

Utilization of the Global Positioning System for monitoring critically endangered white rumped vulture and its impact on tourism in Nepal

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Abstract

The purpose of this study is to focusing on vulture conservation monitoring of critical white rumped vulture and it's impact on tourism, in Nepal research was conducted in Pithauli Jatayu Restaurant from 2016 to 2017. The condition and population of white rumped vulture found in Jatayu Restaurant were taken from field visit and restaurant staff white rumped vulture available all around year. Total number of white rumped vulture is 170-210. 30 active nests were productive of white rumped vultures. Different kinds of awareness programme were lunched specially focused on local people of the Pithauli area. Newspaper articles and news were written broadcast highlighting the vulture conservation in that area. Primary as well as secondary information was collected and analyzed for the study. Available literature documents, books, websites and articles were reviewed to gather secondary information. The cause of vulture decline has found to be veterinary diclofenac use to treat livestock. But the food feeding vulture is free from diclofenac use to treat livestock. But the food feed vulture is free from diclofenac and safe for vultures. The conservation has been found a successfully to increase vulture population. Nawalparasi district was declare as Diclofenac free district. In the most recent year, the technology of the Global Positioning System (GPS) has been dramatically increasing. The working/operation of GPS is based on the 'trilateration' mathematical principle. The position is determined from the distance measurements to satellites. The GPS receiver takes the information from the satellite and uses the method of triangulation to determine a user's exact position.

Keywords: GPS, vulture (white rumped), monitoring, awareness, conservation, tourism, Jatayu Restaurant

1. Introduction

Nepal is a landlocked country possessing diverse scenario of natural piety. Flora and fauna of the country not only fascinate the tourists but also enriches our glory and identity in the world. Heavenly pleasure of bio-diversity and natural form of resources has qualified the country to get reputed position in the globe of the world. Identity of diverse bio-composition and prosperity of natural grandeur of our country derives any viewer to the path of nostalgic attachment to natural heritage.

The spot, Jatayu Restaurant is well facilitated with road transportation facility. East west highway (Mahindra highway) passes through the nearby area of the spot. The designated Kawasoti Municipality is enriched

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with geographical diversities, cultural diversities, caste diversities, religious richness, hill shrines, verdant forest, water bodies, aquatic animal diversities. The spot is near the rich natural heritage of Chitwan National Park and piety of Narayani River with its religious importance.

Pithauli, a village in Nawalparasi district in southern Nepal, is frequently visited by a large number of tourists. This attraction of Jatayu Restaurant is not a dinner but a feeding center for vultures. The restaurant is established in Namuna community forest to preserve endangered species of vulture specially the white rumped and slender billed vulture. Nawalparasi contents seven of the nine species of vulture in the world setting of the restaurant. The restaurant has made it easier for conservation to monitor the birds and their activities. The vultures are fed uncontaminated cattle carcasses. Vulture being endangered species and tertiary consumer of food chain has direct impact on ecosystem. How a consumer plays a role to develop a food chain/web to establish an existence of living is a fact to conceptualize. Likewise the relationship between the ecosystem and survival of the species one so conjoined that consumer can break the hierarchy of livelihood. Conservation of those consumers is essential to human race for the living of their fore coming generations. Besides, the essence of the human rationality has developed the concept to conserve the species, those territory consumers as such different projects has been initiated in the western countries. Being the developing nation the concept has been adapted for the first in Nepal with the Asia continent. The concept of vulture conservation at Jatayu Restaurant has been a first implicated in Nepal within Asia in Pithauli village. These programme has been promoted by the natural habitat and successful community forest project in Nepal. Nepal as such has a large variety of animal species and diversity of geography within limited territory. Jatayu Restaurant has been working for vulture conservation since August 17, 2006.

Vultures are birds as they have larger size than normal birds. Critically endangered white rumped vulture monitoring was conducted in Nawalparasi district in the winter of 2017. The main objective of this study was to identify or to monitor the nest of white rumped vulture after monitoring the nest the more information about the vultures. Restricted pesticides were not found in this area. Diclofenac was not commonly used as veterinary drug in the treatment of livestock. Carcasses disposal practice was also very good in the study area. The local people of that area, also support this kind of vulture conservation programme. White rumped vulture richness found in this area is due to availability of food. The edge of Narayani River is suitable environment for vultures. The Local people of that area also support the conservation programme.

2. Tourism

Tourism is a smokeless industry. For the betterment of good economic development, 'Tourism is highly supportive for a country like Nepal. As our country is very rich in natural and cultural heritage, internal and external tourists can visit different spots to raise the tourism industry. Everyone can get high satisfaction through outstanding practice of natural conservation on vulture via designated spot.

