164764), Zambia Integrated Forest Landscapes Project (P161490), and Lindsey et al. (2014).

MAP 2. Zambia has one of the highest proportions of protected land in Africa



Source: *World Database on Protected Areas (UNEP-WCMC and IUCN 2020)*

and Wildlife (DNPW), previously known as the Zambia Wildlife Authority (ZAWA). Benefits to local communities from tourism are also limited by the size and concentration of the sector; 95 percent of tourism is clustered around the five most popular national parks - Kafue, South Luangwa, Mosi-oa-Tunya, Lower Zambezi and Lochinvar (MoTA 2018).

Too few enforcement staff, inadequate housing, and lack of basic infrastructure, all stemming from lack of funding, further constrain park management and reduce visitor numbers. For example, Lukusuzi National Park is one of Zambia's largest parks, and has high potential for biodiversity conservation and ecotourism, but lacks management and receives little government funding. In fact, protected areas

all over Africa are under-funded, with estimated deficits of over US\$1 billion annually. Zambia's funding deficit is estimated at 91 percent (Lindsey et al. 2018) we compiled a dataset of funding in Africa's PAs with lions and estimated a minimum target for conserving the species and managing PAs effectively. PAs with lions require \$1.2 to \$2.4 billion or \$1,000 to \$2,000/km² annually, yet receive just \$381 million or \$200/km² (median with inadequate funding from the central treasury for wildlife conservation (MoTA 2018).

Globally, governments do not prioritize investments in protected areas, in part because these investments are seen to support conservation but not to further development. Scarce public resources are instead allocated to other, competing development needs. But protected areas can provide development opportunities, as noted above, and may generate returns on public investments that far exceed the amounts governments spend. In the United States, in 2019, an annual investment of US\$3 billion of public resources in the National Parks System resulted in a contribution to GDP of US\$41.7 billion through visitor spending (US NPS 2019). Similarly, in 2018, Parks Canada generated a contribution to GDP of US\$3.1 billion and tax revenues of almost US\$0.4 billion for a public investment of approximately US\$1 billion (Parks Canada 2019). Moreover, investments in protected areas can generate significant benefits for local economies through job creation and income generation, lifting households out of poverty and providing them with incentives to support conservation goals. US Parks are estimated to support 329,000 jobs in gateway communities, and Parks Canada 40,469 jobs.

Governments often lack evidence for the economic impact of protected area tourism on local and national economies, and fail to see the development gains from public expenditure on conservation. The objective of this study is to make the economic case for public investment in protected areas in Zambia by estimating the direct and indirect benefits of tourism on local economies. This estimate of economic

impacts may strengthen the economic case for public investment in protected areas, much like public investments in roads and other forms of public infrastructure and assets. The study also estimates the benefits to local communities, for poor and non-poor households, to understand how protected area tourism incentivizes support for conservation, and how it may improve household incomes.

This study builds on two previous studies on the economic impacts of protected areas in Zambia – World Bank 2007 and Chidakel, Child, and Muyengwa 2021. World Bank (2007) estimated the economic impact of tourist spending on National Government revenues, and the overall effects of GMAs on local consumption, but did not estimate the impacts of tourism in protected areas on local economies and poor households. Chidakel et al., (2021) included the impact of tourist spending on tourist and other businesses near South Luangwa National Park, together with reported local consumption spending by businesses and employees. While this approach progressed towards capturing direct and indirect impacts, it used a 2007 national income multiplier for Zambia to estimate national impacts and did not consider price effects (while this study focuses specifically on local economic and community impacts).

This study assesses the full range of impacts on the local economy, and includes expenditures made in the local economy by households and local businesses who benefit from tourism through employment or through tourism-related local businesses. The study also estimates the additional income created around parks per dollar spent by visitors, and therefore the income multiplier from tourism in protected areas, and the rate of return per kwacha invested by the government in protected areas like national parks. Additionally, the study provides estimates on the economic impacts of human-wildlife conflict and the COVID-19 pandemic, and quantifies possible effects of government policies to increase local benefits from protected area tourism.



2

Background



2.1 POLICY AND INSTITUTIONAL CONTEXT

The GoZ has established the requisite legal instruments, policies, and institutional frameworks to conserve biodiversity in its network of protected areas. The framework behind the current institutions and management systems for protected areas and wildlife was first enacted in 1998 through the Policy for National Parks and Wildlife. This policy led to the Wildlife Act of 1998 which provided for the establishment of a corporate body, ZAWA, as the lead agency for wildlife management and wildlife estates² (MoTA 2018). The Wildlife Act of 1998 was replaced by the Zambia Wildlife Act (ZWA) No.14 of 2015 to improve implementation and linkages with related economic sectors. At the same time, the ZAWA was replaced with the DNPW, operating under the Ministry of Tourism and Art (MoTA). Placing DNPW under MoTA reflects GoZ's vision to create an environment supportive of conservation and the emergence of protected areas which function as economic assets and contribute to development.

All wildlife is protected within the boundaries of national parks. On the other hand, GMAs are separated into consumptive and non-consumptive use zones, with land closer to protected areas designated for non-consumptive use. Parks typically contain privately-run lodges that offer tourists accommodation, food, viewing safaris (photo-tourism) within the park, and other amenities, but no settlements. Villages and lodges exist within the GMAs surrounding parks.

There are three primary stakeholders involved in the management of protected areas, surrounding areas, and tourism-related activities:

- DNPW, which monitors the protected area, deploys park rangers, and represents national government.
- CRBs, which represent the interests of local communities living inside GMAs, with each CRB representing a *Chiefdom*.

CRBs are responsible for community projects such as boreholes, maintenance of community infrastructure including local markets, and hiring of community scouts. There are sometimes several Chiefdoms in a GMA, each with its own CRB.

- Lodge owners, hunting outfitters (individuals responsible for managing licensed hunting in the GMA's consumptive zones), and other tourism service providers.

About 40 percent of tourism in Zambia is based on consumptive use of wildlife (licensed hunting and other extractive activities), and 60 percent is based on non-consumptive use (mainly photographic tourism). The government receives revenues from tourism in protected areas through various mechanisms: through *park entry fees* paid by visitors, *non-consumptive fees* paid by lodges³ located inside national parks, *safari hunting concession fees*⁴ also known as the "right to hunt fee" paid by businesses operating in hunting blocks, *outfitter license fees* paid by hunting operators/outfitters⁵, *animal fees* or trophy fees (varies by species) and *hunting fees* which include application and basic fees. Furthermore, based on stakeholder consultations in July 2019, it was decided that lodges in GMAs⁶ would in the near future be expected to pay a land user fee to the government.

Park entry fees are different for domestic and international visitors: domestic visitors pay 41.7 kwacha (US\$2.98), and international visitors pay US\$25 each. Killing or capturing a game animal⁷ generally requires payment of the four different fees noted above - safari hunting concession fee, outfitter license fee, animal fee, and hunting fee. The GoZ establishes a quota for each species that may be hunted within the consumptive zone of a GMA each year. Animal and hunting fees are per-animal and vary by species. They apply to GMA members as well as visitors from outside the GMA.

2 Includes national parks, wildlife sanctuaries, GMAs and any other area devoted to wildlife and managed by public institutions.

3 Non-consumptive fees include leasing and park entry, bed levies, fees for commercial filming and photography, game drives, walking safaris and water-based activities.

4 DNPW in consultation with the local community is mandated to grant hunting concessions to a business in a specified hunting block. The business enterprise follows the process laid out under section 48 of the Zambia Wildlife Act No.14 and is awarded a contract after a successful bid. The concessionaire has obligations to fulfil during the term of the hunting concession agreement. A hunting block means a Game Management Area or an area within it that is set aside for hunting.

5 A hunting outfitter is a company which offers safari hunting, and which holds a tourism enterprise license and a hunting concession; a hunting license is a license issued under section 40 of the ZWA.

6 For a lodge to be built in a Chiefdom, there must be agreement among three separate parties: first, consent from the local Chief who owns the land must be obtained, followed by approval of the Chiefdom's CRB board; afterwards, the plan is submitted to DNPW and the lodge operator for final approval.

7 Wild animals defined as such under legislation for the purposes of game management, hunted for food and/or particular products, and/or sports, including trophy hunting.

There is no law governing how the GoZ Treasury uses revenues from park entry fees and lodges, and Treasury decisions about park funding are formally independent of the fees collected. The ZWA, however, decides how fees from killing or capturing game animals are to be used. Fifty percent of revenues from outfitter licenses, animal fees, and hunting fees; and 20 percent from safari hunting concessions is shared with the CRB, as per the ZWA. Moreover, five percent from these fees is shared with the local Chieftains, and the remainder allocated to the CRB. In situations in which one GMA has several chiefdoms (thus several CRBs), the money is split equally among the CRBs. The funds to CRBs are further split three ways: 20 percent for CRB administrative costs; 35 percent for community development projects (boreholes, toilets and schools); and the remaining 45 percent for resource protection, primarily hiring

and maintaining scouts for patrols. Once the land user fee is operational, the law stipulates that 45 percent of the fee will be given to the CRB, 5 percent to the chief, and the remainder retained by DNPW.

In addition, lodges inside the GMA are obliged to participate in social responsibility programs, usually involving reinvestment in the community in the form of schools, hospitals, and conservation. This is another mechanism for communities to benefit from tourism in protected areas.⁸

In theory, these revenue-sharing arrangements channel economic benefits from resource conservation to local communities, create incentives for communities to protect the wildlife within the GMA, and compensate communities for losses from human-wildlife conflict.

2.2 STUDY SITES

The study focuses on two national parks - the Lower Zambezi and South Luangwa National Parks (see Map 3). Both parks have high biodiversity values, particularly wildlife, and both attract large numbers of visitors from around the world.⁹

Lower Zambezi National Park, established in 1983, runs along the north bank of the Zambezi River in southeastern Zambia. Prior to 1983, it was the private game reserve of the President of Zambia. It is part of a unique binational

conservation system and borders Zimbabwe's Mana Pools National Park, with the Zambezi River separating the two countries and parks. The Lower Zambezi and Mana Pools National Parks form a contiguous 628,800 hectare (2,428 square mile) protected area, and wildlife moves freely between the two countries by crossing the Zambezi River. Surrounding the Lower Zambezi National Park to the west is Chiawa GMA, with Rufunsa GMA to the north (see Map 4). Chiawa GMA is also a de facto buffer zone for the Zimbabwe park, which extends farther along the Zambezi River than the Zambia park (see Map 4). South Luangwa National Park borders Chisomo and Sandwe GMAs to the south, Lupande and Lumimba GMAs to the east, and Munyamadzi GMA to the north and west (see Map 5).

According to the DNPW, there are six lodges in Lower Zambezi and 21 in South Luangwa. Road access is difficult, particularly during the rainy season. Most visitors, therefore, arrive by plane. A landing strip is located outside each of the two parks, and in the case of South Luangwa National Park, the Mfuwe International Airport is the main point of entry, and there are two strips inside Lower Zambezi Park.

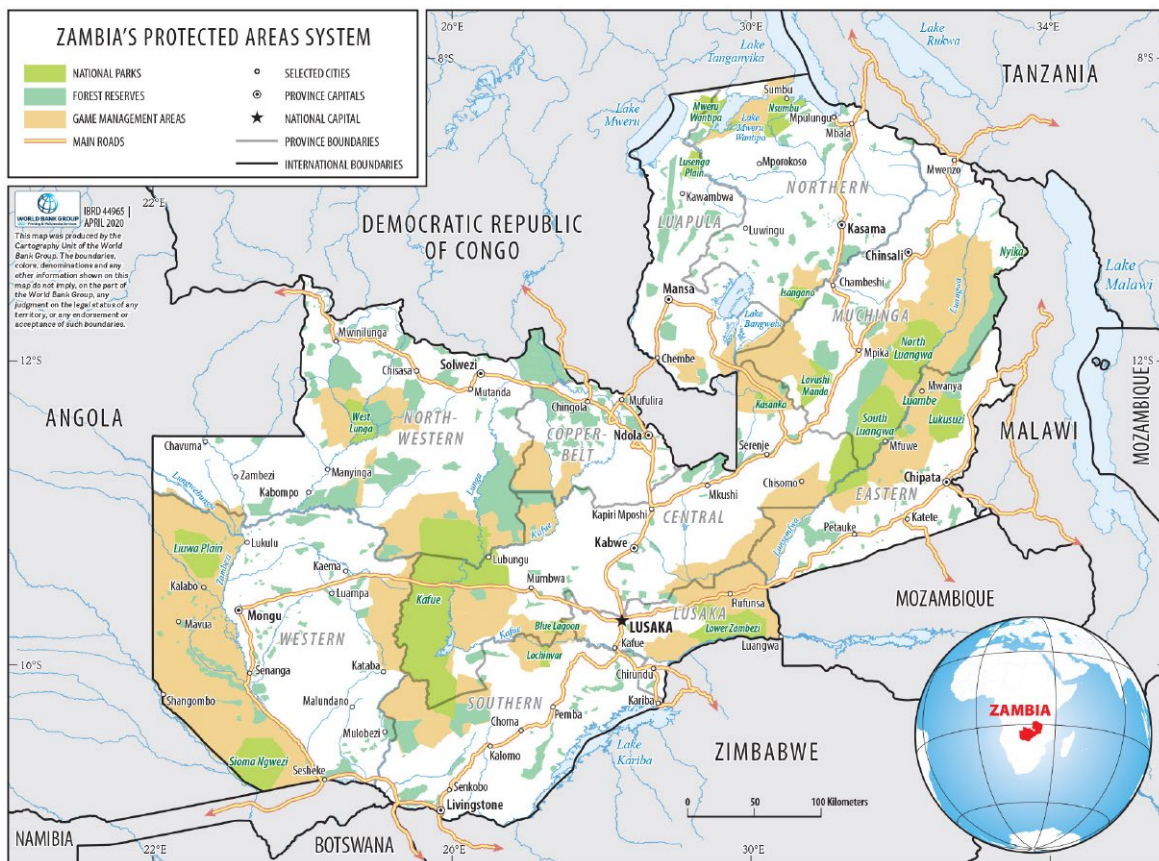
Box 2. What is a Local Economy?

A local economy could be a village, a collection of villages, a town, region, or even country. The wider the demarcation, the more economic activity and economic benefits that will likely be captured, so the definition chosen will depend on the goals of the study. To be effective, conservation policies which underpin protected areas rely on surrounding communities to act as stewards of biodiversity. In Zambia, people living around protected areas need to see the benefits—including economic benefits—of preserving wildlife. For the purpose of this study, therefore, the local economy is defined as the villages within the GMAs surrounding each national park. Moreover, because village households and businesses are linked to nearby market towns just outside the GMA through the purchase of goods and services, the market towns nearest to each park were also included as part of the local economy for this study.

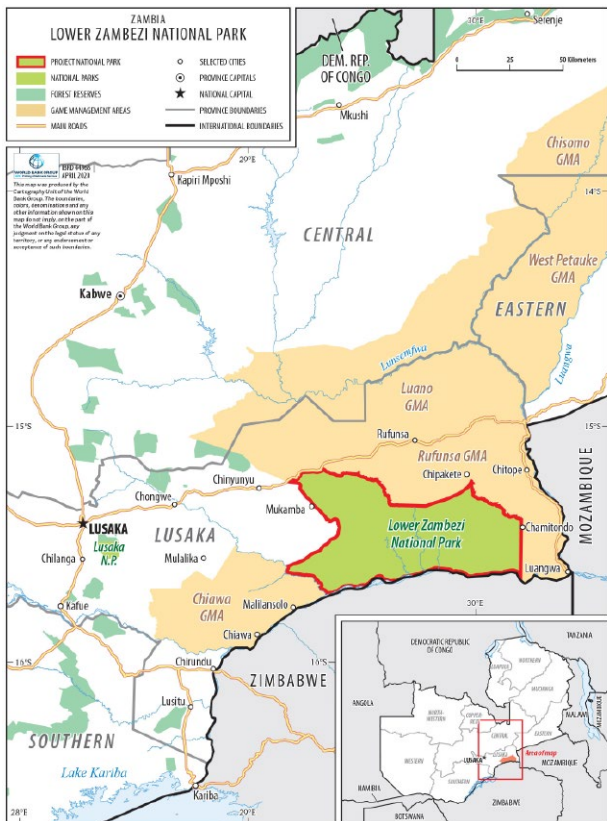
8 In South Luangwa, some study sites i.e., lodges in Chiefdoms, are required to hire 80 percent of their staff from the Chiefdom in which the lodge operates. In practice, this rule is not enforced, and can be satisfied by people from the CRB/Chiefdom's catchment area.

