

**IMPACT ANALYSIS OF TOURISM ACTIVITIES ON LOCAL COMMUNITY
SURROUNDING VOLCANOES NATIONAL PARK IN MUSANZE DISTRICT, KINIGI
SECTOR, NORTHERN PROVINCE OF RWANDA**

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BSTRACT

Tourism is one of the biggest and quickest developing businesses within the world. It is a progressively imperative source of wage, business and riches in much nation counting Rwanda. Universal tourism presently accounts for a bigger share of outside trade receipts and trades profit than any other industry within the world. But, whereas tourism gives impressive financial benefits for our nation, its fast extension has too had negative natural impacts. Characteristic asset exhaustion and natural debasement related with tourism are regularly genuine issues for population.

This study aims at analyzing the environmental impacts resulting from tourist activities at volcanoes National Park, an important tourist attraction in Rwanda.

For data collection and analysis, appropriate methodology was used such as sampling techniques, interviews and questionnaires all backed with reliable documentation.

This study covered a period of 5 years (2007-2011) in Four Sectors of Musanze District Northern Province.

After the collection and analyzing of data, using that methodology, we found that tourism has positive and negative impacts on environment at VNP, but our focus was on negative impacts. Within negative impacts of tourism activities, we have different kind of pollution, destruction of vegetation, sickness of gorilla or people, human wildlife conflict, and destruction of Rwandan culture

This study suggested some solutions for in order to maximize positive impacts in the destination. The staff of VNP in charge of conservation of environment said that there are many rules and regulations to mitigate negative impacts. The people near VNP also said that to minimize the negative impacts of tourism activities they work together with their local leaders in conservation of environment.

This study has been of great importance for society, other researchers and policy makers in tourism area.

Key words: Environment, Impact Tourism, Volcanoes National Park,

Introduction

Tourism is the world's biggest industry. It accounts for more than 10% of add up to business, 11% of worldwide GDP, and add up to traveler trips are anticipated to extend to 1.6 billion by 2020, and thus, it incorporates a major and expanding effect on both individuals and nature. Impacts can be negative as well as positive. Unseemly tourism improvement and hone can corrupt territories and scenes, exhaust common assets, and create squander and contamination. To articulate things differently, potential tourism can offer assistance to create mindfulness and back for preservation and neighborhood culture, and make financial openings for nations and communities (Denman, 2001: P.1).

These potential impacts on nature and biodiversity are strengthened by the truth that visitors tend to consume more than the nearby population conjointly more than at domestic. In expansion, pictures of richness and wealth that are customarily related with occasions frequently fortified the over utilization design. Moreover, formative exercises have taken a toll on the environment and have come about in misfortune of biodiversity. One of the major causes of the degeneration of environment is spontaneous and unchecked developmental exercises within the visitor goals. Tourism, in spite of the fact that, useful for the country's economy, hurts nature when it isn't arranged legitimately (Hannah, & Spenceley, 2010). People who come to appreciate the beautiful magnificence regularly litter the places with polythene and cleared out over nourishment without considering almost its negative effect on environment.

Tourism in Rwanda plays a critical part within the economies of Rwanda particularly of VNP and his environment. Rwanda is well known for the mountain gorillas. This brought worldwide consideration by the preservation efforts of Dian Fossey within the 1960s and 70s. Rwanda and Uganda two nations within the world where mountain gorillas can be gone to securely at the minute.

In 2008, almost 17,000 individuals gone to the volcanoes National Park (VNP) to see the gorillas, expansive increase from the late 1980s and an amazing recuperation from as it were 417 sightseers in 1999 after the reviving of the stop. Rwanda has moreover seen gorilla tourism as a profitable preservation instrument, implementing strict rules for the habituation and trekking of gorilla families (Nielsen and Spencely, 2010).

Interestingly, one should know that Gorillas are like human being. They share more than 98% of their DNA with humans.

A part from this Gorilla in VNP there are other animals such as: elephants, buffalo, birds, bush backs, antelopes etc.