3. Global positioning system

A Global Positioning System (GPS) receiver has radio frequency (RF) circuitry to receive position signals from a plurality of satellites and to provide an intermediate frequency (IF) signal to a correlate circuitry for generating a pseudo range and a Doppler measurement for calculating a position fix. The GPS receiver further has a power supply system which has at least one battery and an alternative external power connector for

connecting to an external power source. The GPS receiver further has a microprocessor having a read only memory (ROM). The microprocessor is electrically connected to the RF circuitry and the power supply system. Since the GPS receiver does not need to constantly process all the GPS position signals that are available to it to provide a useful tool, the ROM includes a program for automatically controlling the power supply to the RF circuitry so that battery power is conserved.

“Tracking animals with a device of this size and with this precision has never been done,” said Peter Marra, head of the Migratory Bird Centre, in a press release. “Now we can identify the exact areas in which these birds live in their tropical wintering areas. The miniaturization technology with which we can monitor the animals throughout their annual cycle is an essential ingredient of effective conservation.

Other followers were used to successfully follow the movements of larger animals, but with the smallest comparable option of about 12 grams, according to the study, they were too heavy for the delicate, small bird oven. Ovenbirds are about the size of a tennis ball and weigh the same as four quarters. If you held them with a heavy GPS tracker, it would mean they would not fly far at all. And many other small followers were inaccurate, only able to track the location of the animal in about half a mile, and expensive, with over \$ 3,000 per unit.

In spring 2013, bird center researchers tested the latest micro-GPS trackers: a miniaturized tracking chip that weighs only 1 gram but is able to locate the location of an animal within 32 feet. The chips are scheduled to start collecting data on July 1 and are activated for eight to ten times during the night for 70 seconds to collect the location data.

The following spring, 24 marked birds returned to the same nesting site, but nine of the bird pieces were damaged or lost. Nevertheless, researchers were able to collect location data from 15 birds, revealing better than ever the details of where the birds go during the winter months and how the species behaves. Even this small part of the data already has important implications for the protectors of nature.

Although general migration patterns are known - for example, scientists already knew that oven birds were coming down to Mexico, Central America, Florida and the Caribbean in winter - the exact locations were a bit of a mystery.

Location data revealed for the first time that birds of prey from different parts of North America did not walk together when moving south: Maryland birds settled in Florida and Cuba, while that those of New Hampshire were getting cold in the Dominican Republic. This knowledge can help conservationists to make more accurate population estimates and to understand how different groups of the same species interact.

And since some populations of small songbirds have been captured for decades without any explanation, this technology will be crucial for future conservation efforts. Bonus: the little birds look cute with small microchip backpacks.

4. Problem statement

Vulture being endangered species and tertiary consumer of food chain has direct impact on ecosystem. Without maintaining ecosystem sustainable development of world and future generation is impossible. Human life is highly dependent on natural resources for their existence. Thus with the extinction of search consumer the world can face crisis of existence. Disturbance on eco-system can result in several problems to human life.

Many of the examples have already shown the result due to harming of ecosystem. Vulture being tertiary consumer in food chain and part of food web links to all the ecosystem behavior. Its extinction can hamper human survival. Thus, the study of research on vulture seems to be reliable to present context as vulture are being

endangered species to the country.

Research questions

1. Why is the conservation of vulture important for the overall conservation and people's life ways in Nepal?
2. What strategies, campaigns and activities have been initiated in order to raise awareness on vulture conservation among the local people?
3. How is the tourism business responding to the conservation program?
4. What is the impact of vulture conservation on the livelihood strategies of the local people?

Research objectives

1. To explore practice of vulture conservation in the area and analyze its impact on local people's life ways and the promotion of tourism through the conservation in Nepal.
2. To explore on the participation of local people to the practice of vulture conservation at Jatayu Restaurant.
3. To find out how vulture conservation in the area is being practiced and impact of tourism through conservation.
4. To analyze the impact of vulture conservation on the livelihood of people and in the promotion of tourism in Nepal.

5. Significance of the study

'Vulture is one of the endangered animal species. Thus, its conservation is highly essential to reserve bio-Diversity. Being one of the major parts of ecosystem its conservation is needed to prevent its extinction. Vulture conservation has two way benefits; one for the protection of ecosystem and the other for the promotion of tourism. Thus, such practice is highly relevant in the present context. Without natural balance, existence of human can also be harmed, therefore endangered species without these conservation practice can be extinct and can harm human society. To prevent the extinction of these species and to publicize the conservation method of practice, the proposed research can impart a great support. Richness of our country in natural heritage can be preserved for long though running different conservation practice in various parts of country. Thus, the proposed research notifies the relevancy of the present context.

