

# Adaptive behaviour of monkeys in urban environment, costs and benefits of differe...

[Environment](#), [Animals](#)



## Introduction

### Background

Rhesus macaque is distributed in some Asian countries like Thailand, Laos, Cambodia, Vietnam, Nepal, Bangladesh, and China with in the west (Roonwal and Mohnot, 1977). It is most frequently unbroken in zoos even in smallest Zoological gardens. Macaquemonkeys' square measure considered cuss species by their nuisance behavior. *M. mulatta* is probably going the foremost adaptable to a good type of habitats and elevations, from high heat to snow fields to cities. It's partially migratory, generally ascending the chain to associate degree altitude of about 2500 m (about 8200 ft) in summer. Rhesus monkey is heavily engineered with compact sturdy limbs. The sleek hair is Xanthus brown, the naked skin is brown to black, and therefore the massive posterior callosities are bright red. No marked discharge swelling happens however skin of cheek becomes red during physiological state amount. Associated male of macaque includes a stoutly engineered body which will be up to sixty three cm (25 inch) long and weight six. 5-12 kilo wherever as females' square measure comparatively small with linear unit starting from 45-55 cm and weight around five. 5 kg. Length of is up to the 1/2 the length of body. The skin hangs in loose folds regarding the neck, breast, and abdomen. Rhesus monkeys square measure characterized by a high degree of social flexibility. Four varieties of social teams may be delineated betting on the quantity of males within the cluster. They are one-male troop, multi- male troop, age-graded male troops and all-male band (Chalise, 2004b). Most social teams vary from 8-180people of each sex; however there square measure generally 2-4 times as several females as

males. Dominance hierarchy is additional evident among little teams of males than those with additional females. The biological time for M. mulattais 135-194 days and usually one baby is born.

Occasionally a collection of twins is created.

Babies are nursed for regarding one year, initial clinging to their mother's bellies and later riding on her back. Sexual maturity in females is reached between the ages of two. 5 and four years while males 2-3 years at the moment.

Females reach climacteric at age twenty five (Southwick et al. 1982). Rhesus is ground feeder and is partially terrestrial and partially arboreal. Most popular foods include wild and cultivated fruits, berries, seeds, roots, buds, bark, cereals, leaves, flowers and barks. But they also were observed eating small insects like ants, beetles, grasshoppers, and termites. They have pouch like mouth so they can temporary store food in mouth. They roost peacefully in trees middle cover to avoid their predators (Chalise, 1998). In Nepal, mainly there species of monkey are recorded namely (Hanuman langur, Rhesus macaque and Assemese monkeys) (Chalise, 2005).

### **Adaptive Behaviour in Animal**

Rhesus monkey (Rhesus macaque) is the species of monkey that we observed in Swayambhunath temple. The one which have red behind are believed it as Rhesus monkey. Swayambhunath monkey temple lies in the top of the hill in western Kathmandu valley, which is an ancient religious destination to Hindu and Buddhist religion. This region is dominant by macaque monkeys, these monkeys are highly adaptable to their surrounding environment and they live in groups comprise of family members, relatives and friends. According to old data this region has nearly 15000 monkeys and

now it has increased. They are important in ecosystem, as they are frutivorus more than 80% of their diet is fruits. They help in dispersal of fruits seed from one part of forest to another part.

Behavior is the response of both the physical as well as habitat condition of animals (Sarkar, 2000). Macaque monkeys do not shape their environment, they use it as it is without any type of modifications, they simply sleep in branches, or in ground. Macaque lives in the groups of their family members, relatives, friends' and so on. They have robust bonding at intervals the family. They choose the most powerful member of the troops as their leader. Although they have the leader there are many sub leaders too. The leader of the group mainly took the responsibilities of protecting the squad from the external threats from different troops (people, searching dog and different wild animals). In case of death of the any relatives from their groups they mourn and cry. They usually prefer to give birth to the 2 babies at a time. Their favorite reaction is to scratching each other bodies, looking for lice and bugs and feeding them. Mainly females carry siblings and newborns but sometimes adult one will also help them. They keep on roaring, moving and mark their territory too. They do not build their nest like other monkeys. This region is not only forest but surround with urban areas, humans and their destructions. Macaque monkey has adapted to human environment, they climb the buildings as its own environment, they have no predator here so they roam without fear, jump from one roof to another, in electric poles.