Besides the VNP, Rwanda has three other national parks and reserves that offer, a range of wildlife and biodiversity. Furthermore, the country has been successful in attracting large numbers of

business and conference travelers, mainly from the neighboring countries of the East African Community.

The gorilla naming ceremony moreover has pulled in a number of worldwide celebrities. Each year since its dispatch in 2005, a gorilla naming ceremony ("Kwitaizina") takes place where the mountain gorilla babies born within the past 12 months.

This exciting ceremony has an impacts on the environment in one way to another. While tourism provides considerable economic benefits for our country, its rapid expansion can also be responsible for adverse environmental impacts.

According to Gazta (2018), tourism has impacts on environment such as Impacts on soils, Impacts on water resources, Impacts on vegetation, Impacts on animal human life, Impacts on cultural environment.

i) Impacts on soil

Important land resources include minerals, fossil fuels, fertile soil, forests, wetland and wildlife. Increased construction of tourism and recreational facilities has increased the pressure on these resources and on scenic landscapes. Direct impact on natural resources, both renewable and nonrenewable, in the provision of tourist facilities can be caused by the use of land for accommodation and other infrastructure provision, and the use of building materials

ii) Impacts on water resources

Water, and especially fresh water, is one of the most critical natural resources. The tourism industry generally overuses water resources for hotels, swimming pools, golf courses and personal use of water by tourists.

iii) Impacts on vegetation

Recently, HAN, and LI(2019) reported that the ecological protection and restoration of eco-tourism areas are lagging behind due to the destruction of tourism activities. They believe that People gradually realize that tourism activities are a "double-edged sword", and eco-tourism has gradually developed into a favored way in the tourism market, with a focus on conservation of the natural environment and the natural landscape cited by (Buswell and Buswell, 2011; Tikkanen et al., 2017). The national ecological nature reserves are the main carriers for tourism activities, with a limited capacity to withstand people's interference and destruction, and tourism activities will be destroyed to varying degrees and may cause species degradation in serious cases (Krupczek and Micha, 2016). This paper explores also the impact of tourism activities on the environmental carrying capacity, vegetation landscape and atmospheric environment of natural ecological protection areas, and seeks measures for the coordinated development of tourism activities and ecological natural protection.

iv) Impacts on animal human life

Tourism has the potential to increase public appreciation of the environment and to spread awareness of environmental problems when it brings people into closer contact with nature and

the environment. This confrontation may heighten awareness of the value of nature and lead to environmentally conscious behavior and activities to preserve the environment. Wildlife can be adversely affected by the construction and maintenance of tourist infrastructure, and by tourist activities. Impacts from tourist infrastructure can be direct, such as when development in lower elevations of mountain resorts restricts the migratory range of certain wildlife, or indirect, such as when marine turtles are disoriented by automobile headlight sand resort illumination.

v) Impacts on cultural environment

Tourism can significantly contribute to environmental protection, conservation and restoration of biological diversity and sustainable use of natural resources. Because of their attractiveness, pristine sites and natural areas are identified as valuable and the need to keep the attraction alive can lead to creation of national parks and wildlife parks.

This paper deals with those environmental problems caused by tourism activities taking a case study of VNP. The study also looked on possibilities of developing tourism sector in this area without harming the environment, and to promote ecotourism all over the country.

Study area description

VNP is located in Northern of Rwanda on a chain of dormant volcanoes: Muhabura, Gahinga, Sabyinyo, Bisoke, Karisimbi and is part of the Arbertine Rift. VNP is bordering by DRC in Western and Uganda in Eastern and it's bordering with two national parks of the two countries: Virunga National Park in DRC and Mgahinga Gorilla National Park (MGNP) in Uganda. The three parks together form an ecosystem that called Virunga massif (**ORTPN, 2004**). The actually surface of this protected area is about 160 km² with the altitude that varies from 2400m to 4500m, and the highest is Karisimbi that is on 4,507m (idem). VNP is surrounded by 4 districts: Burera and Musanze, the two districts of Northern Province, Nyabihu and Rubavu districts of Western Province. These districts are also subdivided into 12 administrative sectors and 30 cells

