

CHAPTER I

INTRODUCTION

1. 1 Background

Koshi Tappu Wild Life Reserve (KTWR) is an important habitat for wildlife and migratory birds. It can be an important place for the habitat of the feral populations due to bringing of cattle and buffaloes for grazing.

A feral organism is that which has been left from the domesticated life, and they have been changed to partly or wholly wild. Certain animals go feral easily but others can't live in feral state if they are left from the domesticated life. Some species will detach readily from humans and pursue their own devices, but do not stray far or spread readily. Others depart and are gone, seeking out new territory or range to exploit and displaying active invasiveness. Some of the common examples of feral populations are goats, cats and pigs. Cattle have been domesticated since the neolithic era, but can do well enough on open range for months or even years with little or no supervision.

The introduction of the feral animals or plants to the new regions can disrupt the ecosystem of that place by predation of the vulnerable plants or animals and may cause extinction of the indigenous species. Feral plants and animals constitute a significant share of invasive species, and can be a threat to endangered species. Animals of domestic origin sometimes can produce fertile hybrids with native, wild animals which leads to genetic pollution in the naturally evolved wild gene pools, many times threatening rare species with extinction.

Also the feral cattle has the chance to bring the disease to the wild animals e.g., bovine TB. Feral cattle (*Bos taurus*) can severely modify native vegetation by browsing, crushing and trampling (Aston, 1912; Wodzicki, 1950). In native forests they invariably lay bare the forest floor and eliminate nearly all young trees, shrubs and ferns, until only a few unpalatable or browse-resistant species remain. Degradation of the breeding habitat of the wild animals affects the range and population of the critically endangered species. Vegetation changes caused by grazing cattle will also be affecting birds, lizards and bats and it is believed that the cattle, *Bos taurus*, are to be the major factor in changing food

availability to the 'Critically Endangered Anegada Is. rock iguana on Anegada Is. (Varnham,2006).

In the recent years KTWR is facing problem with the invasion by feral and domesticated cattle, and buffaloes which are brought for grazing by the people of the buffer zone and the reserve areas. This has seriously affected the biodiversity of the KTWR due to overgrazing and competing for grass with the wild water buffaloes which are the only endangered population living in the KTWR of Nepal. Not only this, the interbreed that occurs of the females feral buffalo with the male wild buffalo result a hybrid young which in term affect the genetic pool of the wild water buffaloes.

1.2 Act and Policies

1.2.1 Environmental Protection Act 2053 BS (1996)

This Act aims to highlight the importance of linkage between economic development and environmental conservation. In order to maintain clean and healthy environment by minimizing, as far as possible, adverse impacts likely to be caused from environmental degradation on human beings, wildlife, plants, nature and physical objects, and to protect environment with proper use and management of natural resources, taking into consideration that sustainable development could be achieved from the inseparable inter-relationship between the economic development and environment protection. Article 9 of the act has provision of the duty of the concerned agency to protect National Heritage. Article 10 of the act has provision of a notification in the Nepal gazetted by the government to maintain any place within the Kingdom of Nepal containing natural heritage or aesthetic value, rare wildlife, biological diversity, plant, and places of historical and cultural importance, which are considered extremely important from viewpoint of environment protection, as an Environment Protection Area. It has also some provision to prohibit the activities which hinders the conservation of such important areas. Act has provision (Article 3) of carrying out Initial Environment Examination (IEE) and Environment Impact Assessment (EIA). Acts further made responsible to the state to protect world heritage sites.

1.2.2 National Parks and Wildlife Conservation Act (2029 BS) 1973¹

Whereas it is expedient to make arrangements for national parks, conservation of wildlife and their habitat, regulate to hunting and to conserve, promote, develop, and make appropriate (proper) arrangements for and use of places which are special importance from the view point of natural beauty in order to maintain the etiquette and welfare of the general public.

Now, therefore, His Majesty King Birendra Bir Bikram Shah Dev has made this Act on the advice and with the approval of the National Panchayat.

1. Short Title, Extent and Commencement

- (1) This Act may be called “the National Parks and Wildlife Conservation Act 1973”.
- (2) This Act shall be applicable throughout the kingdom of Nepal.
- (3) This Act shall come into force on such date as His Majesty’s Government prescribes by publishing a notification in the Nepal Gazette.

2. Definitions

In this Act, unless otherwise the subject or context requires:

- (a) “National Park” means an area set aside for the conservation, management and use of flora, fauna and landscape along with the natural environment.
- (b) “Strict Nature Reserve” means an area of ecological importance or important otherwise, set aside for scientific studies.
- (c) “Wildlife Reserve” means an area set aside for the conservation and management of wildlife and their habitats.
- (d) “Hunting Reserve” means an area set aside for the management of wildlife for allowing hunters to hunt them.
- (e) “Reserve” means a strict nature reserve, wildlife reserve and hunting reserve.
- (e1) “Conservation Area” means an area to be managed according to the integrated plan for the conservation of the natural environment and balanced utilization of natural resources.

* Unofficial translation by Diwakar Chapagain, DNPWC

- (e2) “Buffer Zone” means a peripheral area of a national park or reserve prescribed under the Section 3a. to provide for the use of forest resources on a regular and beneficial basis for the local people.
- (f) “Wildlife” means mammals, aves, reptiles, pisces, amphibians and insects of any kind other than domesticated and the term includes the eggs of oviparous creatures.**
- (g) “Arms” means any type of gun, pistol or similar other firearms, as well as bow and arrow, spear, trap, snare, booby trap, catapult, or any other weapon that cause injury.
- (h) “Hunting” means the act of chasing, capturing, torturing, or killing of any wildlife by any means or of attempting to do so, or of extracting any part of its or exterminating it or of taking out or destroying or disturbing its eggs and nests.
- (i) “Trophy” means the living or dead body of any wildlife or any such part thereof as can be identified.
- (j) “Authorized Officer” means an officer designated by His Majesty’s Government by notification in the Nepal Gazette.
- (j1) “Warden” means a person designated by His Majesty’s Government for conservation and management of National Park, Reserve, Conservation Area or Buffer Zone.
- (k) “Prescribed” or “ as “Prescribed” means prescribed or in the manner prescribed in the rules framed under this act.
3. His Majesty’s Government may declare National Park, Reserves or Conservation Area
- (1) His Majesty’s Government may, if it deems necessary, declare any area as a national park or reserve or conservation area by publishing a notification in the Nepal Gazette by indicating the boundary thereof.
- (2) His Majesty’s Government may, by publishing a notification in the Nepal Gazette abandon or transfer the ownership, or alter the boundaries of any area which has once been declared as a national park, reserve or conservation area.

3a. Buffer Zone may be declared

- (1) His Majesty's Government may declare any peripheral area of a National Park or Reserve as a Buffer Zone by publishing notification in Nepal Gazette by indicating the boundaries thereof.
- (2) His Majesty's Government may, abandon or transfer the ownership, or alter the boundaries of the Buffer Zone prescribed under the Sub-section (1) by publishing notification in the Nepal Gazette.

3b. Management and Conservation of the Buffer Zone

The Warden shall do the works relating to the management and conservation of the Buffer Zone. Provided that while managing and conserving the area it shall not have any effect on the land ownership of local people.

3c. Compensation may be given

In case any local inhabitant's house or land located within a Buffer Zone shall be moved within the existing natural boundary of a National Parks or Reserve because of a flood or land slide and if such inhabitant's house is removed, on the recommendation of the User Committee formed under Section 16c. reasonable compensation shall be given to such person from the amount allocated in accordance with the Section 25a. for local community development.

