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Plants or People?
The Challenges of Tackling Environmental Issues in Developing
Countries

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The world is undoubtedly facing a global environmental crisis. Both developed and developing countries do irreparable damage to the environment every day. Throughout its development, and continuing today, the U.S. has released tons of harmful pollution and greenhouse gases. As the green movement spread in the U.S., however, the country developed elaborate recycling systems, designed energy efficient appliances, and encouraged residents to buy local and organic foods. In most developing countries, and especially where the poorest residents live, there is no recycling system, there is not even a trash collection system, so people often have no recourse but to create local landfills in their own backyards. Energy efficient appliances would seem an incomprehensible luxury, as most do not have reliable electricity in their homes, if they have electricity at all. Food is grown locally, as most are forced to farm for subsistence, but farm land is often scratched out of a dry land or cut from a forest, and malnutrition and starvation are greater concerns than an organic certification. Because the decisions that many in developing countries make in relation to their environment are informed by acute poverty, addressing environmental issues in these places requires addressing human needs simultaneously. The desperate poor often make decisions that are environmentally degrading in order to survive, and these actions are collectively causing great degradation, but cannot be changed without first addressing the root cause- poverty.

In developing countries, environmental issues have a greater impact on daily life than they do in developed countries. While for many Americans climate change is still an abstract

scientific idea, it is the cause of a starvation inducing drought for many in Sub-Saharan Africa. “The environment of the rich and the environment of the poor are indeed a world apart,” wrote Jack M. Hollander, author of *The Real Environmental Crisis- Why Poverty, Not Affluence, is the Environment’s Number One Enemy*.¹ “To the world’s poor- several billion people- the principal environmental problems are local, not global. They are not the stuff of media headlines or complicated scientific theories. They are mundane, pervasive, and painfully obvious,” Hollander wrote.²

In addition to being more local, environmental issues in developing countries are more immediate and life-threatening. A lack of development, industrialization, and urbanization means that people living in poverty in developing countries live within the environment to a greater degree than those in affluent and developed countries. The most immediate environmental problems that developing countries face are “unsafe water, inadequate sanitation, soil depletion, indoor smoke from cooking fires, and outdoor smoke from coal burning fires. . .”³ The environmental problems that developed countries consider are “carbon dioxide emissions, depletion of stratospheric ozone, photochemical smogs, acid rain, and hazardous wastes.”⁴ While both sets of issues are extremely important and need to be addressed, the issues found in developing countries have more local and immediate effects on people. They are issues that are seen and felt in everyday life.

When a certain comfortable level of income is reached, people in affluent developed countries are able to make environmentally-friendly choices. They are able to choose to purchase recycled materials, green cleaning products, and hybrid cars. The steps that are taken in the U.S. to reduce environmental impact are not conceivable for many people living far below the poverty line in developing countries. These people must take action to ensure their survival

and though these actions often fall into what conventional science and the modernized world deem environmentally unfriendly, how can they be blamed for these actions when few viable alternatives are available? The developed world can neither condemn these choices, nor appear to preference the survival of plants and animal species over fellow humans, but how then can environmental degradation in developing countries be prevented? Because the survival of humans depends on the survival of both plants and animals, development must occur in environmentally sustainable ways to improve the lives of people and the environment around them.

If the cycle of poverty and environmental degradation continues, the condition of the land that the poor depend on will worsen and poverty will become further entrenched. As noted in the World Bank's seminal *World Development Report 1992*, the poor "draw a large part of their livelihood from unmarketed environmental resources: common grazing lands, for example, or forests where food, fuel, and building materials have been traditionally gathered. The loss of such resources may particularly harm the poorest."⁵ There is no market price on these resources and so no incentive to use them sparingly.⁶ Open access often leads to open use and then overuse, very much like the classic tragedy of the commons, but as these resources are damaged the livelihood of the many who use them will also be negatively impacted.

While it is true that wealth and technology are strongly tied to environmental degradation, in that wealth leads to excessive consumerism and technology often pollutes, wealth and technology are also important tools for environmental stewardship.⁷ Hollander, a professor emeritus of energy and resources at the University of California, Berkeley, claims that "poverty, not affluence is the environment's number one enemy."⁸ Developing sustainable alternatives for current exploitative practices requires funding and technological advances. Developing

countries aren't equipped with these kinds of financial resources so the poorest of their people must continue the destructive practices that provide daily sustenance and degrade the environment. In this way, institutional and local poverty keeps practices stagnant.

Poverty is at the same time the cause and effect of environmental degradation. It forces people to exploit their resources, and once those resources are compromised, the struggle worsens. Hollander wrote, “. . . my conviction that the vicious and self-perpetuating cycle that connects poverty and environmental degradation can be best broken by attacking and eliminating the source of the problem- poverty.”⁹ Policies that reduce poverty must work hand-in-hand with those that protect the environment in order to break the vicious cycle. Sustainable development is the over-arching goal. “Sustainable development implies that the economy is able to satisfy the requirements of the current generation without reducing the ability of subsequent generations to meet their own needs,” wrote Todd Sandler, author of *Global Challenges: An Approach to Environmental, Political, and Economic Problems*.¹⁰ Developing countries need to work toward sustainable development to improve rather than worsen conditions for future generations.

In addition to a lack of funding and technology, progress is also inhibited by the lack of data and knowledge about the particular components of environmental degradation .

Ignorance is a serious impediment to finding solutions. Governments often make decisions in the absence of even rudimentary information. International initiatives are urgently needed to overcome a grave lack of knowledge in some areas, including soil depletion (especially in Africa), land productivity in and around tropical forests, and global atmospheric issues¹¹

The causes and effects of environmental damage need to be understood and addressed.

Independent commissions have been useful for governments who are able to learn from their technical expertise. National environmental action plans are being drawn up in Africa, involving these commissions as well as other technical experts and citizen's groups, and have been

completed for Lesotho, Madagascar, and Mauritius. At the time of the report in 1992, plans for 17 other countries were being drawn up.¹²

Poverty is also connected to fertility rates and overpopulation, which put additional pressure on resources. According to the U.N. Population Fund, in 1998, the lower a country's income per capita and education levels were, the higher their fertility rate tended to be.¹³ An ever-increasing population puts more and more stress on the environment and leads to a faster rate of degradation and increasing poverty, as a limited amount of resources are shared among more people. According to the World Bank's *World Development Report 1992*, from the period of 1990 to 2030, the world's population is expected to grow by 3.7 billion. An astounding 90 percent of this increase is occurring in developing countries. The population of Sub-Saharan Africa during this period is expected to grow from 500 million people to 1.5 billion people. Traditional land management systems may not be able to adapt fast enough to cope with such increases in population and governments may not be able to provide the kind of infrastructure needed.¹⁴ Population increases and the pressure they put on already scarce resources will have a particularly negative effect on Sub-Saharan Africa, where in 2001 over 40 percent of the population already lived on less than one dollar a day.¹⁵ For these reasons, "Rapid population growth can exacerbate the mutually reinforcing effects of poverty and environmental damage."¹⁶

In countries where starvation and malnutrition still claim the lives of many, the daily priority for many families is finding enough food to get by another day. This leads many to turn to subsistence farming and to cultivating any available piece of land.

The poor are both victims and agents of environmental damage. Because they lack resources and technology, land-hungry farmers resort to cultivating erosion-prone hillsides and moving into tropical forest areas where crop yields on cleared fields usually drop sharply after just a few years.¹⁷

While the land might turn out crops temporarily, it becomes degraded quickly because farming decisions are made indiscriminately. The World Bank report cited agricultural stagnation in Sub-Saharan Africa as an example of “the mutually reinforcing nexus of poverty, population growth, and environmental damage.”¹⁸ When the report was released in 1992, 80percent of Africa’s pastures and range areas showed signs of deforestation.¹⁹ Converting forested areas for agriculture without regard for sustainability, because of the urgent need, leads to less forest in the future to draw other needs from, as poverty and population increase.

Other food source degradations that are related to poverty include “salination, soil erosion, and overexploitation of fragile lands, especially those with low rainfall,” which all stem in part from deforestation.²⁰ Desertification is an ever-increasing threat already dry land. Most importantly, Hollander noted, “Such local resource degradations are in many cases difficult, and almost always expensive, to reverse.”²¹ Salination of soil cannot be reversed without expensive de-salination processes and topsoil, soil nutrients, and healthy forests are difficult if not impossible to restore. With already strapped economies, developing countries cannot afford to reverse the damage being done.

