Gorillas and Economic Development:
A Study of Pro-Poor Conservation and Tourism in Central Africa

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Abstract

National Parks worldwide are beginning to participate in "pro-poor" policies, a strategy aimed at using tourism revenue to reduce poverty through policies that create opportunity and offer benefits to local communities. This study examines four parks in Africa that specialize in gorilla-based tourism. Pro-poor policies of each park are discussed in the context of country and park history. Ugandan poverty rates are then compared based on proximity to national parks. The results indicate that lower poverty rates exist near national parks than in rural control groups; however, no causal link can be established between pro-poor policies and reduced poverty in these areas.

Contents

Introduction and Background

In 1925, Parc National Albert (Albert National Park) was established as the first national park in Africa (Nielsen and Spenceley, 2010). It spanned a large tract of land on the eastern side of the Belgian Congo known as the Virunga Massif and was created to protect the apes of the region (Nielsen and Spenceley, 2010). Since 1925, the area that once covered Albert National Park has experienced many changes. With the drastically changing political landscape of the 20th century, the Congo and a few surrounding countries gained independence, altering the boundaries of the park. Today, the Virguna Massif is a 451 square kilometer area covering parts of the Democratic Republic of the Congo (DRC), Rwanda, and Uganda (GVTC, 2018). The Virunga Massif now contains three parks operated independently by their respective countries: Virunga National Park in DRC, Mgahinga Gorilla National Park in Uganda, and Volcanoes National Park in Rwanda.

These parks contain the few remaining members of *Gorilla beringei beringei*, the rare mountain gorillas that became internationally known through the work of Dian Fossey in the 1960s-70s (Nielsen and Spenceley, 2010). Outside of the Virunga Massif, the only place to find mountain gorillas in the wild is Bwindi Impenetrable National Park in Uganda (GVTC, 2018). This means that the entire known world population of mountain gorillas exists in only three countries in central Africa. Despite many challenges, conservation efforts have been successful in increasing the population of mountain gorillas in the region. The latest census performed by the parks in June 2016 revealed that the critically endangered species' numbers climbed above 1000, and also recorded the highest ever documented number of mountain gorillas in the Virunga Massif (GVTC, 2018).

Areas that are home to the world's last remaining mountain gorillas. Source: IGCP

While the parks protect a wide range of plants and animals that are crucial to the biodiversity of the region, there is more than just the concerns of endangered species to consider. Many people live around the edges of the parks and rely on the land for their livelihoods. Areas surrounding the parks contain some of the most densely populated parts of the region, with "a population that exceeds 1000 people per km², most of whom depend on agriculture" in Rwanda (Sabuhoro et al., 2017). Adding to the issue of population density, many people living adjacent to the parks (and throughout the rest of central Africa) live in extreme poverty.

With the widespread conservation efforts of the region, limited resources available to local people become even more limited. This situation may at first appear to benefit the mountain gorillas and other protected species of the area at the expense of the local people, but a new idea has gained popularity in recent decades that seeks to create a win-win for conservation. "Pro-poor tourism" is a strategy aimed at using tourism revenue to reduce poverty through policies that create opportunity and offer benefits to local communities (Maekawa et al., 2013). The idea is that the losses created by the forfeiture of land and natural resources to conservation efforts can be recouped (and perhaps even exceeded) by benefits shared from the success of ecotourism. By sharing revenue for community projects and providing jobs in the tourism sector, pro-poor tourism seeks to address the needs of local communities.

There are many advocates of this strategy, and pro-poor tourism programs are being put into place worldwide, but the measured effect it actually has on poverty reduction is still largely unknown. This ambiguity also exists for the relatively new policies implemented by the parks in this study. While Virunga, Volcanoes National Park, and Mgahinga/Bwindi have different pro-poor tourism policies, they all share the same tourism generating advantage of being one of the last places on Earth where tourists can witness mountain gorillas in the wild. This study seeks to discuss the pro-poor tourism strategies of the three countries that rely on mountain gorilla tourism, as well as analyze relative poverty rates surrounding national parks in Uganda.

Pro-Poor Policies and Projects

Each of the parks in this study has policies in place to promote development of the local communities. In the early 2000s, representatives of conservation agencies in Rwanda, DRC, and Uganda came together with the support of the International Gorilla Conservation Programme (IGCP), USAID, WWF, and others to develop a "Virunga Massif Sustainable Development Plan." Some of the stated goals of this program that indicate support for pro-poor tourism are listed below:

> "…ensure increased revenues from tourism; …
>
> ensure inclusion of the local community in the planning, development implementation, and benefit sharing process;
>
> recognition that all tourism development has costs, and that the benefits to local communities must outweigh these costs…" (Mehta and Katee, 2005).