4. Restriction on entry into National Parks

- (1) No person shall be allowed to enter into a national park or reserve without obtaining an entry permit as prescribed or the written permission of the authorized official. Provided that this Sub-section shall not be applied to government employees who are on deputation, or to persons who have privileged of right-of-way inside the national park or reserve.
- (2) The design, kind, fee and other conditions of the entry permit mentioned in Sub-section (1) shall be as prescribed.

5. Prohibited Actions within a National Park or Reserve

No person shall take the following actions within a National Park or Reserve without obtaining a written permission from the authorized official:

- (a) To hunt wildlife,

- (b) To construct or possess house, hut, shelter, or any other structures of any material,
 - (c) To occupy, clear, reclaim, or cultivate any part or grow or harvest any crop,
 - (d) To graze any domestic animal or bird, or feed water to it,
 - (e) To cut, clear, fell, remove, or block trees, plants, bushes or any other forest resources, or do anything to cause any forest resources dry, or set it on fire, or otherwise harm or damage it,
 - (f) To dig mines, stones or remove any mineral, stone, boulder, earth or any other similar material,
 - (g) To cause damage to forest resources or wildlife, or to any land,
 - (h) To carry with arms, ammunition or poison, or use them,
 - (i) To takes with any domestic or any other kinds of animal, or trophy by persons other than government employees on deputation, or visitors using right-of-way within the national park or reserve, and
 - (j) To block, divert any river or stream flowing through national park or reserve, or any other source of water, or use any harmful or explosive materials therein.
6. Operation of services within National Parks or Reserves
- (1) His Majesty's Government may, in the supreme interests of the National Parks, Reserves or Conservation Area, make arrangements for operating hotels, public transport services or similar other services or facilities by itself, or by entering into a contract with other parties by following the prescribed procedure.
 - (2) No person shall operate services or facilities of any kind within the National Park, Reserve or Conservation Area without entering into a contract under Sub-section (1).
7. Repealed
8. Repealed
9. Entering into a National Park or Reserve at one's personal liability
- (1) Entering into a National Park or Reserve shall be on one's own liability.

(2) In case any person dies or sustains any loss, damage or injury within a National Park or Reserve, His Majesty's Government shall not be liable to pay compensation for such death, loss, damage or injury.

10. Protected Wildlife

The wildlife mentioned in Schedule-1 of this act shall be considered to be the protected wildlife and their hunting has been prohibited.

Provided that:

- (a) Mad wild elephants, man-eater tigers and wildlife, which suffers from disease or have become disabled that they cannot survive, may be killed or captured on the order of the prescribed officer.
- (b) In case it is deemed necessary to kill wildlife, which come out of forest area and cause considerable loss to human beings or to domestic birds and animals, may be killed, captured or chased on the order of the prescribed officer.

11. Prohibition to hunt without a license

(1) No person shall be permitted to hunt wildlife without obtaining a license. Provided that no license needs to be obtained for hunting the prescribed wildlife.

(2) Any person desirous to obtain a license under the Sub-section (1) shall submit an application form as prescribed to the prescribed officer and if such an application is filed, the prescribed officer shall, after collecting the prescribed fees, issue a license in the prescribed form and type to hunt wildlife.

(3) The person-obtaining license under Sub-section (2) shall hunt in accordance with the prescribed conditions and procedure.

(4) The prescribed officer may refuse to issue a license under Sub-section (2) with or without assigning any reason.

12. Fixation of annual quota for hunting

The prescribed officer shall determine the annual quota of wildlife that may be hunted inside a hunting reserve during a year, on the basis of wildlife censuses conducted from time to time.

13. His Majesty's Government may cancel licenses
His Majesty's Government may, if it deems necessary, cancel the license issued under Section 11 at any time with or without assigning any reason.
14. Hunting Prohibited Period
His Majesty's Government may prescribe hunting prohibited time for certain period and the area by publishing notification in the Nepal Gazette.
15. License to be obtained for collection of samples
- (1) No person shall be allowed to collect samples from any national park, reserve or any other wildlife habitat for the scientific research without obtaining a license.
 - (2) Any person desirous to obtain a license under Sub-section (1) shall submit an application in a prescribed form to the prescribed officer.
 - (3) If an application is filed under Sub-section (2), the prescribed officer may issue a license to the applicant, by collecting the prescribed fee, to hunt any wildlife other than those mentioned in Schedule -1, or collect any insect, bacteria, fish or any natural product subject to the fulfillment of the prescribed conditions.
16. Management of National Park and Reserve
The prescribed officer may, if he deems necessary for the proper management of a National Park or Reserve, hunt, remove any natural resources, or perform any other necessary function inside the National Park or Reserve.
- 16a. Forest resources or other services can be provided
The prescribed officer may provide prescribed forest resources or other services by collecting prescribed fees inside a National Park or Reserve.
- 16b. Management of Conservation Area
His Majesty's Government may, by publishing a notification in the Nepal Gazette, entrust the management of any Conservation Area declared under the Sub-section (1) of the Section 3 to any institution established with the objective of conservation of nature and the natural wealth for the period prescribed in the notification.

16c. User Committee

- (1) The warden, in co-ordination with local authorities may form a user committee for the management of fallen trees, dry wood, firewood and grass in a National Park, Reserve, Conservation Area or Buffer Zone.
- (2) Other rights, duties and responsibilities of the user committee formed under Sub-section (1) shall be as prescribed.

17. Trophy to be produced before the licensing authority

- (1) Any person who secures a trophy under a license obtained by him shall produce it before the licensing authority, or the officer designated by him within 24 hours excluding the time required for the journey.
- (2) The licensing authority shall maintain records of the trophies produced before him under Sub-section (1) and hand over the whole body or part of such wildlife to the person who has produced it before him along with a certificate in the prescribed form if he is satisfied that the trophy has been secured according to the license. Provided that if the license has been issued on the condition that the whole body or part of the wildlife that was to be hunted should be collected to His Majesty's Government, the condition shall be taken accordingly.

18. Prohibition to possess trophies without a certificate

- (1) Any person who has secured trophies prior to the implementation of this act shall produce such trophies before the prescribed officer within the prescribed time limit and obtain a certificate in the prescribed form.
- (2) His Majesty's Government may confiscate any trophy that is possessed without obtaining a certificate under the Sub-section (1) or the Sub-section (2) of the Section 17.

19. Prohibition to sell, supply or do business in trophies without license

- (1) No person shall be permitted to sell or supply trophies, or relinquish his title thereto or do business in trophies in any manner without obtaining a license from the prescribed authority.
- (2) Any person who has acquired title to any trophy through purchase or transfer from a person who has obtained a license according to Section (1)

shall register such trophy with the prescribed authority within the prescribed time limit and obtain certificate of ownership thereof.

20. Recommendation to be obtained for export or import of trophies

Any person desirous to export any trophy from the Kingdom of Nepal or import in accordance with current Nepal law shall obtain a written recommendation of His Majesty's Government, Ministry of Forests and Soil Conservation for such export or import.

21. Necessary action can be taken for self-defense

(1) In case any person is left with no alternative but to use arms or take any other measures against the actual and sudden attack of any wildlife to save his life or that of any other person or domestic animal, he may do so, and in case any wildlife is killed or wounded in such action, it is not considered a crime committed under this act.

(2) In case any wildlife is killed or wounded in the circumstances mentioned in Sub-section (1), the prescribed officer shall be notified accordingly within 24 hours after such event excluding the time required for the journey.

(3) The privilege mentioned in the Sub-section (1) shall not be granted to the persons acting in contravention of this act or the rules framed hereunder.

22. Prohibition to damage boundary markers

No person shall destroy, damage, disfigure, remove or otherwise obstruct boundaries, enclosure, wall, signboards or notices inside a national park, reserve, conservation area or buffer zone.