Despite the challenges stemming from the lack of information and the specific context of each country, some general goals can be agreed upon. The World Bank report indicated two basic keys for policy development for rural environmental challenges. The first is “Preventing the resource degradation that can result from rapidly growing demands for food, fuel, and fiber and from poor stewardship due to poverty, ignorance, and corruption.”²² The second is “Preserving valuable natural forests, wetlands, coastal areas, and grasslands from being taken over for relatively low-value uses that are artificially encouraged by bad policies, imperfect markets, and flawed institutions.”²³ According to the World Bank, many developing countries

still have subsidies for the use of fossil fuels and water which need to be eliminated. There are also many state-owned companies that pollute heavily and need to be made more accountable and more competitive. Another policy that artificially encourages poor land use practices is the policy of rewarding those who clear forests with the property rights for that cleared land.²⁴ Once it is turned into agricultural land, what once was rich habitat lasts only a few seasons for farming before soil nutrients are depleted. This is what is meant by taking over valuable land for relatively low-value uses. Additionally, securing individual land rights or more strictly outlining community rights to resources helps to reduce overuse and degradation of common resources like grazing land.²⁵

While these kinds of over-arching goals can be established, it is very important to consider the unique cases of developing countries and their people when creating policies. The World Bank wrote that trade-offs between income and environmental quality must be carefully analyzed because while resources in developing countries are scarce and need to be protected, basic survival needs must still be met.²⁶ A policy can't completely change an entrenched system of traditional practices overnight. Suddenly barring an impoverished community, for example, from making use of a newly protected forest could worsen their living conditions significantly and cause a crisis followed by conflict.

The World Bank also emphasized that "Standards and policies need to be realistic and consistent with the monitoring and enforcement capacity and the administrative traditions of the country."²⁷ A government or regulating body should avoid setting itself up for failure and giving conservation a negative connotation by trying to implement a plan that they do not have the resources to carry out. Poor enforcement and subsequent failure only undermine the credibility of environmental policies overall and can lead to corruption.²⁸ Countries should also avoid

trying to change the way the administration functions too drastically. Issues within the administration of the country should certainly be addressed, but slowly and with great care, especially if the administrative traditions of the country are tied to its cultural traditions.

It's also important, with the number of multinational corporations, NGO's, and foreign aid organizations working on development issues, that programs coming from international organizations not seem too foreign to the communities they are brought to.²⁹ "Western" or "First World" ideas and programs could be rejected by local communities outright and may not blend well with their traditional practices and cultures, leading them to fail. Like failure of the government to carry out and enforce policy changes, overly western programs could ruin locals' perceptions of conservation. Without the support of the local community little progress can be made.

In its 1992 report The World Bank referenced some policies from the 1991 report that would be beneficial for both the struggling markets of developing countries and their people, which could still be well utilized today.

World Development Report 1991 described a set of 'market-friendly' policies for development. These included investing in people through education, health, nutrition, and family planning; creating the right climate for enterprise by ensuring competitive markets, removing market rigidities, clarifying legal structures; fostering integration with the global economy through promotion of open trade and capital flows; and ensuring macroeconomic stability.³⁰

Investing in people through education would also be an investment in sustainable agricultural practices, in that subsistence farmers would be taught agricultural techniques that are "more knowledge-intensive than conventional approaches" because they include provisions for sustainability.³¹ The importance of ensuring competitive markets and open trade and capital flow is that freedom of international capital flow facilitates the transfer of new and cleaner technology. Without open markets and enterprise, new technologies would never reach

developing countries that do not have the resources and facilities to develop their own technology.³²

One crippling issue in developing countries that could do great damage to policy development is a lack of institutional stability. Without stable institutions, policies that benefit people and their environment cannot be made and enforced. In the *World Development Report 1992* the World Bank outlined four modes of “enhancing institutional arrangements,” the first being to “Clarify objectives and ensure accountability.”³³ Public agencies that implement programs such as public works and agricultural extension programs, the water supply authority, and the forest and land departments all need to be held accountable for the way their actions affect the environment.³⁴ Secondly, the institutions of developing countries must “Establish the capacity to set priorities and monitor progress.”³⁵ This may require a formal high-level agency for implementing and tracking policies for maximum benefit.³⁶ Thirdly, they must “ensure areawide coordination.”³⁷ This is important for the protection of water basins or large forested areas as well as city-wide pollution control, where coordination is the only way to ensure consistency and cost-effectiveness.³⁸ Countries and regions will make no improvements upon the environment if neighbors are simply detracting from their progress. The fourth key component is to “regulate at arm’s length.”³⁹ This means that “Implementing agencies should be held accountable for the effects of other actions and should be kept separate from regulatory and monitoring bodies.”⁴⁰ Several branches are needed for success and one body should not be handling all facets of a program if any objective or critical perspective is to be had.

Perhaps the most important key for policy development is that the people who the policies are designed to benefit are not forgotten. For successful policies, it is crucial to involve local people in all steps.

There is need for demystification of the existing as well as new structural plans for the local community. This is called 'participatory planning,' a system of planning where the target beneficiaries are involved in the planning and implementation and reviews of various strategies and activities under implementation.⁴¹

Generally speaking, the impoverished are politically marginalized and exist on the fringe without a voice, but they are also the most knowledgeable about their communities and their needs.

Outside organizations do not have the same local knowledge and cannot determine what is important to people and what is not. Implementing new policies involves making value and cost-benefit decisions, which can't be made correctly without local knowledge. It is a sensitive area, as changes made are likely to initially hurt some and benefit others. "Making choices between economic and social benefits and environmental costs often requires subjective judgments and detailed local knowledge. Neither governments nor aid agencies are equipped to make judgments about how local people value their environment."⁴²

Impoverished communities, while outside of normal political structures, have strong community ties and some level of self-established community organization. Neighbors help each other cultivate fields, build homes, and raise children. These feelings of kinship and community loyalty can easily transition into the beginnings of civil society. This is important as civil society is becoming more and more important in socio-economic development.⁴³ A thriving civil society creates its own space within the larger political structure. With an active civil society, communities can have a stronger voice and a platform from which to advocate for their needs. Outside donors and international aid organizations cannot truly influence local civil society, so it is the people that must get involved to improve their daily lives and environment.⁴⁴

Local people have often lived for generations in the same area and have seen the cycles of their land and how it has changed. Their traditional practices in themselves are not necessarily degrading. Some may have been successful and sustainable in the past under

different population and climate pressures. There may be some useable aspects of traditional practices that can be incorporated into new practices. This might also ease the transition for people who feel deeply tied to their traditions. “Development projects that have not built on the strengths of existing practices have often failed.”⁴⁵ There is a critical difference between traditional common-property systems, which can promote successful group management of resources, and open-access systems that result in exploitation and over-use.⁴⁶ The World Bank report stated that often policy makers and aid agencies do not understand this distinction and have nationalized resources. In many cases, nationalization and abandonment of traditional management led to more severe environmental degradation.⁴⁷

According to the World Bank report, assuming present productivity trends and projected population increases, the output of developing countries should be rising 4-5percent each year between 1990 and 2030. This means that by the end of 2030, the total output of developing countries will be five times greater than it was when the report was written in 1992. During this period the output of industrialized countries would also triple. Overall, world output in 2030 will be 3.5 times what it was in 1992. If environmental pollution and degradation increase along with output, the result will be horrific environmental pollution and damage.⁴⁸ Tens of millions more people would become sick each year and possibly die from environmental causes. Water shortages would be unbearable. Tropical forests and crucial habitats would shrink to a fraction of their current, already depleted size. While development is necessary and inevitable, it too causes environmental damage which must be curtailed through the promotion of sustainable development. The need for sound policies and strong institutional arrangements cannot be emphasized strongly enough.⁴⁹

With all the evidence that poverty and environmental degradation are strongly correlated, it cannot be denied that developed countries, throughout their development and today, cause a great deal of environmental degradation as well. Is it not the millions of cars and disposable consumer items used that are polluting the air and filling the landfills? Won't development further pollute and degrade these countries' already scarce resources? As the World Bank report stated, "The environmental problems that countries face vary with their stage of development, the structure of their economies, and their environmental policies."⁵⁰ Some problems come from a lack of development, such as contaminated water and land degradation. Other problems come from or are increased by economic growth and development, such as energy-related pollution and deforestation from large-scale logging.⁵¹ The key to reducing environmental damage from development, as written by the World Bank, is to "accelerate equitable income growth and promote access to the necessary resources and technologies" and to recognize resource scarcity in decision-making.⁵²

As development begins, it is likely that conditions will initially worsen, but after a certain level of income is reached, conditions can improve. "An inverted U-shape relationship applies in which environmental quality is sacrificed with growth at low income per capita levels, but is augmented with growth at high income per capita levels."⁵³ If development could continue despite initial worsening, and despite the discouragement this would cause, at a certain point environmental degradation would begin to decrease as income increased. "After a threshold income per capita is achieved, the demand for environmental preservation varies positively with income per capita . . ."⁵⁴ With a certain income security, people are able to consider things outside of day to day survival and will begin to push for environmental preservation. Reaching this state of increasing income and environmental protection will require

skillful balancing, well-crafted policies, local cooperation, and support through the first step of the process. The World Bank wrote that to achieve this, two types of policies are required, “those that build on the positive links between development and the environment, and those that break the negative links.”⁵⁵

There are many positive, or what are called “win-win” links, between efficient income growth and environmental protection included in the World Bank report. Some of these focus on population issues, such as creating reproductive health and education programs for females, which will reduce poverty and environmental degradation due to overpopulation. Agricultural research and extension programs would help to make existing cropland more productive and reduce the need for new cropland, which is taken from forested habitat. Improving sanitation conditions and increasing clean water access will also help individuals and the environment. In the world market, open investment and trade policies will also encourage innovation and the transfer of newer and greener technology.⁵⁶

Increasing income provides the extra funds necessary for the government to establish and run programs like those that will improve sanitation and education. Without this inflow of funds, these kinds of changes would not be possible. This applies not just to the government but also individuals. “When individuals no longer have to worry about day-to-day survival, they can devote resources to profitable investments in conversation. These positive synergies between economic growth and environmental quality must not be underestimated.”⁵⁷

Negative links between development and environment, which are found in the form of distortionary policies, must be broken. Often these are government subsidies for energy, chemical inputs, and logging, which encourage the overuse of natural resources.⁵⁸ For example, “Logging fees in a sample of five African countries ranged from one to 33 percent of the costs of

replanting.”⁵⁹ The revenue accrued from logging fees, if actually used for replanting, only covers the replacement of a small fraction of the cut trees so forested land will always decline. Removing these kinds of policies will also remove many monopolies from the market and allow for healthier economic growth, foster the growth of smaller businesses, work towards a more equal distribution of wealth.