While each park clearly states intent to engage in economic development policies, they are all independently operated by their respective countries, meaning the specific methods for development vary. Details of each country's policies and programs are presented below.

Rwanda – Volcanoes National Park

Mountain gorilla tourism began in Volcanoes National Park in 1979 and was seeing up to 6,900 visitors a year by 1989 (Maekawa et al., 2013). After this initial growth, tourism fell drastically in the 1990s due to the Rwandan Genocide and instability in the region (Maekawa et al., 2013). In the post conflict years, tourism again began to steadily grow, with the most recent statistics showing 27,111 visitors to the park in 2015 (Sabuhoro et al., 2017). Since 1994, the park has seen a total of 271,438 visitors and generated a total of $108,887,192 (USD) in revenue (Sabuhoro et al., 2017).

Of the activities sold by Volcanoes National Park, 85% were related to gorilla treks, indicating that the main driver of tourism for the park is the mountain gorillas (Nielsen and Spenceley, 2010). At the country-wide level, tourism has become the largest source of export revenue in Rwanda, outperforming coffee and tea (Nielsen and Spenceley, 2010), with 80% of this national tourism revenue being generated by Volcanoes National Park (Maekawa et al., 2013). These facts indicate that mountain gorilla tourism has the potential to generate substantial benefits for the local communities as well as the country as a whole.

One of the primary ways that parks attempt to benefit local communities is through revenue sharing schemes. In these programs, parks often designate a specific percentage of tourism revenue to be shared directly with local communities. Volcanoes National Park instituted a revenue sharing program in 2005 that designated 5% of annual park revenues for the development of local communities (Maekawa, et al., 2013). Of these shared revenues, 40% has historically been used to support community enterprises, while the remaining 60% goes toward infrastructure (Maekawa et al., 2013). While the program disbursed a total of $1,561,033 (USD) in the years 2005-2015 (Sabuhoro et al., 2017), this is only a disbursement of about $6 per person since the beginning of the program (Maekawa et al., 2013).

Annual tourism revenue sharing investment at Volcanoes National Park in US dollars

Projects funded by TRS funds at VNP	2005	2006	2007	2008	2009	2010	2011	2012
Infrastructure projects								
Bridges	9589				6849	2,740		
Houses for the poor						12,329	52,870	41,281
Schools		102,880	82,192	65,753	82,192		37,517	46,928
Water tanks construction	12,329				31,407	16,438		14,963
Water canalization							10,293	7,627
Community-based enterprises								
Agricultural projects				24,489	21,233		28,503	44,254
Bamboo plantations			8220		4795			
Livestock projects							19,887	
Support for carpentry					8219			
Motorcyclist competition					4795			
Support for handicraft							3320	
Total TRS investment	21,918	102,880	90,412	90,242	152,641	35,616	155,130	155,053
TRS investment in infrastructure	100%	100%	90.9%	72.9%	74.4%	100%	60%	71.4%
TRS investment in community projects			8.1%	27.1%	25.6%		40%	28.6%

Source: Rwanda Development Board.
Note: 1 USD = 730 Rwandan Francs.
Source: Mananura et al., 2016

While tangible outputs of the revenue sharing program such as schools and water tanks are clear, the actual effect on the standard of living of the local people is harder to measure. One must also take into account the fact that the majority of benefits from mountain gorilla tourism are shared by the national and international community, while only an estimated 6% goes to local communities (Sabuhoro et al., 2017).

Revenue sharing is not the only benefit received by locals. One study using survey data and value chain analysis found that locals benefit in six primary ways (Spenceley et al., 2010):

1) Employment and wages (from the park and from hotels and restaurants in the area)
2) Selling fruits and vegetables
3) Income from joint ventures
4) "Cultural tourism excursions" (such as musical and dance performances for tourists)
5) Craft selling / shops
6) Donations

One of the most notable findings of the study was that the park and surrounding enterprises employed around 455 people full time and 136 people through casual employment.

Uganda – Mgahinga Gorilla National Park and Bwindi Impenetrable National Park

Uganda is the only country that operates two parks containing mountain gorillas. Mgahinga Gorilla National Park is a part of the Virunga Massif, while Bwindi Impenetrable National Park is just north of the Massif. Both parks are operated by the Uganda Wildlife Authority. The history of these two parks is filled with controversy and conflict.