The study was conducted in 4 sectors of Musanze District that are considered as critical zones in poaching and crop raiding specifically in Nyange, Kinigi, Shingiro and Gataraga. In these sectors also, it's where many groups of Gorillas are concentrated, this means that 80% of tourism activities are concentrated in these areas. In Nyange sector the data was collected in 3 cells (Muhabura, Ninda and Kabeza). In Kinigi sector (Nyonirima, Nyabigoma, Kaguhu, and Bisoke. in Shingiro sector, our data was focused on sample population of Mugari, Mudende cells, in Gataraga sector (Mudakama, Rungu). All the cells taken are directly adjacent to the Volcanoes National Park. In total 11 cells were used during our research study.

Research Design

In statistical sense, data is a collective term used to define results of a statistical study, survey or investigation. And data can be classified as numerical (quantitative) or non-numerical (qualitative) responses. Depending on the way there are collected, it is recognized essential information from

auxiliary information. Essential information is information collected straightforwardly from examinations, overview or census utilizing individual interviews or survey.

Questionnaire is a document which is made up of questions and answers related to the topic or subject of the study while secondary data is data collected from existing textbooks, newspapers and magazines, research papers, government or company and others (JAVEAU, 1974:2-11).

The success of any exercise on data collection depends mainly on the effectiveness of the questionnaire. A good questionnaire should be simple, non-technical, questions should not be ambiguous, but there should be pre- printed answers to allow interviewees to choose among given answers.

This study collected essential information utilizing straightforward irregular examining strategy, whereby each part of the population has a rise to chance of being chosen for meet and surveys have been outlined appropriately.

Population, Sampling techniques and Sample size

Population

Grinnell (1999) looks at population as the number of people or objects secured by study or with which the study is concerned. In other words, it may be an entirety set of individuals or things beneath thought in a study.

This study was carried out in 4 Sectors of Musanze District. These Sectors have 83, 570 populations, 30 guides and 5 staff of ORTPN. Thus the total population for our study was 83,605 populations.

Sampling Techniques

Researchers usually cannot make direct observations of every individual within the population they are considering. Insep, they collect information from a subset of people "a test" and use those perceptions to create deductions around the whole population.

In research terms a sample is a group of people, objects, or things that are taken from a bigger populace for estimation. The test ought to be representative of the populace to guarantee that we are able generalize the findings from the research sample to the population as a whole. Testing is a vital viewpoint of information collection.

Sampling techniques

A purposive sampling technique was used because it enabled the researcher to pick the data from respondents for achieving the purpose of the study.

The respondents were selected by the researcher chosen on the strength of their experience on the phenomenon under study.

Kenneth (1978:83) explains purposive sampling as a strategy of testing whereby the researcher employments his or her claim information approximately which respondents to select and choose as it were those who can best meet the purposes of the study. In examining plan, the researcher

utilized the Alain Bouchard equation which refers to table of deciding the test estimate and the researcher was able to induce the test measure for the study.

The table states that when the population is less than one million people, it is comparing to a test of 96 people with 10% as edge of blunder. So, given that the population of this consider is less than 1000 000 people (83,605<1000 000), the researcher applied this formula for finding the Alain Bouchard test estimate corrected.