23. Power to inspect and search

In case there is a reasonable ground to believe that any person has taken any action in contravention of the act, and it becomes necessary to collect evidence or proof of such action, or to arrest him, the prescribed officer may, after securing a warrant from the prescribed authority, enter into and search the house, compound, land or all types of vehicle belonging to such person at any time. Provided that in case it seems possibility of taking some time to obtain a warrant to enter into and search any house, compound, land or vehicle and that the offender is likely to abscond or suppress evidence of his offense during such time, the prescribed

officer may after preparing written records of such matters accordingly, enter into and search such house, compound, land or vehicle at any time.

Explanation:

Officers below the rank specified in the Section 30 shall not be entered into and searched any house, compound, land or vehicles without warrant under this Section. In circumstances in which the offender is not arrested or evidence is not recovered in the course of such entry or search without warrant, the officer making entry or conducting search shall issue a certificate of such entry or search to the concerned person, and also forward a written notice to the prescribed officer within 15 days of such entry and search indicting the reasons for doing so.

24. Power to arrest without warrant

(1) In case there are reasonable grounds to believe that any person who has committed offenses punishable under this act is likely to escape, the authorized officer may arrest him without warrant. The arrested person shall be produced for legal action before the adjudicating authority within 24 hours, excluding the time required for the journey.

(2) In case any offender, or any of his accomplices resort to violence in an attempt to free him or obstruct to arrest him while arresting him or after his arrest by the authorized officer under the Sub-section (1), or if a circumstance appears that the offender to be escaped or freed by his accomplices or in case the life of the person making the arrest appears to be in danger, or in case he has no alternative but to resort to the use of arms, he may open fire, aiming as far as possible below the knee, and if any person dies as a result of such firing, it shall not be deemed to be an offense.

25. Reward

(1) Any person who furnishes information about a poacher who kills or injures rhinoceros, tiger, elephant, musk deer, clouded leopard, snow leopard or bison, leading to his arrest may be rewarded with a sum of up to fifty thousand rupees and any person who furnishes information about a poacher who kills or injures any other protected animals, other than the wildlife

mentioned above, leading to his arrest may be rewarded with a sum of up to twenty five thousand rupees.

- (2) Any person who furnishes information about a person who is in unlawful possession of trophies, leading to his arrest, or who arrests such person may be rewarded fifty percent of the amount collected from the auction sale of the trophies if such trophies are auctioned, or in case the trophies cannot be sold by auction from the point of wild life conservation, a sum of up to Ten-Thousand-Rupees can be rewarded with due consideration of condition, importance, and quantity of such trophies.
- (3) Any person who furnishes information about an offense under this act, other than those mentioned in Sub-section (1) and (2) which leads to the arrest of the accused, may be rewarded with up to One-Thousand-Rupees.

25a. May be expended for the community development

Up to thirty to fifty percent of the amounts earned by a national park, reserve or conservation area may be expended, in co-ordination with local authorities for community development of the local people.

26. Penalties

- (1) Any person who keeps rhinoceros horn or musk-pods in his possession in an unlawful manner with the intention of selling them, or sells, purchase, transfers, or acquires rhinoceros horn or musk-pods, shall be punished with a fine ranging between Rs.789.
- (2) Any person who kills or injures any other protected wildlife other than those mentioned in sub-section (1) be punished with a fine ranging between Forty Thousand and Seventy Five Thousand Rupees, or face imprisonment ranging between one year to ten years, or both.
- (3) Any person who hunts and kills or injures wildlife other than birds and fish inside national park, strict nature reserve or wildlife reserve without license shall be punished with a fine ranging between one thousand rupees and ten thousand rupees or face imprisonment ranging between six months and two years, or both.
- (4) Any person who hunts and kills or injures protected birds shall be fined

ranging between five hundred rupees and ten thousand rupees or face imprisonment ranging between three months and two years, or both.

(5) Any person who hunts and kills or injures birds other than protected birds inside national parks, strict nature reserves or wildlife reserve without a license shall be punished with a fine ranging between two hundred rupees and ten thousand rupees, or face imprisonment ranging between three months and two years, or both.

(6) In cases other than those mentioned in sub-section (1), (2), (3), (4) and (5), any person who commits an offense in contravention of this act or the rules framed under the act shall be punished with a fine not exceeding ten thousand rupees or two years imprisonment, or both.

27. Punishment for Accomplices

In case anybody who helps with knowledge to any person in committing any offense punishable under this act, such accomplice shall be punished to the half of the punishment due to the actual offender. Provided that a person who helps in committing any offense related to rhinoceros, tiger, musk deer and elephant shall be punished equivalent to the offender.

28. Power to Confiscate

In case any person accused of contravening this act or the rules framed under this act is convicted, the adjudicating authority may confiscate the trophies, weapons, means of transport, and other materials connected with such offense. Provided that a hunting dog that is seized may be killed on the order of adjudicating authority before the case is disposed of.

29. His Majesty's Government to be plaintiff

His Majesty's Government shall be the plaintiff in the cases under this act.

30. Investigation and filling of cases

(1) All investigations into offenses under this act shall be conducted by a ranger or an employee up to the rank of Subedar who is connected with forest and wildlife management or by an employee at least of the rank of Non Gazetted class I or by an employee at least of the rank of Sub-inspector in the Police force, and on completion of such investigations, he shall file the case before

the adjudicating authority in the name of national park office or reserve office or wildlife conservation office or forest office or any other office discharging functions relating to forests.

- (2) While filling a case before the adjudicating authority under the Sub-section (1), the concerned officer may consult a Government lawyer.

31. Power to Hear Cases

- (1) The prescribed court or authority shall have the power to hear and dispose of cases under this act.
- (2) While disposing of cases under Sub-section (1), the prescribed court or authority shall follow the same procedure as a court with original jurisdiction adopts it.
- (3) An appeal may be filed before an Appellate Court against the decision made or order issued by the court or authority prescribed under Sub-section (1) within 35 days after such decision is made or order is issued.

32. Power of His Majesty's Government to amend in schedule

His Majesty's Government may, by publishing a notification in the Nepal Gazette make amendments in the schedules of this act.

33. Power to frame rules

His Majesty's Government may frame rules to fulfill the objectives of this act.

34. Repeal and Saving

- (1) The Wildlife Conservation Act 1976 has been repealed.
- (2) In matters written in this act or the rules framed hereunder, actions shall be taken accordingly, and in other matters, action shall be taken in accordance with the prevailing Nepal laws.

1.3 Objectives

A. General

The general objective of the research work is to know the status of the feral cattle in the Koshi Tappu Wild Life Reserve (KTWR) and the effective methods for their evacuation.

B. Specific:

- To study the positive and negative impact of the feral cattle in the KTWR and the surrounding villages in the buffer zone.
- To study changes in the population of the wild animals inside the reserve.
- To study the beneficial aspects including change in the status of the biodiversity of the KTWR

1.4 Justification of the Study

The study is carried out to know the status of the feral cattle in the KTWR. The feral cattle in the reserve are a great problem these days. If the population of the feral cattle will go on increasing, then it will not only degrade the habitat of the reserve of the wild animals, but it may intrude the field which the local people are using for the cultivation in the buffer areas of the reserve. It will destroy the habitat of the endangered wild water buffalo (*Babulus babulis*). Also, it will degrade the resources like thatch grass (Khar) grasses which the local people bring for roofing and the other plants for mat and broom. Not only this, it will affect the livelihood of the local people.

So, it is very essential to control the population of the feral cattle in order to save the biodiversity of the reserve and other harmful affect that are due to the feral cattle. By knowing the socio-economic condition of the people who are dependent on the feral cattle for their livelihood, effective measures could be taken to discourage the rearing of the feral cattle which will result in the increase of the biodiversity of the reserve.

1.5 Limitation of the study

The study was carried out from for a month from 20th September to 23rd October 2009. Only four village development committees (VDCs) were selected viz., Ghoghanpur,

Pipra Purwa, Jagatpur and Kamalpur for the study out of the sixteen buffer zones VDC surrounding the reserve.

