Chapter 9
Macaque–Human Interactions in Past and Present-Day Sri Lanka

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9.1 Introduction

In spite of Sri Lanka's relatively small size (64,740 km^2), the island supports a high level of biodiversity and endemism (Gunathilleke and Gunathilleke 1983; Erdelen 1988). Part of the reason for this high degree of biodiversity is the variety of habitats found between sea level and the highest peak, 2,524 m asl in the central highlands. The habitat types include mangrove forest, grassland, semiarid thorn forest and shrub land, tropical evergreen rain forests, dry mix evergreen, intermediate moist evergreen, highland evergreen, and temperate forests (Erdelen 1988). There are five primate species in Sri Lanka, the toque macaque (*Macaca sinica*), the gray-handed crested langur (*Semnopithecus priam thersites*), the purple-faced leaf langur (*Trachypithecus vetulus*), and the two nocturnal lorises (*L. tardigradus* and *L. lydekkerianus*). With the exception of *S. priam* and *L. lydekkerianus*, all are endemic and classified as endangered or critically endangered (Dela 2007; Rudran 2007; Nahallage and Huffman 2008).

Sri Lanka is primarily an agricultural country, and over the last few decades, due to agricultural, irrigational, and industrial projects and an increase in the human population and urban expansion, natural forested areas have declined rapidly (Erdelen 1988; Wickramagamage 1998). Owing to fragmentation of forests in the wet and dry zones, primates are increasingly frequenting farms and agricultural plots in search of alternative food resources (Nahallage and Huffman 2008). This is the main cause for primate–human conflict today.

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Fig. 9.1 People and primates coexist harmoniously in religious temple grounds. Religious devotees pray and provide food for monkeys as religious offering at the Ruwanwelisaya Stupa (*upper left*, *right*, *lower left*). A priest resting on the steps with gray langurs grooming nearby in the Kataragama temple grounds (*lower right*) (Photos by M. A. Huffman)

However, in Sri Lanka, the peoples' religious beliefs and cultural practices play an important role in defining the terms of primate–human interactions and reflect the past, present, and potential future of their coexistence. An important feature of this country is the presence of monkeys at Buddhist and Hindu temples. For example, the North Central Province city of Anuradhapura, formerly the ancient capital of the country from the fourth century BC to the eleventh century AD, has been protected as a holy site. Named as a UNESCO World Heritage Site, Anuradhapura is visited daily by a large number of local and international tourists alike (Fig. 9.1). The expansive area of woodland surrounding this religious site, protected from development due to its cultural and religious significance, is home to a large population of primates that forage on the natural vegetation. The monkeys are habituated to humans and freely range in and around the sacred sites undisturbed by tolerant monks and tourists. The constant supply of food offerings given to them by religious followers and tourists keep macaques and langurs around the temple grounds. Like Anuradhapura, there are many large and small Buddhist and Hindu temples across the country where primates are protected by the peoples' religious and cultural beliefs, i.e., Kandy, Sigiriya, Dambulla (Central Province), Kelaniya, Kalutara (Western Province), Rumassala, Sella Kataragama,

Kataragama, Sithulpawwa, and Vadasitykanda (Southern Province). These are places where primate–human interactions are relatively harmonious (Fig. 9.1).

Among the five primate species inhabiting Sri Lanka, more is known about the behavioral ecology of the toque macaque than the other primate species. An impressive longitudinal study begun in the 1970s investigated various aspects, such as the social behavior, demography, ecology, disease etiology, and conservation of the toque macaque population in Polonnaruwa (another protected religious-historical site in the North Central Province). The results from this long-term project (e.g., Dittus 1977, 1986, 1998, 2004; Hoelzer et al. 1994; Ekanayake et al. 2007) form the majority of detailed published information about this endemic macaque species today.