Although conservation efforts had been in place for much of the late 20th century while the two areas existed as nature reserves, Mgahinga and Bwindi were not officially established as national parks until 1991 (Blomley, et al., 2010). Up until 1991, locals had access to the area's resources for timber, hunting, beekeeping, mining, and many other enterprises; however, the establishment of national parks put an end to many of these opportunities as well as evicted a few thousand people living within park boundaries (Blomley, et al., 2010). This led to resentment among the locals and provoked attacks on park officials and property (Blomley, et al., 2010).

Given these early conflicts, the two gorilla parks in Uganda faced a much greater challenge in winning over the locals for community participation in conservation efforts; therefore, pro-poor policies were quickly put in place after the establishment of the park. Gorilla tourism began in 1993, and revenue sharing policies soon followed in 1995, allowing for 20% of park revenue to be shared with local communities (Franks and Twinamatsiko, 2018). A few years later, this policy was changed to share only 20% of gate revenue (a fee of about $40/day/visitor) plus an additonal $5 from each gorilla trekking permit sold (Franks and Twinamatsiko, 2018).

In the early 2000s, the parks saw a combined 6,000-10,000 guests annually (Uganda Bureau of Statistics), but the parks have seen continuous growth and now welcome 15,000-20,000 gorilla trackers annually, generating enough revenue to share between $195,000 and

$260,000 USD each year with local communities (Franks and Twinamatsiko, 2018). That is about $10 USD per year for each person living in communities around the park; and unlike some other revenue sharing schemes, there is a bureaucratic process in place for locals to have a voice in how these revenues are spent (Franks and Twinamatsiko, 2018).

In addition to revenue sharing, the parks in Uganda provide many of the same employment and business opportunities discussed for Volcanoes National Park in Rwanda. The park also provides limited, regulated access to natural resources within park boundaries through a program known as "multiple use" (Blomley, et al., 2010). There are also multiple NGOs that operate in the region, most notably the Mgahinga and Bwindi Impenetrable Forest Conservation Trust, which was established in 1994 to help fund community development, research, and park management activities ("Mgahinga & Bwindi Conservation Trust").

There are many pro-poor policies in place in Ugandan gorilla parks, but studies have reported that the benefits are not felt evenly among all communities and people (Blomley, et al., 2010; Tumusiime and Svarstad, 2011; Franks and Twinamatsiko, 2018; Adams and Infield, 2003). In addition to inequality created at the local level, there are also significant leakages of revenues to national and international stakeholders (Adams and Infield, 2003). Other problems hampering the benefits of pro-poor policies include corruption and delays in revenue distributions, as well as continued human-wildlife conflict, namely crop raiding by animals wandering outside park boundaries (Tumusiime and Svarstad, 2011; Franks and Twinamatsiko, 2018). Although many locals still harbor negative feelings, revenue sharing and other pro-poor policy schemes have caused improved perceptions and relations in the last two and a half decades (Franks and Twinamatsiko, 2018).

Democratic Republic of the Congo – Virunga National Park

Virunga National Park gained international attention in 2014 with the release of "Virunga", a Netflix documentary produced by Leonardo DiCaprio and Howard G. Buffett. This documentary focused on the military conflicts that have surrounded the park for the past few decades, as well as the attempts of SOCO International to explore for oil within park boundaries (Basu, 2014). In the 20th century, the DRC experienced colonization, independence, dictatorships, changing political regimes, and a civil war that continues to influence conflicts today (Reybrouck, 2015). Virunga National Park has experienced a lot of conflict and turmoil in this time, and this has greatly affected the park's ability to attract tourism.

Although tourism thrived from the 1960s through the 1980s, later conflicts destroyed demand and the park closed to tourism for an extended period ("Virunga Alliance"). The Virunga Alliance was established as a Public-Private Partnership to help achieve development and sustainability goals, and through the Alliance's efforts, the park was reopened to tourism in 2014 and has seen over 17,000 tourists in the time since ("Virunga Alliance"). But military conflicts continue in the region, with 175 rangers killed on duty to date, and the kidnapping of two tourists in 2018 temporarily reclosing the park (Barnes, 2018).