Some of the VDCs were not selected for the study due to hit of the flood in those areas, and some due to financial burden. There were several problems which I found during the study. The security problem was a major thing over there. People of the villages thought that whether my visit over there was linked with the police official to find out the unusual activities which they do. Keeping in mind, the study was shortened for a short period and target was made to those people who were having cattle.

Attempts were made to gather all the necessary information's from the study area but due to harsh climate, poor transportation facilities, risk of wild animals and the persons involved in illegal activities, it was not possible to collect all the expected informations.

Attempt was also made to find the shelter of the herd of feral cattle, but it was impossible due to the security reasons.

The study doesn't claim to have presented a complete documentation of the feral cattle in the reserve of the study area. However, this study can be taken as a reference for the further studies of the feral cattle in the protected areas.

1.6 Organisation of the Study

The study is organized as mentioned below. Chapter one includes background, Act and Policies, Objectives, Justification of the Study. Chapter two includes literature review, chapter three includes materials and methods which contain description of the study area, methodology, selection of the research site, field visit, interview and questionnaire, data analysis, sources of data. Chapter four contains results and findings, chapter five contains discussion and chapter six includes conclusion and recommendations.

CHAPTER II

LITERATURE REVIEW

There is a close relationship between the natural resources and human beings. Since the past human beings used to live nearby the forest, wetlands, rivers for the continuation of their livelihood. Animals once wild were domesticated by the human beings and again on leaving these animals without any proper guidance make them feral. Feral population of animals could have various impacts on the bio-diversity if their population rises and could also affect the wild genetic pool. Many works related with the feral cattle within the country and abroad have been reviewed in this study.

Brand (1961) in his study of the early history of the range cattle industry in Northern Mexico has found that the discovery, exploration, colonization of Cattle started from Spain and the Canary Islands and were brought to Santo Domingo by Columbus on his second voyage in 1493. From Santo Domingo cattle were introduced into Cuba, and it was from Cuba about 1521 that Gregorio Villalobos² and Hernan Cortes brought to Mexico the first cattle for breeding purposes.

Yocom (1967) studied on the ecology of the feral goats in Haleakala National Park on the Island of Maui, Hawaii during the period of July and August, 1963 and concluded that the goats must be eliminated from the National Park lands if these areas are to be reserved for the future peoples of the world to see native Hawaiian vegetation under as natural conditions as man can maintain. Fencing the park lands will help to prevent potential future problems created by increased populations of these new ungulates.

McKnight (1971) has concluded that one of the many unusual elements of the biota of Australia is the concentration of many tens of thousands of feral water buffaloes on the monsoonal plains of Arnhem Land and these animals have been the most prominent faunal component in a 60,000 square mile (155,400 km²) area for more than a century, and comprise the largest free-ranging population of buffaloes in the world, but their

significance to the region is still not clear, although there has been sporadic harvesting of buffaloes for hides and meat for many decades, well-organized economic utilization has never developed. Because of their size and numbers, the buffaloes play a major ecological role and are considered to be potential hosts for diseases and parasites.

Doran (1976) has described that the feral cattle seen along the Red River by Milford in the late eighteenth century may have been longhorns escaped from Mexico that could later have been incorporated into the Indian herds after their arrival in the West. But the major basis for the great Indian herds of the 1840'S and 1850'S must have been the animals they brought from the South.

Reinhardt and Reinhardt (1981) in their study of cohesive relationships in a cattle herd have found that socially motivated species form groups in which the individuals stay together voluntarily for most of their life and have concluded that socio-ethology in wild or feral animals follows quite a different approach.

Barrett (1982) in his study of the habitat preference of feral hogs, deer, and cattle on a Sierra Foothill Range and found that hogs preferred oak thickets and irrigated pastures; deer preferred brush land and oak woodland; and cattle preferred level topography and sites with relatively high herbage production including irrigated pastures, upland plains, and oak savanna-woodland. An association analysis indicated the greatest potential for inter-specific competition would be between cattle and deer on foothill ridge tops and between cattle and hogs on irrigated pastures.

Krysl *et al.*, (1984) in their study of horses and cattle grazing in the Wyoming Red Desert and their food habits and dietary overlap found that the dietary overlap between horses and cattle during the summer averaged 72% and increased to 84% during the winter.

Tanner et al. (1984) studied the grazing, resting, defecating, and urinating behaviors of cattle (Zebu-European cross breeds) seasonally on a south Florida range from November 1980 through August 1981. They found that the cattle grazed more in the freshwater

marsh during fall but spent more time in the ecotone during spring and summer without the requisite of shade for resting sites, even during the warmest days and hence concluded that excretion activities were more closely associated with grazing than resting.

McInnis and Vavra (1987) studied on the dietary relationships among feral horses, cattle, and pronghorn in Southeastern Oregon and found that there was dietary overlap between horses and cattle each season (62-78%), between horses and pronghorn varied from 7% (summer) to 26% (winter), between cattle and pronghorn varied from 8% (winter) to 25% (spring) and concluded a strong potential existed for exploitative competition under conditions of limited forage availability.

Wood *et al.*, (1987) studied the relation between feral ungulates(horses, cattle, sheep and goats) and plant communities on Shackleford Banks, North Carolina, from 1978 through 1981 and found that ungulates influenced vegetation dynamics by lowering aboveground succession in grass-shrub areas and also slowed the rate of succession in grass-shrub areas.

Ridpath and Waithman (1988) studied on an attempt to remove Asian water buffalo (*Bubalus bubalis*) from 389km² during a 2.3 year period which were introduced into northern Australia between 1826 and 1866 (Letts *et al.* 1979; Tulloch 1979) which soon became feral and are now common on the monsoonal lowlands within 100 km of much of the coast between the borders of the Northern Territory with the states of Queensland and Western Australia (Graham *et al.* 1982; Tulloch 1983) and found that in order to prevent reinfection of domestic herds and environmental damage by feral buffalo, populations must either be eradicated or reduced to a low density so that threats of infection or environmental damage become negligible.

Bayliss and Yeomans (1989) studied on the suitability of the double-count technique for estimating and correcting negative bias in population estimates of feral livestock derived by multi species aerial survey in the Northern territory of Australia and concluded that

the degree of bias was greater between habitats than between species, but was unrelated to the size of the size of groups. They also found that double-count technique is a suitable and cost-effective method of improving the accuracy of population estimates of feral livestock from multi species aerial survey.

Middleton and Mason (1992) studied the seed herbivory by nilgai, feral cattle, and wild boar in the Keolada National Park, Rajasthan, India and they found that the seeds of *Paspalum disatichum* were in the dung of these large herbivores during most of the year while *Acacia nilotica* and *Prosopus juliflora* were found during the hot-dry season and *Echinochola crusgalli* during the monsoon. In their study they also found that 37 small seeded species germinated from the dung of nilgai, feral cattle, and wild boar.

Berteaux (1993) studied the female based mortality in a sexually dimorphic ungulate: feral cattle (*Bos taurus*) of Amsterdam Island in 1988 and found that mortality of juvenile males was higher than that of juvenile females (22.4 versus 11.7%), but mortality of adult males was lower than that of females (18.3 versus 47.7%) and thus concluded that all deaths apparently were due to starvation, mortality was expected to be biased towards males.

Hobbs *et al.*, (1996) in their study of ungulate Grazing in Sagebrush Grassland: Effects of Resource Competition on Secondary Production have found that the three related processes of the past twenty or so years have reinforced the social and economic functions of Barbudan cattle keeping: diminishing rainfall, declining cultivation, and increasing numbers of feral cattle and have concluded that in Barbuda, as in other drought-prone regions, cattle function as a means of "banking" resources on the hoof.