While there are many positive links between economic growth and environmental protection and many ways to break some of the negative links, there are also issues that inevitably worsen with economic growth and cannot be ignored. Because of industry, carbon dioxide and nitrogen oxide emissions certainly increase and municipal waste grows.⁶⁰ Inside and outside the cities air and water pollution can increase, especially if systems to handle waste are not yet in place or not stable. In rural areas deforestation and encroachment onto natural habitats increases to create more available space as cities expand. In their report the World Bank was careful to emphasize the fact that no automatic switch goes off to turn development from destructive to beneficial. The change comes when a country introduces policies to protect its resources.⁶¹

However, since this world is becoming more globalized and connected each day and because of colonial legacy that will never totally fade away, the positive economic growth of developing countries is also dependent on the actions of developed countries. The capacity of developing countries to have sustained income growth depends on the economic policies of industrialized countries. Developing countries need better access to trade and capital markets and policies that will help increase savings and lower world interest rates.⁶² Its not just policies that are needed from developed countries but active financial contributions. “High income countries must play a major role in financing the protection of natural habitats in developing

countries from which the whole world benefits.”⁶³ Rainforests in Africa and South America sequester carbon dioxide for the whole world. They also hold vast potential for medicinal research and are home to species that are found nowhere else in the world. While major environmental resources exist in developing countries, they are beneficial for the entire world, and the charge of protecting these resources should not be the sole burden of the home country.

Additionally, “some of the potential problems facing developing countries- global warming and ozone depletion in particular- stem from high consumption levels in rich countries; thus, the burden of finding and implementing solutions should be on the rich countries.”⁶⁴ At a conference of African environmental ministers held in South Africa in 2008, U.N. environmental experts said, “Africa produces a tiny fraction of the world's greenhouse gases but is particularly vulnerable to the effects of global warming.”⁶⁵ The U.S. is the largest emitter of greenhouse gases while Africa produces a mere four percent of the world total.⁶⁶ Despite this and due to Africa’s climate and geography, the country is feeling and will continue to feel some of the worst results of climate change. “Africa is one of the continents least responsible for climate change and is also least able to afford the costs of adaptation,” said South African Environment Minister Marthinus Van Schalkwyk at the conference.⁶⁷

Computer models have projected significant changes in precipitation patterns in Africa which have the potential to cause food shortages and greater desertification, according to a U.N. Environment Program report released at the conference.⁶⁸ Global warming will undercut agriculture and lead to more erosion.⁶⁹ Water shortages will also worsen. “Lake Chad, which was once the second-largest wetland in Africa and supports 20 million people, is down to five percent of its size in 1973.”⁷⁰ Food and water shortages will necessitate the exploitation of more resources and deepen poverty, so that the vicious cycle will continue.

There are many who contest the validity of the vicious cycle argument, or what is often referred to as the ‘downward spiral’ of poverty and environmental degradation, or the “poverty-degradation nexus.” Primarily they argue that this is an oversimplification and that there are many factors involved, so simple cause and effect links can not be assumed.⁷¹ This paper by no means attempts to simplify the complex issues surrounding both poverty and environmental issues. The connection between the two, however, is undeniable, and policies that are mutually beneficial to both should be taken advantage of. Rather than simplify the issues, this paper means to point out the complications added to addressing environmental issues when human needs are still not being met or addressed.

Other detractors of the “poverty-degradation nexus” argument say that it puts the primary blame for the state of our environment on the poor which is unfair and distracts from other issues.

Blaming the poor has also served to absolve other actors of their responsibilities, and has not taken account of inappropriate government policies, the lack of investment in dry land areas, as well as the broader process of exclusion and marginalization that may be more to blame for land degradation than are poor people themselves.⁷²

Similarly, Frank Ellis wrote, “Making the poor the scapegoat for environmental deterioration merely lets off the hook the commercial and state behaviour responsible for the really big changes that result in switches in the dynamics of people in local governments.”⁷³

Seeing the downward spiral argument as blaming the poor is a misunderstanding of the basic tenets of the argument. The argument does not seek to place blame on the poor, but to explain how their everyday decisions are complicated by the struggle to survive and how they do not have the resources or income necessary to turn their concerns to environmental stewardship. In fact it seeks to remove blame from the poor and explain the factors that inform their actions. The inability of an underfunded, struggling, or dictatorial government to make appropriate

policies, the lack of investment, and marginalization all tie into and stem from poverty issues. Underfunded governments struggle to appropriate money to all issues and can become easily tainted with corruption, as politicians see an opportunity to enrich themselves. The poor often live in squatter settlements and do not have avenues towards official participation in politics so they are often unrecognized and left marginalized. While Ellis's argument that commercial and state operations also cause environmental damage is true, this paper does not seek to establish the actions of the poor as the sole cause of environmental degradation, but as one important piece of the problem that must be addressed in a different way than other pieces.

Part of the process of addressing the environmental issues that are linked to poverty is understanding the context-specific factors of the situation. Even Way, a detractor of the poverty-degradation nexus theory, wrote of the importance of this. She said that the exact causes of land degradation in different localities must be determined because a misdiagnosis of the situation can worsen existing conditions.⁷⁴ Inadequate government policy, lack of education, poor infrastructure, and marginalization are all contextual factors that contribute to poverty and environmental degradation and inextricably link the two issues together so that each factor must be analyzed. In order to fully explicate how the poverty-degradation nexus can be seen and addressed in environmental issues the remainder of this paper will analyze the case of the endangered mountain gorillas in Rwanda, as the survival of both the gorillas and the Rwandans are put at risk by extreme poverty and poverty-driven issues that plague the country.

Rwanda is one of the many countries of Sub-Saharan Africa that is in a dire state. In fact, the region provides an unfortunately large number of potential poverty-degradation case studies. Poverty in Sub-Saharan Africa is incomprehensible. Almost half the population lives on less than \$1 a day.⁷⁵ Sub-Saharan Africa “. . . is still the only place where hunger continues to

increase in both number and percentage of the population, reaching 180 million and 80 percent in 1990.”⁷⁶ It is also “. . . the only region in the world where food production per capita is not expected to be able to keep up with population growth and food insecurity is increasing.”⁷⁷ One-third of children still suffer from stunted growth and malnutrition is not declining. In 1999 almost 40 percent of the population of Rwanda suffered from malnutrition.⁷⁸ Because of these and other factors, Sub-Saharan Africa has the world’s highest rate of child mortality before age five and has the world’s lowest life expectancy for males- 44.8 years.⁷⁹

While life there is short and full of suffering, populations in Sub-Saharan countries continue to grow. Although many initiatives have begun to educate women on their reproductive rights and to promote family planning and the use of contraception in developing countries, these seem to be of little effect in Sub-Saharan Africa. “On average, the number of children per mother has barely declined in 40 years and is still more than six, the highest of all the world’s regions.”⁸⁰ In an era where the value of education is increasingly being recognized as an important step in development, school enrollment actually declined during the 1980s in half of the Sub-Saharan countries. Bluntly put by Hollander, “Sub-Saharan Africa is the world’s basket case of poverty, sometimes described as ‘the hopeless continent.’”⁸¹

As if this astounding level of poverty and poverty-related issues was not enough, the climate of Sub-Saharan Africa exacerbates these issues.

Nature has dealt an unkind hand to Sub-Saharan Africa. The heat is intense and debilitating. The soils are typically poor and difficult to farm sustainably. The rainy seasons can be extremely variable, with recurrent floods in some places (e.g. Mozambique) and persistent drought in others (e.g. Ethiopia). The climate encourages insect-borne diseases such as malaria and dengue fever.⁸²

As population continues to increase and climate change intensifies weather phenomena, the condition of the land that the poor desperately need to survive will worsen.