This is not their natural habitat, small forest where they can live and jump one canopy to another but do not provide water and very less food( insects,

leaves). They doesn't have nature of storing food so, for there hand-to-mouth economy they have to seek their food and water on the daily Basis. They mostly depend on human for food and water. They use same source of water as we do from taps, open water storage in our homes even small ponds, drainage, and puddles. Food is provided like rice, vegetables, fruits, and water but in shortage of food they roam to near houses and shops from where they lift what they can find eat. As they are in middle of human their main diet is junk food, fruits, food grains etc. Generally Rhesus monkeys are more aggressive in nature than other. They are characterized by high degree of social Flexibility. Four types of social groups can be described depending on the number of males in the group. They are one-male troop, multi-male troop, age-graded male troops, and all male Bands (Chalise, 2004b). Rhesus is ground feeder and is partly terrestrial and partly arboreal. Preferred foods include wild and cultivated fruits, berries, grains, leaves, buds, seeds, flowers and bark. They rest peacefully in mid canopy of trees to avoid their predation (Chalise, 1998).

### **Techniques to Identify Adaptive Behaviour**

Below mentioned description from chalise (2003) was used to distinguish the behaviors among troops:

1. Fringing/Feeding Behaviors. All the primates have the same general need to acquire energy, amino acid, minerals, vitamins, water and certain fatty acids. However their specific requirements vary and are met in a great variety of ways (Oates, 1987). Sex differences in diet and foraging behavior have been reported in many non-human primate

species. Females typically spend more time in foraging than co-specific males and feeds on more protein rich food (Rose, 1994). This is the activity where monkey searches the food to eat. They eat whatever they get as a food. Their food includes eating any substance, licking stone, drinking water and slight movement in search of food.

2. Moving. This is also the one of the essential behavior of the monkey where they produce motion of moving from one place to another place. They move especially in the search of food and for their home too. They go here and there and mark their territory too so that there will be no further competition for shelter.
3. Resting. Resting is known as the relaxed position of the monkey in either sitting or lying. With or without eye closed and not active into the other activities (Neville, 1968). Rhesus monkeys can stay in a relaxed posture with eyes closed. Generally, it may takes rest on the trees.
4. Grooming. It is the phenomena of the monkey in which they in their own fur or in the fur of the others for lice, bugs or diet which includes rubbing, licking and scratching. Especially, the monkeys groom at the time of taking rest. In winter there are three peaks of grooming (Sade, 1965) there is auto grooming in which monkey searches its own body. The female monkeys are the most active groomer than the males. The grooming is found to be significantly higher during the mating season. Before and after copulation, the female starts grooming (Teas, 1978).

General Objectives:

1. To study the feeding Behaviors of the Rhesus macaque.
2. To study the relation of Rhesus monkey with the human environment.
3. To study the condition of the living environment of Monkey.
4. To study about the Diet/food of Rhesus Monkey

Specific objectives:

1. To observe the adaptive behavior of Rhesus macaque.
2. To study the costs and benefits of different behaviors

## **Methods and Materials**

### **Materials Used**

Camera

### **Methods**

The study area was located in western part of Kathmandu valley i. e. Swayambhu. It lies in Kathmandu metropolitan municipality ward number 15 and its GPS co-ordinates is 27° 01' 48" N and 85° 02' 04" E and lies above 1350 m above from average mean sea level (amsl). The total land area covered Swayambhunath temple is 313800 m<sup>2</sup> among them 24000 m<sup>2</sup> of land was covered by forest and rest of the other land were covered by temple, chaitya, school, health post, natural science museum, graves and some private residential homes. Study area is situated in the little hillock of Swayambhu in northwest part of Kathmandu valley. It is also known as “Monkey Temple” among international visitors. It one of holiest tourist destination in Nepal. From Swayambhunath temple tourist can observe panoramic views of Kathmandu city so it is one of the attractions for local tourist to visit.

The study area was carried out in March 23, 2019 Saturday at afternoon. We were 15 members in the group with team leader Miss Sonam Shrestha.

### **Research Design**

The research will be based on explorative as well as diagnostic endeavors.

The site will be selected on the basis of species dominance i. e. Rhesus macaques (monkey). There are two types of data collection methods in research. They are:

Primary data: the data collected for the first time by the researcher as original data are known as primary data which refers for the purpose of certain study or information. So, these data are, original in character, highly reliable and relevant. The methods of primary data collection are as follows:

1. Direct oral interview
2. Indirect oral interview
3. Information through correspondents
4. Mailed questionnaire method
5. Schedules sent through enumerators

Among these above data collection methods we preferred direct oral interview methods. For this method first, we prepared some question and surveys were conducted by asking authorized members of Federation of Swayambhu management and conservation and some local people about the monkey behaviors. Our survey based on feeding, walking climbing, foraging, resting and others character and behaviors of monkey.