One area of research that has received little attention in Sri Lanka is the growing field of ethnoprimatology, the multidisciplinary investigation of humans and nonhuman primate interactions (e.g., Loudon et al. 2006; Paterson and Wallis 2005; Wolfe and Fuentes 2007; Fuentes and Hawkins 2010; Hill and Webber 2010). In this chapter, we present results from questionnaires and field surveys investigating how Sri Lankans view primates, their cultural practices, beliefs, and the state of primate–human interactions in a rapidly developing and changing country. It is not the goal of this chapter to provide a picture of the conservation status of primates in the country but rather to describe the relationship humans have had with macaques and other primate species in general, from both a historical and contemporary perspective. We address such questions as: What place does the toque macaque occupy in Sri Lankan folklore and literature? How do people relate to the toque macaque vis-à-vis the langurs in Sri Lanka? What are the major causes of conflict between toque macaques and humans in Sri Lanka?

9.2 Methods

The study was conducted by direct observation and through formal interviews using a standardized questionnaire. Informed consent was obtained before each interview. The study abided by all laws of Sri Lanka, and the protocol and permission to conduct the study was approved by the Department of Wildlife Conservation. A total of 307 formal interviews were conducted (129 women, 178 men) with participants ranging in age from 18 to 85 years. A breakdown of the respondents by status is listed in Table 9.1. The data presented here were collected during our field visits (5–20 February, 2007; 23 February–3 March, 2009, $N = 127$) and by trained undergraduate students from the University of Sri Jayewardenepura and the University of Uva during the period 2007–2009 ($N = 180$).

Administratively, Sri Lanka is divided into 9 provinces and 25 districts (Fig. 9.2). Students were selected based on their province and area of origin to obtain data from as many different districts as possible. In total, 23 districts from these 9 provinces are represented in this database. A breakdown of the questionnaires by province is given in Table 9.2. The unbalanced representation of the provinces is

Table 9.1 Breakdown of the status of respondents

Respondent status	Frequency
Farmer	48
Small-scale vegetable and fruit vendor	26
Student	84
People in national parks	26
Housewife	19
Retired government officer	14
Teacher	7
Laborer	6
Buddhist priest	6
Private business owner	4
Traditional doctor	2
Security guard	2
Not specified	25

due to the war in the Northern and Eastern Provinces during the above study periods, which made it difficult to visit or to find students originating from these areas to conduct interviews.

Respondents were shown close-up, full-body pictures of each primate species with their common names in Sinhalese, Tamil, and English to minimize confusion and increase accuracy. The questionnaire included 28 questions on topics including primates species seen in the area, the approximate number of groups and their group size, (whether they damage crops) their preferred food items, the measures taken by the people to prevent primates damaging the crops, whether they were aware of hunting of primates for food in their respective areas, use of primate body parts for medicinal and ritual purposes, and primate myths and folklore known of or heard about by the respondents.

9.3 Results

9.3.1 The Perceived Trends of Local Primate Population Size and Damage to Crops

When asked about the current number of primates in their area compared to earlier times, 51% of all respondents believed that they had increased in recent years. (It was not our intention to use this response as a measure of population size but rather as a means of estimating any relative change in the frequency of contact between people and primates in recent times.) In some provinces, the majority of respondents said that contact with primates was increasing (Central, 92%; North Central, 75%; Uva, 71%; North Western, 68%; Southern, 53%), while in other provinces, the majority thought their numbers were declining (Western, 41%; Eastern, 64%; Sabaragamuwa, 59%). Eighty-nine percent of respondents said that primates raid