Nature is not the only one to have dealt an unkind hand to Sub-Saharan Africa. “Yet nature’s extremes, formidable as they are, do not alone explain the legacy of poverty and famine that still corrodes the environment of millions of Africans,” Hollander wrote.⁸³ Two other important factors are a century of slave trade and European colonization which did not end in some countries until as late as the 1980’s. These two factors have undermined African communities and local African leadership. Many countries have experienced non-democratic regimes and some are still ruled by dictators. Many countries also have long histories of civil war and violence which continue to erupt today.⁸⁴ Poverty and struggles over limited resources can also lead to increased conflict in already vulnerable areas. Johanna Svanberg-Larson wrote that, “Poverty in Africa is one of the main factors responsible for the instability of this region.”⁸⁵ Large-scale conflicts displace people, change land use patterns, damage natural resources, and often leave the poor in a worsened state, as they may have lost family members, their home, and any assets they may have held.

Rwanda has suffered from all of these damaging factors. Rwanda is home to a detrimental colonial legacy, institutionalized poverty, a recent genocide, recurring conflict, and a major part of the world’s dwindling population of mountain gorillas. In a country suffering from so many other issues, where does the argument for the protection of the mountain gorillas fit? The case is a difficult one to make but it has been tackled by conservationists for decades now, as mountain gorillas reached a critically low number in the 1980s. This case study will primarily follow the work of two conservationists, Amy Vedder and Bill Weber, who spent 23 years working in Rwanda and surrounding countries. Vedder and Weber’s conservation strategy recognized the necessity of working with local communities and addressing poverty and misperceptions to ensure that local ideas about conservation and resource use would be changed

in order to ensure the long term protection of the mountain gorillas, one of the most majestic and critically endangered species in the world.⁸⁶

A conundrum surrounds the issue of endangered species. “Most of the world’s species reside in developing countries, but most spending on protection is in developed countries.”⁸⁷ Tropical forests, like those found in the Virunga Mountains of Rwanda, are home to over half of the world’s species of plants and animals.⁸⁸ The unique animals here cannot exist in other habitats. Besides the mountain gorillas, which are endemic to the Virungas Mountains and the Bwindi Forest, the other mammals living in the forests of the Virungas include elephant, black-fronted duiker, buffalo, spotted hyena, and bushbuck.⁸⁹ There are also 178 species of bird in the park, including at least 13 that are found only in the Virunga and the Ruwenzori Mountains.⁹⁰ Saving these unique and endemic species requires protecting them where they are- in the dwindling forests of developing countries; there is no alternative. The plant life of the forest must also be preserved as unique and equally valuable species.⁹¹

However, the countries that are home to endangered plant and animal species like these are also the most ill-equipped to protect them. A piece of legislation like the Endangered Species Act of the United States, Hollander argued, could never come out of a developing country. The sheer fact of it is that legislation like this requires large expenditures of public and private money that developing countries just don’t have. “In fact, the gap between rich and poor countries in biodiversity conservation investment is enormous,” Hollander wrote.⁹²

In the developed countries, the average investment in protected areas is about \$1,687 per km², whereas in the poor countries the average investment is only \$161. This despite the fact that both the biological diversity and threats to that diversity in poor countries are often much greater than in rich countries.⁹³

Because of this, it is crucial that developed countries work with developing countries for the mutual benefit of both. In its 1992 report, The World Bank detailed two points for successful

conservation efforts, achieved through the coordination and collective efforts of home country governments, international governments, and international donors.

First, complementarities between the goals of development and protection should be exploited. Policies that encourage sound agriculture, off-farm employment, and sustainable logging will also discourage encroachment into natural habitats. Ecotourism, sustainable fishing, and genetic prospecting will be good for development and for biological diversity.⁹⁴

The first set of initiatives helps create sustainable income for local people and also reduces environmental exploitation. The second set of initiatives helps people see the value in protecting environmental resources and their potential to collect revenue that can feed into the community. Secondly, The World Bank wrote, “Specific things need to be done to protect habitats, with financial support from developed countries.”⁹⁵ This money should not be regarded as “aid” and shouldn’t be taken from aid budgets, but should be considered a separate issue also of top priority.⁹⁶ Financial support for specific conservation projects shouldn’t take away from humanitarian aid but it should complement it.

While coordination between international countries and home countries is crucial, the importance of work done at the grassroots level cannot be overstated. Conservation, education, and organization done at the grassroots level are crucial for changing local opinions and actions. While strong connections between international contributors and developing countries are important, the most important connection to make is between local people and their environment. This is the component that Vedder and Weber focused on in their work in Rwanda. The husband and wife team had a comprehensive multidisciplinary approach to conservation, one that paid close attention to scientific and social factors, and considered the needs of both people and wildlife.⁹⁷

According to the World Wildlife Fund, there are an estimated 700 mountain gorillas living today in two separate populations. One population lives in the Virungas Mountains, which run through the Democratic Republic of Congo (the DRC, formerly Zaire), Rwanda, and Uganda, and the second lives in the Bwindi Impenetrable National Park of Uganda.⁹⁸ There is some speculation among primatologists that the Bwindi Forest population is actually a separate subspecies from the Virunga population.⁹⁹ The gorilla habitat in the Virungas is broken into two national parks. The first is the Volcanoes National Park, or the Parc des Volcans, located in Rwanda, and the second is the Virunga National Park, located in the DRC. The part of the Virungas that extends into Uganda is not suitable gorilla habitat and lacks protection so there are no gorillas that live there permanently.¹⁰⁰ This case study focuses on the mountain gorillas of the Virungas, especially those in Rwanda. The WWF recently reported that over the last 12 years the Virunga population has increased by 14 percent, but this hasn't always been the case.¹⁰¹ While censuses are notoriously difficult to conduct, the population was counted at 380 in 2004, but was as low as 254 in 1981.¹⁰²

When Zaire became independent from Belgium in 1960 and became the DRC, the Belgian park staff of the Virunga National Park left. Poachers had free range over the forest to hunt duiker and buffalo. Tutsi tribesmen from Rwanda migrated into the DRC and entered the park area with large herds of cattle. Cattle are particularly destructive as they eat all the ground vegetation, churn the soil with their feet, and leave their excrement behind, affecting soil composition.¹⁰³ Meanwhile, Rwanda was still under Belgian control until 1962 and so was its park land, which went completely unprotected. The Belgian government of Rwanda did not prioritize the mountain gorilla and their habitat. In fact, in 1958 they gave approximately 27 km² of their habitat over to agriculture. This tension between agriculture and natural habitat is a

serious problem that has existed throughout the parks' existence and has often worked to the gorillas' detriment.¹⁰⁴

In 1960, George B. Schaller, a distinguished field biologist and conservationist, estimated that there were about 450 gorillas in all of the Virungas. A census done between 1971 and 1973 by Dian Fossey and Alexander Harcourt discovered only about 275.¹⁰⁵ The cause of this drastic change in the population was poaching and agricultural land conversion. In 1967 a civil war erupted in the DRC. During this time poaching became the biggest threat to the gorillas. Poachers use spears, guns, and snares. While the poachers may not be hunting mountain gorilla specifically, they are often caught in their snares. They can be killed from being caught in a snare or they can be maimed so badly that gangrene enters the wound and eventually kills them. It is not uncommon to see a gorilla with deformations, or missing a finger or hand from being caught in a snare.¹⁰⁶ In 1967, Dian Fossey established the Karisoke Research Center in Rwanda on Mt. Visoke, one of the Virungas. Recognizing hunting snares and poaching practices as a serious threat to the gorillas, Fossey practiced what she called "active conservation," in which, often controversially, she ". . . pursued poachers, burned poacher camps, herded illegal cattle out of the park, and in general became fiercely protective of her self-appointed charges," the gorillas.¹⁰⁷ While some of Fossey's tactics may have gone debatably too far, she did succeed in removing hundreds of snares from the park, an activity park rangers still must carry on today.

In 1968, 38.5 mi², or 40 percent of the total park area in Rwanda was destroyed to grow pyrethrum. When the dangers of DDT were revealed in the U.S., pyrethrum-based insecticides became popular. Kenya began to grow pyrethrum first but wasn't meeting the sudden boom in demand. "When for a while that demand could not be met, the case was bought and sold in Rwanda that this could be a major income-earner. Seeing no particular benefits from their

forests, Rwandans converted 10,000 hectares of the park to pyrethrum development,” wrote Schaller.¹⁰⁸ A European-sponsored plan to grow pyrethrum in what was park land began but by the time the forest was cleared, the pyrethrum market had declined because a synthetic substitute was developed. The land that was cleared was then sometimes used to grow potatoes.¹⁰⁹ A habitat loss of 40percent is devastating for a species, especially when that habitat was one of only two remaining.

This incident was only part of a wider and persistent trend of converting park land from irreplaceable habitat to cropland for unsustainable agriculture. It also demonstrated the fact that Rwandans saw no value in the forest as habitat or eco-system and no value in maintaining the gorillas’ existence. The forest only had value in what it could be converted to, like cropland, or what could be harvested from it, like duiker, a kind of small antelope.¹¹⁰ Because of these perceptions, the parkland that was one of two of the last remaining mountain gorilla habitats in the world was first sacrificed for the Western need for pesticides, and then used for unsustainable mono-cropping.