9 The study sites were selected because they are important tourism destinations, and on the recommendation of the Zambian Government.

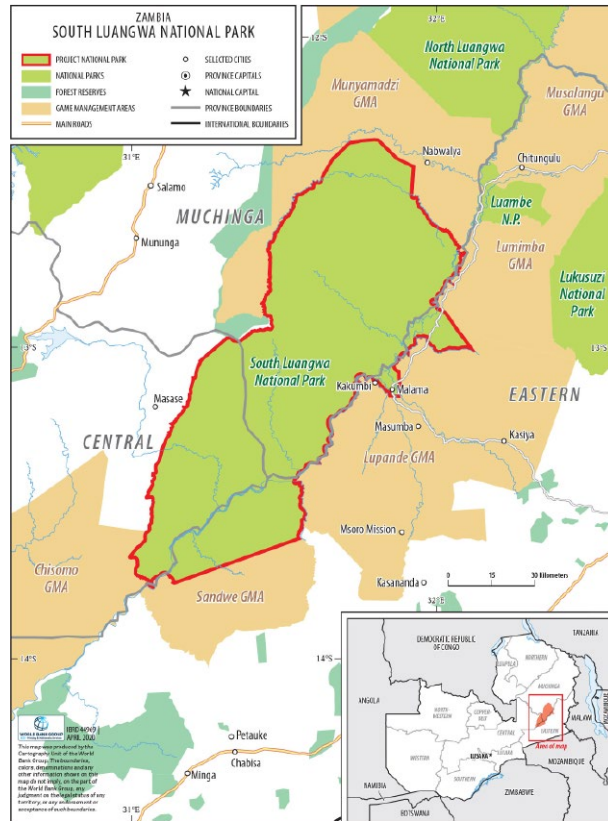
MAP 3: Lower Zambezi and South Luangwa National Parks on the national map of Zambia



MAP 4: Lower Zambezi National Parks and related GMAs



MAP 5: South Luangwa National Park and related GMAs

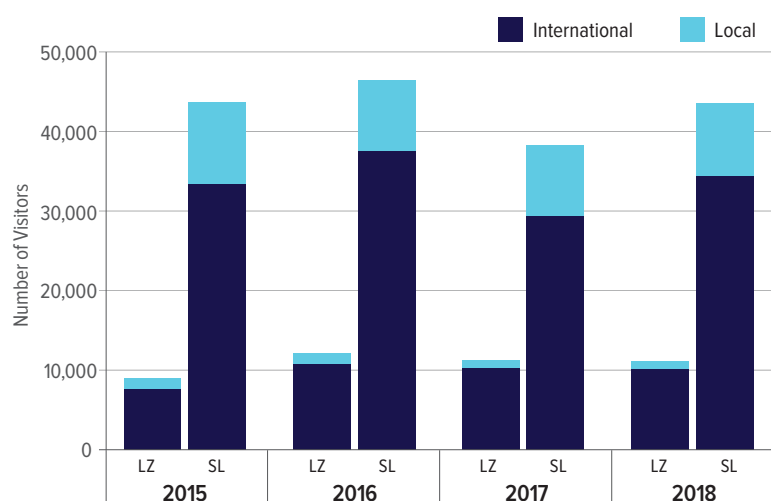


At both sites, a small regional commercial center relatively close to the park supplies goods and services to the households and businesses in the GMA and to park lodges: Chirundu, in the case of Lower Zambezi, and Chipata in the case of South Luangwa. The villages within the GMAs around each park, along with these nearby market towns with which they interact,

constitute what is called the “local economy” for the purposes of this study. Specifically, Chiawa GMA and the market town of Chirundu constitute the local economy for Lower Zambezi National Park, and Upper and Lower Lupande GMA and the market town of Chipata for South Luangwa National Park.

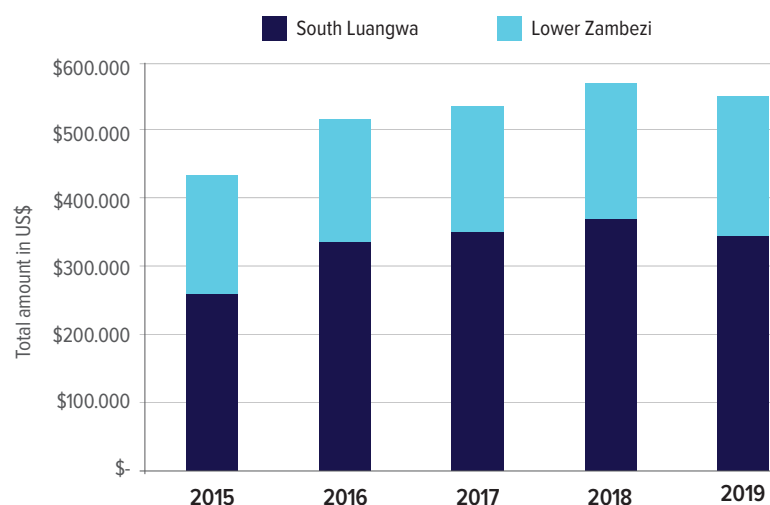
2.3 GOVERNMENT REVENUES AND EXPENDITURES

FIGURE 1. Number of Visitor Entries to Lower Zambezi (LZ) and South Luangwa (SL) National Parks, 2015-2018



Source: DNPW, Government of Zambia

FIGURE 2. Non-consumptive fees



Source: DNPW, Government of Zambia

Figure 1 shows the number of domestic and international visitor entries to each of the two parks between 2015 and 2018. 60,842 visits were made to these two parks in 2018: 11,161 at Lower Zambezi (LZ) and 43,469 at South Luangwa (SL). Most—49,858, or 82 percent—were by international visitors. Over these four years, the number of visits has not varied significantly, averaging about 53,907 per year.

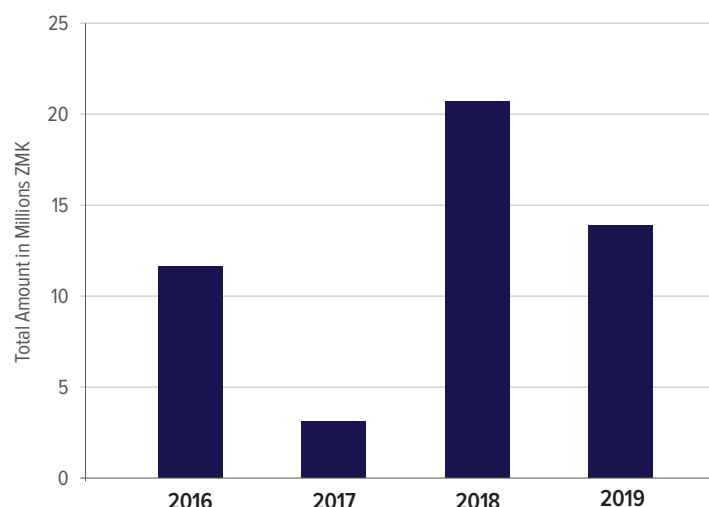
The top panel of Table 1 summarizes GoZ revenues from the two national parks in 2018. Expenditures are summarized in the bottom panel.¹⁰ Revenues totaled 64.5 million kwacha (US\$5.4 million), and expenditures totaled 50.9 million kwacha (US\$4.2 million).

Non-consumptive fees or fixed leases paid by lodges inside the park are a significant source of revenue for DNPW, with a yearly average of approximately US\$520,000 (see Figure 2). South Luangwa generates more money through this revenue stream due to its high number of lodges.

Revenue from hunting constitutes the largest share of revenues from tourism in protected areas to the GoZ Treasury. In 2013, Zambia banned hunting for two years, which resulted in a loss of revenue for communities and DNPW. However, since the ban was lifted in 2015, there have been 44 outfitters paying license fees totaling US\$107,000 per year. Since 2016, revenues to communities from hunting have fluctuated, but amounted to 13.92 million kwacha (US\$1.2 million) in 2019 (see Figure 3).

Notably, expenditure by the GoZ on the two parks is less than the revenue earned from them. The bottom panel of Table 1 presents GoZ expenditures to maintain the two parks. They include a payment of 20.7 million kwacha (US\$1.73

¹⁰ Further details on revenues and expenditures are provided in Annex 1.

FIGURE 3. Non-consumptive fees

Source: DNPW, Government of Zambia

million) to CRBs in the GMAs around the two parks from consumptive (hunting) fees, and expenditures on game wardens, maintenance and office workers, and other workers. Subtracting these expenditures from revenues, the Treasury appears to have netted approximately 16.17 million kwacha (US\$1.34 million) from Lower Zambezi and South Luangwa National Parks. This revenue from two of Zambia's major national parks may be used to support biodiversity conservation at other sites, or other national priorities. However, these revenues are only part of the overall economic impact of these parks on their local economies. The next section describes the methodology used to estimate the total economic impacts – direct and indirect – on local economies and communities.

TABLE 1. GoZ revenues and expenditures at the two study sites (LZ and SL National Parks) in 2018*

REVENUES	ZMK	USD
Park visitor fees	13,727,178	\$1,143,330*
Non-consumptive Fees	6,858,243	\$571,220
Safari Hunting Concession Fees	8,653,694	\$720,766
Outfitter License Fees	1,284,675	\$107,000
Animal Fees	30,996,458	\$2,581,680
Hunting Fees	2,993,532	\$249,331
Total Revenues to GoZ	64,513,780	\$5,373,327
EXPENDITURES		
GoZ Payment to CRBs	20,724,533	\$1,726,146
Wage Expenditures	27,613,450	\$2,299,924
Non-wage Expenditures	2,595,230	\$216,157
Total Expenditures	50,933,213	\$4,242,227
GoZ Revenues Minus Expenditures	13,580,567	\$1,131,100

Note: This is an estimate gained by multiplying the number of visitors (provided by DNWP) by the fee per international and national visitor.

Complete wage expenditure information was only available for South Luangwa in 2018. The last year in which it was available for both parks was 2015. Because of this, 2015 data was used to calculate total GoZ wage expenditures on the two parks. These are conservative estimates of what these expenditures were likely to have been in 2018.

* Information in this table was reported for the two parks together and is given in sum here. Revenues reported by GoZ are conservative compared with local estimates gathered through consultation with experts. Informal estimates for SL National Park range between US\$2–3 million, concentrated mainly in non-consumptive tourism.

3

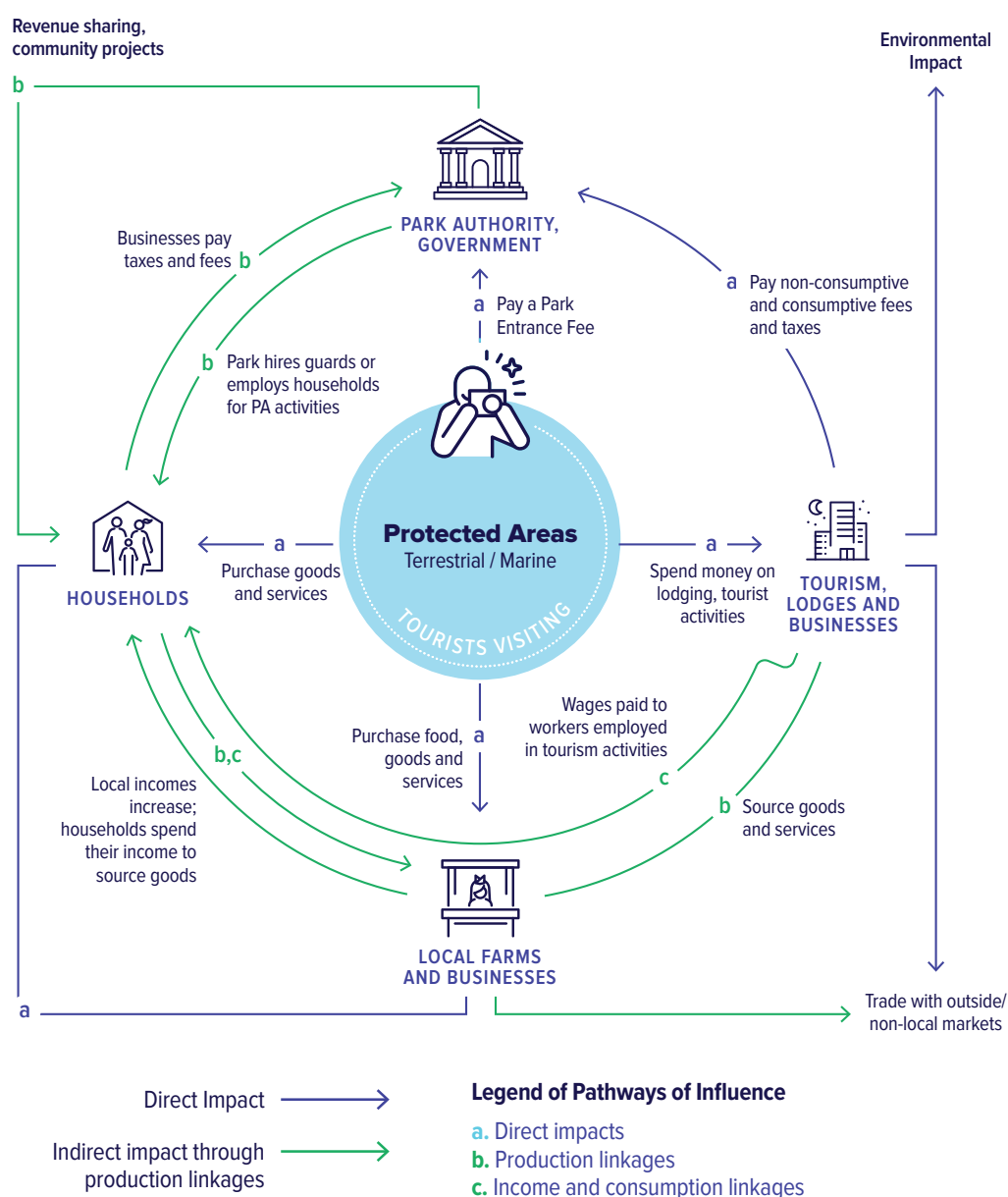
Methodology



3.1 AVENUES FOR ECONOMIC IMPACTS OF PROTECTED AREAS

As noted, tourism in protected areas can impact local economies through direct (shown by arrows a in Figure 4) and indirect channels. Indirect channels can, in turn, be broadly classified as: production linkages (shown by arrows b in Figure 4) and income and consumption linkages (shown by arrows c in Figure 4).