Symanski (1996) in his study of environmental mismanagement in Australia's far north concluded that in order to increase the revenue of the south, the Western Australian government department of Agriculture allowed tens of thousands of cattle and feral donkeys to roam free and increase soil erosion in the north and it was a xenophobic and beholden to a White Australian policy.

Commonwealth of Australia (1997) has concluded that the traditional skill should be employed by the aborigines in order to manage the feral animals (buffalo, cattle, pigs, cane toads, cats and dogs) that pose the problems of the parks ecosystem of the Kakadu National Park.

Gurung (1997) has described the crop damage, livestock and avian stock depredation in four VDCs nearby the Gokarna Safari Park in Kathmandu. The serious problems have been arising due to the negative activities and the interaction between protected area and people living in the vicinity. The agriculture crop damage was recorded in about 10 meter to 50 meter nearby the boundary.

Stubbs (1999) has found that the feral *Equus asinus* populations in Mojave are having deleterious and potentially irreversible impacts on native flora and fauna and he also documented the damage caused by it in plant communities, soils, wildlife, and water quality.

Heinen and Singh (2001) has studied the population viability of the wild water buffalo in the Koshi Tappu Wildlife reserve in which they described the mortality of wild buffalo is mainly due to flooding in the rainy season and also there is a risk to be pose by the illegal grazing of the domestic animals and has recommended for management.

Beever *et al.*, (2003) in their study of Characterizing Grazing Disturbance in Semiarid Ecosystems ranges of the western Great Basin, USA, using plants, small mammals, ants, and soil across Broad Scales, Using Diverse Indices examined disturbance created by feral horses (*Equus caballus*) in nine mountain compaction as indicators and the analyses suggest that the influence of feral horses on many Great Basin ecosystem attributes is not being detected by monitoring only palatable plant species.

Limbu and Karki (2003) have elucidated that crop depredation and human harassment by wild animals were the major problems to the villagers living nearby the KTWR. They also reported that the illegal activities of people in the reserve were the main problem in

the management and have recommended for minimizing of the conflict that will help in the future planning program to the management policy and research of this field.

Lam (2004) has concluded that the personal experience of costs and benefits from the park was the factor most influencing respondent's attitudes toward the KTWR. The levels of dependency on natural resources directly motivated behavior and determined the extent of impacts on the park. He has recommended for the 'real' people-oriented management approaches to achieve long-term biodiversity of the KTWR.

Koike (2006) has discussed on the optimum strategy for spatial management of feral raccoon in Kanagawa Prefecture, Japan.

Shrestha and Alavalapati (2006) has concluded that the households with poor socioeconomic status has greater dependence on the KTWR for firewood, fodder, and raw materials and are likely to possess a more negative attitude towards conservation. Further they have recommended socioeconomic development of the local people for the sustainable management of protected areas and local support for natural resource conservation.

Poorter *et al.*, (2007) has recorded that 487 protected area sites have been in threat or impact with 326 IAS (invasive alien species) in 106 countries especially in Asia, Africa, South and Central America including (Mexico and the Caribbean) and Europe.

CHAPTER III

MATERIALS AND METHODS

3.1 Description of the study area:

Koshi Tappu Wildlife Reserve, one of the most contested protected areas of Nepal due to its poverty and high population. It is located at the south-eastern part of Nepal and lies at 86°55'-87°05'E longitude and 26°34'-26°45'N latitude with an area of 17500 hectare. It was designated as a Ramsar site in December 17, 1987 and it is the first Ramsar site of Nepal. The elevation of the reserve ranges from 75m to 81 m. It is a small reserve, with an area of only 175 sq.km, while an additional 173 sq.km, including adjoining highly populated villages, has been proposed as a Buffer zone. It extends in three districts viz., Saptari, Sunsari and Udaypur with its 16 VDCs as proposed buffer zones. The climate over here is tropical monsoon.

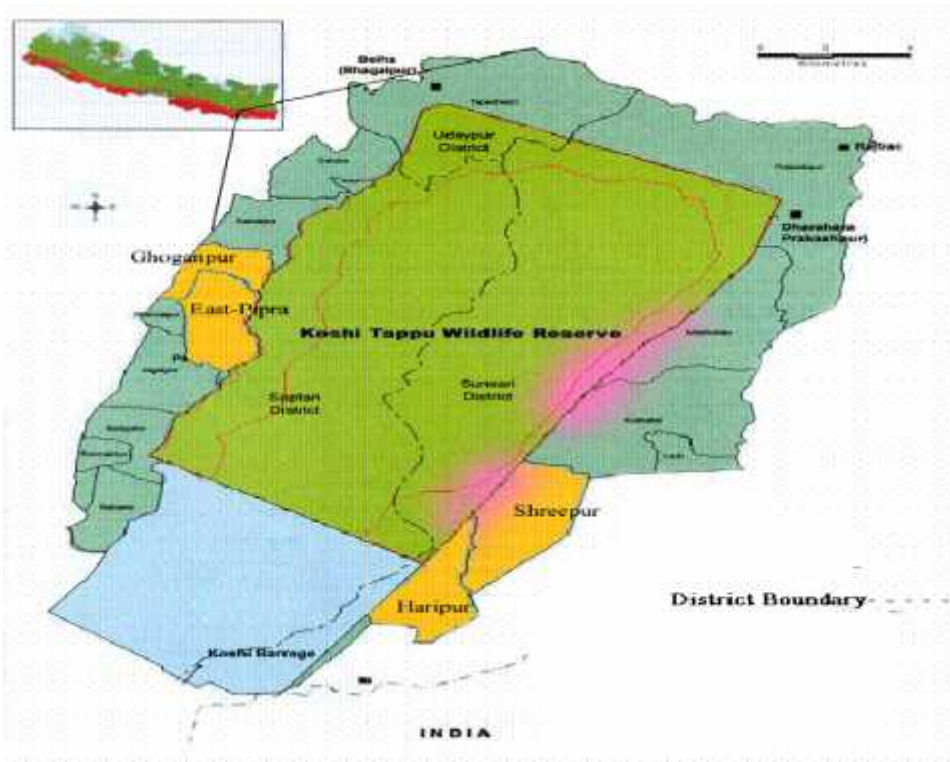


Fig.3.1: Map of the study area

3.1.1 Flora and Fauna

The flora consists of diverse physiognomic types as submerged and floating aquatic plants, tall reed stands, seasonally flooded grassland/savannah and structurally complex forest communities in various conditions of spatial arrangements. Among 514 species of plants, *Dalbergia sissoo*, *Bombyx ceiba*, *Saccharum* sp, *Phragmites* sp., *Typha* sp., *Imperata* sp., *Valisneria* sp., *Eichornia* sp., *Hydrilla* sp., *Azolla* sp., *Lotus* sp. are common species found in the wetlands. Six species of plants found in this area, *Rauwolfia serpentina*, *Alstonia scholaris*, *Oroxylum indicum*, *Acacia catechu*, *Butea monosperma* and *Dalbergia latifolia*, are listed in the different threat categories and appendices of IUCN and CITES respectively. Except *Acacia catechu*, other 5 species are sparse in the area. Lacustrine habitat like oxbow lake such as Kamal Daha harbors 28 species of plants.

Fauna population includes different types of birds and other wild animals. Among 485 species of birds, notable birds recorded in the site include *Gallicrex cinerea*, *Caprimulgus asiaticus*, *Bubo coromandus*, *Coracina melanoptera*, *Saxicola leucura* and *Megalurus palustris*. At least 114 species are water birds, 176 species breed in the reserve and 180 species are passage migrant or winter visitors. It is the only area in Nepal where water cock (*Gallicrex cinerea*) and Abbott's babbler are found. Out of these 485 species of birds, 12 species are globally threatened and 101 species are nationally threatened. People living in nearby villages depend on the buffer zone for energy, fodder, livestock grazing, building materials and other products. Fish farming in the artificial pond and use of wetland vegetation for the construction of local items has become increasingly prominent for income generation. Koshi Tappu Wildlife Reserve is one of the important tourist destinations in Nepal where migratory and resident birds can be seen at the barrage and on the main river channel.