Also in 1968, the Cologne Zoo convinced Rwandan authorities to capture an infant gorilla for them. The Rwandan authorities hired poachers to do the job. In order to capture one infant, the poachers killed ten members of the gorilla group. They captured a second infant in the same recklessly destructive way from another group. Both infants died ten years later at the zoo.¹¹¹ Like the pyrethrum incident, this poaching incident represents many others of its kind and demonstrates several endemic issues. It is likely that the Rwandan authorities were highly paid by the Cologne Zoo for the capture of the infants. However, it’s also likely that the payment received was much greater than any sort of meager salary the authorities were paid. The actual hiring of the poachers for the captures demonstrates the inner connections that can

exist between authorities and those committing illegal activity and lax enforcement of park land restrictions.

In 1974, however, enforcement improved. The Rwandan government strengthened the guard force and tightened down on illegal cattle grazing in the park. They began to fine the owners roughly ten dollars per head for cattle found within the confines of the park. On the DRC side of the Virungas, park authorities were still unconcerned about cattle grazing issues.¹¹² At this time it was also popular for tourists and white Rwandan residents to purchase the hands and heads of gorillas from poachers as trophies and souvenirs.¹¹³ As often was the case with conservation, when one step forward was taken, two backward steps also occurred.

The disconnect in conservation actions taken by Rwanda and the DRC contributed significantly to the gorilla's endangerment. The lack of coordination between the two countries over the shared forest explains why the World Bank listed area-wide coordination as a key part of enhancing institutional arrangements. There has often been conflict between the DRC and Rwanda and the institutions of both countries have many issues to tackle in their respective country, but the conservation work of each could be strengthened by complementary work by the other. The institutions of both countries are stronger combined than apart.

In 1978 The New York Zoological Society, now known as the Wildlife Conservation Society, sent Amy Vedder and Bill Weber to Rwanda to collaborate with the Office of Tourism and National Parks on gorilla conservation. Vedder and Weber had been Peace Corps volunteers in the Congo in 1973 and taught at a small school, where they learned how valuable the human side of conservation is.¹¹⁴ In Rwanda they were to study land-use practices of gorillas and humans, discover the attitudes of locals toward the park, develop a viable tourist program, and begin conservation education.¹¹⁵ It was a heavy task to be charged with but with Vedder's

background in biology and Weber's in social science, their combined work would eventually become the successful Mountain Gorilla Project.¹¹⁶ Vedder and Weber's general strategy was to ". . . attack the problem on three fronts: anti-poaching to halt the killing, education to change people's perceptions and values, and tightly controlled tourism to generate political support for the park and gorillas through foreign revenue and local employment."¹¹⁷

Despite conservation efforts from Vedder, Weber, Fossey, and others, a census in 1981 revealed that the population had dropped again since 1973, from 275 to 254.¹¹⁸ In order to prevent any further decreases, living conditions around the park had to be addressed to reduce local exploitation of the park. The poverty and limited resources of those living around the park led them to encroach upon gorilla habitat and use the land unsustainably.

We can note with dismay or condemnation that the United States consumes almost 40 percent of the Earth's resources, even though its population represents only six percent of the world total. But the rural people of an impoverished nation like Rwanda, which lacks the economic and geopolitical clout to reach beyond its own borders, must survive on resources within walking distance of their homes.¹¹⁹

For many, one of these resources was the forest of the Virungas. In fact, Vedder and Weber wrote that while they were working in Rwanda over 100,000 farmers lived within a five mile radius of the park. "Behind them," they wrote, "millions more scratched out a living on shrinking plots of tired land. The park and its gorillas held no value to local Rwandans, who saw only potential farmland under the green blanket of forest that towered above them."¹²⁰ In 1989, Rwanda had the highest population density in Africa, at 500 people per mi². At the time, this was also the highest density of a rural population in the world. Competition for land was so heavy that the park land was cut significantly three times for farmland since its establishment in 1929- in 1958, 1973, and again in 1979.¹²¹ To make conditions worse, in 1989 Rwanda was at the center of the AIDS epidemic in Africa.¹²²

Local residents lived for the most part in traditional homes around the park. Ruhengeri was the commercial center of the area and the land between that city and the Parc des Volcans had a higher than average population density because the land was an old lava plain which made it flat and fertile.¹²³ Rwanda is divided into political units called prefectures. The prefecture that the Ruhengeri area is located in had the highest population density of all the prefectures in Rwanda- 921 people per mi². Since the park and two large lakes are located in the prefecture, the land available for settling and farming was already reduced.¹²⁴

In a typical household in the Ruhengeri area, the home is built on the lower side of a hill and the family farms a small area of the valley bottom below. Some fields were also located at elevation in various spots on the hills. A survey done by Weber in 1984 revealed shockingly that the total area of these fields amounted to barely one acre per family. “Rwandans were gardeners more than farmers,” Vedder and Webber wrote, “and their fate inextricably tied to that of the land on which 95percent of them lived and worked.”¹²⁵ These conditions set the stage for a significant land shortage that affected and will continue to affect the park and its gorillas. To the average struggling Rwandan, the park represented only a space that could be farmed for food and income and was not. To make matters worse, the park earned less than \$7,000 in entrance fees in 1978, making it difficult for the Office Rwandais du Tourisme et des Parc Nationaux, the ORTPN, to defend the park and the gorillas’ value to local residents.¹²⁶

Not only did the land use restrictions of the park affect farming and the availability of cropland and food, they also affected the locals’ ability to gather wood. Wood is a basic resource used for building houses, cooking meals, boiling water, and providing heat in what often can be a cold, damp climate. In Ruhengeri, the only trees that were not within the Parc des Volcans were located within communal, commercial, or private wood lots. The commercial lots

were used for tea-growing plantations. However, as Weber reported, “Unfortunately, the annual increment from all this wood- the amount that would permit a sustainable harvest over time- met less than one third of the estimated demand for the Ruhengeri population in the mid-1980s,” estimating that the average Rwandan consumed just under a cubic meter of wood each year.¹²⁷ In other words, in order to meet their need for wood, residents of the Ruhengeri area would have to harvest wood from these woodlots at an unsustainable rate, suffer from lack of fuel wood and building material, or find another source for wood- the park.

As part of his surveying of local farmers, Weber asked an older man if he would grow his own supply of bamboo for his own building needs and the man replied, “You’d have to be the son of a white woman to think I’d grow bamboo when I can get all I want free from the park.”¹²⁸ This statement is indicative of the attitude of the Rwandans living around the park. They have grown up living around the park and see it as Rwandans’ land, but do not understand the valuable role the land, untouched and unintruded upon, plays in the conservation of the mountain gorillas and other species of flora and fauna. Because of this they will continue to exploit the land for their own gain, especially as it is a “free” resource and the land outside the park is already well stripped of its resources and divided into increasingly smaller and less productive parcels.

In the 1980s, almost $\frac{3}{4}$ of Ruhengeri’s farmers reported a reduction in soil productivity due to erosion.¹²⁹ A decrease in soil productivity is both a cause and effect of deforestation, which leads to erosion and a cycle of degradation. Removing trees from a parcel of land changes the nutritional balance and cycles of the soil. There is no longer a periodic decomposing cover of leaves and vegetation that fertilizes the soil. Rain water rushes over the land, rather than being slowed by trees and vegetation, and washes away valuable topsoil. When the soil stops

producing for local farmers, they see no alternative but to abandon the land and move onto a new area, which is often forested and must be cleared. This leads to further deforestation, then in a few years, reduced soil productivity and increased erosion.

Weber spent a great deal of time interacting with and interviewing local Rwandans around the park to gauge their living conditions and interests in conservation in order to find the positive “win-win” links that could be employed to benefit both the people and the gorillas. In one of these surveys Weber found that most of the farmers who lived around the park did produce enough food from their land to support their families’ basic needs, but most felt like they didn’t have enough land to subdivide among their eldest sons, as is part of Hutu tradition.¹³⁰ The Hutus, a large group in Rwanda, are an agricultural people who grow potatoes, corn, beans, coffee, tea, sorghum, “and other subsistence crops.”¹³¹ This traditional tie to and need for land is something that the average conservationist, neglecting to consider the influence of local people, would not likely discover, but it is crucial to understanding why the need for land is felt so direly. This desperate need for land was visually evident around the park, as every parcel of land up to the very park border was cultivated. “Walks along the park boundary presented a study in stark contrasts,” Vedder and Weber wrote.¹³² Rows of potatoes went right up to the park’s boundary line of Cyprus tress. There was no transition or buffer zone to counter influences upon the park from agriculture.¹³³

If the local residents could better understand the role that the Virungas play in the maintenance and protection of their greater ecosystem, they might be better inclined to leave the natural system untouched. Water in Ruhengeri is unequally distributed and of an uneven quality but is plentiful because of an average of five feet of rainfall a year. According to Vedder and Weber, “The best water came from the park, where the Virunga forest served as both filter and

water storage tower.” An old Belgian piping system fed water from the park to several points along the park boundary.¹³⁴ The Virunga mountain range, wrote Schaller, represents just half a percent of the country’s land but ten percent of the entire country’s water catchment.¹³⁵ The volcanic peaks of the park are part of the chain that helps form the watershed between the Nile River and the Zaire River, also known as the Congo River.¹³⁶ The forest acts like a giant sponge to hold water in the wet season and then distributes it in the dry season. When the forest was reduced by 40 percent in 1978 for the pyrethrum project, outflow from the park decreased dramatically from the recorded rate in 1958.¹³⁷ Every reduction of the park and its forests impacts the water supply for people in and beyond the surrounding communities.¹³⁸

If the park was not protected as gorilla habitat, the local Rwandans would have likely already cultivated it, and would have destroyed the delicate water balance. As Schaller wrote, “Without gorillas the local people would already have cut their lifeline.”¹³⁹ It is not that Rwandans are being deprived of the valuable resources contained in the Virungas in order to protect the gorillas, but that by protecting gorilla habitat, they are preserving the keystone of their ecosystem- what holds together the tenuous area of greater Ruhengeri. If more of the park was converted into cropland, perhaps some families would be able to increase their income for a time through a cash crop. This would last only as long as the productivity of the compromised soil lasted and would be at the expense of their communities’ drinking and irrigation water.