FIGURE 4. Economic Pathways of Tourism in Protected Areas



3.1.1 Direct impacts

Protected areas attract tourists who spend money on various services. Tourists spend money at lodges inside national parks and GMAs (often via tour packages they purchase outside the country which in turn channel money into the lodges). Tourists also partake in tourism activities such as game drives, walking safaris, wildlife photographic tourism, hunting, etc. either through the lodges or hunting outfitters and other tourism service providers. Tourists sometimes purchase goods and services directly from local businesses and households. Finally, tourists also pay park entrance fees that accrue to the GoZ Treasury along with consumptive and non-consumptive fees and taxes from tourism lodges and businesses. Among these channels of tourist spending, the only one that contributes directly to local economies is when tourists buy directly from local businesses and households, and these opportunities are limited or nonexistent when visitors fly directly to parks or airstrips close to them. *A tourism impact analysis based on tourist expenditures would stop here and would only capture a fraction of the impact of tourism in protected areas on the local economy.*

Protected areas also affect local economies directly by affecting resource extraction—in the case of Zambia’s national parks, through restrictions on hunting and fishing. By regulating these activities, protected areas can have an adverse effect on the incomes of households that would otherwise hunt or fish. On the other hand, by promoting the recovery of over-exploited common property resources (forests, animals, and fish), protected areas may also increase sustainable resource extraction. Wildlife in parks is protected but recovering populations may spill over into GMAs or buffer zones. The benefits of larger wild animal populations include hunting opportunities for local people in the consumptive zones inside GMAs. Of course, larger wild animal populations also increase the likelihood of human-wildlife conflicts, as when elephants raid farmers’ fields or predators attack livestock. The overall impacts of wildlife on local incomes are therefore unclear, and need to be both quantified, and better understood.

3.1.2 Indirect Impacts Through Production Linkages

As tourism activities expand and resource extraction contracts, these activities’ demand for intermediate inputs will change, producing a

first round of indirect effects in a local economy through production linkages. For example, more tourists mean increased demand for lodging and restaurant meals, and therefore greater demand for everything from ingredients (meat, fish, fruits, vegetables, etc.) to beverages and napkins and workers. To the extent that lodges and tour operators hire workers from local households and purchase goods and services from local farms and businesses, the greater demand for lodging and meals will have positive linkage effects on the local economy. Inputs purchased from outside the local economy will create positive linkages for other parts of the country, or potentially in other countries and not for the local economy. Similar impacts are realized when a park hires local guards or employs local households, when hunting and other revenues are shared with CRBs and used to source local goods or to employ local people, and when the corporate social responsibility (CSR) programs of lodges and other businesses generate local economic activity. When tourist services, protected area management activities, and those promoted by CRB and CSR programs expand, they create positive indirect impacts on local economies. On the other hand, a contraction in resource-extraction may have an opposite effect if extraction relies on local inputs. *An input-output (IO) analysis would stop here, and only capture the direct impacts and the indirect impacts through production linkages.*

A critical issue when analyzing these production linkages is whether the local supply of goods and services can expand to meet the new demand. If it does not, growth in demand around protected areas may inflate prices. This reduces the real or inflation-adjusted income gains from protected areas. Estimation of indirect impacts must take these potential inflationary effects into account.

3.1.3 Indirect Impacts Through Income and Consumption Linkages

In addition, all production activities in the local economy triggered by tourism in protected areas generate income in the form of wages and profits. Wages paid to workers in tourism potentially also have a positive indirect effect on the local economy as they trigger fresh rounds of spending. Wages and profits from locally owned tourist businesses, and local businesses which supply them, flow into local households, which in turn spend income in the local economy. Of course, if resource extraction contracts

household incomes, then indirect income effects from the protected area via that activity may be negative instead of positive.

As local activities expand to supply new household demands, new rounds of increased input demand, income, and household expenditures follow, creating additional increases in income and demand in the local economy. Successive rounds of impacts become smaller and smaller, and the overall (direct and indirect) effect of the expansion in tourism converges to an income multiplier, defined as the change in local household incomes per unit of fresh infusion of cash into the economy through tourist spending. If local market linkages are strong, each dollar of tourist spending may increase local income by

more than a dollar. Local income multipliers are not necessarily greater than one, because the new demand created by tourist spending may be met by purchases from other parts of Zambia or abroad. In this case, the income “leaks out” from the local economy to other places, creating benefits there instead. If the supply of goods and services in the local economy is elastic, prices will not change much as local demand increases. Otherwise, rising local demand could place upward pressure on prices, causing real or price-adjusted multipliers to diverge from nominal (cash income) ones. *The general equilibrium (GE) model will capture all of the effects, the direct impacts and both channels of indirect impacts.*

3.2 LEWIE MODEL

Quantifying the direct and indirect impacts of tourism in protected areas on local economies therefore requires an applied GE approach. For this study, a GE method called “local economy-wide impact evaluation” (LEWIE) was used.¹¹

LEWIE uses simulation methods to estimate the direct and indirect (or “spillover”) effects of protected area-induced tourism. LEWIE uses a structural approach that integrates models of actors (businesses and households) within a GE model of the local economy. Businesses include locally owned firms and businesses not owned by locals but typically employing some local workers and purchasing some locally supplied inputs. There is a rich tradition in economics of using micro survey data to construct models of agricultural households that are both producers and consumers of food (Singh, Squire, and Strauss 1986). LEWIE initially uses micro-survey data and econometric methods to construct models of firms, households, and household-farms within local economies. Then, these micro-models are “nested” within a GE model of the local economy, drawing from the literature on GE modeling in economics (Dixon and Jorgenson 2012). The models of firms describe how businesses combine various factors (e.g., hired labor, family labor, land, capital) and

intermediate inputs (fertilizer, seed, and a variety of purchased inputs) to produce an output (corn, prepared meals, a service), which may be consumed locally or sold. The household and household-farm models describe productive activities, income sources, and consumption/expenditure patterns. In a typical model, households participate in activities such as crop and livestock production, resource extraction (e.g., fishing), retail, other business activities, and in the labor market. Production functions for each activity are the recipes that turn inputs into outputs.

Micro survey data are required to populate the LEWIE model, and play two main roles in its construction. They provide initial values for variables in the model i.e., inputs and outputs of each production activity, and household expenditures on goods and services. The data are also used to econometrically estimate model parameters for each household group and sector, together with standard errors on these estimates. These initial values and parameter estimates are organized into a data input spreadsheet designed to interface with the GAMS (Generalized Algebraic Modeling System) software used to program the LEWIE model.

11 A basic reference for this methodology and examples of recent studies using the LEWIE methodology can be found at <http://beyondexperiments.org/> (Taylor and Filipinski 2014).

3.3 DATA COLLECTION¹²



Box 3: Building Capacity While Doing Research

A team of 15 Zambian university students and recent graduates were trained to carry out the fieldwork for this study. This included a one-week face-to-face course on the LEWIE methodology, and on how to conduct detailed household and business surveys with questionnaires using the ODK platform. At the end of the week, the team visited a village near Lusaka for field testing. This was followed by two weeks of data collection around Lower Zambezi National Park and two weeks around South Luangwa National Park. Enumerators were awarded certificates of completion of the LEWIE survey training course and fieldwork.

The students (8 men and 7 women) were extremely appreciative of the hands-on experience through which they gained research, survey, and team-work skills, and felt privileged to view their country's natural assets up close. They reported seeing lots of elephants and other animals on the way to fieldwork sites, and appreciated learning about protected area management and the tourism sector. Some quotes from their feedback report include:

My experience in the field in lower Zambezi was an eye opener to the adverse effects of drought and climate change and how it affects ordinary people who heavily depend on agriculture in this region for their livelihoods
—Mr. Kenneth Mulenga.

With this experience, I gained more knowledge on protected areas, gained more skills with field work, my group working skills have improved and my communication skills have really been enriched. It was an extremely, overwhelming experience working in the field — Miss Nozyenji Mwale.

To build the LEWIE model, data were gathered through surveys of tourists, lodges and resorts, local businesses, and local households. Surveys gathered information on production, income, expenditures, and the locations of transactions (i.e., whether they are inside or outside the local economy). The household and local business surveys were entered onto tablets using the Open Data Kit (ODK) platform for Android. A team of Zambian enumerators were trained to carry out the business and household surveys (see Box 3).

Table 2 shows the total number of households, the sample size, and the percentage of households surveyed at each site.

Data on visitor expenditures were gathered through hard-copy survey forms distributed by Proflight, the air carrier that services the majority of tourists, on its return flights to Lusaka from each of the two parks. In total, 226 visitors returned complete and usable questionnaires for our survey. Of these, most—all but 12—were international visitors.

Reliable data on lodges' income and expenditures is proprietary and difficult to obtain. For this study, these data were gathered from three sources: data collected by the survey team from six lodges at both parks, a recent survey of 13 lodges in South Luangwa conducted by Chidakel, Child, and Muyengwa (2021), and information about lodges, including nightly rates, available online.¹³ The data were broadly consistent across sources.

TABLE 2. Sample Sizes and Local Populations

	LZ		SL	
	GMA	Market Town	GMA*	Market Town
Estimated number of households	6100	3000	8000	10000
Sample size for survey	311	164	330	124
Percent surveyed	5.1%	5.5%	4.1%	1.2%

*Note: Number of households for SL only includes the two surveyed Chiefdoms.

¹² Further details on the data collection methods are provided in Annex 2.

¹³ For example, see <https://www.zambiatourism.com/accommodation/lower-zambezi/national-parks/zambia/38/>



4

Data Summary



4.1 TOURISTS AND TOURISM BUSINESSES

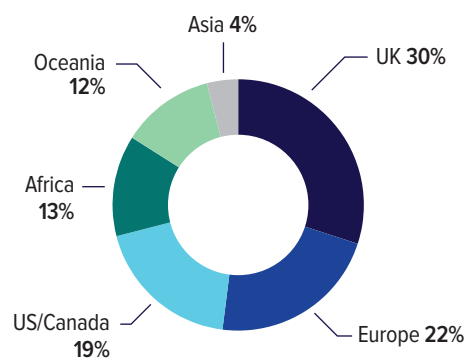
Figure 5 shows the shares of visitors by region of origin. The largest share came from the United Kingdom, followed by the rest of Europe and the United States and Canada. Similar shares were from Africa and Oceania.

Less than one-fifth (18 percent) of surveyed tourists reported visiting Lower Zambezi during their trip, while many more (93 percent) reported visiting South Luangwa. These percentages add up to more than 100 percent, because many people visited both parks.¹⁴ The majority of visitors came for tourist activities (greater than 90 percent). On average, the duration of stay was 3.4 nights and 5.0 nights for Lower Zambezi and South Luangwa, respectively; the sizes of tourist groups were comparable between sites (see Table 3).

By far the largest expenditure was on tourism packages that included accommodation, meals, and park entry fees and tours. In most cases, packages also included international airfares, transport to and from the park (usually by plane), and commissions to booking agents. On average, tourists spent 40,661 kwacha (US\$2,904¹⁵) per person to visit Lower Zambezi and 34,359 kwacha (US\$2,454) to visit South Luangwa National Park. Subtracting booking agent commissions, airfares, and other costs of getting to and from parks (as these do not contribute

to local economic impacts),¹⁶ and dividing by the average stay at each park, gives the local expenditure per tourist per night. These expenditures include spending on lodging, meals, park entry, tours, and out-of-pocket items. They equal 3,097 kwacha (US\$221) at Lower Zambezi and 1,909 (US\$136) at South Luangwa (Table 4). Most of this money flows into lodges, which offer rooms, meals, and park tours. Spending outside of tourism packages was higher at Lower Zambezi (1,430 kwacha, or US\$130) than South Luangwa (881 kwacha, or US\$68).

FIGURE 5. Tourists by Origin



Source: Tabulations from visitor survey

TABLE 3. Trip Characteristics

		Share of Surveyed Tourists	Average Number of Nights Spent	Average Number in Party	
				Total	Adults
Lower Zambezi	Mean	0.18	3.37	5.9	5.66
	(N=41 visits)	(0.39)	(1.3)	(6.34)	(5.92)
South Luangwa	Mean	0.93	5.01	5.7	5.39
	(N=211 visits)	(0.25)	(0.39)	(6.18)	(5.66)

Source: Tabulations from visitor survey

¹⁴ The percentages from the survey data roughly align with the most recently available official data on park visits: in 2018 there were 11,161 visits to Lower Zambezi and 43,469 to South Luangwa (DNPW estimates). The percentage of visits to Lower Zambezi in the official data (20 percent of the total for the two parks) is close to that of our survey. In our survey, the percentage of respondents who reported visiting South Luangwa is somewhat higher than that from the official data for 2015 (80 percent).

¹⁵ The exchange rate for survey and model outputs is 1 ZMK = 14 USD unless otherwise noted. This rate reflects an average exchange across the time of the survey.

¹⁶ It is estimated that about 60.1 percent of the cost of tour packages is spent on lodges. This is a rough estimate based on the costs of direct bookings as advertised on websites, and is used in the absence of such information from hotels themselves. Hotels that do not advertise their prices, including some luxury lodges, were not included in this estimate, and therefore, accommodation costs are conservatively estimated.

Taking the average for each expenditure category, it was estimated that lodges spent an average of 6,314 kwacha per visitor on wages, 249 kwacha on locally-grown crops, 202 kwacha on local livestock products, 1,213 kwacha on local services, and 740 kwacha on goods from local

retailers. On average, lodges purchase approximately 16 percent of their daily inputs (in value terms) from non-local sources.¹⁷ These expenditures are the indirect pathways through which local communities benefit from tourist spending.

TABLE 4. Local Tourist Expenditures in Kwacha

	Lower Zambezi	South Luangwa
% Purchasing Packages	0.68 (0.47)	0.79 (0.41)
Mean Local Expenditures Per Tourist/Night (lodging, meals, park entry, tours, out-of-pocket)		
All Visitors	3097	1909
SD	(3523)	(2170)
International Visitors	3,600	1,998
SD	(3617)	(2191)
Domestic Visitors	331	242
SD	(295)	(198)
Mean Local Expenditure Per Tourist/Night, by Type* (Only Available for International Tourists)		
Lodges (includes room, meals, tours, park entry)	1,668	1,028
SD	(1897)	(1168)
Mean Out-of-Pocket Spending		
Total	1430	881
SD	(1626)	(1001)
At Lodge (e.g., curios, bar)	336	207
SD	(382)	(235)
Local Retail Shops [†]	720	444
SD	(819)	(504)
Local Services [†]	107	66
SD	(122)	(75)
Local Transport	267	164
SD	(304)	(187)
Sample (Max)	33	177
Sample Size	226	

*Note: Breakdown by expenditure type is only possible for international visitors, due to small sample size of domestic visitors. Airfare and Hotel costs are derived using average flight costs when costs are included in tour packages. Out-of-Pocket Spending not included in package cost.

[†]Local retail shops include all manner of convenience shops, liquor shops, souvenir shops and other retail goods. Local Services include bars and clubs, massages, and other services.

**Sample size varies due to availability of information.

¹⁷ As previously noted, the definition of local economy includes the nearby market towns (Chirundu for Lower Zambezi and Chipata for South Luangwa), where most hotels purchase inputs in bulk.

4.2 HOUSEHOLDS

The household surveys provide rich data on household demographics, economic activities, and spending, which determine economic impacts within local economies around each park.

Average household expenditure per capita is 5,067 kwacha (US\$362) at Lower Zambezi and 3,108 kwacha (US\$222) at South Luangwa (see Table 5). At Lower Zambezi, 56 percent of households have average per-capita expenditures below the poverty line of US\$1.90/day (using PPP adjusted exchange rates).¹⁸ The poverty rate is higher at South Luangwa at 83 percent. The World Bank reports that Zambia as a whole had a poverty rate of 58 percent in 2015, the latest year for which this information is available.¹⁹

Table 6 reports households' demographic characteristics and activities. Households at Lower Zambezi and South Luangwa have 4.5–6.2 members on average, with poorer households having more members on average (6.2 vs 5.5 for Lower Zambezi and 5.6 vs 4.5 for South Luangwa poor and non-poor, respectively). The most common source of income for households at both locations is agriculture, followed by livestock, and wage employment. Forty percent of poor households in Lower Zambezi and 24 percent in South Luangwa have some form of wage employment; these numbers are higher, at 59 percent and 47 percent for their non-poor counterparts in Lower Zambezi and South Luangwa, respectively. Wage employment includes work in non-tourism and tourism activities.