3.1.2 Population and land holding size

The Koshi Tappu region is also characterized with a diverse population of high density. According to DNPWC (2002), there are 340 settlements and 12,296 households with a population of 85,557 in the proposed buffer-zone which includes sixteen Village Development Committees (VDCs) in three districts (Sunsari, Saptari, and Udaypur). The

average population density is about 620 persons/ sq.km, which is extremely high compared to the national average (157persons/sq.km) (UNDP-GEF, 2002). Furthermore, about 39% of households are either landless or own less than 0.05ha (DNPWC, 2002). The livelihoods of most of the economically active population in the buffer zone are derived from agriculture and natural resource use.

3.1.3 Villages Profile in which study was carried out

East-Pipra

East-Pipra VDC lies in the western part of the Koshi River. It touches Jagatpur and Ghoghanpur VDCs on the west .This VDC is elongated along the embankment of the Koshi River and has its shape nearly rectangular. The VDC has 622 households with a total population of 3452 with 1720 males and 1732 females (CBS, 2001). It has a diversity of Terai ethnics, castes along with migrants from hilly regions in the recent years. The ward is mainly inhabited by Dhanuk, Baatar, Tharu, Mushhar, Koiri, Mahato (Nuniya), Kumhar(Pandit), Yadav(Ahir), Sah(Teli), Chammar(Ram), Gupta (Rauniyar) and Mallah, Newar etc.

Jagatpur

Jagatpur VDC lies in west to the East-Pipra VDC and the reserve. In the north lies the Ghoghanpur and in the south lies the Badgama VDC which is in the buffer zone. The total household in the VDC is 756 with a population of 4646 in which 2395 are males and 2251 are females (CBS, 2001). Tharu, Yadav, Baatar, Paswaan, Mallah, Mushars, Teli, Rauniyar and other castes reside in this village.

Ghoghanpur

Ghoghanpur VDC west of East-Pipra VDC and the reserve. The Jagatpur VDC lies south of it and Kamalpur VDC lie north of it. Few wards of this VDC lie in the buffer zone. This VDC comprises the population of Tharu, Muslim, Yadav, Brahmin, Chhetri, Mushars, Baatar and others. Total households in the village is 923 with a total population of 4879 comprising males 2388 and 2491 females (CBS, 2001).

Kamalpur

Kamalpur VDC touches Odraha VDC in the north, Ghoghanpur in the south-west and in the east of it lies the reserve. This VDC has the diversity of Tharu, Yadav, Raj Dhobi, Baatar, Mushars and other population. The total household in the village is 824 with a total population 4820 of which 2476 are males and 2344 are females (CBS, 2001).

3.2 Methodology

The general methodology employed during the present study is described as follows:

3.2.1 The Universe and Sample

The study has been conducted in the four VDCs viz., Jagatpur, Kamalpur, East-Pipra and Ghoghanpur from 20th September to 23rd October 2009, for a month. Altogether 109 households were interviewed of which 41 households were from East-Pipra, 31 were from Jagatpur, 24 from Kamalpur and 13 from Ghoghanpur.

3.2.2 Research Design

The study has been designed in an exploratory and descriptive framework to analyze the status of the feral cattle in the protected areas, particularly in the Koshi Tappu Wildlife Reserve and the effective methods for their evacuation. Descriptive research design was concerned basically with the feral cattle and the related studies. The explorative research design has been used to explore the status of the feral cattle in the Koshi Tappu Wildlife Reserve and the effective methods for their evacuation.

3.2.3 Nature and Sources of Data

Both primary and secondary information sources were used for the fulfillment of the objectives of the study. To generate primary data the study was based on field survey whereas secondary sources of information has been collected from Central Bureau of Statistics (CBS), TU Central Library, Department of National Park and Wildlife Conservation (DNPWC), Conservation and sustainable use of Wetland (CSUWN), various journals and internet etc.

3.2.4 Techniques and Methods of Data Collection

For the convenient of this study, the following data collection tools and techniques were used.

3.2.5 Sample Size

3.2.5.1 Interview

Interview schedule has been designed for the collection of data. RRA technique was employed. Structured, unstructured and open ended questions were prepared to seek the information on various aspects. Interview schedule was adopted and questionnaires were filled up visiting households in the particular study area.

3.2.5.2 Questionnaire

The structured questionnaire has been prepared for the information collection in the study area. Both the open ended and closed questions were included. The local people of the particular area having cattle were requested to fill up the questionnaire.

3.2.5.3 Interview with Key Informants

The key informants were interviewed for their information required to study. They were the representative of VDCs, president of the Buffer Zone Management Committee.

3.2.5.3 Observation

Observation method was also used to obtain the accurate information. A visit was done inside the reserve to know the presence of the feral cattle inside the reserve.

3.2.6 Data Analysis and Interpretation

Data were collected from the various sources using various data collection techniques and tools. Thus collected data was analyzed. Simple statistical tools such as table, pie-chart were used to analyze quantitative data whereas qualitative data was analyzed in a descriptive way.

CHAPTER IV

RESULTS AND FINDINGS

The four buffer zone VDCs: East-Pipra, Jagatpur, Ghoghanpur, Kamalpur lies close to the reserve. These VDCs lies in the western part of the reserve in Saptari and extends along the embankment of the KTWR. The people living in these VDCs rear cattle and most of them go to the reserve to graze their cattle or they pay certain kilos of paddy for herding their cattle. In these four buffer zone VDCs, 109 households were interviewed and the respondents were either the head of the family or the grazer of the cattle inside the reserve. In East-Pipra VDC, 41 households were interviewed, 31 in Jagatpur, 24 in Kamalpur and 13 in Ghoghanpur. Among the households surveyed all were found to be dependent on the reserve to graze their cattle all or part of the year. They were also found to be dependent on the reserve for bringing one or the several types of resources like thatch grass for roofing, different type of grass for broom, mat, fish, edible ferns and other several types of resources.

4.1 Feral Cattle

Feral cattle have become a major problem in the reserve area these days. The number of the domesticated cattle and feral cattle are increasing due to free grazing land of the reserve from the past few years.

4.1.1 Ethnic composition and status of Cattle in East-Pipra

Out of the total 41 households interviewed in the East-Pipra ethnic groups like Mukhiya (Mallah), Sardar(Batar), Shrestha(Newar), Rai, Tharu, Yadav, Muslim, Dhanuk(Mandal), Khatway(Khang) were found living there. The total number of cattle was 236 among the households. The total number of lost cattle was 32 of the 14 households in the past years while the lost buffalo was 4 of the 3 households. The number of feral cattle was 5 (here the feral represents the cattle that are left in the reserve for grazing and are not brought to home after grazing). All were found to be using the reserve land for grazing their cattle. Most of them were going to the reserve for grazing their cattle and used to return back

home after grazing every day. Only one household was having feral cattle and was five in number. The household having feral cattle was that which used to leave the domesticated cattle in the reserve and were not bringing the non-interested cattle back to home after regular grazing. The feral grazers also mentioned that they generally leave the cattle in the reserve from Falgun (February) up to Jestha (May) for five months and then bring back home at the end of Jestha (May). Some of the households were rearing cattle by paying 30kg paddy/cattle per year to the grazer.