In addition to being used for wood gathering and occasional conversion to cropland, during Vedder and Weber’s work, the park was still being used for illegal hunting and poaching, just as it was in 1967, despite many beliefs that poaching had been taken care of. Schaller wrote that poachers on the DRC side of the park were sometimes heavily armed with automatic weapons, but that they were mainly after elephants, not gorillas. There were shootouts between

poachers and park guards during which members of both sides were often killed. According to Schaller, after the problem of poaching and individual gorilla's stories received great attention through media coverage of Fossey's studies, it seemed to many, including Schaller, as though the threat of poaching was eliminated. "Rwandans put an end to that with all the publicity after the deaths of Digit and Uncle Bert. The word spread that there was no market for gorillas. Back in the States and in Europe, gorilla consciousness soared," Schaller wrote.¹⁴⁰ Digit and Uncle Bert were two male gorillas, both killed by poachers in 1978, who had been made popular and internationally known by Fossey's studies of their groups.¹⁴¹ However, while poaching of gorillas may have declined after these events, there is a big difference between gorilla consciousness increasing in the U.S. and Europe and gorilla consciousness in Rwanda and the DRC- two countries that actually have the ability to directly influence the lives of gorillas. While Westerners who fell in love with the images of gorillas on their television and sent money to various funds did contribute to conservation, the most important contributions had to come from local Rwandans and Congolese, who still greatly lacked any gorilla consciousness.

The term poacher is a broad one and while there may have been a reduction in well-armed, organized poaching rings, smaller-scale individualized poaching was still occurring. "There are two kinds of poachers: one hunts to feed his family, and another hunts to sell meat to hotels and rich Rwandans, to sell elephants for ivory, antelopes for skins, and gorillas for their skulls," said Jean-Pierre von der Becke, the former director of the Mountain Gorilla Project.¹⁴² It is the first kind of poacher that slips under the radar and does indirect damage to gorillas. Rwandans don't consume primate meat, but many smaller animals live in the forest, particularly the duiker.¹⁴³ After the penalty for killing a gorilla was increased in the 1980s, von der Becke admitted that "We still find snares, but they are for duikers, and you cannot stop that completely.

The main problem is that the gorillas are trapped in snares too . . .”¹⁴⁴ These same snares that Fossey and others had been removing from the park since 1967 still plague the mountain gorillas. They are tension-sprung and tighten when the bamboo pole they are connected to is contacted. The snare is supposed to pull up to tighten around the leg of a small animal like a duiker, but often catches gorilla’s hands and feet, maiming them or leading to deadly infection.¹⁴⁵

While Vedder and Weber wrote, agreeing with Schaller, that organized gorilla poaching had declined, they recognized the enormous damage that just a few trophy hunters or gorilla poachers could have on the population. Trophy hunters primarily target silverbacks, and in a population of 260 there are just about 30 silverbacks.¹⁴⁶ The loss of just one or two is extremely damaging to the population. When a silverback is killed by poachers, a new silverback takes over. The new silverback may kill all the infants in the group in a reproductive strategy seen among some social animals, so that he can conceive his own progeny and ensure the transfer of his own genes throughout the group.¹⁴⁷ While the poacher might personally kill one silverback, the repercussions of this could include the death of an entire generation of a gorilla group.

This is not the only fact about gorilla sociobiology that compounds the difficulties of conservation. Gorillas reproduce slowly. If a female’s infant survives infancy, she won’t have another infant for about four years. Also, 40-50 percent of young gorillas die before reaching adulthood, most in the first year of their life, from respiratory illnesses or accidents.¹⁴⁸ Gorillas are exceedingly defensive of their young. When poachers capture a gorilla infant, they often have to kill the group’s silverback, the infant’s mother, and any others who get in the way. This leads to two to three gorillas being killed for each infant captured, or worse, like the case of the infants taken for the Cologne Zoo where ten members of the group were killed. These captured

infants often die quickly in zoos or still in the hands of the poachers who capture on speculation and then seek out buyers.¹⁴⁹

It is clear that the attitudes and practices of the impoverished Rwandans living around the park greatly contributed to the difficulties of mountain gorilla conservation. Because of this, Vedder and Weber made positively influencing popular opinion about the park and conservation a key part of their conservation strategy. Weber conducted several surveys among local people and then formulated a strategy for education and awareness programs to help Rwandans understand the goals and benefits of conservation, particularly the value of the mountain gorilla and its habitat. In 1979, just one year after their arrival, Weber's survey of local farmers found that several surprising misunderstandings existed. More than half of all the local farmers thought that they could grow crops on park land if it was converted, despite the fact that none of their typical crops were adapted to grow in the elevations of the park's mountains, up to 8,800 feet.¹⁵⁰ This misunderstanding may have been fueling the perception that the park was a waste of good crop land.

Weber also found that 40 percent of the local people felt that they needed to hunt or cut wood in the park even though they knew it was illegal.¹⁵¹ It was not a misunderstanding or lack of knowledge about local law, but the necessities that local people faced that drove them to exploit park land illegally. Finally, most of the locals couldn't think of any value the forest held if it couldn't be cut or if the wildlife in it couldn't be hunted.¹⁵² However, when Weber told local farmers that there were at that time only 260 mountain gorillas left in the world, more than four out of five of them thought the gorillas should be protected. They however did not see or understand the connection between protecting gorillas and protecting gorilla habitat. In fact, more than half of these same farmers thought the entire park should be converted for agricultural

purposes.¹⁵³ The farmers' views of conservation were clouded by their own needs and the shortages they saw around them. While they were concerned for the survival of the shrinking gorilla population, many were also painfully aware of their own families' struggle for survival. In a country suffering from gross malnutrition and land shortages, the park desperately needed to be associated with some sort of tangible benefits in order for local farmers to realize its worth.

Weber continued to expand his work with the local community as part of his and Vedder's conservation efforts. In 1986, Weber surveyed over 600 families across the Ruhengeri prefecture. He asked people to list their personal concerns in order of priority. Neither the park nor the gorillas were included in any of the responses. In order from most important to least, the priorities were land, poverty, soil erosion, shortages of water, wood, and food, and health. When Weber asked what problems they felt they would be confronted with in ten years time, the responses were lack of land, overpopulation, and food shortages.¹⁵⁴ It is clear from these responses that locals had more pressing concerns regarding the survival of their families than wondering if the wood they cut or the traps they laid in the park land were hurting the gorillas, which were still a mysterious and distant entity to them. Vedder and Weber discovered, in fact, that half of the farmers who lived just outside the park couldn't even describe a gorilla.¹⁵⁵ Many had never seen one in their lives. The need to address the shortages faced by Rwandans, while increasing awareness and promoting conservation couldn't have been clearer.

These destructive practices carried out upon the park and its gorillas occurred because of the complicity of the surrounding inhabitants and local government. The Rwandans who lived at the edge of the park for generations seemed to see the land as theirs. If instead of viewing the park land as part of their natural resources, which caused it to suffer from the tragedy of the commons, the locals could see it as point of pride and uniqueness for their country as the last

remaining stronghold of an incredible species, they may feel more inclined to protect the Virungas. Trying to achieve this change, Weber traveled to primary schools throughout the area showing a film of the mountain gorillas made by Fossey's research team, adding his own commentary through a translator. Weber tried to foster "conservation nationalism."¹⁵⁶ Rwandans, Weber wrote, were proud people who wanted greater respect from the world. Their country was the last stronghold of the great mountain gorilla and what better way to promote Rwanda than through making the country known for its conservation efforts and the wonderful biodiversity of its park.¹⁵⁷

In addition to visiting schools, Vedder and Weber created radio broadcasts and conservation workshops for Rwandan science teachers. They had posters and T-shirts made and distributed that promoted gorilla conservation. They equipped a vehicle with audio visual equipment and took it village to village, playing conservation-oriented video footage of the mountain gorillas that villagers were expected to protect but had likely never seen in their lives.