The formula is:

$$nc = \frac{n}{1 + \frac{n}{N}} = \frac{n}{\frac{N+n}{N}}$$

N: Population of study

N: a sample of 96 individuals

nc: corrected sample

$$\frac{N \times n}{N + n}$$

Thus the sample will be:

$$nc = \frac{83605 \times 96}{83605 + 96} = 95.8 \approx 96$$

The sample was 96

Sample Size

Purposive Sampling was used to select the villages in which respondents were selected. Selection of the villages was based on the dynamism of conservation and tourism activities. The sampling unit was a household that surrounds VNP in the Cells of Nyange, Kinigi, Shingiro and Gataraga sectors. A simple reasonable choice sampling was used to select the sample elements. The Sample size was 95 based on the formula of Alain Bouchard. These respondents are taken as detailed below:

30 tourists guide, 5 Staffs of ORTPN, 60 peoples of the 4 sectors surrounding VNP. In Nyange (15peoples), Kinigi (20Peoples), Shingiro (15 People) and Gataraga (10Peoples). The researcher used local leaders for choosing these people. These people were selected based on the strength of their experience on the phenomenon under study for example the ex-poachers called “inkeragutabara”.

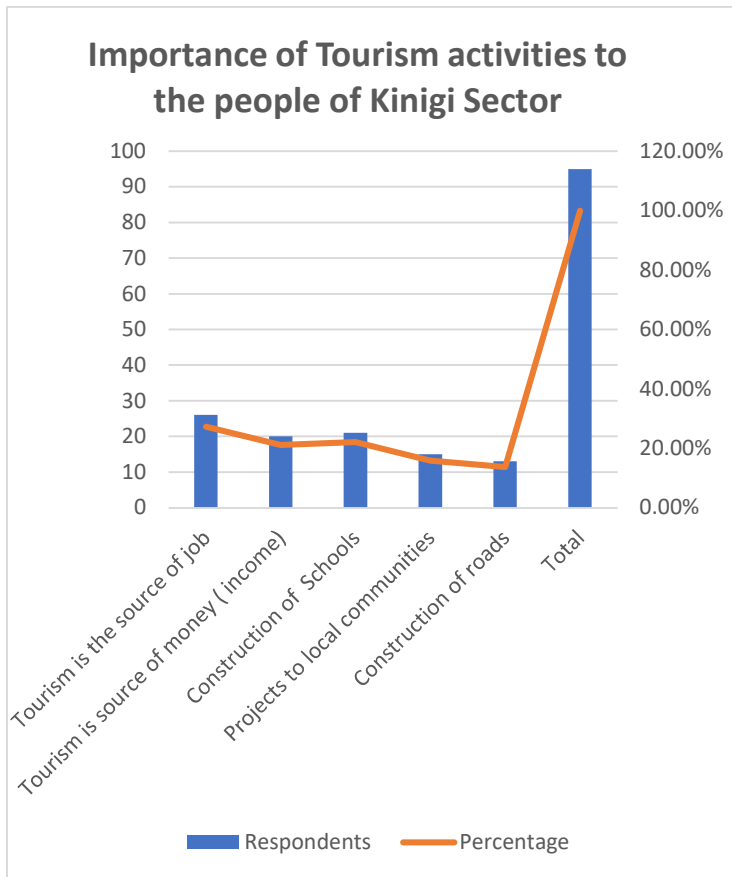
Data collection methods

Surveys were conducted to obtain the figures at source. These figures obtained are called primary data. The following methods were used:

- Questionnaire
- Interview
- Documentation
- Informal discussions

The key informant of this study included: local communities who don't work directly with the park, local authorities (Executive Secretaries of Sectors and Cells), VNP Staff, Ex-Poachers (member of conservation teams) etc.

