Pangolin Conservation Educational Kit

Prepared by
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Chinese Pangolin

Indian Pangolin

The Rufford Foundation
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BS 2072 (2015/016 AD)

Why this book is important

Pangolin is one of the protected wildlife species in Nepal. There is however little knowledge about the species. Also, the species is facing a harsh habitat condition for its existence. The community forests have emerged as better habitat for the pangolin after the conservation of forests by the community people. At this time, the dissemination of knowledge about pangolin among the community people would be an appropriate conservation strategy. Therefore this manual about pangolin has been produced which could be used by the community people at local level. The local level field staffs concerned about the conservation of pangolin could also use this manual which provides the basic knowledge about the behaviour, habitat, conservation status and other relevant information about the species. Students of forestry science may also find the manual useful. This manual will fill up a gap of information about the pangolin and will create awareness in the community level and could be a useful guide for the conservation of this vulnerable species.

-Nirjala Raut

Acknowledge

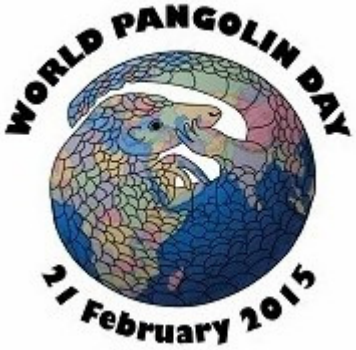
Many thanks are due to Rufford Foundation for providing the grants to undertake a study on pangolin in Rani Community Forest User Group, Makawanpur, Nepal and to prepare this manual.

Authors are thankful to Professor in wildlife, Shankar Prasad Lakhey, and Lecturer Mr. Krishna Prasad Dahal and Raj Babu Pahari , Institute of Forestry, Hetauda Campus, Hetauda, Nepal for providing valuable suggestions and support during preparation of this manual. The assistance and collaboration of the members of Rani Community Forest User Group and the respondents of the survey is also greatly acknowledged.

Narayan Prasad Gautam, assistance Professors of Institute of Forestry (IOF, Pokhara Campus, Pokhara, Nepal) encouraged and offered every support to prepare this manual. Others who have helped include Md Yusuf Ansari, Campus Chief, Institute of Forestry (IOF) Hetauda Campus, Hetauda; Narayan Tiwari, Bishnu Hari Wagley, Yogendra Yadav and Mahendra Singh Thapa (Lecturer, IOF), Rajendra Neupane, District Forest Officer, Makawanpur, Yubaraj Maskey, Regional Forest Director, Yubaraj Regmi, Chief Warden, Parsa Wildlife Reserve, Pravin Bidari, Assistant Forest Officer, Makawanpur, Bishnu Prasad Neupane, Chairman, Rani Community Forest User Group. We are indebted to all of them.

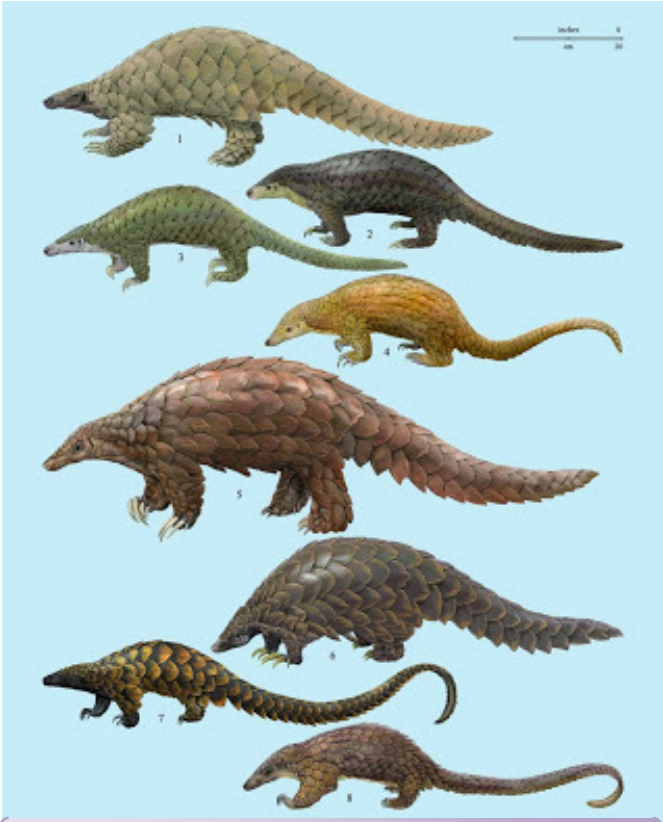
PART-1: General description on Pangolin

Name and Classification: The name pangolin comes from the Malay word pengguling, meaning "something that rolls up" also in some literatures it has been discussed as pangolin has the French origin and refers to the animal that is able to curl up into a ball. By doing do so, it can protect itself from many predators. Pangolins belong to the mammalian order *Pholidota* and are placed in their own family, *Manidae*. There are eight species of pangolins worldwide: Four in Asia, and four in Africa. It is known as scaly anteater or trenggiling in English and *Salak* in Nepali. The world pangolin day is in 3rd Saturday in February.