6. Data and results

6.1 Selection of the study area:

Jatayu Restaurant of Nawalparasi Pithauli is of first kind and unique in Asia in conservation of vulture. Jatayu Restaurant encompasses the area of Kawasoti Municipality of Nawalparasi District of Nepal. Jatayu Restaurant of Nawalparasi.

6.2 Nature and source of data

Primary data

Primary as well as secondary data have been widely used in the study. Primary data collection was done from study area with the help of interaction, organization conducting the program and management committee along with local people.

Secondary data

The secondary data was collected from various brochures and reports related to vulture conservation program. Similarly various news articles, websites published by various sources related to study were also been adequately used for relevant information. From the study, both qualitative as well as quantitative data was collected.

The study applies the survey method and questionnaire where distributed to fifty respondents within the organization for the study. The study also emphasizes the relationship between culture and vulture. The research design in the study is descriptive research as well as exploratory research. The study uses structure questionnaire with both open and closed ended questions and interview to a collect data.

Table 1. Indian sub-continent

| s.n | Species | Range countries | Resident/ Migratory | Conservation status |
|-----|---------------------------|--------------------|---------------------|-----------------------|
| 1 | White-rumped vulture | Nep, Ind, Pak, Ban | Resident breeder | Critically endangered |
| 2 | Slender-billed vulture | Nep, Ind, Ban | Resident breeder | Critically endangered |
| 3 | Long billed vulture | Ind, Pak | Resident breeder | Critically endangered |
| 4 | Himalayan griffon vulture | Nep, Ind,Pak | Resident breeder | unspecified |
| 5 | Eurasiangriffon vulture | Nep, Ind,Pak | Winter visitor | unspecified |
| 6 | Red-headed vulture | Nep, Ind, | Resident breeder | Critically endangered |
| 7 | Egyptian vulture | Nep, Ind,Pak | Resident breeder | Endangered |
| 8 | Cinereous vulture | Nep, Ind,Pak | Winter visitor | Near threatened |
| 9 | Lammergeirer | Nep, Ind,Pak | Resident breeder | Least concerned |

(Nep=Nepal, Ind=India, Pak=Pakistan, Ban=Bangladesh)
(IUCN, 2009 and DNPWC/MoFSC/GoN, 2009)

Table 2. Status of vultures in Nawalparasi (Pithauli Jatayu restaurant)

| s.n | Species | Range countries | Resident/ Migratory | Conservation status |
|-----|---|--------------------|---------------------|-----------------------|
| 1 | White-rumped vulture (Danger Giddha) | Nep, Ind, Pak, Ban | Resident breeder | Critically endangered |
| 2 | Slender-billed vulture (Sano Khairo Giddha) | Nep, Ind, Ban | Resident breeder | Critically endangered |
| 3 | Himalayan griffon vulture (Himalayan Giddha) | Nep, Ind,Pak | Resident breeder | unspecified |
| 4 | Red-headed vulture (Sun Giddha) | Nep, Ind | Resident breeder | Critically endangered |
| 5 | Egyptian vulture (Seto Giddha) | Nep, Ind,Pak | Resident breeder | Endangered |
| 6 | Cinereous vulture (Raj Giddha) | Nep, Ind,Pak | Winter visitor | Near threatened |
| 7 | Eurasian griffon vulture (Khairo Giddha) | Nep, Ind ,Pak | Winter visitor | unspecified |

(Nep=Nepal, Ind=India, Pak=Pakistan, Ban=Bangladesh)

(IUCN, 2009 and DNPWC/MoFSC/GoN, 2009)

Sources: Yam bahadur Nepali, DB Chaudhary, Ishwori Chaudhary, Kebal Chaudhary (BCN Nepal) Pithauli Jatayu Restaurant (Nawalparasi).

Table 3. Data analysis(I)

| Groups | Positive Response | | Negative Response | | No. Response | | Total | |
|--------|-------------------|----|-------------------|----|--------------|----|-------|-----|
| | n | % | n | % | n | % | n | % |
| I | 7 | 14 | 1 | 2 | 2 | 4 | 10 | 20 |
| II | 2 | 4 | 7 | 14 | 1 | 2 | 10 | 20 |
| III | 1 | 2 | 6 | 12 | 3 | 6 | 10 | 20 |
| IV | 8 | 16 | 2 | 4 | 0 | 0 | 10 | 20 |
| V | 0 | 0 | 7 | 14 | 3 | 6 | 10 | 20 |
| Total | 18 | 36 | 23 | 46 | 9 | 18 | 50 | 100 |

46% of the total respondents of the groups gave negative response due to their lack of capacity to distinguish between different vulture species. 36% of the respondents agreed with positive knowledge on distinction of vulture species and 18% of the respondent do not give any response to the distinction of species.