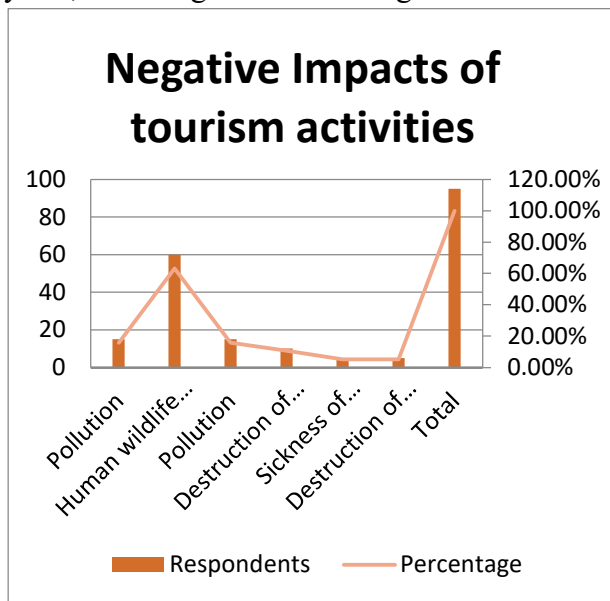
Results



For this first objective of our study, the respondents gave some importance of tourism activity to the local people; whereby **21.1%** of respondents said that tourism activities are source of money for them and for the country in general. For Yehia(2019) found that the number of jobs created by tourism in many different areas is significant. These jobs are not only a part of the tourism sector but may also include the agricultural sector, communication sector, health sector, and the educational sector. Researchers believe also that many tourists travel to experience the hosting

destination’s culture, different traditions, and gastronomy. This is very profitable to local restaurants, shopping centers, and stores. They said that if tourists come to visit Volcanoes National Park, they pay money and this leads to the increase of our national economy.

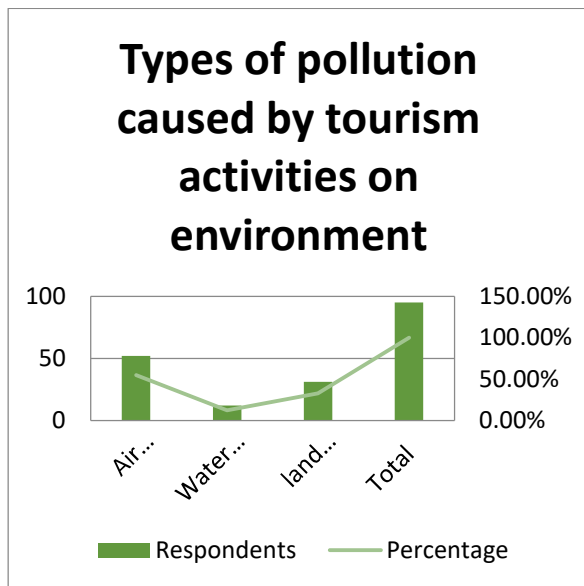
Other **27.3%** of respondents said that, tourism is source of job for them. They said that if tourists come to visit Volcanoes National Park, they need somebody to help them for transporting their bags. Sometimes the young persons are there for helping them and receive money from tourists. Other types of job from tourism activities are the tourists guide, working in hotel or restaurants, working in travel agency, etc. It is here where we have many respondents, **22.1%** of respondents said that tourism activities are the source of construction of schools in their area and 13.7% of respondents said that tourism activities are the source of construction of roads in the area. Finally, there are **15.8%** of respondents who said that tourism activities are very important for them because they help them to have many projects. Here, in interview with one the staff of RDB, they said that, VNP together with its conservation and development partners has been promoting and participating in the development of community based tourism initiatives around VNP for 7 years. One of the most successful example of this work is the establishment of the Sabyinyo Community Eco lodge, which is being operated by Governors Camp as the Sabyinyo Silverback Lodge, and which is claimed by the community believe "SACOLA", which uses lodge rental and community fees to support socio-economic and conservation initiatives in the community, which up until 2010 had generated in excess of US\$500,000 for SACOLA and its community projects. Besides SACOLA, other community tourism projects have been supported in the VNP area over recent years, including a cultural village and a craft center shop neighboring the Kinigi VNP headquarter.



63.2% of respondents consider that the big negative impacts of tourism activities for people are the human wildlife conflict. This finding has been supported by In VNP there is many species of wildlife such as: Buffaloes, Gorillas, bush backs, antelopes and so on.