The systematic position of the species is presented below:

Kingdom:	Animalia
Phylum:	Chordata
Group:	Vertebrata
Class:	Mammalia
Order:	Pholidota
Family:	Manidae
Genus:	*Manis*



8 sps of Pangolin-Photo courtesy: Novataxa

Asian species

- Indian pangolin (Manis crassicaudata), Endangered
- Chinese pangolin (Manis pentadactyla), Critically Endangered
- Philippine pangolin (Manis culionensis), Endangered
- Sunda or Malayan pangolin (Manis javanica), Critically Endangered

African species

- Giant pangolin (Manis gigantea), Vulnerable
- Ground pangolin (Manis temminckii), Vulnerable
- Tree pangolin (Manis tricuspis), Vulnerable
- Long-tailed pangolin (Manis tetradactyla), Vulnerable

Morphology: Pangolins are a unique group of mammals that are characterized by having a covering of scales rather than fur. These scales are composed of keratin (the same material that makes up human fingernails), although some species also have a hard layer of calcareous material underneath the keratin. The belly, underside of the head and inside of the limbs is not covered with scales. All pangolin species have long, strong claws on their front limbs which are used for digging and climbing (in the arboreal species). The arboreal species have long, recurved claws on their hind feet and a long, prehensile tail to further assist them when climbing. The two ground pangolin species have short nails on their hind feet, an adaptation to their terrestrial way of life. They are predominantly solitary and nocturnal, but become active earlier in winter and some individuals may become entirely diurnal during winter.

Diet: Pangolins are entirely *myrmecophagous* - that is to say they only feed on ants and termites. The proportion of ants and termites consumed varies seasonally and geographically, but typically 90–95 % of the diet consists of ants and the remaining 5–10 % of termites. Some of the Indo-Asian species are believed to feed on other insects as well, but there have been too few studies to verify this. Pangolins are very important natural predators of these insects, keeping their numbers in check. A single pangolin literally consumes millions, if not billions, of ants, termites and their larvae each year. The tongue is very long - as long as the head and body combined - and is thin and covered in sticky saliva. The tongue is folded back into a special sheath called the *Xiphisternum*, which curls along the abdomen wall to the pelvic region and curls upwards and forwards before ending in a blind sac against the diaphragm.

Territorial species: Pangolins have fixed territories which are shared by an adult male and female, as well as the previous year's offspring. Territory boundaries are presumably demarcated through scent-marking and adjoining territories overlap only marginally. Males have rarely been seen to engage in combat, during which time they rise up on their back legs and slash at each other with the long claws on the front limbs. A larger animal may also try to wrap around his smaller opponent and squeeze him.

Reproduction and parental care: Pangolins are mammals and as such give birth to live young. Pangolins have pectoral mammary glands, like humans and elephants. Typically, pangolins are solitary except in mating season. May to July is their preferred mating seasons. Male pangolins often fight each other for females in the mating seasons. The winner will mate with the female pangolin. Females give birth to one baby (which is called a pup) a year and may rarely give birth

to twins. It is believed that the ground pangolin species may only give birth every second year. The gestation period is about 3–4 months. The pups are born with fully-formed but soft scales, which harden over the first few days. The mother leaves the baby in a burrow (terrestrial species) or hollow tree or log (arboreal species), periodically returning to nurse it. When about one month old, the baby accompanies the mother while she forages. The pup hitches a ride on the base of the mother's tail, hooking its claws under the mother's scales. As the pup grows it becomes more adventurous, alternating riding on the mother's back with foraging nearby. Pups become independent at 3–4 months, but will remain in their natal home range until about 1 year old. The new-born pangolins reach sexual maturity in one or two years.

Special features and life span: Pangolins make very few sounds. When they walk or climb, their scales can be heard rubbing against one another and against the vegetation. When awakening or feeding, they snort and chuff audibly. Males also rarely make a soft hooting noise. Pangolins are long-lived and are believed to live for up to 20 years in the wild, with the oldest recorded pangolin (an Indo-Asian species) living for more than 19 years in a zoo. This is the exception, however, as pangolins do not survive well in captivity and most die very soon after entering captivity. This is the reason why there are virtually no pangolins in captivity or in zoo's worldwide.

Conservation threats: It is illegal under the DNPWC Act to remove wild animals, including pangolins, from the wild. Those found in nature reserves are also protected. Furthermore, a total trade ban has been placed on wild pangolins under the Import and Export; CITES Act.

Poaching for illegal wildlife trade and habitat loss have made these incredible creatures one of the most endangered groups of mammals in the world. The pangolins face the greatest threat from rapid urbanisation (for building, road and farming sites) that resulted in massive habitat loss. The slow-moving pangolins are also often injured or killed by vehicles when they stray off too far from the forested areas onto roads. Globally, pangolins are greatly poached for its meat and scales, the latter in which is believed to have medicinal value. As the pangolins have a low fecundity rate of only 1 (rarely 2) offspring per year, the global pangolin population is depleting at a much faster rate than it can recover.