TABLE 5. Poverty Headcount

		Average Per Capita Expenditure (Annual)	Poverty Headcount*
Lower Zambezi sample: 329	Mean	5,067	0.56
	SD	(6,478)	
South Luangwa sample: 233	Mean	3,108	0.83
	SD	(3,377)	

Note*: Poverty Headcount calculated as the proportion of households with under \$1.90/day per capita income (PPP adjusted using PPP exchange rate of 4.475)

TABLE 6. Household Demographics and Activities

		HH Size	Head Age	Head Educ	Share of Households Participating in:				
					Agri	Livestock	Fishing	Business	Wage Employment
Lower Zambezi Poor	Mean	6.15	47.2	5.52	0.76	0.50	0.15	0.27	0.40
	SD	(2.57)	(14.0)	(3.76)	(0.43)	(0.50)	(0.36)	(0.44)	(0.49)
Lower Zambezi Non-poor	Mean	5.52	43.1	7.86	0.77	0.59	0.23	0.34	0.59
	SD	(2.44)	(12.9)	(3.50)	(0.42)	(0.49)	(0.42)	(0.48)	(0.49)
South Luangwa Poor	Mean	5.60	46.1	5.77	0.94	0.60	0.11	0.23	0.24
	SD	(2.33)	(15.3)	(3.42)	(0.24)	(0.49)	(0.32)	(0.42)	(0.43)
South Luangwa Non-poor	Mean	4.54	46.3	6.78	0.85	0.44	0.13	0.33	0.47
	SD	(2.29)	(15.8)	(3.53)	(0.36)	(0.50)	(0.33)	(0.47)	(0.50)

Source: World Bank survey

¹⁸ World Bank 2018 PPP exchange rates were used in lieu of 2019 figures, which were not available at the time of this study.

¹⁹ The World Bank in Zambia: Overview. <https://www.worldbank.org/en/country/zambia/overview>

The importance of local tourism is evident in household wage activities (see Table 7). Twenty-four percent of poor households and 34 percent of non-poor households around Lower Zambezi National Park and 17 percent of poor households and 42 percent of non-poor households around South Luangwa had wage income from tourism employment during the year prior to the survey. Non-poor households have a higher percentage of members working in tourism-related enterprises. Tourism-related activities, including jobs in lodges, restaurants

and tour businesses, tend to pay higher wages than other activities: 58 kwacha per day for poor workers and 84 kwacha per day for non-poor workers at Lower Zambezi, and 58 kwacha per day for poor workers and 66 kwacha per day for non-poor workers at South Luangwa.²⁰ Types of tourism-related jobs listed on the household survey include visitor services (restaurant work, employment at hotels/lodges and tour agencies), maintenance (repairs, ground keeping) and crafts (handicraft manufacturing).

TABLE 7. Wage Income and Employment

		Days Worked	Share Working > 150 Days	Average Wage Income	Average Wages per day (kwacha)	Share with Second Job	Share with Tourism Employment	Average Tourism Employment Wage
Lower Zambezi Poor N=117	Mean	152.2	0.47	7325	52.2	0.08	0.24	58.4
	SD	(113.1)	(0.50)	(8,208)	(66.3)	(0.27)	(0.43)	(31.6)
Lower Zambezi Non-poor N=136	Mean	191.0	0.67	13710	71.4	0.01	0.34	83.7
	SD	(103.9)	(0.47)	(11,898)	(57.6)	(0.12)	(0.47)	(57.7)
South Luangwa Poor N=95	Mean	120.9	0.31	4065	33.2	0.04	0.17	58.2
	SD	(90.7)	(0.46)	(5,176)	(32.1)	(0.20)	(0.38)	(30.7)
South Luangwa Non-poor N=36	Mean	200.3	0.64	11525	56.4	0.00	0.42	66.0
	SD	(89.8)	(0.49)	(8,264)	(30.4)	N/A	(0.50)	(20.3)

Source: World Bank survey

20 Variation in wages between poor and non-poor workers in the same sector is due to differing positions held by workers within these groups (e.g. a poor employee in the tourism sector likely works in a job that pays lower wages than the job of a non-poor employee).

4.3 LOCAL BUSINESS AND ENTREPRENEURIAL ACTIVITIES

Thirty percent of households in Lower Zambezi and 25 percent of households in South Luangwa own and operate some form of business. Businesses are defined as entrepreneurial activities, including small business types such as hawkers, small grocery stalls, and other roadside vendors. Distribution of business types

varies between the two survey sites (Table 8). More service-type businesses are found in South Luangwa.²¹ This may be because visitors pass through communities on their way from the airport to South Luangwa, while at Lower Zambezi, there are no communities or businesses between the airport and the park.

TABLE 8. Household Business Types by Site

Business Type	Lower Zambezi	South Luangwa
Agriculture	8.8%	17.7%
Livestock	0.6%	0.6%
Retail	68.5%	43.7%
Services	16.6%	33.7%
Hotels and Lodges*	1.7%	0.0%
Tour Operators	3.9%	4.4%
Total	100%	100%
Sample (number of businesses)	172	181

*No households in the South Luangwa sample operated a hotel or lodge.

Source: World Bank Survey

²¹ A number of restaurants, coffee shops, barbers, and other services line the road leading up to the main gate of South Luangwa National Park.

5

LEWIE Model Findings



As noted above, the LEWIE model can be used to estimate the direct and indirect impacts of tourism in protected areas on a local economy. There are many avenues through which these impacts manifest. Data availability determines in large part the extent to which these avenues can be captured through the LEWIE model. A summary of the avenues and how they are modeled by LEWIE is provided in Table 9.

Once built, the LEWIE model can be used to quantify impacts on a local economy. Because the model parameters have been estimated econometrically, Monte Carlo methods are used to perform significance tests and construct confidence intervals around the simulated impact results as shown by Taylor and Filipinski (Taylor and Filipinski 2014). For this study, 500 iterations of the simulations for each park were conducted. Additionally, the LEWIE model considers nonlinearities and local price effects.

Simulations require making judgements, based on the survey data, about where and how prices are determined (that is, market closure, which is not known with certainty). Sensitivity analyses were performed, and combined with the Monte Carlo method described above, to test the robustness of simulated impacts to market-closure assumptions.

The impact of tourism in protected areas on the local economy is estimated in two steps. Step one entails simulating the impact of *an additional tourist* on the local economy. This step also provides an estimate of the income multiplier of an additional dollar of tourist spending. The total impact is estimated in the second step by multiplying the per-tourist estimate by the total number of tourists who visit the national park. Comparing the total impact with public investment in the park provides an estimate of the rate of return on the public investment.

TABLE 9. Avenues of Impact Captured by LEWIE

Impact	Avenue	Included in LEWIE?	Comment
Direct	Tourist spending at local businesses	Yes	
	Restrictions on resource use and positive spillovers from Park to GMA	Yes	These impacts are built into the base run of the model. It is important to note that this version of LEWIE is static and therefore does not account for changes in the resource base and its use.
	Impact of human-wildlife conflict	Yes	As per the information provided in the household surveys, crop damage caused by animals (primarily elephants, and in Lower Zambezi hippos as well) was between 11–14 percent of total output. This impact is included in the base run as households currently receive no compensation for this damage.
Indirect – production linkages	Hiring and local sourcing of goods by tourism establishments	Yes	These linkages are included for lodges but not for other tourism service providers due to data limitations. Only four percent of farmers reported selling produce directly to lodges. Most crop sales are through traders and intermediaries who collect goods from farms and sell them on to hotels and other businesses. Hotels also source goods and services from businesses in local towns.
	Hiring and local sourcing of goods by CRBs	No	CRBs receive money from hunting licenses and use it to provide services such as maintenance of public facilities and hiring of scouts for the park. The LEWIE model does not account for CRB spending due to lack of information on their budget and expenditure. Hiring of local labor, however, is reflected in the household surveys.
	Hiring and local sourcing of goods by park managers	Partially	Hiring staff for park operations is captured in the household section of the surveys. Scouts and rangers are largely locals. However, operational costs of park management (DNPW) are not included due to lack of information on their expenditures.
	Activities supported by CRS programs	No	Because breakdowns of CSR expenditures into different categories, as required for the LEWIE estimation, were not available, CSR expenditures are not included in the analysis.
	Input use spillover effects of resource use restriction	Yes	
	Household expenditures based on wages and profits earned through tourism sector linkages	Yes	

* This question was only added towards the end of the survey period.

5.1 IMPACT OF ADDITIONAL TOURIST ON THE LOCAL ECONOMY

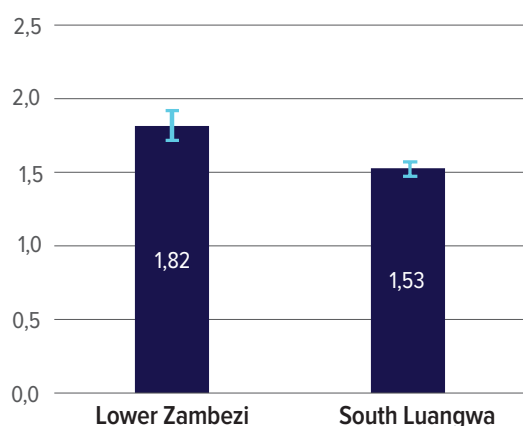
Table 10 shows average tourist spending and the impacts of an additional average park tourist on household incomes around the two parks. *Simulations find that an additional tourist adds 18,968 kwacha (US\$1,355) to local real (inflation-adjusted) income to the economy surrounding Lower Zambezi National Park and 14,625 kwacha (US\$1,045) at South Luangwa National Park.* We estimate that each additional visitor to South Luangwa and Lower Zambezi spends an average of 10,437 kwacha (US\$745) and 9,564 kwacha (US\$683) in their local economies, respectively. Total spending per tourist is higher: 40,661 kwacha (US\$2,904) and 34,359 kwacha (US\$2,454), respectively. The difference between total and local spending includes international and local airfares, commission fees on packages, and costs of visiting other parks in Zambia, which do not enter into the local economies of the study sites. The impacts on local incomes are larger than the amount of money tourists spend in the local economy because of the income and production spillovers this spending generates. The bottom of the top panel of Table 10 presents 95% confidence intervals around these local GDP impacts. They

are 17,959–20,075 (US\$1,283–1,434) at Lower Zambezi and 14,106–15,007 (US\$1,008–1,072) at South Luangwa. These income impacts are particularly striking when one considers that data limitations did not allow for the inclusion of some key avenues of impact, such as expenditures by the CRBs.

Most of the local income gain goes to households within the GMAs surrounding the parks. Poor households, which are more numerous, tend to receive more benefits. Poor households located in the GMA at Lower Zambezi receive 6,429 kwacha (US\$459) per additional tourist; non-poor households gain 5,984 kwacha (US\$427). The gains are 4,865 kwacha (US\$347) and 1,139 kwacha (US\$81) for poor and non-poor GMA households at South Luangwa, respectively. Poor and non-poor households in the market town near Lower Zambezi gain 3,876 kwacha (US\$277) and 2,679 kwacha (US\$191), respectively. Poor households in the market town near South Luangwa gain 7,916 kwacha (US\$565), and non-poor households gain 706 kwacha (US\$50).

TABLE 10. Local Income Impacts of an Additional Tourist

Income effects of one additional tourist	Lower Zambezi		South Luangwa	
	Kwacha	US\$	Kwacha	US\$
Average total spent by an additional tourist	40,661	2,904	34,359	2,454
Average total spent by an additional tourist in LZ/SL	10,437	745	9,564	683
Changes in local economy incomes				
Real (inflation-adjusted) Income	18,968	1,355	14,625	1,045
95% CIs	[17,959; 20,075]	[1,283; 1,434]	[14,106; 15,007]	[1,008; 1,072]
Changes in household incomes, by location				
Poor households in GMA	6,429	459	4,865	347
Non-poor households in GMA	5,984	427	1,139	81
Poor households in local market town	3,876	277	7,916	565
Non-poor households in local market town	2,679	191	706	50

FIGURE 6. Real-Income Multipliers for an Additional Kwacha of Tourist Spending

Tourist spending creates these income impacts by stimulating the local demand for goods and services, either directly (as when tourists or lodges buy goods and services from local businesses and households), or indirectly (as when lodges pay wages to local households, which in turn spend their income on locally-supplied goods and services). Table 11 summarizes the impacts of an additional park visitor on production (in value) by local farms and businesses. The largest impact is on business activities (retail and service), mostly the small family-owned stores at which households around parks spend the largest share of their incomes. The value of retail sales increases by 2,995 (US\$214) kwacha at Lower Zambezi and 8,085 kwacha (US\$578) at South Luangwa, while gross revenue in service and other activities rises by 5,442 and 3,788 kwacha (US\$389 and US\$271)

at these two sites, respectively. There are also positive impacts on crop (1,591 kwacha at Lower Zambezi and 3,227 kwacha at South Luangwa) and livestock (1,050 kwacha at Lower Zambezi and 882 kwacha at South Luangwa) production. Households pursuing these activities, as their revenues increase, hire labor, purchase inputs, and generate profits that add further to local incomes.

Figure 6 shows the income multipliers, that is, impacts on local income or GDP for each additional kwacha that visitors spend locally. Note that the additional kwacha that visitors spend is primarily at lodges, and does not add to local income until it creates income gains in local households. Thus, these multipliers represent mainly indirect effects of tourist spending on local incomes. The multipliers are adjusted for price inflation and thus represent real-income effects. *An additional kwacha spent by visitors at Lower Zambezi raises the total income of households around the park by 1.82 kwacha. This is higher than the multiplier at South Luangwa: 1.53 kwacha.* The vertical line at the top of each bar gives the 95-percent confidence interval around the income multiplier, obtained by running 500 iterations of each simulation. The two lines are short compared with the corresponding bars, indicating high confidence in the estimates. Both multipliers are positive and large, and the confidence intervals lie well above 1.0. This indicates that, in most cases, each kwacha that tourists spend creates *significantly more than one additional kwacha* of income in communities around the parks.

TABLE 11. Production Impacts of an Additional Tourist

Production effects of one additional tourist	Lower Zambezi		South Luangwa	
	Kwacha	US\$	Kwacha	US\$
Agricultural Crops	1591	114	3227	230
Livestock	1050	75	882	63
Retail	2995	214	8085	578
Services and Other Production	5442	389	3788	271

Figure 7 shows how much of the multiplier benefits households within the GMAs versus households in the market towns. At Lower Zambezi, where roads are poor, more of the income benefits stay inside the GMA than at South Luangwa, where there is better market integration between the park, GMA, and nearby

town. Poor and non-poor GMA households in Lower Zambezi gain 0.62 kwacha and 0.57 kwacha, respectively, of new income for every kwacha that tourists spend there. Poor and non-poor households in the market town near Lower Zambezi gain 0.37 kwacha and 0.26 kwacha, respectively. In South Luangwa, households in the GMA receive 0.51 (poor) and 0.12 (non-poor) kwacha of income per kwacha spent by tourists. Market town households near South Luangwa benefit substantially, with poor and non-poor households gaining 0.83 and 0.07 kwacha, respectively, per kwacha spent locally by tourists.

The discrepancy in multiplier shares between poor and non-poor households partly reflects the size of the population in each category. Normalizing multiplier shares by populations (i.e., dividing the multiplier share for each group; see Figure 8) reveals that the multiplier share *per resident* is largely comparable between poor and non-poor populations. In the pie charts in the figure, a number greater than 1.0 indicates that a household group's share of benefits is larger than its share of population, and a number less than 1.0 indicates the opposite. At Lower Zambezi, the relative shares are slightly less than 1 (0.83) for poor households in the GMA and slightly greater than 1 for the other three household groups. At South Luangwa, the relative share is slightly higher for the market town poor and GMA non-poor, and it is slightly lower for the other two groups.