Secondary data. These are the data already collected and presented in some previous research or investigation reports. The data is already processed and tabulated these type of data are not original in nature. For example, reports and publications made by CBS are primary for that organization but secondary for those who use it. Secondary data can be obtained from following sources:

1. Published source
2. Secondary source

We review various journals for viewing comparison of monkeys behaviors are noted in urban environment with behavior of monkeys in undisturbed environment.

Division of work on field survey and report writing:

S. N Name of

Field observation

Preparation of report

1

Sonam Shrestha (Team Leader)

Questionnaire Survey

Cover + Discussion and Conclusion + compile

2

<https://assignbuster.com/adaptive-behaviour-of-monkeys-in-urban-environment-costs-and-benefits-of-different-behaviours/>

Manju Shree Thakur

Questionnaire Survey

Annex + Results

3

Bibek Sapkota

Photographs Introduction 4

Nabin Thapa

Questionnaire Survey

Introduction 5

Rona Vaidya

Survey at front stupa area

Introduction

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Samjhana Shrestha

Survey at main stupa Area

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Anup Basnet

## Questionnaire Survey

### Materials and methods

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Prakriti Rajbhandari

Photographs Results 11Rijuna Khadka Survey at front stupa area Results

12Shasi kala Khadka Survey at main stupa Area Results 13Babita Acharya

Photographs Discussion and Conclusion 14Binita Pokhrel Survey at front

stupa area Discussion and Conclusion 15Deepa Lama Survey at main stupa

Area Discussion and Conclusion

## Results

### Groupliving

Rhesus macaques have their own kind of adaptive behavior for living in certain habitat. Rhesus macaques are those types of species which lives in large male and female groups. These monkeys are characterized male dispersal and the female philopatry; this means that female stays in their natal groups whereas male emigrates from their natal groups at the beginning of breeding season for mating opportunities. Swayambhunath temple is popular place where we can find the Rhesus macaques. These are one of the species mainly found in most of the temples of Kathmandu.

In the Swayambhunath temple we found interesting behaviors of monkeys like some were fighting for food, some were biting plastic bottles, some were

playing by hanging on trees, some were sharing water from a bottle whereas some were quite aggressive. We also found that most of them were sitting in group and some were alone. But monkey mothers were quite protective about their babies so that no one can harm them.

Due to weekend there were many visitors and tourists so there were less monkeys. Although there were many dogs, the monkeys were not that much disturbed. Sometimes monkeys also snatch things from people like cameras, bags, etc. we also saw that some of them were so irritated and trying to harm people. They have sensitive behavior so if anyone tries hurt them then their whole group attacks and try to save their group members. So, we got to know that they have very good groupism or bonding with each other.

### **Foraging**

Rhesus macaques are mostly herbivores feeding on mainly fruits and also eat bread, noodles, biscuits, small insects, vegetables, plants, seeds and leaves. The committee soaks about 15 kilograms of chickpeas daily for these monkeys to feed. While food is abundant, they are distributed in patches, and forage throughout the day in their home ranges. They drink water when foraging, and gather around streams and rivers. Rhesus macaques have specialized pouch-like cheeks, allowing them to temporarily hoard their food. Sometimes, they also snatch foods from people.

### **Cost and Benefits**

Having the populations of more than 15000, Rhesus macaques have many cost and benefits of their behavior in that area either for them or for people.

Here below are some cost and benefits (advantages and disadvantages) of their behavior.

**Benefits** Cost While living in group, they are safer from humans and animals. They quarrel within group. Their behavior is influenced by human activities. Sometimes they face scarcity of food due to their increasing number. While the majority of parental care is the responsibility of the mother, infants are also handled by close female relatives and protected by adult males.

**Dominancy** increases as the stronger one dominates the weaker one of the group. They use their expressive faces to communicate with other monkeys and also body language, gestures, and varieties of vocalizations. These signals are used to communicate in times of danger, in aggressive behavior, while grooming, and even when discovering extra good food.

As from above given table there are more benefits than cost and it should and must be in that way because if the cost is greater than the benefits, then natural selection would not favor the behavior. So, their population is increasing due to greater benefits than costs.