4.1.2 Ethnic Composition and Status of Cattle in Jagatpur

The total number of households interviewed were 31 and the ethnic composition was Paswan, Tharu, Dhanuk, Batar, Singh(Rajput), Yadav, Baddi, Sah (Teli). The total number of cattle among the households was 172. The total number of the lost was 16 of which 15 were cattle and 1 was buffalo. Only one household was found to be rearing the cattle (10 in number) in the reserve for nearly 10.5 months and cattle was brought back to home for 2.5 months in winter for dung cake. He was also rearing other cattle of the villagers and was charging Rs. 60 per cattle per month or 60 kg paddy per cattle for a year. Another person was also found to be rearing 90 cattle of the villagers for Rs. 60 per cattle per month.

4.1.3 Ethnic composition and status of Cattle in Kamalpur:

The total number of households interviewed was 24 and the households were Tharu, Mahato, Yadav, Khatway, Baatar, Dhanuk, Sah Teli, Mehta. The total number of domesticated along with feral cattle population was found to be 223. The lost population in the past was 22 and the feral cattle were found to be 60 in number. The maximum number of cattle in a single home was found to be 60. The feral cattle was in three households and they were bringing back home only few cattle from the reserve after regular grazing due to lack of shed for all the cattle in home.

4.1.4 Ethnic composition and status of Cattle in Ghoghanpur:

The total number of households interviewed was 13 and the households were of Tharu, Muslim, Khatway, Sah(Teli). The number of cattle reared was 50 and the lost cattle were

4 in the past.

Table 1. Number of households interviewed in four VDCs with the number of domesticated cattle, lost cattle in the past, lost buffaloes, and the feral cattle

S.No.	VDCs	Number of households interviewed	Domesticated Cattle	Lost Cattle	Lost buffalo	Feral
1.	Jagatpur	31	172	15	1	0
2.	Kamalpur	24	223	22	0	60
3.	Ghoghanpur	13	50	4	0	0
4.	East- Pipra	41	236	32	4	5
Total		109	681	73	5	65

In the studied four VDCs in 109 households the total domesticated cattle was 681(82.64%), lost cattle in the past 73 (8.85%), lost buffalo 5 (0.6%), and the feral 65 (7.8%) (Figure: 4.1).

Fig: 4.1 Percentage of the domesticated cattle, lost cattle, lost buffalo and feral cattle in the study area.

4.1.5 Methods to rear feral cattle and the cattle of the villages

Some of the facts sighted by the feral herd rearer:

- a. Tagging of ear of feral herd with ear ring, piercing and making hole in the ear, symbolic representation of owner's name beginning with letters A,B,C etc., and with Nepalese native alphabet like K, Kha, sign of Trishul and of other types of tattoo, which used to help the local people to identify their cattle.
- b. Unity among the feral herd rearing group .An example that clarifies it was the story of Baluwa (Ghoghanpur VDC) where a villager reared a feral cattle which he had bought from other villager. He reared for 6 months, thereafter the owner came and claimed that the cattle was his property. As there was tagging in the name of the owner the villager couldn't claim for the cattle. An another example was that once Aghania of Jagatpur had sold a cattle for some amount, but the other feral rearing group halted the sold cattle for 4 days on the way charging of being theft as there was marking of letter of his first name. Aghania had to make a call to the herd group to assure that he had sold the cattle and was not being theft.
- c. Cattle were brought to home in winter for 2.5 months for dung cake and most of the cattle used to stay in the reserve for the rest of the months of the year.
- d. In a difference of 4-5 days salt was provided to the cattle in the reserve. Some feral rearing people who were having a large herd were seen to provide salt for twice in a year i.e., in Ashard (June) and Kartik (September).
- e. Domesticated cattle of villages were seen to be reared by some of the villager by charging 30/40/60 kg paddy per cattle.
- f. Not all the cattle were seen to be brought back to home after regular grazing. Those that were taking the trail of home were brought back to home and also feral rearer were unwilling to bring back all the cattle as they were having only limited space of shed for the cattle in their home. Domesticated cattle which were not partial feral were brought back to home after regular grazing.
- g. Most of the cattle were from India (90%) and only 10% of the cattle were from Nepal according to the local people.

- h. Most of the Indian cattle were from the border belt like Raghapur, Raniganj, Karjain, Lahi, Birpur areas, Chhatapur, Araria and they had their relatives in Nepal who were helping them for rearing.
- i. Nepalese feral cattle were generally from the areas of Haripur, Shripur, Bakro, Gobargadha, Narsingh, Dhanpuri, Barmajhiya, Badgama, Mainakaderi, Portaha, Tengri.
- j. Around 50 thousand of the cattle were reported from Badgama, Dhanpuri, Mainakadayri, Kamalpur, Portaha, Tengri. The number of the feral cattle in the reserve varied with people; 5 to 6 thousand in number, 30 thousand in number, 4-5 herd with 5 thousand in a single herd, more than 10 thousand on the both side of the Mariya Dhar(a tributary of Koshi River). Mostly the people of the downstream (Duban) area were having 200-300 cattle each. In a herd of 200-300 cattle one person was found to be the rearer of the herd.
- k. They had their shed in the downstream area (Duban) nearby Badgama and the herds of cattle were found to graze from Duban area (Saptari) to upstream Garaiya (Udaypur).In the flooding season they used to graze their cattle in the upstream.
- l. Feral rearing group were found to be staying in the reserve at night by lighting fire and milking one or two cow as they spend their night there.
- m. Feral herd rearer used to stay there in the reserve in the absence of the reserve staffs but as they used to feel the presence of the security personnel they used to leave the reserve without evacuating the cattle. They used to make shelter of tent as they used to stay there.

4.1.6 Methods to evacuate the feral cattle

Lots of efforts were made in the past to evacuate the feral cattle despite that the population of the feral cattle has been increased in the recent years. Warden and Army Major used to give free offer to the villagers of the buffer zone to catch and rear the feral cattle which were in the reserve but only domesticated which were grazing in the reserve were caught as feral used to run away and people had even paid rupees 1000 to release their cattle.

Different persons had different views in order to evacuate the feral cattle. Most of them sighted that the reserve should be free to graze the cattle and they were mostly the people who were having high number of cattle. The few people who were against the reserve grazing were having lesser number of cattle and had the concept of conservation. In the vicinity of the reserve, most of the people were found to be landless and their livelihood was more or less dependent from rearing cattle. Most of the people sighted that the reserve should be without feral cattle but in return they should be provided with fodder ground in order to graze their cattle. According to them, if the feral cattle will be evacuated there will be plenty of thatch grass for them, but what I found in Kamalpur VDC where few people were having feral cattle in large number (up to 25 in a single home) were against the re-establishment of the reserve office. According to them reserve personnel were nuisance to them in the past, as they used to persecute them. The people of Kamalpur VDC were intensively dependent in the reserve for grazing their cattle for their livelihood.

Few people who sighted methods to evacuate the feral cattle

- a. They sighted that the army personnel who are giving security for the reserve should be involved for the evacuation. Administration should not be loyal to the people and shouldn't allow people to graze their cattle in the reserve. They sighted that the reserve personnel are corrupted as they provide grazing ground to the people who provide milk and money. When the reserve staffs give deadline then the local people keep aside cattle for few days, then they request the officials for grazing and enter their cattle.
- b. Reserve should be made free to catch and rear the feral cattle. If such an announcement will be done by the government then the people who are having feral cattle will evacuate their cattle in a fear of losing their cattle.
- c. Rearing of cattle in the reserve from the Indian villages should be strictly prohibited.
- d. Grazing land should be provided to the local people to graze their cattle. Local people had hope of income from the cattle rearing.
- e. Delimiting the boundary line of the reserve and fencing should be done in order to control the population of the feral cattle.