There are several reasons why the total multiplier effects of an additional tourist who spends an additional kwacha are higher at Lower Zambezi than South Luangwa. At Lower Zambezi, a higher percentage of workers are employed by the tourism industry, and wages are higher than at South Luangwa. Wages are the main avenue through which tourism directly affects household incomes. Anecdotally, people explained that they have sustained themselves through the recent drought in part from the wages of lodge workers, and the movement of this income through their tightly knit communities. Villages in the GMAs around South Luangwa are more integrated with outside markets, and thus, more tourism-derived monies escape from the South Luangwa economy. The larger impact on households in the market town near South Luangwa reflects this greater market integration between the GMA and the town.

FIGURE 7. Which Households Benefit from Tourist Spending Multipliers?

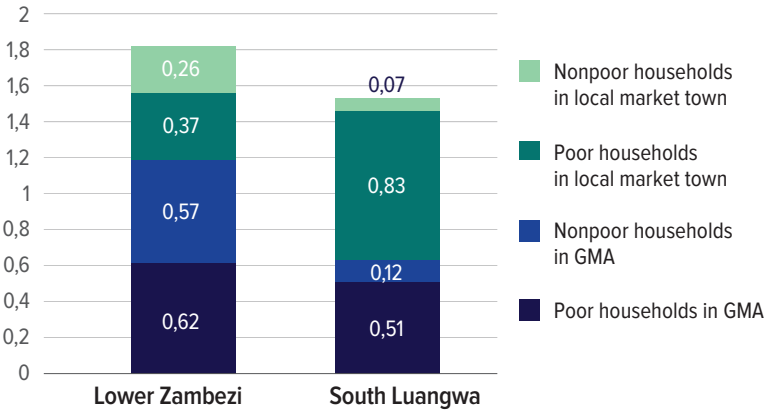
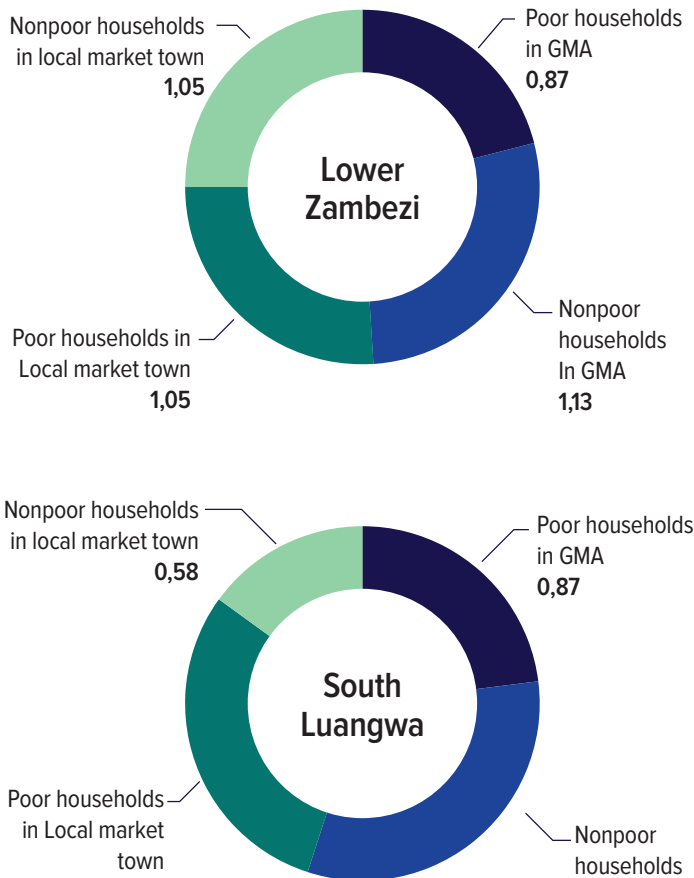


FIGURE 8: Distribution of Multiplier across Poor and Non-Poor Populations



5.2 TOTAL IMPACTS OF NATURE TOURISM ON THE LOCAL ECONOMY

It is impossible to know what the local economies around these two parks would look like in the absence of tourism. Nevertheless, the total impact of nature-based tourism on incomes around the two parks can be approximated by multiplying the impact per additional tourist by the number of tourists visiting the parks.²² We estimate that *tourism adds 212 million kwacha (US\$15.1 million) to total income or GDP around Lower Zambezi and 635 million kwacha (US\$45.4 million) to the GDP around South Luangwa National Park* (Column A of Table 12). It is important to note that even though the effect of an additional visitor and kwacha spent is higher at Lower Zambezi, impacts of nature tourism are much larger in South Luangwa because of its higher tourist numbers.

Dividing these economic impacts by government expenditures (wage and non-wage) on the two parks provides estimates of the returns on government spending. Based on this calculation, *there are substantial economic returns on government spending at both parks: 16.7 kwacha of income gain per 1 kwacha of government spending on Lower Zambezi National Park,*

and 28.2 kwacha per 1 kwacha of government spending on South Luangwa National Park.

The impact of tourism on employment around the two parks includes employment by tourist businesses and indirect employment impacts from tourism. These employment effects can be estimated by dividing the total labor value-added by the average local wage.²³ Based on this method, we estimate that *national park tourism generates 7,463 full-time equivalent jobs around Lower Zambezi National Park and 28,210 jobs around South Luangwa National Park.*²⁴ To put these employment impacts into perspective, they are equivalent to 14 percent and 30 percent of the total populations around the two parks, respectively.²⁵

Our results are comparable to findings from a recent study of the economic impact of tourism around South Luangwa National Park (Chidakel, Child and Myengwa, 2021).²⁶ This study found that, even though only 25 percent of tourist spending is captured locally, tourism contributes around 40 percent of local income, and 70 percent of local businesses are highly dependent on tourism expenditures. The study concludes that multiplier effects are an order of magnitude (>10 times) higher than park management costs. Our study differs from Chidakel et al. (2021) in both its modeling approach and geographic scope. Besides surveying households in the GMA area, our study includes businesses and households in and around Chipata town, which is a major commercial hub in the South Luangwa area. We also include the nearby market town in the Lower Zambezi survey. By casting our net more widely in this way at both sites, we detected more of the economic benefits created by nature-based tourism.

TABLE 12. Estimated Impact of Tourism

	A	B	C	D
	Estimated Economic Impact of Tourism (US\$)	Expenditure on Park Maintenance (US\$)	Expenditure on Wages (US\$)	Rate of Return
Lower Zambezi NP	15,121,783	43,990	861,352	16.7
South Luangwa NP	45,410,793	172,167	1,438,573	28.2

* Expenditures are reported by GoZ for 2018 and therefore use the exchange rate noted for Table 1.

22 In reality, marginal impacts, as approximated by the impact per additional tourist, may differ at different levels of tourism. Over time, local economies would have to adjust to a complete loss of tourism revenue, and to new access to currently protected lands and activities (e.g., hunting), and these in turn would change the economic impact of the protected area tourism on the local economy. We do not attempt to address these complex, dynamic questions in our modeling, nor the sustainability and resource-management questions that inevitably would arise. These are left for future research.

23 The effect of labor value-added is estimated in the LEWIE model as the returns to labor, a productive asset, and represents the wage income gains to the local economy. Dividing by wages allows us to estimate the extra employment generated through tourist spending.

24 For these calculations, we used average local tourism industry (lodge, restaurant and tour operator) daily wages of 74.4 and 62.0 kwacha/day and average full-time equivalents of 173 and 142 days/year at Lower Zambezi and South Luangwa National Parks, respectively. Average wages are higher in the tourism industry than in other economic activities. Thus, the full-time equivalent job gains reported here understate actual impacts on local employment.

25 For South Luangwa the GMA study area consisted of the two chiefdoms surrounding SLNP. Employment impacts include the two market towns, Chirundu and Chipata.

26 Chidakel, Child and Myengwa estimate that including local contributions, tourism in SLNP in 2015 was responsible for about US\$38 million in national GDP.

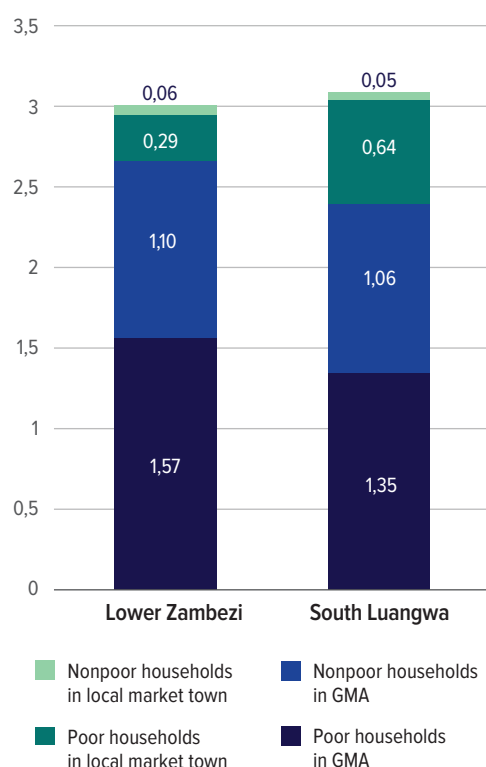
Governments can create additional benefits for local populations by hiring local people to work in parks as guards, guides, game wardens, etc. This brings income directly to households around the parks. The LEWIE model estimates impacts beyond the benefits of park-related jobs, by describing indirect income effects. The model estimates that an additional worker hired by the park generates an increase in local real income of 19,467 kwacha (US\$ 1,479) at Lower Zambezi and 13,655 kwacha (US\$ 1,038) at South Luangwa. The cost to government of hiring an additional worker is 12,871 kwacha (US\$978) at Lower Zambezi and 8,804 kwacha (US\$669) at South Luangwa per annum, which is considerably less than the local income gains from hiring the additional worker (see Table 13 below).

This park-hiring impact can also be expressed in terms of an income multiplier. An additional kwacha spent by the government on park wages creates a local economy real (inflation-adjusted) multiplier of 3.02 kwacha at Lower Zambezi and 3.1 kwacha at South Luangwa (Figure 9). Households in the GMAs receive 2.67 kwacha of this government spending multiplier at Lower Zambezi and 2.41 kwacha at South Luangwa, and households in the nearby market towns get 0.35 and 0.69 kwacha, respectively. These park employment multipliers are higher than tourist spending multipliers because wages paid to locally hired park personnel go directly to local households, whereas a fraction of tourist spending does.

TABLE 13. Government Hiring an Additional Local Laborer

Income effects	Lower Zambezi		South Luangwa	
	Kwacha	US\$	Kwacha	US\$
Changes in local economy incomes				
Real (inflation-adjusted) Income	19,467	1,479	13,655	1,038
Changes in household incomes, by location				
Poor households in GMA	10,136	770	5,958	453
Non-poor households in GMA	7,083	538	4,660	354
Poor households in local market town	1,861	141	2,825	215
Non-poor households in local market town	387	29	211	16
Cost of Implementation	12,871	978	8,804	669
Loss in crop production	Not applicable			

FIGURE 9. Which Households Benefit from Government Spending Multipliers?



5.3 IMPACTS OF COMPLEMENTARY INVESTMENTS AND OUTSIDE SHOCKS

Besides estimating the economic impacts of tourism and park hiring on the local economy, the LEWIE model can be used to simulate the local economic impacts of other government interventions and economic shocks.

5.3.1 Local Economy-Wide Costs of Human-Wildlife Conflicts

Animal incursions from each of the two parks cause crop losses for nearby households, and information about these losses was gathered during the surveys. Human-wildlife conflicts reduce crop output by almost 14 percent at Lower Zambezi and 11 percent at South Luangwa. This is equivalent to 10.4 million kwacha (US\$0.8 million) in crop losses at Lower Zambezi and 14.1 million kwacha (US\$1.1 million) at South Luangwa. The base LEWIE model uses harvest data reported at the time of the survey. Thus, the 11–14 percent loss of crop value from human-wildlife

conflict is included in the base model. A human-wildlife conflict simulation which returns lost crops to households was conducted to estimate the loss to the local economy (i.e., it estimates the counterfactual of no human-wildlife conflict, the negative of which is the local-economy impact of the human-wildlife conflict that actually occurred).

Crop losses can have major implications for the households suffering them, and send negative ripple effects through local economies. Table 14 presents the impact of crop losses from animal incursions on income around the two parks. The total real (inflation-adjusted) income losses are around 23.7 million kwacha (US\$ 1.8 million) at Lower Zambezi and 16.3 million kwacha (US\$ 1.2 million) at South Luangwa. These numbers represent the total economic cost of crop losses due to human-wildlife conflicts, and they significantly exceed the direct negative impacts on households that suffer these losses.

TABLE 14: Estimated Losses from Human-Wildlife Conflict

Income effects	Human-wildlife conflict			
	Lower Zambezi		South Luangwa	
	Kwacha	US\$	Kwacha	US\$
Changes in local economy incomes				
Real (inflation-adjusted) Income	-23,665,409	-1,798,571	-16,302,224	-1,238,969
Changes in household incomes, by location				
Poor households in GMA	-11,084,700	-842,437	-9,302,568	-706,995
Non-poor households in GMA	-7,774,781	-590,883	-2,576,346	-195,802
Poor households in local market town	-3,684,955	-280,057	-4,182,148	-317,843
Non-poor households in local market town	-1,120,973	-85,194	-241,162	-18,328
Cost of Implementation	Not Applicable			
Loss in crop production	-14,728,733	-1,119,384	-12,883,629	-979,156

5.3.2 Local Economy-Wide Impact of a 5 Percent Increase in Local Input Purchases by Businesses

Governments can increase local benefits from tourism by encouraging businesses to source more inputs locally. The LEWIE model was used to simulate the impact of a 5 percent increase in the amount of goods sourced locally by

businesses. This was done by increasing the volume of local purchases by businesses (both services and retail) by 5 percent while holding purchases from outside the local economy constant. The results are shown in Table 15.

A 5 percent increase in local purchases boosts local incomes by 2.73 million kwacha (US\$0.21 million) in Lower Zambezi and 4.64 million kwacha (US\$0.35 million) in South Luangwa. The largest share of benefits in Lower Zambezi go to non-poor households in the GMA (1.83 million kwacha, or US\$0.14 million), and non-poor households in market towns follow with an estimated impact of 763,958 kwacha (US\$0.06 million). Poverty alleviation effects of increased local purchasing are larger for poorer communities in South Luangwa. Poor GMA and town households in the South Luangwa region receive an estimated 1.63 million kwacha (US\$0.12 million) and 1.79 million kwacha (US\$0.14 million), respectively, from the increased local purchasing. This is at least partially driven by the larger proportion of poor households at the South Luangwa study site.

TABLE 15: Impacts of 5 Percent Increase in Local Purchases by Businesses

Income effects	Lower Zambezi		South Luangwa	
	Kwacha	US\$	Kwacha	US\$
Changes in local economy incomes				
Real (inflation-adjusted) Income	2,731,311	207,573	4,643,502	352,894
Changes in household incomes, by location				
Poor households in GMA	61,586	4,680	1,634,221	124,197
Non-poor households in GMA	1,826,932	138,842	896,254	68,113
Poor households in local market town	78,835	5,991	1,789,238	135,978
Non-poor households in local market town	763,958	58,059	323,789	24,607

TABLE 16. Monthly Income Loss from No Tourism

Income Loss Per Month of Lost Tourism	Lower Zambezi		South Luangwa	
	Million Kwacha	Million US\$	Million Kwacha	Million US\$
Loss in local economy incomes				
Real (inflation-adjusted) Income	17.6	1.26	53.0	3.78
95% CIs	[17.9;17.4]	[1.28;1.24]	[54.0;51.9]	[3.86;3.71]
Loss in Household Real Income, by location				
Poor households in GMA	6.0	0.43	17.6	1.26
Non-poor households in GMA	5.6	0.40	4.1	0.29
Poor households in local market town	3.6	0.26	28.7	2.05
Non-poor households in local market town	2.5	0.18	2.6	0.18

5.3.3 Local Economy-Wide Losses Due to COVID-19

Just as increases in tourism and tourist spending have positive multiplier effects, negative shocks produce negative income multipliers in local economies. The COVID-19 pandemic has resulted in substantial losses in tourism and tourism income. The LEWIE model was used to simulate the impact of a complete loss of tourism for one month on the local economies around Lower Zambezi and South Luangwa parks. Tables 16 and 17 present the estimated impacts on income and production, respectively.