Important ecological roles: Control of the termite & ant population Pangolin adults may consume about 70 million insects per year. Their digging action used when feeding also helps to loosen and aerate the soil.

Advisory on Pangolin:

How can we help?

- If you witness any illegal trading or poaching:

  a. Collect information. Take photos or video evidences of the traps, snares, nets, trapped animals, poachers, and/or their vehicle license plate number.

  b. Call nearby Parks or forest office: if you are inside a protected area, such as a wildlife reserve or national park or forest area it is important to inform immediately to park office or forest office or forest user group office. Alternately, you can call at 100, the local police.

- Do not buy any pangolin products, such as meat, scales, and leather and medicinal products.
- Raise awareness by sharing with your friends and family about the threats to pangolins, and what can they do to help.
- Report your sightings, and contribute resources or media you have to various animal research and welfare groups to assist in research and conservation efforts.

What to do when I encounter a pangolin?

- Do not be alarmed. These animals are shy and will not attack humans.
- Do not touch, chase or corner them, as they will be frightened from your approach. You are advised to leave them alone.
- Observe them! It is not very often that you will get to see a live pangolin. Share your findings with pangolin research and welfare groups.

Exercise-1

1. How many species of pangolin are found in the world?
a. 10 c. 7
b. 8 d. 15
2. How many species of Pangolin are found in Asia?
a. 2 c. 4
b.3 d. 5

3. How many species of Pangolin are found in Nepal?

a. 2 c. 4
b.3 d. 5

4. The Nepali name of Pangolin is

a. Sun gohoro c. Salak
b.Gohoro d. Saraf
5. The English name of Pangolin is
a. Trenggiling c. Scaly Anteater
b.Both a and c d. Monitor lizard

6. Which is not the Asian species of Pangolin?

a. Chinese Pangolin c. Indian Pangolin
b.Sunda Pangolin d. Ground Pangolin

7. What does Myremechophagus means

a. Feed on Insects c. Feeds on Termites
b. Feeds on ants and termites d. None of the above

8. Gestation period of Pangolin is

a. 3-4 months c. 1-2 months
b.5-6 months d. 7-8 months

9. Pangolin is believed to live upto

a. 16 years c. 20 years
b.18 years d. 22 years

10. Pangolins are greatly poached for its....

a. Meat only c. Meat and scales
b. Scales only d. None of the above

PART-2: Pangolin in Nepal

There are 208 species of mammals, including human, in Nepal. Pangolin (*Manis species*) is one of the mammalian species found in Nepal. Locally they are known by various names:

- In Nepali language = Salak
- Newari = Kaynaya
- Tamang = Kose
- In the hilly area of Nepal = Hilemaccha
- Limbu = Padasekh

Two species of pangolins (scaly ant eater) are found in Nepal:

1. *Manis crassicaudata* (Indian pangolin), and
2. *Manis pentadactyla* (Chinese pangolin)

- In India, these same two species of pangolins are found and are known by the various local names eg *Bajra kit, Bajra kapta, suraj mukhi etc.*
- In Nepal, these species are known by *Salak.*
- Both species are endangered.
- They are hunted for their flesh and scales.
- Scales are considered having medicinal and magical properties. A brief description about those two species is presented below:

1. ***Manis crasscaudata***

English Name: Indian Pangolin, thick-tailed pangolin
Nepali Name: *Tame Salak*

Conservation status:

- This species is listed as Endangered because it is subject to hunting and increasing levels of poaching, principally for its meat and scales, both for local use and for illicit international trade in scales, which has also occurred historically.

Indian Pangolin-Photo courtesy: ecoindia.com/gifs/indian-pangolin.jpg

- Available evidence suggests this trade is destined for East Asia where scales are used in traditional medicines.
- It is suspected populations of this species will fall by at least 50% in the next 21 years

Range description:

- This species is distributed in South Asia from parts of eastern Pakistan through much of India south of the Himalayas (excluding northeastern portions of the country), Southern Nepal, Bangladesh and Sri Lanka.
- There are historical records of this species in southwest China and there have been dubious records in Myanmar
- This species is very locally distributed in Pakistan
- In India, this species is widely distributed from the plains and lower hills south of the Himalayas to extreme southern India. There are historical records from Kerala and Kanyakumari; Tamil Nadu; Delhi; Madhya Pradesh; Karnataka; West Bengal; Goa; Gujarat; Rajasthan; Bihar; and other 6 states of India.
- This species is distributed in lowland areas of southern and western Nepal, below 500 meters elevation, being found in Suklaphanta Wildlife Reserve, Banke National Park and Bardia National Park in the west, and Chitwan National Park and Parsa Wildlife Reserve in the south.
    - Rani CFUG is situated between Chitwan National Park and Parsa Wildlife Reserve. So the site is best for Indian Pangolin.
- In Bangladesh, this species was historically found throughout the country.
- In Sri Lanka, this species is found locally throughout the lowlands , up to 1100 msl
- **Distribution**: Native: India; Nepal; Pakistan; Sri Lanka possibly extinct: Bangladesh

Population:

- There is virtually no information available on population levels of any species of Asian pangolin.
- There is a lack of research on population densities and on local, national and global populations.
- However, this species is thought to be in significant decline, primarily due to poaching for food and medicinal purposes locally. Moreover, trends in trade involving Asian pangolins

in recent years suggest the species is now frequently found in illicit international trade, primarily its scales, with origins including India, Pakistan and potentially Nepal.