Table 4. Data analysis(II)

| Groups | Improve activity on conservation and further good management. | | More package programmers and training offering | | More publicity via media for tourism promotion. | | Total | |
|--------|---|----|--|----|---|----|-------|-----|
| | N | % | n | % | N | % | n | % |
| I | 2 | 4 | 3 | 6 | 5 | 10 | 10 | 20 |
| II | 1 | 2 | 3 | 6 | 6 | 12 | 10 | 20 |
| III | 2 | 4 | 6 | 12 | 2 | 4 | 10 | 20 |
| IV | 1 | 2 | 2 | 4 | 7 | 14 | 10 | 20 |
| V | 1 | 2 | 4 | 8 | 7 | 14 | 10 | 20 |
| Total | 7 | 14 | 18 | 36 | 25 | 50 | 50 | 100 |

Source: Field survey 2017

50% of the respondent recommended to increase publicity via media for tourism promotion, increase participation while 36% recommended for moral package programmers and trainings. 14% of the respondents were in favor of activity on conservation and good management.

6.3 Vultures at Jatayu Restaurant

The condition and population of different vultures found in Jatayu Restaurant was taken from field source via Restaurant Staff and is presented in the table below:

| Name of vultures | Available | Population (Range) |
|---|-------------------------|--------------------|
| 1. Nephron percropteus (Egyptian vulture) | Found (all around year) | 4 |
| 2. Gyps bengalensis (White rumped vulture) | Found (all around year) | 170-210 |
| 3. Gyps tenuirostris (Slender billed vulture) | Found (all around year) | 3 |
| 4. Gyps Himalayans's (Himalayans Griffon vulture) | Found in winter season | 115 |
| 5. Gyps fulvous (Eurasian Griffon vulture) | Found all around year | 2 |
| 6. Aegyptius monarchs (Cinereous vulture) | Found (all around year) | 3 |
| 7. Sarcogyps cavus (Red headed vulture) | Found (all around year) | 4 |

7. Summary

The study entitled "Utilization of the Global Positioning System" for monitoring critically endangered white rumped vulture and its impact on tourism in Nepal of community management Pithauli Jatayu Restaurant, Nepal was carried out in local area around 'Jatayu Restaurant' in Nawalparasi namely Kawasoti municipality. Impact on local inhabitant by Jatayu Restaurant, conservation of vultures species, biodiversity, tourism, local

culture, local opinion to Jatayu Restaurant was studied to get theoretical and statistical results.

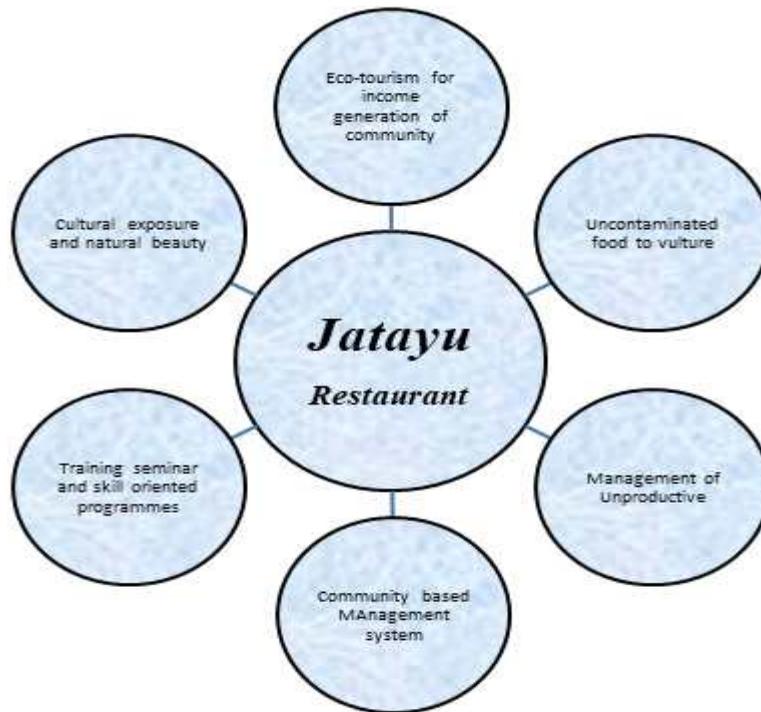
Primary and secondary data, both are presented. Question discussion, and interaction were done during the course of study. Sufficient literature and documents were studied for research. Local people were mainly focused in the study along with practitioners, scholars, institutions related, researchers and tourists. The survey was done among 50 respondents, which were divided into five groups and data were collected.