## **Discussion**

In case of Rhesus macaque, aggressive behavior can be seen around urban area as the artificial feeding is mostly occurred specially in temple area. This happens mainly due to competition for food. In temple area these kinds of behavior takes place notably during morning time when there are a great number of worshippers. (Teas et al., 1982) But in case of our study we observed the aggressive behavior of Rhesus macaque in a very less manner.

Coinciding with the finding of Teas, 1982 we found minimal numbers of rhesus species during our observation time which was observed after 12: 30 pm.

On the other hand, grooming was witnessed in most of the Rhesus macaque which is said to be one of the inmost patterns of social behaviors. The pattern was mostly encountered between mature and infant monkeys. The grooming takes place not only for pairing but also points out the want of social contact among animals. (Reinhardt, 1988) Chalise, 1999 mentioned in Makalu Barun Conservation Area which is an undisturbed area, foraging activity done by monkeys were more than average and grooming was relatively low. Similarly, Swayambhunath Temple which is situated in an urbanized area with growing civilization, grooming of Rhesus macaque was noticed in most.

In most of the habitat of monkeys, leguminous plants ranked one of the top ten among the preferred plants. While in natural habitat they feed on root, leaf, steam, fruits in accordance to with availability of plants.(Chalise, 2000) Whereas in Swayambhunath Temple monkeys were mostly dependent on artificial food, insects, left over from visitors, so claimed monkey foods by seller including chick peas, cauliflower, corn, biscuits (offered to monkeys by visitors). The temple welcomes visitors in regular manner which made the monkeys dependent on artificial foods rather than foraging in nearby forest. Still, the monkeys of Swayambhunath Temple are in scarce of foods. The poorly managed waste around the temple caused the monkeys to feed on unhygienic foods raising the probability of health effects on them.

As mentioned by Caroline, 1993 developing urbanization in town area of Shimla monkeys are likely to expand toward town areas due to lack of forest area or trees. Relatively, their dependence on agricultural crops for their diet will also increase. As a result there will be conflict between human and monkeys. Same scenario in Swayambhunath Temple might also occur soon if the monkeys are highly disturbed by civilization. Apparently, monkeys were seen foraging on rubbish food left by visitors. This might give rise to various diseases which can be communicable and affect nearby local people or visitors too.

The plants and trees found in forest area of temple mostly contains Pinus wallichiana, Shorea robusta etc. Monkeys feed very less on these plants which is why it would be more preferable if the authorized body would plant tree species on which they actually feed on such as broad leaves plant, oak trees, fruit trees etc. Monkey (also known as non-human primates), thus appear to have close historical association with urban human communities across in their different distribution ranges and more particularly in Southeast Asia. Rhesus macaque species have successfully adapted to new environment to and appear across cities (mostly temple areas). Monkeys inhabit mostly on agricultural land, roadsides and temples due to the foraging. Monkey in the urban environment seems to be affected due to anthropogenic activities which increase the mortality rate due to gastrointestinal parasitic infection, predation of dogs and conflict with humans etc. In comparison to forest environment Rhesus macaque individuals had higher rank dissemination learning and more enhanced

research reactions to new response. Urban Macaques are highly aggressive toward each other and towards individuals in comparison from the undisturbed Macaques. It is distinguishable between urban macaque and undisturbed macaque in terms of their direct influence on behaviors associated with foraging. Monkey in the urban environment are directly dependent to human origin resources for foraging.

Monkey covered many regions in the world and most of them tend to live in forest areas where there are lots of trees as they live in trees and they depend on the leaves for food of trees. Some monkeys like in trees whereas some live on land. For survival, they travel from place to place for food. Rhesus monkeys can grow in variety of climates and habitats. They depend on fruits, seed, roots, herbs and insects for their food.

## **Chapter 5: Conclusion**

Rhesus macaques have been residing in Swayambhunath area since a long time. The study on the adaptive behavior and also the cost and benefits of their behavior were carried out. As per committee's old data the number of Rhesus macaque was about 15000 and were increasing. Rhesus macaque plays a vital role in the attraction of tourism in the temple. Most of the Rhesus macaque is depended on artificial foods, waste foods, ice-creams, etc. We found that Swayambhunath area was polluted because of internal and external tourist and that directly named the monkey's as they feed on the waste left by visitors. We observed that they enjoy living in groups. They attack if any people try to harm or tease them. Grooming was observed as a major inmost pattern of social behaviors. By analyzing the advantages and



disadvantages of their behavior, it was seen that cost was greater than the benefits. So we conclude that natural selection is favoring the behavior. They have managed to be successfully adapted to the new environment i. e. urban environment.

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