Weber was also able to have conservation added to the secondary school curriculum with the help of the Belgian Technical Assistance Program, the United States Peace Corps, and Rwanda's Ministry of Education.¹⁵⁸ This education component of the Mountain Gorilla Project targeted secondary school students because ". . . they rode the fast track to future leadership positions."¹⁵⁹ What made it an extra challenge to reach children through Rwanda's education system was that less than two percent of all young Rwandans attended secondary school in 1978 and less than half of those students graduated. Teaching conservation there would not reach a large number of young Rwandans, but it would in theory reach the right ones. Because the number of young Rwandans who reached this level of education was so small, 2/3 of these students went on to become government officials, teachers, businessmen, and military leaders.¹⁶⁰

Teaching secondary school students made it more likely that the ideals of conversation in the upcoming generations would reach the top echelon of Rwandan leadership.

One development in particular that encouraged the residents to see the value in maintaining the park was the introduction of sustainable tourism, the second main facet of the Mountain Gorilla Project. Like all conservation programs, a tourism program must be carefully executed, as it can have as many negative influences as positive ones. It is of primary importance to make sure that locals truly benefit from tourism instead of being cast aside for high paying visitors. Tourism must also benefit and not negatively impact or disrupt the gorillas.

When tourism first began in 1978, the park had 1,352 paid visitors in one year. In 1984 the park received 5,790 visitors, showing a rapid increase and a growing interest in gorilla tourism. By the mid-1980s tourism was the fourth largest earner of foreign exchange in Rwanda and the gorillas were the main attraction.¹⁶¹ This provided the much needed economic argument for gorilla conservation. It also had a significant impact on local opinion. When asked by Weber in 1980 if they thought the park should be converted to agricultural land, 51 percent of local farmers said yes. In 1984 when tourism was burgeoning, only 18 percent said yes.¹⁶² When asked in 1980 what use wildlife had if hunting was illegal, 41 percent of farmers could see some benefit in wildlife in itself, and in 1984 that number grew to 63 percent.¹⁶³

It's likely that these changes in opinion had to do with the increase in local employment due to the ever-increasing number of tourists. Employment opportunities increased both around the park and in the city of Ruhengeri. There a hotel and several restaurants were renovated for incoming tourists. Not only did locals take notice of the park's increased benefits, but the government also took notice and increased political support of the park service.¹⁶⁴ However, Vedder and Weber found that most conservation jobs went to people from outside the area and

that park revenue too often was misappropriated by the government.¹⁶⁵ The benefits of tourism that go directly to local residents must be great enough to outweigh what they see as a loss of traditional resources. While jobs were created, they were mostly in the service industry and were not higher level conservation jobs.

Tourism in part detracted from the positive attitude changes and development of pride in Rwandan biodiversity. To some tourism sent the message “that the park and gorillas were for the abazungu, not for the native abanyarwanda.”¹⁶⁶ Programs were set up to garner foreign, and primarily white, interest in coming to see the gorillas. Westerners were able to visit habituated gorilla groups while many living around the park still had never seen a gorilla up close. When the system ended that allowed locals to visit gorillas during non-peak season for roughly five dollars they could not afford the normal ticket, which cost \$200. Only a few hundred Rwandans had been able to take advantage of the system before it was stopped by a new ORTPN director in 1989.¹⁶⁷ Worldwide it is Westerners who truly take advantage of ecotourism opportunities and who are the primary visitors of these kinds of attractions. Furthermore, as Vedder and Weber noted, Rwanda could make several million dollars a year from gorilla tourism, but the international airlines that transported visitors there made millions more. Rental car chains and hotels that visitors used were also mostly foreign-owned.¹⁶⁸ By giving the impression that conservation is not for Rwandans or gorillas but for foreign tourists, tourism that does not adequately benefit the community may cause many locals to be resentful and less inclined to support conservation initiatives or feel a sense of conservation nationalism.

While negative impacts upon local residents from tourism must be considered, the negative impact on the species themselves can also not be ignored. In 1989 six gorillas died in the span of just a few months. Autopsies showed that five of them had died of respiratory

ailments, which could be attributed to the extremely cold and wet weather they live in during the rainy season. These kinds of ailments are a reminder of earlier habitat loss which forced the gorillas to move to increasingly higher and into colder elevations in the park.¹⁶⁹

The sixth gorilla, however, tested positive for possible exposure to measles. Measles is no longer an illness associated with Westerners, but at that time it was the second highest cause of infant mortality in Rwanda. This led researchers to believe that the measles had come from a Rwandan, not a Western tourist, but the gorilla was from a group habituated for tourist visits.¹⁷⁰ The measles could have come from a Rwandan guide or assistant on the gorilla habituation or visits. As gorillas are a close genetic relative of humans, increased contact with humans in general could lead to the increased possibility of gorillas suffering from human ailments. Vedder and Weber wrote that “. . . measles among gorillas could have the same devastating effect already seen among nonresistant populations of humans around the world.”¹⁷¹ With a population of just a few hundred, the mountain gorillas of the Virungas could be devastated or even lost if an epidemic were to spread through them from increased human contact. Tourism programs like these must be undertaken very cautiously and the size and frequency of tourist groups must be carefully controlled. After the deaths, the gorillas visited by tourists had to be inoculated.¹⁷² Earlier Vedder and Weber, along with others, had fought to keep visitation groups at six tourists each, but faced opposition from those who wanted to maximize profit. An uneasy compromise was reached and the number was increased to eight, but seeing profits roll in influenced the decisions of park officials¹⁷³

Despite any negative influences on the gorillas through the first decade of tourism, a 1989 census counted 320 gorillas, a significant increase. Additionally, 45 percent of these gorillas were younger gorillas, which is higher than typical.¹⁷⁴ This means that the population

was showing signs of recovering and positive reproduction. However, as attitudes were changing, awareness and conservation education were spreading, and Rwanda was becoming a world-renowned eco-tourism site, an unimaginable disaster began. The Rwandan genocide took place from April to June 1994. An estimated 800,000 people were killed in the murderous rampage that lasted about 100 days. The violence was mostly carried out by the Hutus, the majority group, against the Tutsis, the minority.¹⁷⁵ Some perpetrators of the violence were offered incentives, like food and money, and some were told they could take over the land of the Tutsis they killed.¹⁷⁶ The distinction between Hutus and Tutsis is sometimes identified as an ethnic one and sometimes identified as a socio-economic one, but is generally agreed to have stemmed from Belgian colonial systems. Two million Hutus also fled Rwanda for the DRC, fearing retaliation.¹⁷⁷ Overall, in just a few months, the population of Rwanda went from 7.6 million to 4.8 million. This reduced population was the same size as Rwanda's population when Vedder and Weber arrived in Rwanda, 16 years earlier. Thousands of these people also had serious physical and psychological wounds.¹⁷⁸

Vedder and Weber were fortunately able to leave Rwanda while tensions were rising and reached the United States where they waited in safety but in terror about what could be happening to their friends in Rwanda. A major U.S. television network asked Vedder and Weber to speak on primetime evening news about the fate of the mountain gorilla during the violence.

We replied that it would be wrong to discuss our concern for gorillas against a background of unspeakable human suffering. We did offer to appear if we could talk about the country and its people, but the woman on the phone assured us that more people were interested in the gorillas. Sadly, she was probably right. We declined the request.¹⁷⁹

In the U.S. especially there seems to have been a significant lack of in-depth reporting about the genocide, leading to a general lack of acknowledgement of its enormity and a slow response

among leaders. Flooded with images of bright-eyed, adorable gorilla infants and the individual stories of gorillas studied in-depth by conservationists and broadcasted by the media, Americans seemed to relate more to these animals than to the common humanity of those being slaughtered.

It is both a positive and negative fact, as Vedder and Weber acknowledged, that “Mountain gorillas have star quality. They command attention. They have a global constituency that is prepared to act when they are threatened.”¹⁸⁰ Where is that global constituency when vulnerable Rwandans are threatened?

With regard to mountain gorillas . . . animal rights advocates should recognize that their concerns might be seen as irrelevant- or even offensive- in the Rwandan cultural context, where the most extreme violations of human rights remain deeply etched in the national consciousness. There are more than a few Rwandans who wonder if the Western world would have intervened more quickly and forcefully if mountain gorillas, rather than Africans, were being slaughtered in 1994.¹⁸¹

With human rights so insecure in so many African countries, is there really room to argue for animal rights? It seems callous and inhumane to put the survival of the mountain gorilla over the Rwandan, but fortunately that is not a choice that must be made. The livelihoods of both can be protected, and must be protected, simultaneously. There is a necessarily close connection between the Rwandans and the mountain gorillas. They share a very small country with very limited resources. By helping Rwandans secure sustainable sources of income, food, wood, grazing ground, and water, and most importantly, by helping them secure peace, the future of the mountain gorilla is in turn secured. By seeming more interested in the needs of gorillas, animal advocates and conservationists risk alienating the very people they desperately need on their side, which is why reducing environmental degradation must go hand-in-hand with improving the quality of life of local residents.

As a testament to this, the work Vedder, Weber, and others of the Mountain Gorilla Project carried out with residents through education programs, local outreach, and the beginnings of sustainable tourism, had an astounding result during the genocide.