Although the instability of the region makes tourism based pro-poor policies an unlikely strategy for sustainable development, the Virunga Alliance has made some progress in

development of local communities. The Virunga Alliance website lists the following achievements:

- Direct employment of 120 individuals through park ranger and other tourism-based programs
- 400 jobs created indirectly by tourism-based initiatives
- Creation of two operational hydroelectric plants, beginning construction on two others
    - Provides affordable electricity to 600 homes, 43 businesses, and 2 industrial investments
    - Free electricity for local schools and hospitals
    - Employment of locals at these plants
- Micro-business and micro-finance efforts to support local entrepreneurs
    - Sicover Soap Factory providing employment and business loans
- Construction of 20 hospitals, 9 schools, 2 health clinics, and 68 km of feeder road repair ("Virunga Alliance")

It is clear that the Virunga Alliance has made significant progress on funding social programs and infrastructure, but the real effect these programs have on local communities is yet to be studied. Funding from outside sources has been significant in the success of Virunga and the Virunga Alliance. The EU has provided funds since 1988, the Warren G. Buffet Foundation has been a large donor in recent years, and there are many other international, non-profit, and NGOs that have assisted Virunga (Marijnissen, et al., 2018). But until stability is regained in the DRC, it is unlikely that Virunga will be able to fund its own pro-poor policies through tourism revenues.

Literature Review

Although classical theory might suggest that living near a national park may create a poverty trap due to limited access to natural resources and agricultural land, studies have found that this is not necessarily the case when comparing areas near parks to similar rural control districts (Naughton-Treves, et al., 2011; Andam, et al., 2010).

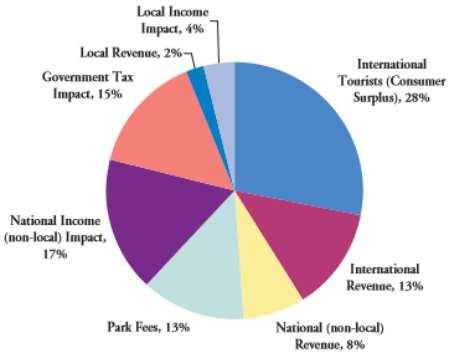
In addition, studies of African and global national parks have shown that ecotourism based pro-poor policies have been successful in improving livelihoods of locals in certain cases (Naughton-Treves, et al., 2011; Andam, et al., 2010; Coria and Calfucura, 2012; Nielsen and Spenceley, 2010; Wunder, 1999).

As with any economic policy, the effects vary by region and are not always positive. As mentioned above, pro-poor policies can create inequality and often suffer from corruption and mismanagement (Tolbert, et al., 2018; Coria and Calfucura, 2012; Tumusiime and Sjaastad, 2013). Local perceptions of the gorilla parks vary from ambivalent to hopeful but have shown significant improvement in the last few decades (Tumusiime and Svarstad, 2011; Tolbert, et al., 2018; Tumusiime and Sjaastad, 2013).

There is evidence to suggest that as pro-poor policies continue and grow, there could be a positive impact on economic development in local communities, but there seems to be a consensus on a few key factors that must be improved for these policies to be successful. Many researchers suggest that in order for pro-poor policies to be successful and sustainable, they must be transparent and involve local communities in decision making processes, empower locals and develop human capital, reduce leakages to national and international groups, exist in a region of relative stability, and limit corruption and mismanagement of funds (Ekise, et al., 2013; Spenceley, et al., 2010; Coria and Calfucura, 2012, Tolbert, et al., 2018).

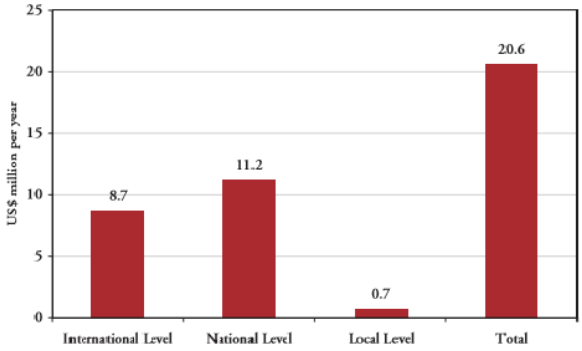
Finally, although many studies suggest that national parks and pro-poor policies have the potential to create many benefits, it is important that these benefits are felt at the local level and not monopolized by the national government and international community. An economic valuation of the Virunga and Bwindi regions performed in 2005 found that the majority of benefits from gorilla-based tourism are felt at the national and international level, while local regions actually experienced a net loss from conservation and tourism (Hatfield, 2005).