- In India, the overall status of this species is not well known, though it is listed as Vulnerable in the Indian red data book.
- Although this species is found in protected areas and community forests of Nepal, for example there has been recent photographic evidence of its presence in the Suklaphanta Wildlife Reserve in the last few years, like elsewhere its status and abundance are unknown.

Physical description

- Head and body length of *Manis crassicaudata* can range from 45-75cm, and the tail can be 33-45cm.
- Males are generally larger than females.
- The head is small and triangular in shape and the body is slender and long.
- *Manis crassicaudata* is covered with about 15-18 rows of tough scales along the dorsal side of its head and body, and about 14-16 rows of scales on its tail.
- In defense, it rolls itself into an inconspicuous ball and hides its soft under parts.
- The tough surface protects them from predators, prey, parasites, cold weather, and sharp rocks when they burrow.
- These scales are yellow-brown or yellow-gray in color and made of fused hair.
- The scales make up 1/4 to 1/3 of it's body mass. They possess 5 powerful claws on each limb, 3 of which are adapted for digging burrows or locating their prey's nests.
- They have no teeth.
- Their tongue, which is 23-25.5cm long, is their main tool for capturing food.
- Average adult weight range is 5 to 35 kg (11.01 to 77.09 lb)
- Average adult length range is 45 to 75 cm (17.72 to 29.53 inch)

Reproduction

- Little is known about the reproduction patterns of *Manis crassicaudata*.
- Births have been recorded in January, March, July, and November.
- The gestation period is between 65-70 days.
- Females give birth to a single young, and ocassionally two can be produced.

    - Newborns can weigh from 200-500 grams. Their scales are soft, eyes are functional, and can immediately crawl on its own.
    - At about 1 month of age the young are carried on the dorsal base of the mother's tail when foraging, and at about 3 months of age the young are weaned.
    - The newborn animals have open eyes.
- According to the study made by Max Planck Institute for Demographic Research, an average longevity of *Manis crassicaudata* under captive conditions is 13.5 years. Nothing is known of longevity in the wild.

Behavior

- *Manis crassicaudata* are nocturnal, spending most of the day in their burrows or among rocks. They are more active at night when they leave their burrow in search of food.
- They do not have good hearing or eyesight.
- *Manis crassicaudata* live alone most of the time, with the exception of the mating season. During the breeding season both pangolins are found in the same burrow.
- Their burrows range in depth and depend on soil type. Soft soil can have burrows 6 meters deep, while rocky hard soils have a more shallow depth of 2 meters.
- They usually close the entrance of their burrow with loose soil to hide it from predators.
- For protection the Indian pangolin curls up into a ball, exposing only its scales. *Manis crassicaudata* also have anal glands capable of emitting a foul smelling, yellow fluid for defense against its predators.
- They can climb with their forelegs and use their prehensile tail and limbs.
- However, since most *M. crassicaudata* feed and live on the ground, they are considered terrestrial.
- This species poses no threat to humans.

Food habits

- *Manis crassicaudata* has a myrmecophagous (feeding on ants-used especially of organisms that prey on but do not live with ants) diet.
- They mainly eat ant, termites, and their eggs, although one Indian pangolin's stomach was reportedly filled with beetle wing sheaths, cockroaches, and skins of worms.
- They rely on their sense of smell to locate the nests of ants and termites.

- They have 3 main claws that allow them to dig through tough soil. Once they locate and expose the nests their tongues allow them to infiltrate the nest sites with ease. They rapidly "lick" their tongue along the nests as if they were drinking water to catch their prey.
- Since *Manis crassicaudata* have no teeth all of the process of "chewing" is done in the stomach.
    - They have a two chambered stomach. One is used for storage, the other which is 1/5 the total size of the stomach is rough and lined with thick muscular tissue. This is the part of the stomach that "chews" and grinds the food before it goes to the intestines.
- They prefer several species of prey item, for instance, they might pass up ants and termites under logs in favor of termites in mounds.

2. Manis pentadactyla

English Name: Chinese Pangolin, scaly anteater
Nepali Name: *Kalo Salak*

Chinese Pangolin-©Rufford/N Raut

Conservation status:

- This species is listed as Critically Endangered due to high levels of poaching for meat and scales, both targeted and untargeted, across its range.
- Evidence indicates that poaching has now shifted to the south and west of this species' range and there has been a very heavy unrecorded and therefore likely illicit trade involving an estimated ten of thousands of animals in international trade in the last decade.
- There are predicted continuing declines of ≤90% over the next 21 years or three generations.
- This species is listed in CITES Appendix II.

Range description:

- This species occurs in the Himalayan foothills of Nepal, north and northeastern India, possibly northeastern, northern Viet Nam, and through southern China.