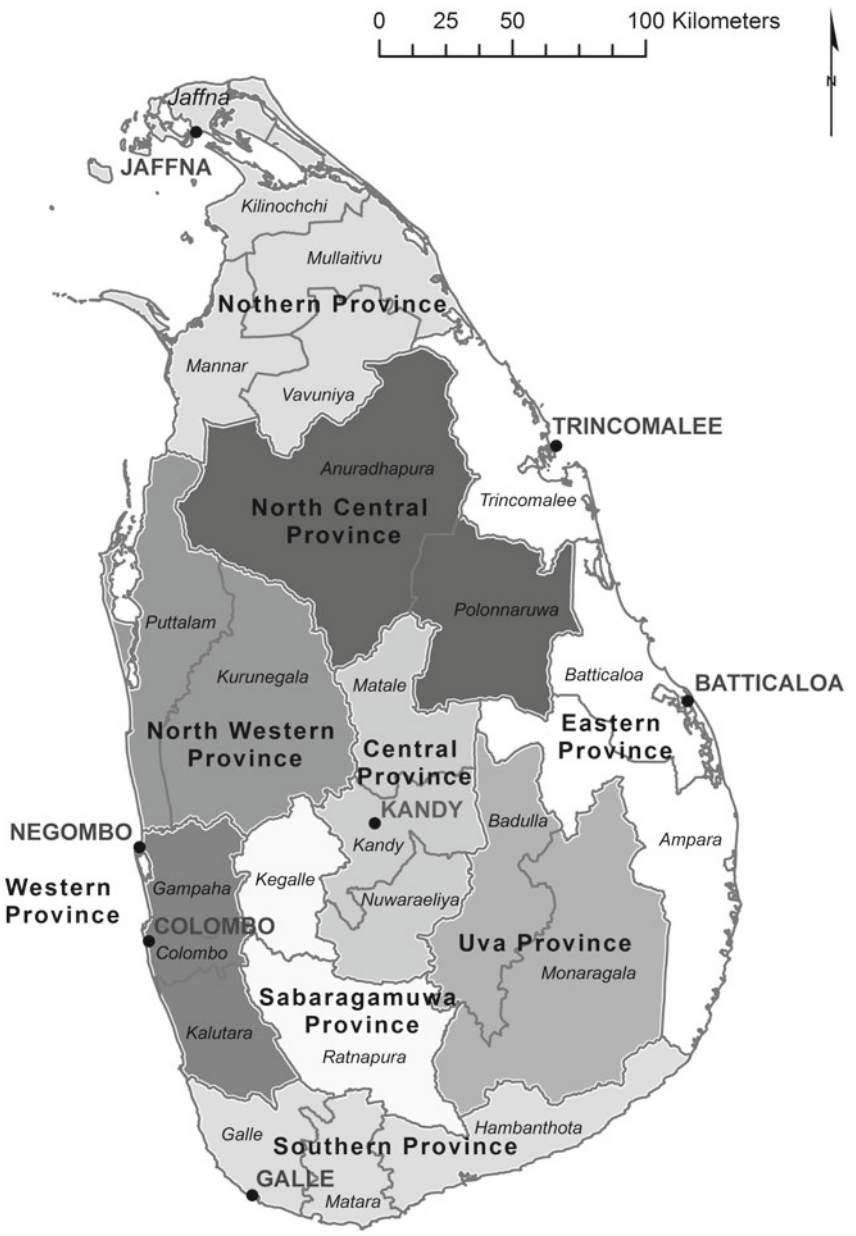

Fig. 9.2 Administrative province and district map of Sri Lanka (Source: Produced by Dr. Janet Nackoney)

Table 9.2 Province-wise distribution of questionnaires

Province	Percentage respondents
Western	26
Southern	24
Sabaragamuwa	15
North Western	10
Uva	7
North Central	7
Central	5
Eastern	5
Northern	3

Table 9.3 Prevention methods used against crop-raiding monkeys ($N = 307$)

Method	Percentage usage
Firecrackers	31
Making loud sounds	22
Shooting	10
Using traps	9
Throwing stones	7
Catapulting/sling-shooting stones	5
Scarecrow	3
Using dogs	2
Poisoning	2
Hanging dead monkeys in the trees	1
Placing cut trees and branches around garden	1
Covering crops with nets	1
Other methods	6
Using mirrors	0.8
Guarding	0.8
Hanging polythene strips, bags	0.6
Applying cow dung	0.6
Hanging red flags and umbrellas	0.6
Hanging shiny objects	0.5
Using nets	0.3
Sprinkling gun powder	0.3
Dynamite	0.2
Applying black oil to fruit tree trunks	0.2

crops, and 60% considered them as pests. Forty-eight percent thought that primates were afraid of people, while 45% said they were not, and some (7%) had no opinion one way or the other.

People used various techniques to protect their crops from monkeys (Table 9.3). Respondents on average reported 2.5 (SD 1.38, range 1–6) different methods; the

Fig. 9.3 Agriculture pests, temple guardians, or entertainers, macaques are regarded in many different ways across the country. Small-scale farmers selling their produce at roadside stands near their homes (*upper left*), commercial farmers (*upper right*), and roadside food vendors (*lower left*) are often the target of crop-raiding monkeys (Photos by M. A. Huffman). A toque macaque performing in front of a private home in a suburb near Colombo (*lower right*). (Photo by C. A. D. Nahallage)

most common was the use of firecrackers (31%) or making other loud sounds (22%). Trapping or shooting monkeys (19%) was practiced most frequently in the Southern, Sabaragamuwa, and North Western Provinces.