Fig 1: Annual benefits accruing from gorilla-based tourism



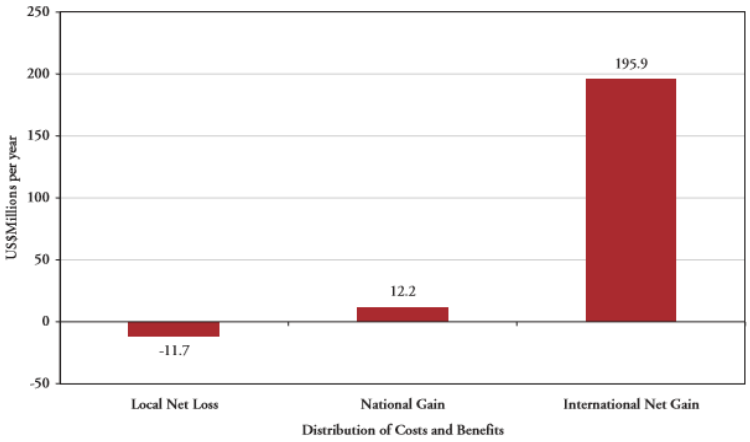
Source: Hatfield (2005)

Fig. 2: Distribution of annual gorilla tourism benefits (2000/2001)



Source: Hatfield (2005)

Fig. 5: Distribution of annual forest benefits and costs between stakeholder levels



Source: Hatfield (2005)

Data and Methods

Data availability is extremely limited in the three countries of this study. Uganda was the only country with sufficient data to perform analysis on poverty statistics, so this report will proceed by focusing on Ugandan national parks. Data was collected from the Uganda Bureau of Statistics. From the "2004 Uganda Poverty Atlas Optimized" and "2007 Nature Distribution and Evolution of Poverty & Inequality in Uganda" reports, data was pulled on rural poverty rates for the years 1992 and 2002. Given that gorilla tourism and pro-poor policies were started in the mid-1990s, these years serve as before and after points. Data was available at the county level for both 1992 and 2002, and at the subcounty level for 2002. Once poverty statistics were collected for rural counties and subcounties, the ArcGIS Online portal of the Uganda Bureau of Statistics was used to map these counties and classify them by their location relative to national parks:

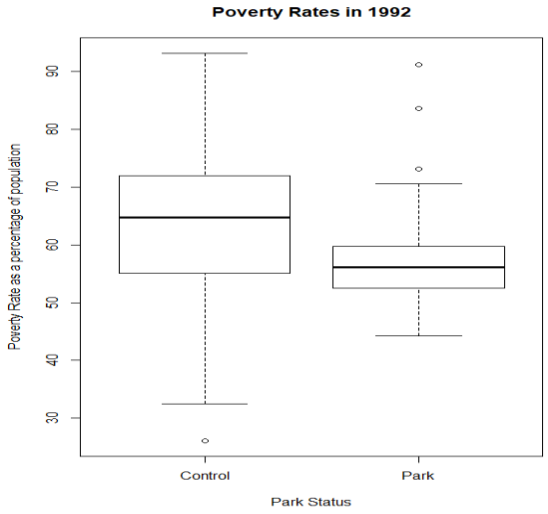
- Gorilla – Bordering a gorilla park (Mgahinga or Bwindi)
  - Counties = 3, Subcounties = 9
- NP – Bordering a national park that is not a gorilla park
  - Counties = 28, Subcounties = 68
- Park – Bordering any national park (gorilla and NP)
  - Counties = 31, Subcounties = 77
- Control – Rural county that does not border a national park
  - Counties = 113, Subcounties = 780

Once the counties were classified into their respective groups, comparisons of poverty rates across these groups were performed using Welch's t-tests, Welch's one-way ANOVA, and contrasts in R. Welch's tests were used to correct for the difference in sample sizes across groups. Poverty rates presented are the percentage of people living below the poverty line in a given region. The poverty line varies slightly by region but is within 15,000-16,000 Uganda Shillings/adult/month in 1992 and 20,000-21,000 Uganda Shillings/adult/month in 2002.

At the county level, comparisons are done between the Park group and Control group, due to an insufficient sample size of gorilla parks. At the subcounty level, comparisons are broken up into three groups to isolate the effects of gorilla parks: Gorilla, NP, and Control.