The result of this combination was seen in the exceptional declaration- by both sides- after the outbreak of hostilities in and around the park in 1990, that everything will be done to protect the mountain gorillas. We know of no other military conflict where the combatants proclaimed to the outside world that they would not harm wildlife.¹⁸²

Only one gorilla is known to have been killed in Rwanda during the civil conflict leading up to the genocide in the early 1990s or during the genocide in 1994, and this single death is thought to have been from an accidental encounter.¹⁸³

While technically the genocide was over, smaller violent conflicts continued. The infrastructures of the country proved to be devastated. Deprived of much of their crops, their livelihoods, and their family, many Rwandans were reduced to a deeper state of poverty. Vedder returned to Rwanda in 1995 and saw scenes of devastation. Ravaged land increased the land shortage problem. The country as a whole was impoverished, as foreign and domestic finances were looted by Rwanda's outgoing government.¹⁸⁴ Because the violence had not entirely ended, Vedder worked with a conservation group in the DRC in June and July of 1996.¹⁸⁵ In 1995 and 1996, the "archipelago of refugee camps" along the borders of Rwanda was a threat to the country's security. "Armed bands of young men would cross Lake Kivu or infiltrate through the Virunga and Nyungwe forests. . ." They would also take refuge in the forests.¹⁸⁶

Conditions were still dangerous in Rwanda, so Vedder did not return again until 1999. At this time, however, Vedder was happy "to find that the country had made surprising domestic progress."¹⁸⁷ The country was beginning to look again like it did before the civil conflict of the 1990s and the genocide. There was also greater internal security. The government was encouraging a policy of villagization, where people were increasingly moving into villages, both

to improve access to services and to improve security. Greater security helped protect the Rwandans as well as the gorillas, whose forest habitat had become the refuge of many violent groups during conflict.

Because of the violent turmoil in Rwanda and its surrounding countries, no census had been taken since 1989, when a population of 324 was recorded. The next census was not conducted until 2004, when 380 gorillas were counted, a 17 percent increase.¹⁸⁸ This was an increase of 126 gorillas from the low of 254 that was counted in 1981, three years after Vedder and Weber's arrival in Rwanda. In 2004, *National Geographic* reported that the mountain gorilla had made a rebound.¹⁸⁹ In the article Vedder said, "There are not many great success stories in conservation today . . . this is tremendously gratifying . . . It's outstanding that these countries have been able to provide protection on an interim basis during terrible times, and these numbers are a testament to their commitment."¹⁹⁰ At 380, the population is on its way to reaching what is believed to be its natural size. When the first census of mountain gorillas was taken in the 1950s, there were 450 gorillas in the Virungas. According to Vedder, this number is likely to be close to the natural population density, as the protected area of the Virungas is about 780 km².¹⁹¹ However, the danger of extinction for the gorillas, still surrounded by conflict and poverty, is far from over. While Rwanda seemed to be stabilizing, conflict came next not from within, but from the neighboring DRC.

In May 2007, 200 Mai Mai militia fighters attacked three observation posts in the Virunga National Park.¹⁹² They drove the park rangers out and left the area vulnerable to poachers.¹⁹³ They also threatened to kill the gorillas themselves if authorities attempted to pursue them into the park. The Mai Mai may have acted in response to a recent government crackdown and attempts to drive out and demobilize the remaining militia in the eastern part of

the DRC.¹⁹⁴ The Mai Mai are a rebel force and are loyal to the dissident Congolese general, Laurent Nkunda. In July the group shot five gorillas at point-blank range, leaving the bodies where they fell.¹⁹⁵ While no motivation for this violent destruction is clear, it seemed to be an act of defiance toward the Congolese government and conservation authorities, as well as their own assertion of authority and a demonstration that their threats were not empty.

In this strange and violent incident it is as if the gorillas were used as hostages. The Mai Mai, fully aware of the value of each individual gorilla to the population, as had been taught throughout Rwanda for the last three decades, threatened to destroy Rwanda's most valuable living assets in order to have their demands heard. This presents an interesting and unfortunate turn of events after the gorillas were largely protected during the civil war and genocide of the early 1990s. Because of the attention given to the gorillas by conservationists, Westerners, and Rwandans, the Mai Mai brought attention to themselves and their demands by effectively taking the entire park hostage and killing five gorillas.

By September rebel forces totally controlled the area and also threatened to kill any conservationist or ranger that entered the area. Many rangers and their families were forced to flee. The efforts of those who stayed or later returned to protect the gorillas were outstanding and very successful. However, the protection of the gorillas from the violent militants came at a high cost of human life. Over 97 rangers were killed in the park since conflict involving armed militant rebel groups began in the DRC in 1996.¹⁹⁶ In January of 2009, the Rwandan and Congolese military began to move in on the Mai Mai and their leader Laurent Nkunda was arrested. Since then, the conflict has calmed significantly but many threats remain to the gorillas, from armed conflict and many other sources.

In February of 2009, the Congolese park ranger relaunched their joint patrols with Rwandan park rangers. Maintaining these patrols is important to prevent hunting in the park. In two months of the very dangerous patrols during the Mai Mai occupation, rangers found 1,200 snares in the park.¹⁹⁷ Cooperation between the DRC and Rwanda is crucial to the survival of the mountain gorillas. As we have seen in past decades, the positive steps taken by one country can be completely nullified by the inaction of the other. Until 2003, the two countries were effectively at war but during that time they worked together for conservation and they continue to work together today.¹⁹⁸

In 2008 it was officially estimated that there are 700 mountain gorillas in the world- the combined population of the Virungas and the Bwindi Impenetrable Forest of southwestern Uganda. The Bwindi population is comprised of 320 gorillas, around which there is still speculation about a separate subspecies.¹⁹⁹ While conservation efforts seem exceedingly successful and the populations seem to be growing well, recently gorillas have faced a new enemy that no one could have ever envisioned- the ebola virus. As reported by Richard Black of the BBC News, “Why ebola is now taking its toll on apes is not clear, but may be connected with forest clearance. One theory is that the as yet unidentified animal which harbours the virus lives on the edge of forests; logging creates more edges, and so enhances the transmission of ebola.”²⁰⁰ Minimizing the spread of ebola among gorillas is another reason to stop the clearing of forest in the Virungas and to find other sources for cropland and wood collection. Stopping the spread of ebola will benefit Rwandans, who can also be ravished by this terrible disease.²⁰¹

The world’s remaining 700 mountain gorillas, face danger from habitat destruction, poaching, violent conflict, and now disease. After reaching an all time low in the early 1980s, their population shows signs of health and growth, but they are still critically endangered. While

most Rwandans now better understand the plight of the unique species living in their country, the Mai Mai occupation of 2007 reminded the world how the attention given to mountain gorillas can be manipulated and how easily this incredible species can be hurt, or worse, destroyed. Since the 1980s and even earlier, many conservationists have been working tirelessly to preserve the gorillas by protecting their habitat, reducing poaching, illegal hunting, grazing, and wood-harvesting, and by increasing local awareness of conservation. In order for these steps to be effective and long-lasting, the local community must be in agreement and involved with conservation. They are the ones who are asked to change their practices and to give up some of the valuable but scarce resources they rely on, all while many of them are struggling to survive as well.

Rwandans living around the Parc des Volcans deal on a daily basis with severe land shortages, agricultural stagnation, malnutrition, poverty, and often civil conflict. Living at a subsistence level with very few resources and an ever-growing population, they took advantage of whatever resources they could find, regardless of whether it was within protected parkland or not. When human needs are not being met and human rights are not secure, it is difficult to convince those who have already been pushed to the fringes to feel compelled to protect a species that they feel no connection to and may have never even seen. Conservation can often be seen as a “white” or privileged issue, perpetuated by hoards of Western tourists coming to see the gorillas and the Western media’s fascination with exotic and often anthropomorphic species, so local residents must feel some sort of benefit or connection to conservation in order to participate.

Amy Vedder and Bill Weber, conservationists who worked in Rwanda among both the gorillas and the local Rwandans, found that this connection to the mountain gorillas was missing.

Local farmers also did not understand how important preserving the Virunga forest was, not only as gorilla habitat, but as a major water catchment for the surrounding communities. Without their extensive surveying of the local population, Vedder and Weber would not have discovered these and other crucial facts about local ideas and perceptions that helped shape their effective education, conservation nationalism, and eco-tourism programs. Vedder and Weber's conservation strategy, which also looked to address the needs and values of local people, is an example of what kind of policies and social science work is needed to begin to break the poverty-degradation nexus, through the use of "win-win" policies that benefit local people and their environment.

Still feeling the lingering effects of the 1994 genocide and the conflict that continued for years after, life for many Rwandans is still riddled with poverty and struggle, but many have shown extreme dedication to gorilla conservation, like the park guards who risked and even lost their lives when militant groups surrounded the park on several occasions. The people of Rwanda have put forth an inspiring story of breaking the poverty-degradation nexus in another way as well- by showing dedication to conservation through the most unimaginably difficult times and while their own circumstances were spiraling rapidly downward. In the coming years, hopefully the bravery of these people will be rewarded with peace and positive growth for themselves and the mountain gorillas that have come to show that the people of their country are not just victims of poverty and genocide but are also capable of incredible acts of conservation.

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