- It exists at high altitudes, especially in the southern and western parts of its range, though also occurs at much lower altitudes, for example in Hong Kong and likely in the northeast of its range.
- The species is marginally present in northern India (Bihar) and has been recorded in northeastern India (Arunachal Pradesh, Assam, Meghalaya, Nagaland, Manipur, Tripura, Sikkim and the northern part of West Bengal).
- This species is mainly found in the deciduous forests and subtropical regions.
- In Nepal, where it is confined to elevations below approximately 2,000 msl
    - The rolling hills of central Nepal have a huge number of termite mounds where Chinese pangolins are found in great numbers.
    - In Nepal, they are found above the altitudinal range of Indian pangolin.
- In China, this species' distribution extends from the southern part of the country.
- Little is known about the species' distribution in Bangladesh.
- Native countries: China, Hong Kong, India, Lao People's Democratic Republic, Nepal, Taiwan, and Viet Nam

Population:

- There is virtually no information available on population levels of any species of Asian pangolin either at the global or national level anywhere across the species' range.
- In China, pangolins were commercially extinct by 1995, with Chinese demand for pangolin products.
    - Estimated populations of the Chinese Pangolin in China to be 50,000-100,000, in 2004.
- Surveys conducted in the Royal Nagarjung Forest in Kathmandu, Nepal, in the early 1990s determined that there was a healthy population; however, the general trend elsewhere in Nepal was dramatic declines, due to increased access to hunting areas.
    - Hunting of pangolins here for contemporary international trade also suggests populations continue to be subject to exploitative pressure.
    - This species has also been found in the forests in Makawanpur district. Both; Indian and Chinese pangolins (*Manis pentadactyla*) are found in the district.
- Trade figures suggest this species is under severe hunting pressure in Northeast India.
- The species is very rare in Viet Nam.

- The species has been so heavily hunted in Lao PDR that field sightings are exceptionally rare.
- The status of this species in Bangladesh, Bhutan, Myanmar and Thailand is unknown.
- Population trend of this species is decreasing.

Physical description:

- The Chinese pangolin has been referred to as the scaly anteater because that is what it resembles.
- It measures around 60 cm from head to body with an 18 cm tail. Sexual dimorphism is present in this species.
- *Manis pentadactyla* has about 18 rows of overlapping scales.
- Chinese pangolins have a small pointed head and a narrow mouth.
- The nose is fleshy and has nostrils at the end.
- This bronze colored animal has a very round body.
- The forefeet and hind feet are equipped with sharp claws.
- They have no teeth.
- Average adult weight is 2.35 kg (5.18 lb). Weight range is known between 2 kg-9 kg.
- Average length range is

Reproduction:

- In Nepal, Chinese pangolins reproduce during April and May.
- A single young is born measuring about 45 cm and weighing about 454 gm (1 lb).
- The young also have scales; however, they remain very soft for at least two days, and then harden. The young pangolin can walk on its very first day.
- The newborn animals have open eyes.
- If the mother is threatend, she folds her offspring under her body with her tail.
- Male pangolins have been observed to exhibit remarkable parental instincts and share a burrow with the female and young.
- Average number of offspring is 1.
- Females are generally smaller than the males.

Behavior:

- Not much is known about *Manis pentadactyla*.
- Not only are they nocturnal animals, but they are extremely shy and slow moving creatures.
- They are not aggressive.
- They defend themselves by curling up into a ball, and they are also protected from predators by the hard scales that cover their bodies.
- *Manis pentadactyla* is a predominantly terrestrial species.
- It has, however, been observed in the jungle canopy up to 20 ft above the ground.

Food habits:

- *Manis pentadactyla* feed on insects, namely ants and termites.
- They use their claws to open up termite and ant mounds.
    - Then they draw the prey into their mouths with their 25 cm long, sticky tongues.

Exercise-2

1. The distinguishing feature of Indian and Chinese pangolin is
a. Length of tail
b. Body size
c. Color of the scale
d. All of the above

2. In Nepal, Indian Pangolin are found in
a. Chitwan National Park
b. Suklaphanta National Park
c. Bardia National Park
d. All of the above

3. In Nepal, Chinese Pangolin are distributed in
a. Terai regions of Nepal
b. High himalayan regions
c. Himalayan foothills
d. None of the above

4. The male Pangolin are generally
a. larger than female
b. smaller than female
c. equal to female
d. None of the above

5. The tough surface of pangolin protects it from
a. predators
b. parasites
c. cold weather
d. All of the above

6. Pangolin do not have
a. ears
b. tail
c. teeth
d. tongue

7. Pangolin uses its.....to capture food
a. hands
b. tongue
c. claws
d. foot

8. Pangolin posses..... to human
a. high threat
b. no threat
c. low threat
d. None of the above

9. The conservation status of Indian Pangolin is
a. Endangered
b. Critically endangered
c. Vulnerable
d. Near Threatened

10. The conservation status of Chinese Pangolin is
a. Endangered
b. Critically endangered
c. Vulnerable
d. Near Threatened