Results

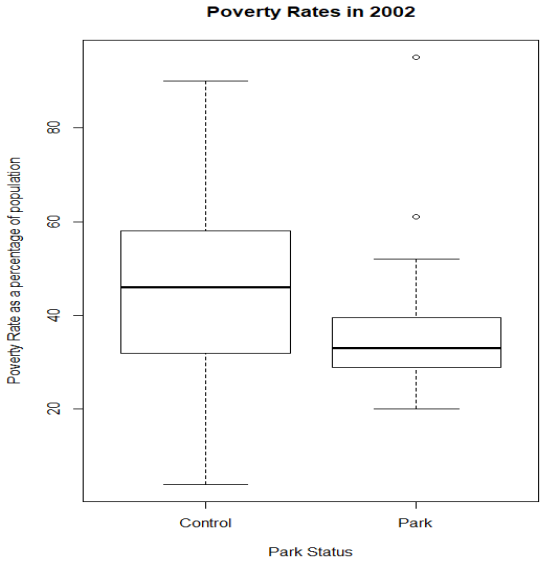
County Level 1992



	Control	Parks
Mean Poverty Rate	64.79%	58.60%

Welch's t-test p-value = .0085*

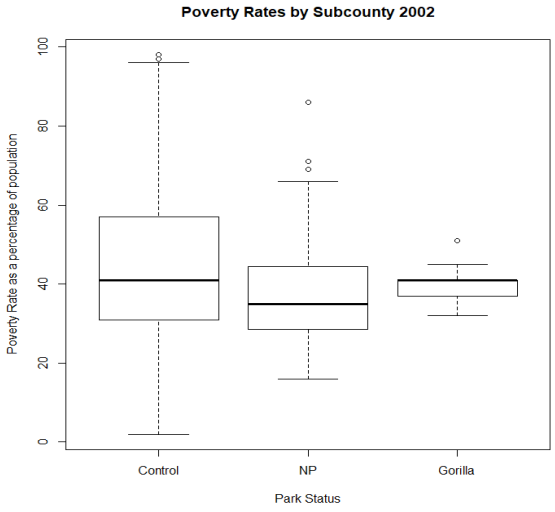
County Level 2002



	Control	Parks
Mean Poverty Rate	46.54%	37%

Welch's t-test p-value = .0025*

Subcounty Level 2002



	Control	NP	Gorilla
Mean Poverty Rate	44.96%	38.01%	40.33%

Welch's ANOVA p-value = .0013*

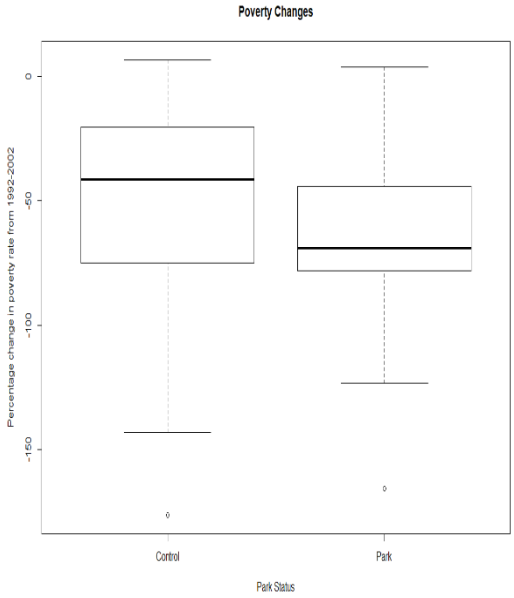
Contrasts (Games-Howell)

1. Control vs. Gorilla p-value = .087*
2. Control vs. NP p-value = .001*
3. NP vs. Gorilla p-value = .626

At the subcounty level, a violation of homoskedasticity prevented a traditional ANOVA from providing reliable results. To correct for this, non-parametric methods (Welch's ANOVA and Games-Howell Contrasts) were used to compare poverty rates across groups.

County Level Changes in Poverty Rates 1992-2002

The figures presented here are the mean percentage changes in poverty rates from 1992 to 2002 classified by park status. For this analysis, 4 outliers were removed that had a percentage change greater than 200%. These counties' changes were well above all other 140 observations' changes and were removed so as not to skew the national averages.