The simulations showed that a complete loss of tourist revenue around the two parks reduces local real GDP by 17.6 million kwacha (US\$1.26 million) per month without tourists at Lower Zambezi and 53.0 million kwacha (US\$3.78 million) per month without tourists at South Luangwa (Table 16). Each month without tourists at Lower Zambezi reduces the income of GMA poor households by 6.0 million kwacha (US\$0.43 million) and GMA non-poor households by 5.6 million kwacha (US\$0.40 million). Poor market town households at Lower Zambezi lose 3.6 million kwacha (US\$0.26 million), and non-poor households lose 2.5 million kwacha (US\$0.18 million). Losses at South Luangwa are substantially larger: Poor (non-poor) GMA households lose 17.6 (4.1) million kwacha, or

TABLE 17. Monthly Production Loss from No Tourism

Monthly Production Loss	Lower Zambezi		South Luangwa	
	Kwacha	US\$	Kwacha	US\$
Agricultural Crops	811,983	57,999	1,479,344	105,667
Livestock	173,876	12,420	976,532	69,752
Retail	872,033	62,288	2,785,957	198,997
Services and other production	622,123	44,437	5,061,314	361,522
Hotels	69,902	4,993	4,838,106	345,579

US\$1.26 (US\$0.29) million per month. Market town households are also heavily impacted: poor market town households lose 28.7 million kwacha (US\$2.05 million), and non-poor households lose 2.6 million kwacha (US\$0.18 million).

All production activities lose, with sales losses ranging from 0.17 million kwacha (US\$12,420) in livestock to 0.87 million kwacha (US\$62,288) in retail activities at Lower Zambezi, and from 0.98 million kwacha (US\$69,752) in livestock to 5.1 million kwacha (US\$361,522) in services and other production at South Luangwa (see Table 17).





6

Conclusions and Policy Recommendations

The study set out to make the case for greater investment of public resources in protected area management by estimating the local economic impact – direct and indirect – of tourism at two biodiversity-rich areas, through the application of the LEWIE model. Its focus is on the local economy, defined as the households and businesses in the GMA, and the CRBs in the vicinity of the protected areas and in the main market town. This focus was chosen in order to understand the potential of protected areas to benefit local households. These households often suffer from restrictions placed on natural resource use by conservation authorities, and from human-wildlife conflict; and their support is critical to the integrity of parks as they can discourage encroachment, poaching, and other threats. Economic development of the local economy is also a goal in-and-of itself, and an additional reason to have a local focus.

One of the key findings of the study is that the economic return per kwacha of government spending in protected areas is significantly greater than 1 to 1: *about 16.7 kwacha at South Luangwa National Park and about 28.2 kwacha at Lower Zambezi National Park*. Public investment in protected areas not only helps to conserve biodiversity, it also helps to make protected areas more attractive to tourists – for example, by securing wildlife through investments in anti-poaching measures or by providing well maintained safari trails. When tourists visit protected areas, they not only pay park entry fees, but also for lodging, meals, transport, souvenirs, and other tourism services. These expenditures directly benefit the tourism sector, but the benefits do not stop there. Tourism service providers hire labor and source goods and services from the local economy, and trigger a chain of benefits for local businesses and households that are not directly connected with the tourism sector. It is the sum of these direct and indirect benefits that result in the high economic returns per kwacha of investment by the government. **Investment in protected areas is therefore good for biodiversity conservation and for the development of the local economy.**

It is important to note that these estimates of economic return are conservative. Firstly, only benefits to the local economy have been estimated. Tourists who visit protected areas also spend money outside the local economy – for example, while traveling to the protected area – and tourism businesses are likely to source goods and services from outside the

local economy. Both these channels add to the economic return per kwacha of government spending. Secondly, because of data limitations, some pathways through which tourist spending benefits the local economy have not been accounted for, and baseline figures e.g., for park fees and hotels, are conservatively estimated. Thirdly, impacts on the local economy when CRBs use revenues from hunting fees to hire local households or source local goods were not considered. A limitation of this approach, like other ex-post economic impact evaluations, is that we do not know what local economies looked like before the advent of national parks and tourism. As tourism expands, economies around protected areas evolve. Private and public investments stimulate and transform the structure of the economy in ways that the model is not able to capture. Because of this, it is possible that this study understates the full economic impact of nature-based tourism around the two parks.

Interestingly, government revenues from tourism in the two protected areas – gathered through park visitor fees, non-consumptive fees, safari hunting fees, outfitter license fees, animal fees, and hunting fees – exceed current investments in the park, *generating a net of 16.17 million kwacha (US\$1.34 million) for the GoZ Treasury*. Biodiversity in these two parks is therefore a source of revenue for the government and not a financial burden. This may not be the case for every protected area, as not all protected areas will attract tourists, even when the supporting infrastructure – roads, air strips, lodging etc., –are available. Surplus revenues from protected areas that do attract tourists can be used to subsidize investments in other parts of the protected area network.

Another key finding of the study is that expenditures by tourists visiting protected areas generate significant income multipliers for households in the local economy, benefiting households directly involved in the tourism sector and those not, and benefitting both poor and non-poor households. The study estimates that *an additional kwacha spent by visitors at Lower Zambezi National Park raises household incomes around the park by 1.82 kwacha and around South Luangwa National Park by 1.53 kwacha*. Tourists spend money at local retail stores, on local services, and on local transport, generating incomes for households in the local economy. These transactions establish a direct link between tourists and the local economy but are only a part of the local economic

benefits generated. Furthermore, the bulk of tourist spending goes towards airfares, commissions to booking agents, and expenditures at lodges, further limiting the benefit transmission through the direct link. Households additionally benefit indirectly through production and income linkages, when tourism operators hire local households and source local goods, and when households spend wages and businesses spend profits earned through the tourism sector. This implies that not only households directly engaged in the tourism sector, but also other households benefit. Moreover, both poor and non-poor households benefit. An additional kwacha of spending by visitors at Lower Zambezi raises the real income of poor households within the GMA and local market town by 0.99 kwacha, and those of non-poor households by 0.83 kwacha. At South Luangwa, the real income multipliers for poor and non-poor households are 1.34 and 0.19, respectively.

Studies that look only at tourism expenditures to estimate impacts will underestimate impacts on the local economy, and over emphasize leakage from tourism activities outside the local economy. It is critical to consider both direct and indirect mechanisms to assess the economic impact of tourism in protected areas on the local economy.

Tourism generates a significant number of jobs, directly and indirectly. The study estimates that *national park tourism generates 7,463 full-time equivalent jobs around Lower Zambezi National Park and 28,210 jobs around South Luangwa National Park*, equivalent to 14 percent and 30 percent of the populations around the two parks, respectively.

The study also provides an estimate of the significant negative impact of human-wildlife conflict on the local economy through crop losses. Animal incursions on to farms reduced crop output by 11–14 percent around the two parks, as per the information gathered through the household surveys. The direct impact from crop damage, together with the indirect impacts through production and income linkages, *amount to income losses in the local economy of around 23.7 million kwacha (US\$1.8 million) at Lower Zambezi and 16.3 million kwacha (US\$1.2 million) at South Luangwa*. These are significant losses, and they do not consider losses from human injury, including mortality, to which this study does not attempt to assign economic value. The magnitude of economic losses from crop loss is much less than the total impact of tourism on income around the two parks – *212 million kwacha (US\$15.1 million) around Lower*

Zambezi and 635 million kwacha (US\$45.4 million) around South Luangwa National Park. Because the base run of the LEWIE model includes damages from human-wildlife conflict, the estimated economic impact of tourism presented here already is net of these losses. Households that incur losses from wild animals may or may not be the same households which benefit from tourism in the protected area. Particularly for households that do not benefit directly or indirectly from tourism, there may be a need to compensate for losses incurred from animal encroachments. Currently, no such mechanism is in place.

In summary, the analysis finds that the two study sites are important tourist attractions which protect biodiversity and support their local economies, providing jobs for poor and non-poor households, and for those directly involved in the tourism sector, and those not.

With over 40 percent of Zambia's land area under some form of protection, including 20 national parks, there is even greater potential for protected areas to contribute to development goals while maintaining the country's rich biodiversity asset base. For this vision to be realized, however, protected area management challenges must be addressed, tourism in protected areas promoted and diversified, and benefits shared with local communities fairly. Protecting natural assets, growing and diversifying the tourism business, and sharing benefits with local communities form the basis of pursuing development and biodiversity conservation goals together.

PROTECT NATURAL ASSETS

To promote biodiversity conservation and secure the natural assets which attract visitors, it is critical that protected areas be protected, enhanced to reverse degradation, and generally well managed. This requires addressing the underlying factors that are contributing to poor performance of Zambia's protected areas. The following are identified in this report:

Increase public investment in protected area management: As indicated in this study, public funding of protected areas results in a high return on investment. Using public funds for park management is especially important, as well managed parks attracts tourists, underpinning a sustainable tourism industry and maintaining livelihoods and benefits for local communities. Existing investments in natural resource management, such as those supported by the World Bank projects "Transforming Landscapes

for Resilience and Development Project” (P164764) and “Zambia Integrated Forest Landscapes Project” (P161490), aim to improve livelihoods, land rights, ecosystem services, and sustainability. While these projects and other government investments lay the groundwork for a well-supported nature-based tourism sector, further resources are needed to attract tourists, for example, through improved access and connection with local communities. Greater investment is also needed to increase the number of wildlife rangers and scouts, to strengthen ranger capacity, and to upgrade infrastructure and equipment. DNPW is currently working at one-fourth the capacity needed to properly manage parks, and the technology being used for research and monitoring is outdated. Public investment in protected area management can ensure that areas continue to attract tourists without degrading Zambia’s rich biodiversity, and support its continuation, so that protected area management and tourism are mutually beneficial, and self-reinforcing. Retaining revenue for resource protection and operations can also ensure the sustainability of tourism, so that protected area management benefits from the industry it supports.

Build capacity of protected area managers: Protected area managers require the right blend of education, training and expertise. In particular, to manage commercial and business operations within and around protected areas requires that staff are well versed in the laws and policies of the protected area, understand the business needs of tourism operators, and can manage commercial entities to reflect protected area values. The Zambia Tourism Master Plan 2018–2038 identifies lack of tourism and business acumen among managers tasked with tourism development in protected areas as a cause for concern. While required skills will vary depending on the protected area, education, experience, and training in certain fields are needed for commercial services regardless of

location. Some relevant competencies include: understanding the legal framework that applies to operators, how to develop contracts or other authorizing instruments and solicit bids if applicable, how to monitor and evaluate operators, skills related to data collection and analysis, business acumen, negotiation skills, and asset management training, if government facilities are to be assigned to an operator. As recommended by the World Bank (2007), standards and curricula are needed to grow the skills required by a nature-based tourism industry, and on-the-job training in commercial services programs support this goal.

Undertake regular Visitor Spending Effects Assessments at the national level: This study presented a methodology to assess the economic impacts of tourism in protected areas on local economies at two study sites. To make the case for regular allocation of public resources, and to support planning and program design to identify, for example, where tourism services can be improved, it is important that such assessments be conducted by the government regularly, and at the national level. This will require first and foremost that data on tourists, tourism businesses, the local economy, and park management be collected systematically. Therefore, a complementary recommendation is to: *Implement regular visitor surveys for monitoring and evaluation.* A key challenge for this study was the lack of available tourist information. Carrying out visitor surveys is crucial to understand the impacts of tourism and how they may change over time. The number of visitors to each park, and their spending habits are important for informing policy plans. Strengthening data collection has also been previously identified as a critical input for national tourism plans in Zambia (World Bank, 2007). Visitor surveys would ideally be deployed on a rolling basis to capture seasonal trends in tourism activities, and administered at the end of a visitor’s trip.

GROW AND DIVERSIFY THE TOURISM BUSINESS

Zambia has been attracting increasing numbers of tourists to its protected areas; however, the country lags behind some of its neighbors in terms of numbers of visitors. Based on the World Economic Forum (WEF) 2019 Travel and Tourism Competitiveness ranking, Zambia, with a score of 3.2 out of a maximum of 7, ranked low overall: 113 out of 140 countries (WEF 2019); see Figure 10 below. Categories in which Zambia scored poorly, and significantly below the global average included *infrastructure* (air and land transport, and tourist services), *health and hygiene services*, and *international openness*. On the other hand, Zambia ranked 41st among 140 countries for its natural resource assets.

Many of Zambia’s natural assets are inaccessible to tourists because of poor road infrastructure. Diversifying tourism through increased connectivity not only allows the sector to develop in new protected areas, but also combats over-reliance on the few natural assets that currently attract tourists. The need for investment in critical infrastructure, echoed from World Bank (2007) and (Sichilongo et al. 2012), goes beyond roads, and applies to air, telecommunications, and power supply. Updating policies related to the tax regime and visa requirements are also needed. Policies that increase domestic investment in tourism

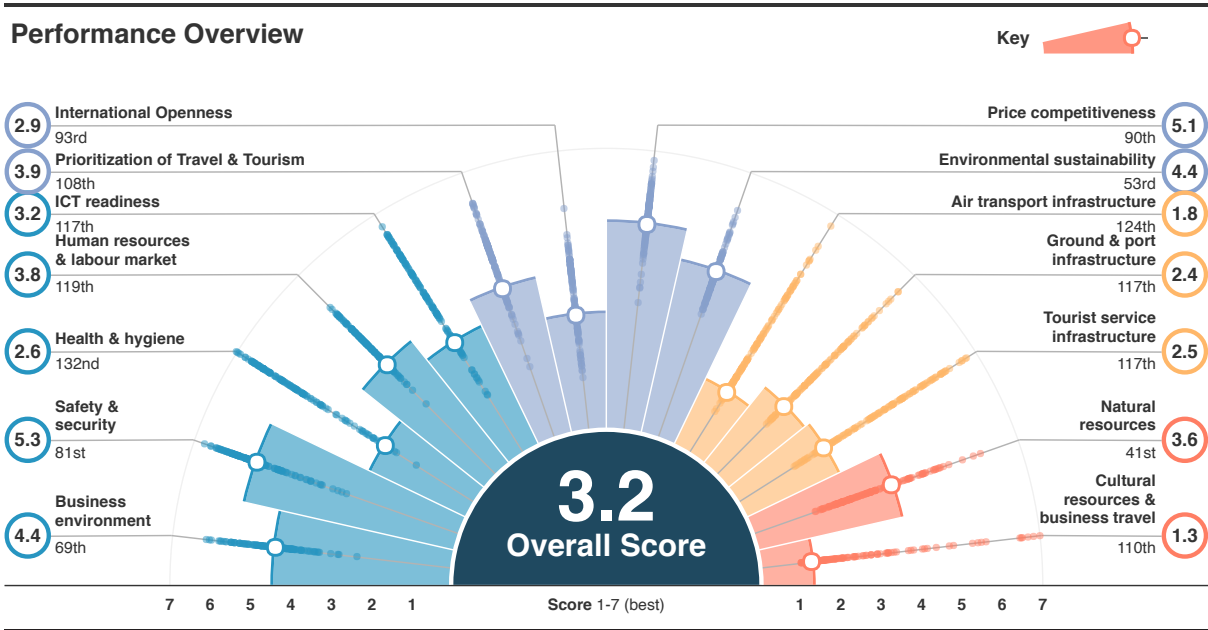
additionally support the industry’s growth while building local ownership of protected areas.

Promoting local tourism improves the social equity of nature-based tourism, and encourages Zambians to enjoy the natural beauty of their country, while preferential pricing supports such local tourism and keeps leisure spending by Zambian professionals within the country. This strategy can also buffer the industry from future shocks—a clear lesson learned from the Covid-19 pandemic.