Sometimes these animals harm human life, property (counting the devastation of crops) and individuals slaughter them, or something else hurt. Both people and creatures suffer from the interaction with each other. 15.8% of respondents said that contamination is the negative impacts of tourism activities

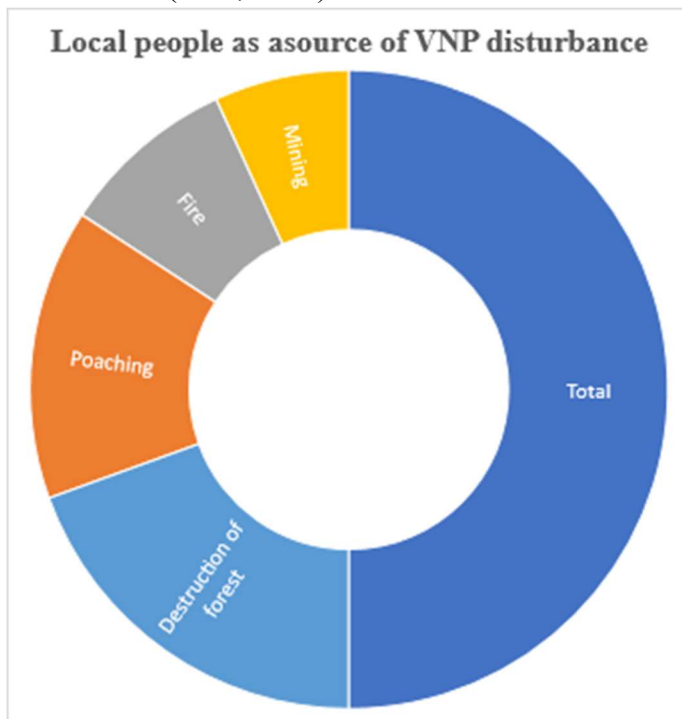
Apart from this problem, 10.6% of respondents said that tourism activities are the cause of destruction of vegetation. They said that if tourists want to go to visit gorilla, they cut down trees for getting a way to pass in. Other respondents, 5.2% said that tourism activities are source of sickness for people or gorilla. If for example there is a tourist who suffers from cough and flu, they can easily contaminate our gorilla. Lastly there are other respondents 5.2% who said that tourism activities are the source of Rwandan culture destruction because of different tourists with different cultures. In different context, Oduber, Ridderstaat and Martens (2015) reported that there is direct relationship between the visitors behaviours and destination vegetation's health



It is seen that 54.8% of respondents indicated that the very big problem of pollution caused by tourism activities is air pollution. This kind of pollution is caused by smoke from industries or from restaurants and hotels. The study findings concurred with Zhang, Hou, Li and Huang (2019) who have too surveyed the impacts of air pollution on the local tourism industry such as how contamination decreases tourism request. Having said that, the researcher were not clear on how and why discuss contamination impacts tourists' encounters at a person level.

Another type of pollution caused by tourism activities on environment is water pollution and this is the response from 12.6% of respondents. They said if the water is polluted it can be the source of much disease for people and animals like fish and so on; and this is because of lack of latrines in the park. Also they said that waste water from factories or from hotels and restaurants is the cause of pollution if they are not treated properly. That waste can pollute lakes. Then 32.6% of