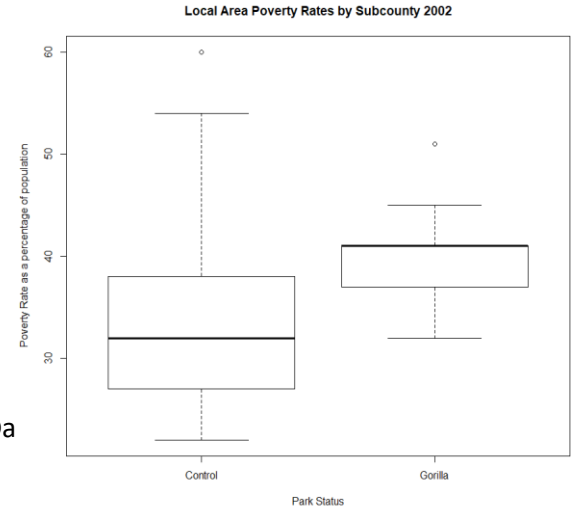


	Control	Parks
Mean % change in poverty rate	-49.48%	-63.95%

Welch's t-test p-value = .0443*

Local Comparisons (Subcounty Level 2002)

Up to this point all comparisons are made at a national level, that is, all rural counties in Uganda are compared based on park status. The two gorilla parks reside only in the southwestern part of Uganda. To compare the communities bordering gorilla parks to control groups in their local region, the set of rural subcounties that exist in the 5 counties closest to the gorilla parks were collected. From this local subset, a comparison was again performed on poverty rates by park status. Contrary to what was found at the national level, subcounties bordering gorilla parks had significantly higher poverty rates than control groups in the region.



	Control	Gorilla
Mean Poverty Rate	33.57%	40.33%

Welch's t-test p-value = .0066*

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Conclusions

A few main conclusions can be drawn from the comparisons of poverty rates at both the county and subcounty level. The first is that counties that bordered national parks had significantly lower poverty rates in both 1992 and 2002. In 1992, counties bordering national parks had a mean poverty rate about 6% lower than the control group, and this difference grew to 9% in 2002.

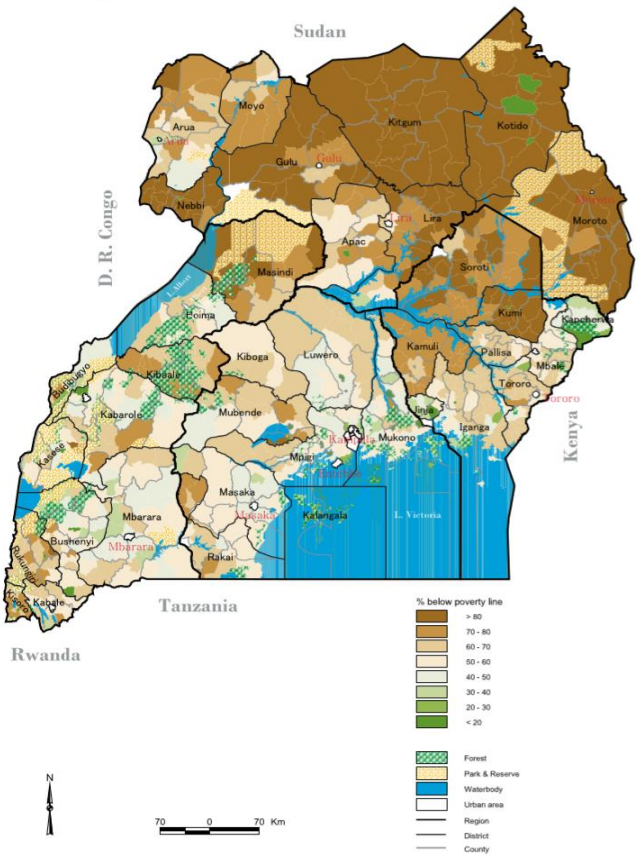
Poverty rates also declined more rapidly near national parks in the decade between 1992 and 2002. While control group counties were able to reduce poverty by an average of 49.98%, counties near national parks reduced poverty by 63.95% on average. These results indicate that at the county level, communities bordering national parks are better off on average than those rural counties that do not. Because the national parks used were spread throughout all regions of the country, this serves as a true representation at the national level. Unfortunately, these results are for all national parks in Uganda, and the effect of just the gorilla-based parks could not be isolated at the county level due to insufficient sample size.

The effects of gorilla-based parks can be isolated at the subcounty level, however. When comparing poverty rates at the subcounty level in 2002, it was discovered that both gorilla parks and all other national parks did have significantly lower poverty rates on average than control groups, which agrees with the results at the county level. Therefore, 9 years after the start of gorilla-based tourism in Mgahinga and Bwindi Impenetrable, subcounties bordering these parks did have lower poverty rates on average than the national control group.