The whole study findings can be summarized into the following main points listed below: Jatayu Restaurant has promoted the habitat for vulture's conservation through god shelter and safe food.

- Vulture's population was identified and found that probable environment has been created by the restaurant to ensure their sustainability at the restaurant vicinity (premises).
- Local view of inhabitant was analyzed to get field result for multi-dimensional aspect of Jatayu Restaurant.
- Jatayu Restaurant promotion through restaurant effort was studied. Income generation of local people through restaurant effort was studied.
- Procedure to be taken to best manage Jatayu Restaurant was developed. 90% respondents supported to continue community based management.
- Skill orientation programmer, trainings and seminar package needed to launch was reported in among 60% respondents.
- Local effort and participation was found satisfactory for the Jatayu Restaurant conductions during study.
- Gender discrimination was understood while research was done, analyzing the participation of female in the campaign.
- Additional packages and its application were known from 70% local inhabitants demand.
- Indigenous Tharu culture of the study area was studied.
- Cattle rescue and availability of food for vultures were understood.
- Community practice to be continued was concluded through study.
- Eco tourism for local people income generation was understood and analyzed.
- Publicity to be increased at national to international level more and more was surveyed and presented statistically. 35 respondents (70%) reported to increase publicity to promote tourism.
- Use of diclofenac and its discouragement was highlighted in the study.
- Evil practice of wildlife hunting were targeted to be discouraged and revolted via study.
- Local people interaction was highly facilitated in the study.

8. Conclusion

Jatayu Restaurant in Nawalparasi has attempted a good practice on vulture conservation. The population of the vultures has been increased through the project in short span of time. Vultures being natural scavenger cannot be imparted from our living world. But in these days due to use of diclofenac to cure livestock has declined these birds to be critically endangered. The way of their increment is their feeding of uncontaminated food free from diclofenac poisoning.



Uncontaminated food: Natural scavengers ‘vultures’ are detritivores in feeding habitual Jatayu Restaurant has been providing uncontaminated cattle carcasses free from ‘diclofenac’ which has been a main cause for vulture’s declination to critical endangerments.

Management of unproductive cattle: Unproductive cattle are burden of farmers to rear and care. These cattle are kept at Cow Rescue Center in Jatayu Restaurant paying some money to cattle owners. These cattle due to unproductivity are left in the society and after their death cause pollution. At Jatayu Restaurant these cattle are well managed and are fed to vultures after natural death. Cattles are good care at Jatayu Restaurant.

Community based management: It is the ‘Restaurant’ feeding center for birds (vulture). It is the community based management in Kawasoti Municipality (Pithauli) to provide safe food to vultures.

Eco-tourism for income generation: Jatayu Restaurant has prioritized the effort to generate income of local community through flourishing of ecotourism. Natural beauty and swoop down of vultures at meal time have been highlighted by Jatayu Restaurant for attracting tourists.

Cultural exposure and Additional programmes: Jatayu Restaurant has exposed the additional view of indigenous culture. Tharu culture can be viewed and tasted in the community around the restaurant. It has also promoted the additional benefit to local people through programmes, seminars and skill orientation trainings.

9. Recommendations

To create the probable environment to save the vultures habitat following recommendations are to be functionalized via Jatayu Restaurant. Local participation should be increased more and through analyzing local

view and perspective to safe guard the 'Jatayu Restaurant' sustainability.

Wildlife destruction use of 'diclofenac' should be discouraged: Jatayu Restaurant must be an example for discouragement of wildlife destruction. It can raise a consciousness for student and about importance of wild life through its practice. For its continuity 'diclofenac' should be discouraged. Though it is banned, some may use illegally. So there should be cross check in veterinaries aiming to provide safe food to vultures.

Risk of future and provision of safe food should be taken under consideration:- There may be future and threats in running the project. This risk should be detected and solution should be taken for eradicating problems and future hard situation. Safe food should be continuously provided to vultures for their survival reducing the endangeredness.

Management system, package programme, female enrollment and publicity should be strengthened: Management should maintain efficiency to conduct project package. Additional programmes for skill orientation should be launched with increasing female enrollment in the programmes and project. The foremost considerable recommendation is to increase media to promote tourism and to renown the outstanding practice of the restaurant in vulture's conservation through safe feeding, monitoring population, and food habit and breeding.