11. Out of 5 claws, they use.....claws for digging.
a. 1
b. 2
c. 3
d. 4

12. They have anal gland for .....
a. emitting a foul smell
b. emitting a pleasant smell
c. locating prey
d. escaping from enemies

PART-3: Important facts on pangolin

Common facts:

- Both Indian and Chinese pangolins (*Manis pentadactyla*) are found in Makwanpur district.
- These species have been seen in Piple Pokhara and Rani Community Forests of Makawanpur district.
- The forest habitat and the elevation range of Makawanpur district offer a suitable environment for both of the pangolin species.
- Population of the species is decreasing in order.
- Pangolins are insectivore and feed on ants and termites, digging them out of mounds and logs using the long claws.
- The pangolin makes its home in regions with preferable ecological features suitable for digging their burrows, such as soft and semi-sandy soil.

Living burrow | Feeding burrow

Photo courtesy: Mahmood T. et al

- Pangolin burrows fall into one of two categories: **feeding** and **living** burrows.
    - Feeding burrows- are smaller than living burrows and are created more frequently during the spring, when there is a greater availability of prey.
    - Living burrows- are wider, deeper, and more circular, and are occupied for a longer time than feeding burrows

        - They are mainly used to sleep and rest during the day. After a few months, the pangolin abandons the burrow, and forms a new one close to the availability of prey.
        - However, it is not uncommon for the pangolin to shift back to the old burrow.
- Female pangolin is smaller than male weighing up to 50-90% more.
- Once the babies are about a month old, they venture outside the burrow with their mother, riding on her back.
- Pangolins have no teeth.
- In its natural habitat, this species may also consume various other foods for example invertebrates including bee larvae, flies, worms, earthworms, and crickets.
    - Pangolins living in dry areas must go without water. But where water is available they drink freely.
    - Their way of drinking is lap up water with a rapid in and out shuttling of tongue.
- As captives, they eat a variety of food such as milk, custard and pudding.
    - Other food may be raw or cooked chopped meat, minced or boiled egg, carrot.
    - They love to take milk, raw egg, pudding, moistened *satoo* with honey.
- The interesting fact about the fasting of pangolin that can last from 2 to 8 weeks.
- Pangolins are very friendly animal for human being.
- They not only maintain balance in nature by consuming the ants and termites, they also protect agricultural crops and buildings by reducing the risk of ants and termites.
- In seeking its food the animal is guided largely by its sense of smell.
- Male pangolin usually squirts its scent or urine along the burrow and bushes to mark its territory.
- Though terrestrial in habit, pangolins climb and swim well.
- They are often seen in trees probably in quest of tree ants.
- Pangolin can be kept as pet animal.
- This animal is harmless to children and gets easily tamed.
- Pangolin has a peculiar habit of standing upon its hind leg in fantastic stooping position.

Uses

Different organs of pangolins are used by people. People use the organs of pangolin for various reasons. Many legends and beliefs surround the pangolins and their body parts. For all these reasons, the pangolins are killed, and traded illegally. The body parts of pangolins that are traded illegally are briefly described here:

1. Flesh of the pangolin is consumed. Meat is eaten with great delicacy by many people and they kill pangolins for their flesh.

Photo courtesy: National Geographic

2. Scales: scales are made into rings as a charm against rheumatic fever and other ailment.
3. Uterus: There is mis-belief prevailing about the flesh of pangolin. A misbelieve prevails among some people that if the extract of pangolin uterus is given to pregnant women can prevent abortion.
4. Skin: Skins are traded illegally. Skins are used for making coat, belt, bag etc.

Risk/Threat

Pangolin is in great risk. The risk is associated both with the internal habit of pangolins and their external environment.

As the life span of pangolin is very short (about two years in captivity), they produce only few individuals. Pangolin has very low reproductive rate. The number of offspring from a mother is therefore relatively very small. The adult female usually gives birth to one cub per litter. There is only one litter in a year. Very often, the baby pangolins are preyed upon by jackals, foxes, and

leopards. The specialized food requirement (ant, termite) of this species has posed it in another risk. This species has very poor defense mechanism. There is no need of extra skill to kill this animal. Virtually anybody can kill this animal if they intend to do so. The taxonomic uniqueness (monotypic order, family and genus) of this species has posed it in serious threat. Such phenomena help to reduce its population.

Habitat destruction is one of the serious risk factors for the pangolins. The natural habitat of pangolins is disturbed by men. This has made difficult for them to stay alive, to grow, and to produce offspring. Deforestation, illegal felling, and forest fire are the major destructive activities and such activities destruct the natural habitat of pangolin which makes the existence of pangolin dubious.

There are many misbelieves that surround pangolins. Many people thought that consuming/using its various parts (flesh, scales, skin, and claws) may bring prosperity, improve health, or brings a good luck. They are also believed as the source of traditional medicine. For these reasons, all of the organs of pangolins fetch a big amount in international black market and therefore the illegal trade of the organs of pangolin is on the rise. There surround many misbelieves about pangolin and has caused illegal hunting and trafficking its organs. Skin and scales have high demand in international markets. Because of illegal killings and trade the number of pangolin is decreasing.