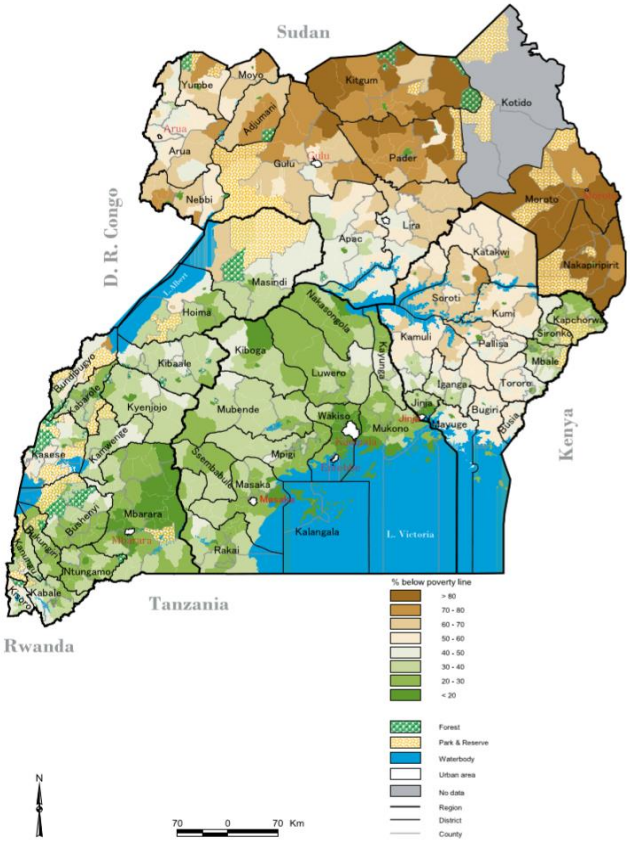
This result seems to be contradicted at the local level; however, there is a possible explanation. When comparing subcounties that border gorilla parks to their closest neighboring subcounties, it was found that the gorilla park subcounties did have significantly higher poverty rates on average. While this may be true, the gorilla parks reside in a relatively wealthy region of Uganda. It is clear from the maps on the following page that the southwestern tip of Uganda had relatively low poverty rates in both 1992 and 2002. The results of this study indicate Mgahinga and Bwindi Impenetrable are relatively poor in a wealthy area. This is a possible explanation why the results seem to be contradictory at different scales.

Although the results of this study seem to indicate that living near a national park is correlated with lower levels of poverty and quicker rates of poverty reduction, it is important to note that this analysis cannot be used to draw any kind of causal relationship. Due to data deficiencies, this study can only conclude that lower poverty rates were observed near national parks than in control groups on average. This study does not conclude that the national parks or pro-poor policies are the cause of lower poverty rates. The interesting connection between national parks and poverty observed in this study of Uganda warrants further investigation once better data becomes available.

Map 3.19 **Uganda, 1992 - Sub-county level Poverty Incidence**



Map 3.20 **Uganda, 2002 –Sub-county level Poverty Incidence**



Source : Uganda Bureau of Statistics ("2007 Nature Distribution and Evolution of Poverty & Inequality in Uganda")

Discussion

While an interesting correlation between poverty rates and national parks was established in this study, data deficiencies limited the scope of this study significantly. To continue the study of this subject, better data needs to be collected both on poverty rates and on park related revenues. Because revenue sharing programs are used to fund the construction of schools, hospitals, hydroelectric plants, and other social programs, it would be interesting to see how proximity to a national park effects poverty indicators like educational attainment rates, water quality, infant mortality rates, and other community characteristics that pro-poor policies attempt to have a direct impact on. An analysis of these variables may bring researchers closer to establishing a causal relationship between pro-poor policies and poverty reduction.

Although this study and others indicate that pro-poor policies may have the potential to reduce poverty in local communities, it is important that these programs are managed well. As discussed in the literature review, there are significant leakages and corruption that limit the ability of these policies to impact local communities. In addition, including community members in the decision-making process is likely to improve relations between parks and the surrounding communities, allowing for locals to become more involved and willing participants in conservation efforts.

Finally, it is imperative that the benefits of tourism are felt at the local level. The current situation in which the international community reaps most of the benefits of tourism may prove unsustainable. If parks are serious about improving the living standards of the local communities, they must work harder to ensure benefits are retained locally. Local communities bear the majority of the costs of conservation through loss of natural resources and agricultural land. For pro-poor policies to be effective, locals should also receive an equitable share of the benefits.

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