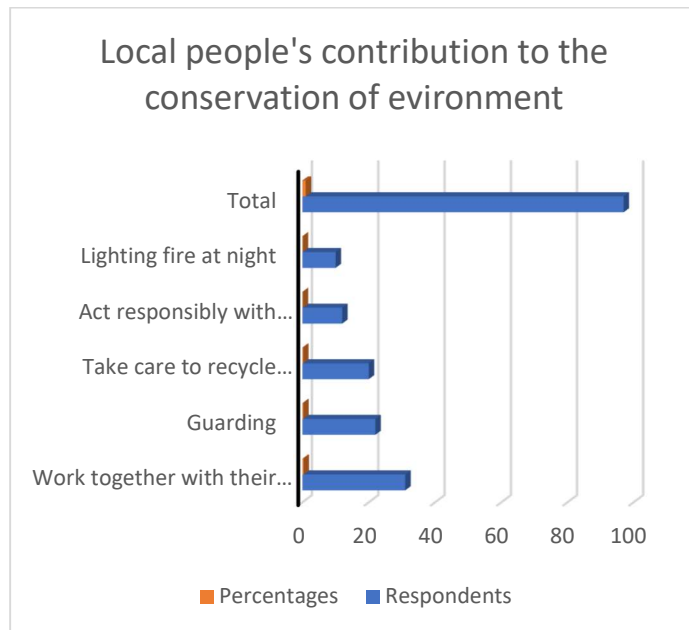
respondents said that land pollution is a big problem caused by tourism activities to local communities, because there is no dust bin in the park where tourists can put the waste. During the interview, the managers of VNP said that they have many rules and regulations for fighting against those pollutions caused by tourism activities. During interview the respondents gave other problem caused by tourism activities such as expropriation of people by force during the construction of hotels or construction of roads therefore, the people lose their properties. During the time of this study, local people said that there is not a quick system of compensation to the different incidents caused by those activities or caused by wild animals from the VNP. Currently, the Rwandan Government disposes compensation mechanism for damages caused by wild animal (GoR, 2011)



There are many activities, which can destroy VNP done by local people. Our research revealed that according 38.9% of respondents there is a big problem of deforestation.

The timberland is exasperates by logging companies collecting timber and it is altered for agriculture purposes. This causes territory misfortune and fracture. Divided territories limits breeding openings, diminish food assets and increase human conflicts with wildlife and this can be the cause of displacement of those animals from protected areas where it will be impossible for local community to have benefits from tourism even for the whole country. 29.5 of respondents said that there is a problem of poaching. The fire issue was raised by 17.9%of respondents while 13.7%said that mining is also a problem for VNP.

During interview with on VNP staff, he said that even if some local people are the source of VNP destruction there are also some contributions of local communities in conservation of the environment or VNP in general.



As one can observe in the figure above, **21.1%** of respondents indicated that their contribution in conservation in the environment is taking care and recycle materials whose production creates pollution; **12.7%** of respondents, for them, to conserve environment they act responsibly with household chemicals and their disposal; **32.6%** of respondents indicated that they work together with their local leaders in protection of environment.

Within the interview also, the local leaders said that there are many types of punishments for all people who try to do the activities which can be the source of pollution or degradation of local communities. **23.1%** of respondents said that they adopt several measures to deter crop raiding wild animals from their crop fields, within the measures there is guarding and **10.5%** of respondents said that they use lighting fire at night. During the interview, the people said that also they can use scarecrows, wrapping with cloth (targeting mainly primates). Those methods are used either individually or in combination. Here the community surrounding VNP ask to RDB to clarify the law of compensation, the use of fencing and to make bigger and largest the size of wall between people and VNP. Also they suggest the support of big lamp that can be used while guarding their crops during the night.

Solutions to the problems caused by tourism activities on the local communities

The fourth and last objective was to find out the solutions to the problems caused by tourism activities on the local communities.

The respondents try to give some solutions for minimizing the present level at which pollutants are introduced into the environment and for remediating (Cleaning up) past problems; **69%** Said

that we can minimize pollution if we take care to recycle materials whose production creates pollution; **15%** of respondents said that we minimize pollution and other problems if we act responsibly with household chemicals and their disposal; **13%** of respondents said that this is the work of local leaders and RDB authorities.

During interview, the Staff of VNP said that there are rules and regulations to fight against those problems. On the list, the following attract the stakeholder's observance.

- If you are doing not feel well, have loose bowels or a sore throat; it would be ideal if you report it to your guide.
- If you have unremitting sickness such as heart infection, emphysema, or joint pain, if it's not too much trouble reconsider your choice to journey, Wellbeing administrations are constrained close the park.
- If you must relieve yourself, bury all solid waste and toilet tissue at least one foot (30 cm.) If you are with a guide, ask the guide to dig the hole etc.