9.3.2 Use of Nonhuman Primates as Pets and Performers

Most people said they preferred toque macaques as pets because they believed that macaques resemble humans more closely than langurs and adapt better to captivity. In North Central, North Western, and Sabaragamuwa Provinces, toque macaques are used as performers for profit (Fig. 9.3). Trained macaques are taken to urban neighborhoods, villages, and to public places such as parks and temple grounds to entertain the crowds. The most common performances were scenes such as visiting parents-in-law during the New Year, carrying a box of gifts on the head while walking upright on hind legs, or being punished by the police for stealing. Toque individuals are usually dressed in a pair of trousers and a shirt and constrained by a leash. Typically, the cost is equivalent to one US dollar per performance.

Table 9.4 Use of primate body parts for medicinal purposes

Species/part	Ailment	C	N	NC	NW	E	Sb	S	U	W
Langur meat	Asthma	○		○		○	○		○	○
Meat	Poor eyesight						○	○		○
Meat	Leprosy					○				
Meat	Malnutrition, piles			○						
Meat	Malnutrition							○	○	
Meat	Heartburn, kidney and lung diseases						○		○	
Meat	Boils, TB									○
Meat	Heart and lung diseases							○	○	
Liver	Malnutrition			○				○		
Heart	Malnutrition							○		
Hands, tail	Cracks in hands and feet								○	
Stomach contents	Malnutrition			○						
Oil	Burns									○
Macaque meat	Piles				○					
Meat	Asthma				○					
Meat	Whooping cough, piles	○								
Meat stomach content	Malnutrition	○								
Feces	Whooping cough				○					
Oil	Fractures							○		○
Urine	Snake bites							○		
Loris tears	Not specified			○						

Province: *C* Central, *N* Northern, *NC* North Central, *NW* North Western, *E* Eastern, *Sb* Sabaragamuwa, *S* Southern, *U* Uva, *W* Western

9.3.3 Primates as Food, Medicine, and Ritual Objects

With the exception of Northern Province, primates are hunted for food everywhere but at a very low frequency and in secret. Forty-seven percent noted that people in their respective areas hunted primates for food, while 42% said hunting did not occur, and 11% said they were not sure.

Primates are also hunted for body parts to be used as medicine (Table 9.4) and for ritual activities; this occurred very infrequently and only in rural areas. There are marked province-wise similarities and differences in this belief system, suggesting that it was historically practiced throughout the country. In Central Province, for "apala" (ritual practiced against unfavorable positions of the planets in one's horoscope), the intestine of a macaque is wrapped around the neck of an affected person at dawn, and he/she is not allowed to speak during the treatment. In North Western Province, loris tears mixed with other ingredients are ritually smeared on a plate to see into the future. In Sabaragamuwa Province, the heart of the purple-faced langur is given to pregnant women, and the skull, skin, and penis are used in "thovil," another traditional healing ritual. Also, the meat and bones are used for "huniyam" (a practice akin to black magic or voodoo). In Uva Province, langur heart, when

consumed, is believed to increase one's intelligence. In Western Province, both toque macaque and purple-faced langur skins are used to make drums.