Growing tourism beyond the five parks that are currently visited by tourists will require planners to *assess the tourism potential of Zambia’s protected area network and to prioritize sites that could be developed to diversify Zambia’s tourism offering*.

Another intervention to promote tourism in protected areas relates to the *concessions policy*. Four factors are critical for the development of a strong commercial services/concessions program in any country: strong protected area laws and regulations, public support for commercial activity in parks, demonstrated economic benefits, and systems to evaluate the implementation of the laws and regulations on a continuous basis and modify them when necessary. As per information gathered from government officials, private sector tourism operators, and

FIGURE 10. Zambia Travel and Tourism Competitiveness Index Profile



non-governmental organizations, some of these conditions are met in Zambia, but not all (see Box 4 for detailed analysis).

The Tourism Master Plan provides three main recommendations to reform tourism concessions in Zambia's protected areas: establish a tourism specialization in DNPW and cultural agencies, prioritize tourism development, incentivize DNPW to take a more commercial approach to managing parks and protected areas, plough back revenues directly into its core conservation mandate, and establish a transparent and consistent concessions policy for nature tourism areas. Additional actions to further strengthen Zambia's nature-based tourism sector include:

Box 4: Assessment of Factors Needed for a Strong Concessions Program

Strong protected area foundational laws and regulations: ZWA serves as a foundational law; however, NGOs and private actors were unfamiliar with the regulations and processes for soliciting concessions. According to those interviewed, there are no procedures to award commercial service/concession contracts in a competitive, transparent, fair and easily understood manner, criteria to evaluate proposals are not publicly available, contracts are too short for a fair return on investment, and new concessions are awarded on an ad hoc basis. Interviewees also stated that contracts are "generally renewable" but that poor park management is affecting feasibility, and that reasonable opportunities for a profit by the concessioner are not considered. Similar concerns were raised for the Zambia Tourism Master Plan 2018–2038, which noted that there is no clear concessions system in the country and that land allocations in national parks and GMAs are managed on an ad hoc basis.

Public support for commercial activity in park areas: Interviewees believe that there is much public support for protected areas, and for commercial activities in these areas if such activities are compatible with the protection of wildlife; and regulations which require operators/concessioners to hire local people bolster this public support. It is not clear, however, whether any provisions governing the award of contracts give preference to local entrepreneurs.

Demonstrated economic benefit: There was general concern that if protected areas are not better managed, that the economic stability of surrounding communities will falter and that this would lead to more poaching, thus reducing tourism. Interviewees expressed a high level of concern over the need for resource protection, and to ensure that protected area revenues benefit local communities.

Evaluate the implementation of the law and regulations on a continuous basis and modify the regulations when necessary: The DNPW has not evaluated, or updated the laws and regulations governing concessions, even though the Tourism Master Plan suggests steps to improve the regulatory process.

Note: The information on Zambian concession operations comes from brief conversations with DNPW officials, interviews with private individuals and NGOs operating in Zambian parks, and internet research.

¹ Zambia Tourism Master Plan, 2018–2038, Final Report, March 2018, accessed via internet August 18, 2020: <https://www.mota.gov.zm/wp-content/uploads/2020/03/Zambia-Tourism-Master-Plan.pdf>

1. Establish completion dates for all actions in the Tourism Master Plan. Priority should be given to drafting regulations, policies and then procedures.
2. Ensure tourism concession regulations, policies, and procedures are drafted in accordance with the law and global best practices including from neighbouring nations. Pursue a streamlined business environment for these, the absence of which has stifled previous tourism business initiatives in Zambia (Sichilongo et al. 2012). Seek input into the regulations and policies from community groups, the private sector, tourism businesses, citizens, and other stakeholders. A needed policy adjustment is to lengthen concessions agreements to improve the sustainability of private sector business models.
3. DNPW should develop a strategic plan specifically for tourism concessions. This plan should enable the organization to identify goals, objectives, and specific tasks, then set priorities for action. It will also open dialogue on partnerships between the government, community organizations, private entities, and NGOs to attract further capital.²⁷

SHARE BENEFITS WITH LOCAL COMMUNITIES

As noted, development of local communities is a goal in itself. Ensuring that benefits from protected area tourism are shared with local communities helps further this goal. Moreover, when local communities benefit from tourism to protected areas, they are incentivized to support conservation efforts and discourage encroachment, poaching, and other activities that lead to the degradation of protected areas. Furthermore, engagement with local communities can provide a unique tourist experience beyond typical protected area-focused activities. Strengthening tourist interactions with communities through homestays, traditional cultural exhibitions, and other learning experiences further develops economic opportunities and buy-in from communities living near protected areas.

Zambia's protected area regulations mandate sharing of revenues with CRB in GMAs. These revenues can be substantial. Communities have, however, expressed concern that they do not always receive their share of the revenues in a timely manner. Previous studies of CRBs in Zambia's GMAs have also found that non-poor households benefit more from revenue sharing than poor households (World Bank,

²⁷ Enhancing PPPs as a strategy for Zambia's protected areas is also recommended by World Bank (2007), Simasiku et al. (2008), and Sichilongo et al. (2012).

2007). Greater transparency in the transfer of funds would help to alleviate these concerns. Revenue sharing with communities can be expanded where it is currently limited, for example, in situations in which hunting revenue is shared, but not photography or lodge-related revenues. Furthermore, while the income multiplier for local households from visitor spending in protected areas is significant, there are opportunities to raise this multiplier through government policies and programs. Table 18 summarizes these opportunities.

Finally, it is critical to reflect on the costs of the COVID-19 pandemic for local households and businesses, and the role that protected areas can play in an economic recovery. The study shows that the pandemic has resulted in substantial losses in tourism and tourism income: 17.6 million kwacha (US\$1.26 million) of real GDP loss per month without tourist revenue at Lower Zambezi, and 53.0 million kwacha (US\$3.78 million) of income loss per month at South Luangwa. At the same time, investment in protected areas can serve as a mechanism for green economic recovery.

Large-scale investments in protected areas can create jobs and boost economic recovery and resilience. In the United States, the Civilian Conservation Corps (CCC) was established during the Great Depression, creating jobs, infrastructure, and businesses which exist to this day. The initiative was created through a government-wide partnership which brought together the Forest Service (under the Department of Agriculture), the National Parks Service (under the Department of Interior), the

Labor Department, and the US Army. During the CCC's nine-year operation, approximately 5 percent of the US male workforce (about three million people) was employed through the program. Beyond the temporary creation of jobs, the CCC is credited with increasing visitors to national and state parks from 3.2 to 20.4 million over its nine years. Today, the parks system attracts over 320 million visitors each year, benefitting local gateway regions with estimated spending of over US\$21 billion, supporting more than 340,500 jobs, and generating US\$41.7 billion in economic output (World Bank, Environment, Natural Resources & Blue Economy 2020).

In the wake of the COVID-19 pandemic, Zambia could benefit from a CCC-like scheme to renew the nature-based tourism sector in a way that maximizes benefits to park-adjacent communities. As the global economy re-opens, Zambia's tourism industry can empower small- and medium-sized firms through concessions policies in and around natural areas, and encourage spending in local communities. It can empower citizens to gain entry to the nature-based tourism industry through training and support, as also recommended by Sichilongo et al. (2012). Additionally, supporting local businesses through loans, fast-track financing, or technical assistance to diversify and use digital technologies can contribute towards business continuity. Jobs created, for example, to improve accessibility (e.g., road network improvements), patrol protected areas, and improve park infrastructure can grow tourism and create a sustainable incomes for households in surrounding areas.

TABLE 18: Opportunities to Strengthen the Income Multiplier for Local Households

Impact	Avenue	Opportunities to deepen the linkage
Direct	Tourist spending at local businesses	Explore opportunities for tourists to interact directly with local communities. This will involve a combination of investment in transport infrastructure so that tourists pass by local towns and villages on their way to parks, and strengthening the capacity of local communities to provide goods and services to tourists. As recommended by World Bank (2007), establishing market niches and diversifying tourism offerings can strengthen the tourism industry and its supply chains.
	Restrictions on resource extraction and positive spillovers from Parks to GMAs	While restrictions on resource use by communities within protected areas will have to be maintained, positive spillovers from protected areas to GMAs – e.g., when wild animals move from a protected area into a GMA due to growing herd size – will increase the benefits to the local economy. Improved protected area management with a focus on enforcement will be critical to increase positive spillovers.
	Impact of human-wildlife conflict	As noted, animal incursions lead to significant loss of income for households near protected areas and within GMAs. Mitigating losses through investment in local level strategies (seasonal fences, livestock corrals, etc.) or establishing mechanisms to compensate households for their losses can promote coexistence.
Indirect – production linkages	Hiring of local labor by tourism establishments, CRBs, and park managers	Employment in the tourism industry is an important source of income for households in the local economy. Opportunities to further increase employment occur both through increasing demand by growing the tourism industry, and increasing supply by building human capital. This study shows that when local people are hired to work in the park as guards, guides, game wardens etc., that the impact on the local economy is greater than the cost to the state. In fact, an additional kwacha spent by the government on park wages creates higher income multipliers (3.02 in Lower Zambezi and 3.1 in South Luangwa) than those for tourist spending (1.57 in Lower Zambezi and 1.42 in South Luangwa).
	Sourcing of local goods by tourism establishments, CRBs, and park managers	Greater sourcing of goods and services by tourism establishments is another potential avenue for higher impact on the local economy. World Bank (2007) highlights that national-level leakages from tourism occurring through imports and profit repatriations will not decrease unless local participation in the sector is improved.

ANNEX 1

Detailed Expenditures from DNPW Estimates for South Luangwa and Lower Zambezi

Expenditures	South Luangwa		Lower Zambezi		Total	
	ZMK	US\$	ZMK	US\$	ZMK	US\$
GoZ Payment to CRBs					20,724,533	1,726,146
Wildlife Police and Game Wardens	12,970,184	1,080,287	8,416,489	701,009	21,386,673	1,781,296
Maintenance Workers	2,797,241	232,982	689,324	57,414	3,486,565	290,396
Office Workers	1,504,427	125,304	1,142,182	95,132	2,646,609	220,436
Other Workers			93,603	7,796	93,603	7,796
Wage Expenditures	17,271,852	1,438,573	10,341,598	861,352	27,613,450	2,299,924
General Administration	200,180	16,673	108,690	9,053	308,870	25,726
Financial Management and Accounting	150,000	12,494	50,000	4,165	200,000	16,658
Tourism Sector Development Programs	70,000	5,830	40,000	3,332	110,000	9,162
Community Based Wildlife Management	276,250	23,009	239,290	19,930	515,540	42,939
Wildlife Conservation and Management	954,490	79,499	90,170	7,510	1,044,660	87,010
Road Maintenance	416,160	34,662		0	416,160	34,662
Non-wage expenditures	2,067,080	172,167	528,150	43,990	2,595,230	216,157
Total Expenditure					50,933,213	4,242,227

Source: DNPW, Government of Zambia

ANNEX 2

Data Collection Methodology

Household and Local Business Survey

The Lower Zambezi survey covered all of the Chiawa GMA under the Chiawa Chiefdom which surrounds the main entrance to the park. At South Luangwa National Park, the large area covered by the combined Upper Lupande and Lower Lupande sites made it unfeasible to collect data from all chiefdoms. Thus, two chiefdoms were selected to comprise the survey site in South Luangwa: Senior Chief Nsefu's chiefdom in Upper Lupande, and Chief Kakumbi's chiefdom in Lower Lupande.

Four visits were made to seek permission, to identify villages, to randomly select households, and to conduct the survey. In the initial visit, members of the team approached chieftains from each chiefdom/township to brief them on the purpose of the study, to gain their blessing for the research, and to request a list of villages and the number of households in each village under their administration.²⁸ This list was subsequently collected by the team. Villages consisting of fewer than 40 households were either combined with nearby villages, or dropped if that option was unavailable due to logistical constraints. Villages were then randomly selected from each site (Chiawa GMA, Nsefu Chiefdom and Kakumbi Chiefdom).

If a village was randomly selected for survey, the next visit was to the headman (leader) for further briefing, at which point a list of households in the selected villages was constructed with help from the headman and 2–3 locally-hired guides. Permission to interview the villagers was also obtained from the headman during this visit.

On the third visit, 30–50 households were randomly chosen for interviews (depending on

the number of households in the village). At this time, the headman and guides were requested to convey the following information to the selected households: 1) the purpose of the study and length of the survey; 2) that participation in the study was voluntary; 3) that not all members of the household were needed at the time of the survey; and 4) that the data are confidential and to be used solely for the purposes of this study. Once households consented to the interview, they were confirmed on the list; if they declined, a nearest neighbor household was approached as a replacement. An estimated 85 percent of households approached agreed to be surveyed. In a few cases in which the headman had a roster of households in the village, the second and third visits were combined.

On the final visit, enumerators, assisted by local guides, approached households for interviews. One village (or one village cluster) was visited each day of the survey. The order in which villages were surveyed depended largely on the availability of the headman or his deputy. An average of 45 households were surveyed each day.

The household survey included a module designed to gather information about businesses, and this was administered to households with businesses. Other businesses in the villages and nearby market towns were surveyed to supplement the household business sample, and gathered the same information as for households. Lacking a master list of businesses, all small businesses in each surveyed village were approached (villages typically had only a few businesses). In market towns, an every-other-business approach was adopted for surveying. As in the household surveys, owner-operator participation in the business surveys was voluntary.

28 In practice chiefs did not know the exact number of households in each village and thus gave an estimate.

Tourist Surveys

Information on tourists was collected through questionnaires that Proflight Zambia graciously made available to its passengers returning from the two parks. This is the most comprehensive way to gather such data because most visitors fly to the two parks and over 90 percent of them use Proflight as their carrier. It was not possible to gather information from visitors who drove to the parks and thus we do not know whether their behavior and expenditures are similar to those in the survey. However, it is unlikely that their inclusion would alter the findings because they constitute such a small share of park visitors. The survey was conducted during the peak season in October and November, and is thus representative of the majority of visitors, who visit parks during this period.

Tourism Businesses Survey

The key tourism activities are lodges inside and outside the national parks, which provide visitors with accommodation, meals, game viewing and hunting (in the consumptive use areas of GMAs). Lodges, in turn, spend money on (i) taxes and concession fees to the GoZ, (ii) wages to workers from communities near the park, other parts of Zambia, or abroad, (iii) food, crafts, and services purchased locally, in other parts of Zambia, or abroad, and (iv) maintenance, utilities, and other costs of managing and running a lodge. Some also support local communities by investing in specific “corporate responsibility” projects.

ANNEX 3

Additional Data

Summary Statistics

Table A3.1 provides a breakdown of employment by sector at each site. The largest percentage of workers at Lower Zambezi are employed by hotels/restaurants/tour operators (32 percent), followed by domestic work (21 percent), agriculture (15 percent), and construction (12 percent). At South Luangwa the largest shares are construction (29 percent), hotels/restaurants/tour operators (24 percent), and domestic work (22 percent).

Crops and Livestock

Owing to large difference in climate and growing conditions, households in Lower Zambezi and South Luangwa grow different types of crops. Figure A3.1 displays the percentage of households engaged in various types of crop cultivation.

Households at both sites are largely subsistence farmers, with some farmers producing a surplus to sell in local markets. Maize is the main staple crop grown at both sites, with rice only produced in South Luangwa. More vegetables, fruits and tubers are grown in Lower Zambezi; the two primary cash crops, cotton and tobacco, are grown in South Luangwa.