Hunters use many methods to kill the animal. They catch this animal by using dogs, tracking them and digging them out of burrows. Some may catch the animal by trapping. This shy animal sheltering in burrow is dislodged by digging all around or sending smoke of chilly from the hole of burrow. Thus, men are most serious threat for pangolins. With their strange protective strategy i.e. rolling their body into a ball - they can protect themselves from many wild animals but men. Pangolins are among the most trafficked and poached mammals.

Men harm them directly i.e. by hunting, killing; and indirectly i.e. by destructing their habitat. All for these reason, the pangolins are facing great risk. If the current trend is continued, their existence is questionable.

Protection of pangolin

Pangolins are protected animal in Nepal. The national and international communities are very much concerned about the conservation of pangolins. IUCN and CITES are among the most

important international bodies that are working for the conservation of vulnerable floral and faunal species. The National Park and Wildlife Conservation Act, 1973 of Nepal has listed the Pangolin as one of the protected animals. Indian Pangolin is listed as Endangered whereas Chinese Pangolins are as Critically Endangered species under the IUCN category. Pangolins are listed at Appendix II of CITES. Although, they are receiving less scientific attention and there are very few scientific studies.

Followings are the important acts for the conservation of biodiversity in Nepal (conservation of floral and faunal species):

- National Parks and Wildlife Conservation Act, 1973 (BS 2029)
- National Parks and Wildlife Conservation Regulation, 1974 (BS 2030)
- Forest Act, 1993 (BS 2049)
- Forest Regulation, 1995 (BS 2051)
- Environment Protection Act, 1996 (BS2053)
- Environment Protection Regulation, 1997 (BS2054)
- Export import (control) act, 2013 (BS 2057)
- Biodiversity Conservation Strategy, 2002
- Local Governance Act, 2055
- Local Governance Regulation, 2056

Role of Community Forest User Groups in Pangolin Conservation

Though, the pangolin is strictly protected by law in Nepal, the proper study about the species is still lacking. The population of this protected animal is uncertain. The legislation is necessary for the protection of this animal. Legislation alone is, however, not sufficient for the conservation. After the rehabilitation of once depleted community forests of Nepal, such forests have been a suitable habitat for the wild animals such as pangolin. The community involved in the management of community forest, therefore, can play a crucial role in conservation of this species. The Community Forest User Groups (CFUGs) can initiate different activities for the conservation of pangolin:

Rani CFUG activity-©Rufford/KP Dahal

1. **Awareness:** Dissemination of information may help in creating awareness about the pangolin, its conservation status, important of the species, etc. For creating awareness, the community forest user groups (CFUGs) may implement different activities. Poaching is one of the serious threats for pangolin, the CFUGs may work for creating awareness about the situation of poaching and its measures to control poaching.
2. **Habitat conservation:** Forest fire control: forest fire is destructive agent. Uncontrolled forest fire destructs the forest and also destroys the food and shelter of pangolin. CFUGs may help in the conservation of pangolin by controlling forest fire.

   Grazing control:

   The rampant uncontrolled grazing suppressed the young plants and destroys the forest and by doing so the habitat of pangolin is disturbed. The CFUGs therefore should work towards controlling the grazing.

   Habitat improvement:

   Pangolin dig a furrow for the shelter and it depends on ant and termite. The habitat of the pangolin should not be disturbed.
3. **Penalty and reward:** The penalty and reward system may be one of the important factors for the conservation of wild animal, especially for the conservation of pangolin. By their active participation, the CFUGs can control the pangolin poaching and protect this important animal.

4. **Networking and coordination**: The Community Forests are the mosaic of forest areas managed by different communities. Pangolin can move around these Community Forests. These CFUGs, there could make a network of the CFUGs for creating awareness about pangolin. They can work together for the protection of pangolin found in their forests.

Conclusion and Suggestions

Two species of pangolin *Manis crassicaudata* (Indian pangolin) and *Manis pentadactyla* (Chinese pangolin) are found in Nepal and they are protected by the law. Recently, these species have been found in Rani Community Forest of Makawanpur district and the users of the forest have been dedicated their effort to conserve the species in their forest. The study area (Rani Community Forest) is the suitable habitat for the pangolin. The community people (Users if the Rani Community Forest User Group and other stakeholders) want to conserve this species in the forest. They take pride to have this species in their forest. There is separate block allotted in Rani Community Forest for the pangolin. In those blocks, suitable habitat for the species has been developed.

The pangolin habitat in the study site is in good condition. The number of the species may be increased in the coming days. The habitat condition and the protection measures adopted by the Rani Community Forest can support for the protection and the conservation of the species. The Rani Community Forest has been the attraction for the people and community forests users groups of all over the country. After the successful pangolin conservation in the forest, Rani Community Forest could be the one of the tourist centre in Makawanpur district. If poaching of the species is controlled by imposing strict rules and adopting appropriate conservation measures the Rani Community Forest could be instrumental to conserve this vulnerable species.