9.3.4 Primates in Folklore, Myth, and Other Narrations

Folklore and myths regarding primates are abundant in Sri Lanka. The majority of the population practice Buddhism, introduced approximately 2,500 years ago, and many related folklore regarding primates can be found. The Jataka stories, originating from India, revolve around the 550 rebirths of the bodhisattva before attaining buddhahood. In 22 of these stories, the bodhisattva was born as a monkey, and these stories highlight the kindness, forgiveness, helpfulness, intelligence, and patience of bodhisattva through the behavior of monkeys in different situations (e.g., Nalapana Jataka, Kapi Jataka, Vanarinda Jataka, and Tayodhamma Jataka). Other primate folklore in Sri Lanka also highlight their intelligence and curiosity. For example, the monkey that lost its tail by being too curious or the one that injured its face by trying to imitate a person shaving his beard. One that appears in many cultures is about the hat seller who got his hats back from a troop of thieving monkeys by getting the troop to imitate his actions, taking off his own hat, and throwing it to the ground. A famous Hindu epic poem, the *Ramayana*, is also very popular in Sri Lanka with both the Hindus and the Buddhists. A central character, Hanuman (the monkey god worshipped by Hindus), is the brave leader of an army of monkeys, who flies to Sri Lanka in search of Sita, kidnapped by the Sri Lankan king, Ravana (Fig. 9.2).

Myths and beliefs about primates differ across the country. For example, some communities in the Northern and Western Provinces believe that it is good luck to see monkeys when they leave the house, whereas some communities in North Western, North Central, Southern, and Western Provinces believe that if a monkey calls out just before someone leaves the house for work in the morning, it will bring bad luck and the person will not be able to carry out their work as planned. In Southern, Uva, and Western Provinces, people believe that the right side of a langur's body is made of human flesh, so they refrain from eating them altogether or do not use any part of the right side of the animal's body. In Sabaragamuwa Province, people believe that if a monkey enters into the house through the kitchen door, somebody in the house will fall seriously ill. It is also believed that macaques were created by the demon "Wasawarthi Mara" to cause trouble for villagers. Another animal created by him is thought to be the wild pig, another source of damage to garden plots.

9.4 Discussion

Like other "weed species" in the genus *Macaca,* in our survey, toque macaques were frequently found in close proximity to human habitations (Guatier and Biquand 1994; Lee and Priston 2005; Richard et al. 1989). The gray langur and purple-faced

langur can also be classifiable as a kind of "weed species," given their ability to live close to human habitations. Though their diets are less omnivorous than macaques, their food habits do overlap, and they forage in cropfields and kitchen gardens in villages, towns, and cities across the country. Not surprisingly, this close proximity to humans has long been a source of conflict, which is mirrored by similar situations throughout the distribution of other macaque species and langurs across Asia (e.g., Fuentes et al. 2005; Fuentes and Hawkins 2010; Riley 2007; Sha et al. 2009; Southwick et al. 1961; Sponsel et al. 2002; Watanabe and Muroyama 2005).

Long-term analysis of trends showing an increase in contact and conflict between humans and macaques was documented in Japan by Watanabe and Muroyama (2005). They attributed this increase in the visibility of previously timid macaques to species range expansion caused by deforestation and a resultant decrease in natural food resources, increased acculturation to human environments, and a less fearful attitude towards humans due to the aging population of farmers living in the countryside. Respondents to our questionnaire in some parts of Sri Lanka believed that primate populations had increased in the last several years. In the absence of reliable studies on regional primate densities, it is not possible to affirm or refute these claims. In the absence of reliable primate population estimates for the country, we can only interpret our results as indicative of an increase in contact with primates, possibly due to some of the same factors identified by Watanabe and Muroyama (2005), e.g., forest fragmentation and habitat loss due to an increase in development activities. Interestingly, many people opined that toque macaques and langurs were forced to come closer to human settlements in search of food resulting in increased contact with people. Respondents in Galle District, Southern Province, stated that earlier, purple-faced langurs were seen only in the forests and hardly came to the village, but with the reduction of local forests, they are now frequent visitors. In the more urbanized and industrialized Western Province, respondents said that the purple-faced langur population had decreased because they saw fewer of them in recent years. Rudran (2007) states that only a few forest patches remain at the edge of the province and that most langur populations are restricted to these patches and to the surrounding areas.

Toque macaques and langur species are not distributed equally throughout Sri Lanka (Nahallage and Huffman 2008); as a result, the damage caused by them differs with location. For example, in places where all three species can be found (Matale District and Nuwaraeliya District, Central Province, Badulla and Monaragala Districts, Uva Province), toque macaques are considered the most serious crop raiders. Also in Central and North Western provinces, where toque macaque numbers are said to be larger, they are considered as more serious pests than langurs. Purple-faced langurs are the most prominent species found in Western and some parts of Southern Province (Galle District). They cause more crop damage and are considered greater pests in these areas than toque macaques. In some parts of the Southern (Hambanthota District) and North Central Provinces, gray langurs cause greater crop damage than purple-faced langurs or toque macaques.