Summary of major findings

Following the general objective of this study, which was to analyze the local communities' tourism activities at Volcanoes National Park, an important tourist attraction in Rwanda, the researcher revealed the following as a summary of findings:

- This study revealed on one side that tourism activities in VNP have positive impacts on local communities through revenues linked to different services offered to tourists (hotels, transport facilities and other services). On the other side, the results of research study have shown that VNP has negative impacts to the environment and our study was concentrated more on the negative impacts than positive impacts.
- The Results shown that the negative impacts of tourism activities are as follows: pollution, Human wildlife conflicts, destruction of vegetation, sickness of Gorilla or people, Destruction of Rwandan culture, etc.
- The study revealed that within pollution on environment caused by tourism activities there are: water pollution, air pollution, vegetation pollution etc.
- The study also revealed that this kind of pollution is caused by smoke from industries or from restaurants and hotels.
- Another findings of this research is that, if the water is polluted can be the source of much disease for people and animals like fish.
- Waste water from factories or from hotels and restaurants is the cause of pollution if they are not treated properly.
- Another finding is that we must avoid those problems by taking care to recycle materials whose production creates pollution, acting responsibly with household chemicals and their disposal and work together with their local leaders in protection of environment surrounding VNP, guarding etc.

- The last finding is that tourism activities must be very organized well planned to avoid environmental degradation.

Therefore, same mitigation measures are still needed including compensation law to crop damage and harvesting property even for human life injury in order to promote ecotourism in this area.

Conclusion

The quality of the environment, both natural and man-made, is fundamental to tourism. In any case, tourism's relationship with the environment is complex. Numerous exercises can have antagonistic natural impacts.

Many of these impacts are linked with the construction of general infrastructure such as roads and airports, and of tourism facilities, including resorts, hotels, restaurants, shops, etc.

The negative impacts of tourism exercises can steadily defeat the natural assets on which it depends. On other hand, tourism has the potential to make advantageous impacts on the environment by contributing to natural security and preservation.

Negative impacts of tourism happen when the level of guest utilize is greater than the environment's capacity to manage with this utilize inside the satisfactory limits of alter. Uncontrolled tourism exercises posture potential dangers to numerous normal zones around the world. It can put gigantic weight on a range and lead to impacts such as: soil disintegration, contamination, expanded weight on imperiled species etc. Tourism can cause the same shapes of contamination as any other industry: air pollution, solid waste, architectural or visual pollution etc. This study aimed at impact analysis of tourism activities on local communities, focusing on VNP in four Sectors of Musanze District .The specific objectives of the study were: To determine the impacts of tourism on local communities for VNP and its surroundings, and to the people. To assess the local contribution to the conservation of environment and particularly VNP, to find out the solutions to the problems caused by tourism exercises on the neighborhood communities and to examine the role of tourism activities in the environmental sustainability. Information collected from the sample of 95 respondents who are involved in tourism activities in these sectors, as well as from questionnaire administered to them and interviews, showed that those types of pollution (air pollution, vegetation pollution, solid waste, etc) are present in VNP. They reported that air pollution is from CO₂ emissions related to transportation vitality utilize and request contamination is from, cars, buses etc. It appears moreover that waste transfer could be a genuine issue and inappropriate transfer can be a major despoiler of the common environment like waterways, roadsides etc.

This may be exceptionally huge issue since within the VNP there are no restrooms for tourists. In VNP range, trekking sightseers produce awesome bargain of waste. Visitors on endeavor take off behind their trash, camping types of gear and so on

Some respondents said that air pollution is a problem caused by tourism activities. Others said that water pollution is also a problem from tourism activities and vegetation pollution is also present

as the problem caused by tourism activities. Even if tourism activities have negative impacts on local communities, there are too positive impacts of tourism exercises on environment such as Employment, source of income (money, construction of schools, etc.

Finally, the information collected during this research shows that there are possibilities of developing tourism sector in the destination investigated without harming the environment, and to promote ecotourism all over the country of Rwanda. The main solution is to put all stakeholders' efforts to promote responsible tourism for sustainable tourism development and have in place tourism law to govern the tourism and hospitality industry.

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