Exercise-3

1. In Makwanpur District of Nepal, following species of Pangolin are found

a. Indian Pangolin only
b. Chinese Pangolin only
c. Both Indian and Chinese Pangolin
d. None of the above

2. Indian pangolins are found in.....

a. Chitwan National Park
b. Suklaphanta National Park
c. Bardia National Park
d. All of the above

3. Generally, Pangolin build .....types of burrows

a. 1
b. 2
c. 3
d. 4

4. Pangolin spend most of the time in....

a. Feeding burrows
b. Resting burrows
c. Living burrows
d. All of the above

5. *Manis Pantadactyla* is predominantly.....species

a. Terrestrial species
b. Arboreal species
c. Best swimmers
d. All of the above

6. The main ecological role of Pangolin is.....

a. Helps in pollination
b. Reduce risk of ants and termites in agricultural crops
c. Helps to keep away birds from Agricultural crops
d. All of the above

7. Pangolins maintain territory by.....

a. Urinating
b. Scratching
c. Rubbing their bodies
d. Defecating

8. The number of Pangolin is in .....trend

a. Increasing
c. Constant
b. Decreasing
d. None of the above

9. Pangolin mostly gives birth to .....cub per litter

a. 1
c. 3
b. 2
d. 4

10. Community Forest User group can initiate.....activities for pangolin conservation

a. Awareness
c. Networking and coordination
b. Habitat conservation
d. All of the above

Part-4: Some photo plates regarding "Indian Pangolin Conservation Project, Makwanpur"

Program Badge and School Bag for students of Poorer family of the project area –©Rufford/N Raut

KIS with Wildlife Prof. Lakhey -©Rufford/N Raut

School Teaching Program -©Rufford/N Raut

Training on Pangolin Conservation-©Rufford/N Raut

Workshop-©Rufford/N Raut

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Appendix

List of Protected Animal in Nepal

Mammals

SN	SCIENTIFIC NAME	ENGLISH NAME	LOCAL NAME
1.	*Macaca assamensis*	Assamese monkey	Assamis rato bandar
2.	*Manis sps.*	Pangolin	Salak
3.	*Caprolagus hispidus*	Hispid hare	Hispid kharayo
4.	*Canis lupus*	Wolf	Bwanso
5.	*Ursus arctos*	Himalayan Bear	Himali rato bhalu
6.	*Ailurus fulgens*	Red panda	Habre
7.	*Prionodon pardicolor*	Spotted linsang	Silu
8.	*Prionailurus bengalensia*	Leopard cat	Chari bagh
9.	*Felis lynx*	Lynx	Lynx
10.	*Pardofelis nebulosa*	*Clouded leopard*	*Dwanse chituwa*
11.	*Panthera tigris*	Tiger	Bagh
12.	*Panthere uncial*	Snow leopard	Hinu chituwa
13.	*Elephas maximus*	Asiatic elephant	Hatti
14.	*Rhiniceros unicornis*	Rhinoceros	Gainda
15.	*Sus salvanius*	Pygmi hog	Pudke Bandel
16.	*Moschus chrysogaster*	Musk deer	Kasturi mirga
17.	*Cervus duvauceli*	Swamp deer	Barhasingha
18.	*Bos gaurus*	Gaur	Gauri gai
19.	*Bos mutus*	Wild yak	Yak
20.	*Bubalus arnee*	Wild buffalo	Arna
21.	*Ovis ammon*	Great tibetan sheep	Nayan
22.	*Pantholops hodgsoni*	Tibetan antilope	Chiru
23.	*Antilope cervicapra*	Black buck	Krisnasar
24.	Tetraceros quadricornis	Four horned antilope	Chauka
25.	*Hyaena hyaena*	Striped hynae	Hundar
26.	*Platanista gangetica*	Gangetic dolphin	Shons

Birds

SN	**SCIENTIFIC NAME**	**ENGLISH NAME**	**LOCAL NAME**
1.	*Catreus wallichii*	Chir pheasant	Kalij, Chir
2.	*Lophophorus impeyanus*	Impeyan pheasant	Danfe
3.	*Tragopan satyra*	Crimson horned pheasant	Monal
4.	*Ciconia ciconia*	White stork	Seto sarus
5.	*Eupodotis bengalensis*	Bengal florican	Khar majur
6.	*Sypheotides indica*	Lesser florican	Sano khar majur
7.	*Grus grus*	Sarus crane	Sarus
8.	*Buceros bicornis*	Giant hornbill	Thulo dhanesh
9.	*Ciconia nigra*	Black stork	Kalo sarus

Reptiles

SN	SCIENTIFIC NAME	ENGLISH NAME	LOCAL NAME
1.	*Gavialis gangeticus*	Ghariyal	Gharial gohi
2.	*Python molurus*	Python	Ajingar
3.	*Varanus flavescens*	Monitor lizard	Sun gohoro

Source: DNPWC (2013)

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Special Thanks to-

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Mr. Rajbabu Pahadi (Lecturer, Institute of Forestry, Nepal)
Mr. Narayan P Gautam (Lecturer, Institute of Forestry, Nepal)
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THANK YOU VERY MUCH.....