The methods used to prevent crop raiding differed from place to place and was largely dependent on the socioeconomic status of the area (Nahallage and Huffman 2008).

In Western Province, the most common methods used to prevent crop raiding were firecrackers, throwing stones, and making loud sounds. These methods were quite effective in chasing purple-faced langurs away and are harmless. Here, purple-faced langurs were mainly seen in home gardens eating food grown for household consumption. For this reason, they were considered more of a nuisance than a serious pest. For the most part, people in this region tolerated them. In Central, North Central, North Western, Southern, and Sabaragamuwa Provinces, areas of large-scale commercial farming, macaques caused more serious economic damage (Fig. 9.3) and were less favorably looked at. In these cases, people had harsher opinions and used stronger methods to prevent macaques from raiding crops, such as shooting and trapping.

Among the indigenous people of lowland South America, primates are viewed as both symbols of power and as food. In a review by Cormier (2006), a general tendency was noted for larger bodied primates to be hunted for food; however, they were also more likely to be associated with taboos and not eaten by individuals of certain ritual (age, sex, reproductive state) or social status or revered as having come from former human beings or created by a divine being. Some of the indigenous communities avoid certain primate species as food because of their close resemblance to humans (Cormier 2006). In our survey, some respondents said that primates were hunted for food, but that it was not a common practice. The main reason for this low frequency is religious as Buddhism and Hinduism eschew killing animals (Nahallage and Huffman 2008; Rudran 2007). When hunted, however, the langur species were reportedly preferred over toque macaques because of their larger body size. In many areas, people believed that langur meat is especially good for treating certain diseases, such as asthma, leprosy, malnutrition, and piles. As langurs are leaf-eating primates, the respondents reasoned that many of the leaves eaten by the langurs are of high medicinal and nutritional value; therefore, the meat should be good for use as medicine. Furthermore, it is interesting to note that most people in the rural villages believed that primate organs, especially heart and lungs, can be transplanted to humans. This belief likely originates from the close similarity they perceive between primates and themselves, not only in anatomy but in social behavior as well. Another important feature of human–primate interaction in Sri Lanka is the presence of a large number of primates in and around the Buddhist and Hindu temples. There are many famous temples throughout the country visited daily by large numbers of pilgrims. These places play an important role in conserving endangered primates. Other examples from different countries include Lopburi in Thailand; Chamundi Hills in Mysore, India; and Ubud Monkey Forest in Bali (Fuentes et al. 2005; Loudon et al. 2006; Watanabe et al. 2007; Wheatley 1999; Wolfe and Fuentes 2007; authors' personal observations).

In habitat-source countries, primates are intricately enmeshed into the daily lives through folktales and myths (i.e., Ashliman 2011; Cormier 2006; Loudon et al. 2006; Riley and Priston 2010; Shahar 1992). People have likely incorporated monkeys so easily into these stories because of the close similarity between the two species. People in the rural areas of Sri Lanka still strongly believe these myths about primates, and the fear of retribution prevents the majority of people from

harming monkeys. The major threat for their survival is the loss of habitat and conflict with farmers, which is more pronounced in some provinces than others. Although farmers believe that primates cause more damage to their crops than other animals, studies elsewhere have shown that damage cause by primates is actually far less than what the farmers believe it to be (Riley 2007; Siex and Struhsaker 1999). The large body size and group size of the primates magnify the actual extent of damage caused (Nahallage and Huffman 2008). Therefore, it is necessary to systematically quantify the damage caused by primates and to communicate these findings to farmers.

Peoples' religious beliefs and cultural practices play an important role in defining the terms of primate–human interactions and reflect the past, present, and potential future of their coexistence (Loudon et al. 2006). In this light, the study of ethnoprimatology is an important conservation tool for understanding the human perspective on primates, which, when meshed with scientific studies, offers a holistic understanding of the current plight of primates. A better understanding of the Sri Lankan perception of macaques and other primates, with whom they coinhabit the island, will be helpful in the conservation and management of primates in Sri Lanka.

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