TABLE A3.1. Employment by Sector

	Lower Zambezi	South Luangwa
Domestic Work	21%	22%
Agriculture	15%	4%
Store/Factory/Food Processing	4%	5%
Construction	12%	29%
Beauty/Transportation	3%	2%
School	0%	2%
Government	7%	2%
NGOs	4%	2%
Hotels/Restaurants/Tour Operators	32%	24%
Other Services	2%	10%
Sample Size (Households with Wages)	253	131

Source: World Bank survey

FIGURE A3.1. Crop Types

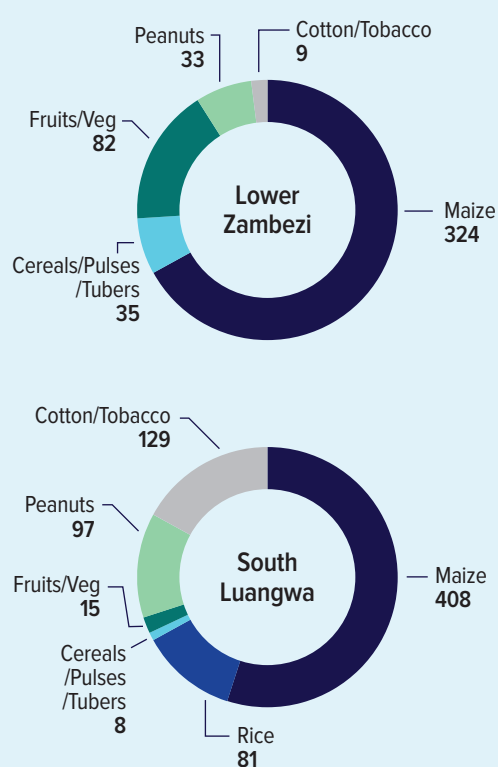


Table A3.2 summarizes crop production at the two sites at the plot level. Harvested crop values are low at both sites but substantially lower in Lower Zambezi, especially for poorer households. A severe drought in 2019 caused widespread crop failure at both sites, especially Lower Zambezi. The majority of farmers in Lower Zambezi experienced large-scale crop failure; poor households were able to harvest only 8 percent of their plots, and non-poor households were only able to harvest 15 percent of their plots (compared with 50 and 55 percent in South Luangwa, respectively).²⁹

Average plot sizes are larger in Lower Zambezi, 2.71 and 2.62 acres compared to 0.62 and 0.40 acres in South Luangwa for the poor and non-poor, respectively. Labor for agricultural activities is supplied primarily by the household itself, though some households (primarily the non-poor) do hire outside labor. Overall inputs are low, 21 percent (32 percent) of the plots owned by poor (non-poor) households in Lower Zambezi used pesticides, while this number is 14 percent (15 percent) for poor (non-poor) households in South Luangwa. Similarly, fertilizer use is low, 13 percent (28 percent) of plots owned by poor (non-poor) households applied fertilizer in

Lower Zambezi; in South Luangwa this figure is 15 percent (18 percent) for plots owned by poor (non-poor) households.

Table A3.3 uses data on South Luangwa, and a subset of Lower Zambezi farmers who were able to obtain some harvest despite the drought to summarize harvest use. Over half of farmers who managed some harvest in Lower Zambezi sold a portion of their crops (58 percent for poor and 65 percent for non-poor), compared to around 40 percent of both poor and non-poor households in South Luangwa.³⁰ In Lower Zambezi, just under half of all crops produced (by value) were consumed by households (46 percent and 42 percent, for the poor and non-poor, respectively), while households in South Luangwa consumed a smaller percentage of their harvest at 38 percent and 36 percent for poor and non-poor, respectively. Spoilage is higher for households at Lower Zambezi (8 and 10 percent, for poor and non-poor households, respectively) when compared to South Luangwa (3–4 percent, for poor and non-poor households, respectively), while households in South Luangwa have a higher percentage of their harvest being stored or given away.

TABLE A3.2. Crop Production and Inputs

		Average Plot Size (acres)	% Harvested	Average Harvest Value	Family Labor days	Hired Labor days	Inputs	
							Pesticides	Fertilizer
Lower Zambezi Poor N=208	Mean	2.71	0.08	240.65	155.47	0.83	0.21	0.13
	SD	(2.30)	(0.27)	(1089.8)	(177.5)	(5.0)	(0.41)	(0.34)
Lower Zambezi Non-poor N=171	Mean	2.62	0.15	1131.90	180.85	28.82	0.32	0.28
	SD	(2.45)	(0.35)	(4133.2)	(189.6)	(115.7)	(0.47)	(0.45)
South Luangwa Poor N=575	Mean	0.62	0.55	1001.47	235.41	3.92	0.14	0.15
	SD	(1.10)	(0.50)	(2,138.0)	(198.9)	(37.8)	(0.34)	(0.36)
South Luangwa Non-poor N=117	Mean	0.40	0.50	1153.65	196.91	15.82	0.15	0.18
	SD	(1.13)	(0.50)	(2460.6)	(165.2)	(74.1)	(0.35)	(0.39)

Source: World Bank Survey

Note: Information presented at the plot level

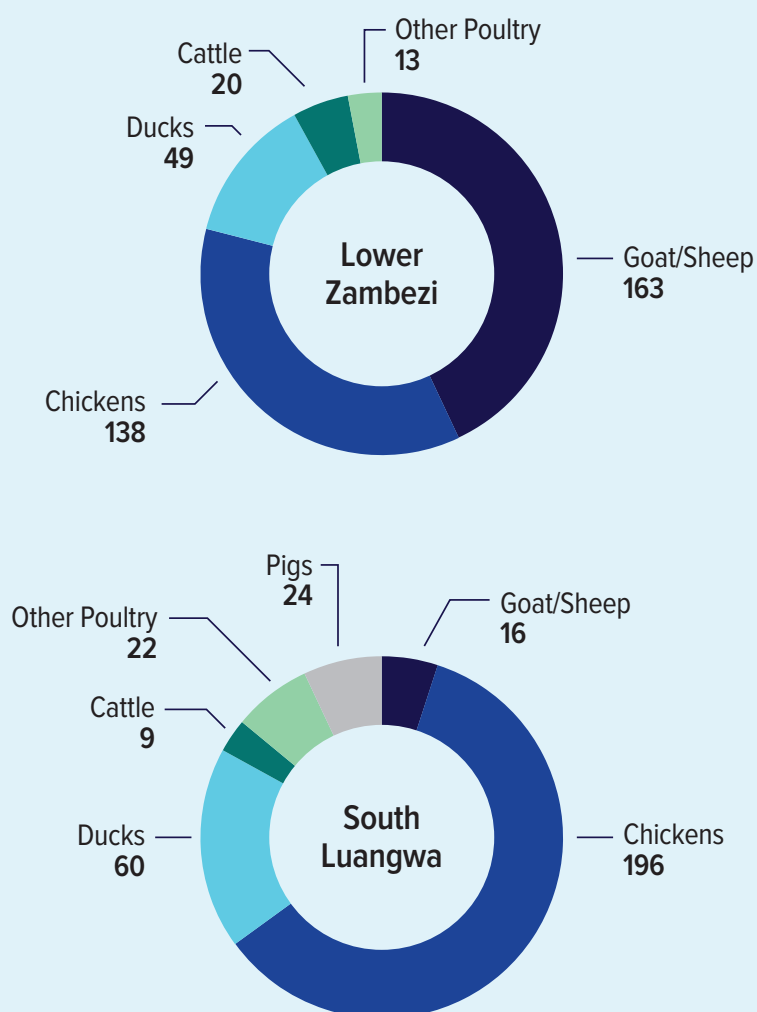
²⁹ In the survey we asked households how much they actually harvested and how much they had expected to harvest from each plot under ideal conditions. A plot was considered to have experienced crop failure if the farmer failed to harvest more than a third of what was expected.

³⁰ Crop sales happen primarily at local markets; 72 percent of crops sold in South Luangwa and 96 percent of crops sold in Lower Zambezi are sold in nearby town markets.

TABLE A3.3. Crop Use and Sales

		Share of Households Selling Crops	Share of Crop Sold	Share Sold to a Lodge	Share Consumed	Spoilage	Share to Gifts and Storage	Share Damaged by Animals
Lower Zambezi Poor N=129	Mean	0.58	0.11	N/A	0.46	0.08	0.03	0.18
	SD	(0.50)	(0.28)	-	(0.44)	(0.24)	(0.11)	(0.29)
Lower Zambezi Non-poor N=139	Mean	0.65	0.23	N/A	0.42	0.10	0.04	0.11
	SD	(0.48)	(0.33)	-	(0.47)	(0.24)	(0.11)	(0.17)
South Luangwa Poor N=342	Mean	0.40	0.21	0.04	0.38	0.03	0.19	0.11
	SD	(0.49)	(0.35)	(0.20)	(0.35)	(0.13)	(0.25)	(0.23)
South Luangwa Non-poor N=120	Mean	0.39	0.21	0.06	0.36	0.04	0.21	0.09
	SD	(0.49)	(0.36)	(0.24)	(0.35)	(0.16)	(0.27)	(0.22)

Source: World Bank Survey

FIGURE A3.2. Livestock at Lower Zambezi (LZ) and South Luangwa (SL)

The composition of livestock varies between the two sites (see Figure A3.2). Chickens are common at both sites; however South Luangwa lacks goats. Locals reflected that livestock predation was severe in South Luangwa, and that this discouraged goat farming. Only a small percentage of livestock-rearing households had cattle, due to Tsetse flies and the risk of *Trypanosomiasis* to unvaccinated animals.

Table A3.4 summarizes livestock values, sales and purchases, and input use. Total livestock value is substantially higher at Lower Zambezi, a more livestock intensive region. Households in Lower Zambezi consumed 9 and 12 percent (in value, for poor and non-poor households, respectively) of their herds over the 12 month period prior to the survey, compared with 14 and 22 percent (for poor and non-poor households, respectively) in South Luangwa. A third of all households sold or purchased livestock during the year prior to the survey, and nearly all livestock transactions took place within the GMA or nearby market towns. Inputs for livestock production are low as most animals are free ranging.

TABLE A3.4. Livestock and Inputs

		Total Value	Share Consumed	Sales		Purchase		Input values (kwacha)		
				Share Selling	Local %	Share Buying	Local %	Pens	Vet	Feed
Lower Zambezi Poor N=115	Mean	2,809	0.09	0.50	0.80	0.31	0.98	58.42	26.78	3.55
	SD	(4,431)	(0.16)	(0.50)	(0.40)	(0.47)	(0.1)	(164.4)	(118.5)	(18.5)
Lower Zambezi Non-poor N=116	Mean	3,797	0.12	0.38	0.80	0.32	0.95	105.49	46.54	34.88
	SD	(5,408)	(0.19)	(0.49)	(0.40)	(0.47)	(0.23)	(253.1)	(138.2)	(140.5)
South Luangwa Poor N=194	Mean	954	0.14	0.36	0.99	0.28	1.00	21.75	14.66	37.78
	SD	(2,778)	(0.24)	(0.48)	(0.06)	(0.45)	-	(217.3)	(75.1)	(244.5)
South Luangwa Non-poor N=35	Mean	821	0.22	0.17	1.00	0.31	1.00	1.43	1.43	11.86
	SD	(1,478)	(0.32)	(0.38)	-	(0.47)	-	(6.0)	(8.5)	(50.9)

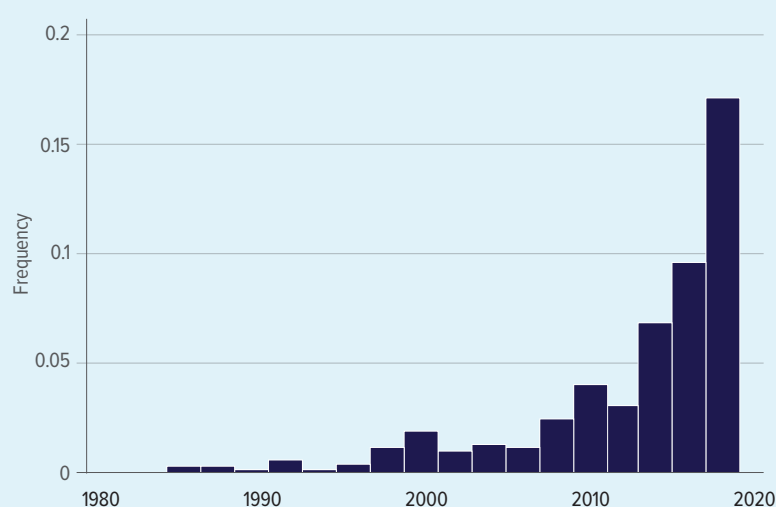
Source: World Bank Survey

The business surveys (and business modules in household surveys) asked the year in which businesses formed. Figure A3.3 provides a frequency distribution of business formation, which shows that most businesses started up recently.³¹

Most businesses in communities around the two parks are family operated. Table A3.5 presents information about businesses around the two parks. They pay wages: hired, as opposed to family, laborers are paid an average of 445.8 kwacha (US\$35) per month in Lower Zambezi and 570.8 (US\$43) per month in South

Luangwa.³² Businesses in South Luangwa tend to hold more assets (and inventory), with an average asset value for South Luangwa businesses of 38,155 kwacha (US\$2,935) compared to 19,369 kwacha (US\$1,489) in Lower Zambezi. Businesses in South Luangwa make a higher profit: 5,427 kwacha (US\$417)/month, compared with 4,145 kwacha (US\$318) in Lower Zambezi.

Table A3.6 summarizes local business costs and whether they are met inside or outside of the local economy. Business costs inside the local economy potentially create income growth linkages for other businesses or households. A large percentage of businesses do not pay rent, either because they are street vendors or because they own the land on which their businesses operate. Among those who do pay rent, the average monthly rental is 204 kwacha (US\$17) at Lower Zambezi and 130 kwacha (US\$11) at South Luangwa. Transport costs are substantially higher in Lower Zambezi due to poor road conditions. The majority of input purchases are local. Most smaller businesses buy their inputs locally from larger traders who source goods from outside the local economy. Using the total value of input purchases from all businesses in the sample, Table A3.7 presents the share of goods and services purchased from outside the local economy by business at the two sites. For retail type businesses (corner shops, traders, etc.), almost half of their inputs are sourced from outside the local economy, while the percentage of outside procurement is lower for service-type businesses (hotels, restaurants, repair shops, etc.).

FIGURE A3.3. New Business Formation

31 An increasing number of recently-formed businesses may indicate high levels of business failure. Information on failed businesses is not available.

32 As is often the case with household and business data, there are some differences in average wages paid from the two data sources.

TABLE A3.5. Business Operations

		Months Operated	Labor			Asset Value (kwacha)	Revenue (kwacha)	Profit (kwacha)
			Hired Workers	Monthly Wage	Family Workers			
Lower Zambezi (N=172 Businesses)	Mean	9.5	0.58	445.8	1.96	19,369	14,035	4,145
	SD	(3.7)	(1.8)	(781.6)	(2.14)	(52,139)	(43,748)	(11,995)
South Luangwa (N=181 Businesses)	Mean	9.1	0.65	570.8	1.55	38,155	16,584	5,427
	SD	(3.9)	(1.7)	(662.5)	(1.1)	(168,540)	(89,873)	(27,546)

TABLE A3.6. Business Costs

		Rent	Transp.	Monthly Crop Purchases		Monthly Livestock Purchases		Monthly Services Hired		Monthly Retail Goods Purchased	
				Kwacha	% Purchased Outside	Kwacha	% Purchased Outside	Kwacha	% Purchased Outside	Kwacha	% Purchased Outside
Lower Zambezi (N=172 Businesses)	Mean	204	725	112	12	142	12	127	17	632	20
	SD	(797)	(2,379)	(417)	(0.28)	(1,042)	(0.31)	(468)	(0.36)	(4,176)	(0.39)
South Luangwa (N=181 Businesses)	Mean	130	285	223	0.03	75	0.25	80	0.03	653	0.12
	SD	(421)	(1,085)	(1,705)	(0.09)	(521)	(0.4)	(225)	(0.14)	(3,608)	(0.31)

TABLE A3.7. Share of Inputs Purchased Outside the Local Economy

	Retail Businesses	Service Businesses
Lower Zambezi	46%	12%
South Luangwa	47%	1%

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