- f. Improvement of the behavior of the reserve staffs towards the local people.
- g. Formation of users group and finding out who are having cattle and they should be informed for removing the cattle. Effort can also be made by forming 10 people in a group and catching the feral cattle inside the reserve.
- h. Local people can evacuate the feral cattle with the help of reserve staffs. They sighted that the local cannot evacuate without the help of reserve staffs as they are in thousands.

4.1.7 Positive impact of the feral cattle in the KTWR and the surrounding villages in the buffer zone

There were no positive impacts of the feral cattle in the reserve rather there were lots of demerits from the feral cattle to the reserve. Feral cattle were responsible for the decrease in the biodiversity in the reserve, i.e., by grazing the young fodder which mainly included the thatch grass. Only those people were benefited from the feral cattle to whom the feral cattle belonged.

People living nearby the reserve were found to be benefitting a lot from the reserve after the reserve had been made open for free grazing in the absence of security personnel. People rear their feral cattle and as the cattle grow up they make the young cattle get trapped within a bamboo fence trap made inside the reserve. They tie up with ropes to the cattle for some days without fodder. As they get sapped with energy they find the buyer. The cost for a pair of robust oxen was found to be 60 thousand rupees. Affluent people sighted that the poor were benefitted a lot from the cattle these days due to free grazing inside the reserve. Only lesser Nepalese were found to be benefitted as compared to the Indians from the feral cattle, as most of the feral were reported from India. Most of the people sighted that the free grazing land in the reserve had elevated their income from the past few years as they could raise their cattle well.

4.1.8 Benefits from the domesticated cattle to the villagers

Lots of benefits were obtained by the local by rearing cattle. As the reserve became free grazing land in the absence of reserve staffs, most of the households increased the number of cattle. In the past years they had only few cattle but in the recent years the

number of cattle had been drastically increased which had contributed a lot for the elevation of their income.

It was found to be easier for the people to rear the cattle. People were found to pay 30-60 kg of paddy per cattle for grazing their cattle in the reserve. A person named Shreelal was found to graze 90 cattle of Jagatpur VDC (Kabilasha-a single ward) at the rate of Rs. 60 per cattle per month. Poor people were found to be more benefitted as compared to the affluent people as in the absence of enough land the only source of their income had become cattle rearing. Some people were also found to be selling cattle up to 30-40 pairs in a year. They were generating income by selling milk in the local market and to the villagers.

4.1.9 Negative impact of the feral cattle in the KTWR and the surrounding villages in the buffer zone

Severe biodiversity loss was found with the increase in the number of the feral cattle. Local people only sighted what the loss they were having due to the increase in the number of the feral cattle.

Local people sighted that with the increase in the number of the feral cattle, the reserve fodder ground had decreased for the domesticated cattle. Feral cattle had grazed the fodder ground intensively, so the local people had to go far distance inside the reserve to graze their cattle. It was a problem for the local villagers when their cattle get mixed in the feral herd as the cattle didn't want to get separated from the herd and find a path of their home after regular grazing. In a group of feral herd they used to behave like feral and run away while they were made to separate from the herd. In order to remove the cattle from the feral herd people were found to be paying rupees 500 or more. Feral cattle used to graze all the thatch grass in the young stage and it had created scarcity of thatch grass for the local people. Most of the people who were dependent on thatch for the livelihood were highly affected. Also the local people were having problem of thatch for roofing. People of other areas were found to be benefitted a lot as most of the feral cattle were not of the local villagers rather it were from the other areas. As the feral cattle had grazed the fodder ground, the plants like edible fern were found less in which the local people were found to be dependent for their livelihood. With the increase in feral

population the local people cattle were occasionally found to be theft as the cattle used to go to the reserve for grazing. With the increase in number in the feral cattle and the visit of the domesticated cattle inside the reserve for grazing the crop depredation of the local villagers had increased. The missing cattle were found to depredate the crops on the way as they used to get back to their home after regular grazing.

4.1.10 Condition of the Wild Animals population

Severe loss of wild animals was reported after the vacuum of the reserve staffs. Even it was sighted that the local club of East- Pipra generated a lot of income by hunting wild animals, especially wild boar and selling in the local community and the nearby market. It indicates that there was a severe loss of the wild animals since the last few years. The local sighted that the wild boars which used to come to depredate crops in the past in the field were not noticed since the last few years. Hunting of deer was also done using the dogs and trap net.

4.1.11 Benefits from the KTWR to the local People

- a. Beneficial for fodder for cattle, buffaloes.
- b. Beneficial for fuel wood, dung cake, low grade construction materials like thatch for roofing.
- c. Beneficial for income generation by selling thatch grass, broom, mat, edible fern, fish.
- d. Occasional consumption of fish from the wetland of the Koshi reserve.
- e. Income generation from fish for the wetland dependent ethnic groups.
- f. Development activities like pond (which the local people were using for income generation) had started as sighted by the member of buffer zone users group in Ghoghanpur from the revenue generated from the tax of sand, gravel that were sold from Gangajali river, Paada river within the area of buffer zone and thatch of the reserve.

4.1.12 Biodiversity condition

Severe loss of biodiversity was seen in the reserve due to the increase in the feral herd since the past few years. The feral population had almost consumed the fodder ground. Firing the thatch grass was seen inside the reserve and it was done by the feral herd rearer in a hope of growth of new vegetation. The habitats of wild animals were found to be destroyed. Due to the frequent visit of people and hunting of wild animals there was the loss in the number of wild boar and deer. These animals were in more number in the past and were often seen running inside the reserve. According to the villagers in the past it was very difficult to come out of the house in the night due to fear of the wild boar and wild buffaloes but not so at present. They were fear of wild buffaloes around January and February as these animals used to come to depredate wheat. Wild boar had not been reported from the past 2-3 years that used to come often to depredate paddy of the local people. People elucidated that the wild buffaloes were lesser in number rather the buffaloes that come to raid their crops were the buffaloes of the villagers who often leave them to raid other crops.

Cutting down of trees from the breast height were reported in the Kamalpur belt and later on using the rest part of the tree for wood. Even people were having problem of Saruwa (*Jatropha* sp.) which people were using for firewood from the reserve. Due to intense cutting down of trees the local people had difficult to find shade of trees during the scorching sun rays as they go inside the reserve for grazing.

Fish poisoning was reported in the recent years in the wetlands of the reserve and it had caused severe loss of the aquatic animals. Due to use of poison for fishing the livelihood of the local wetland dependent ethnic groups like Mallah and Mushars was severely affected.

CHAPTER V

DISCUSSION

5.1 General Overview

Koshi Tappu Wild life Reserve is located in the eastern part of Nepal and comprising three districts with its buffer zones viz., Udaypur, Saptari and Sunsari.

The reserve is surrounded by villages where people are mainly having less than 0.05 hectare of land (DNPWC, 2002) are poor and dependent in the reserve extensively for thatch and for fodder for their cattle.

No work has been done regarding the feral cattle in the reserve. This may be a new work for documenting the feral cattle inside the reserve.

All information and finding here are primarily based on field observation, interview and group discussion with the local people, reserve staffs, and the buffer zone user's group people living in the study area. The study mainly focused on the feral cattle in the reserve. There were two categories of people who were using the reserve for grazing their cattle. One were using reserve for grazing cattle everyday and returning back cattle in the evening. Other type of people was using the reserve for rearing their cattle with partial feral number and partial with cattle domesticated form. The reason behind for using the use of reserve as partial feral cattle was due to lack of enough shed area for all the cattle. They have increased the number of the cattle in the recent years due to free grazing ground they have got after the political instability of the country. Two types of the people were found to be rearing cattle as feral.

In the recent years the number of feral cattle has been increased and it might be due to vacuum of reserve staffs which was created during the time of Maoist insurgency period. Recently there has been presence of reserve staffs but it has become a difficult task for them to make the reserve free of feral cattle and the domesticated cattle.

5.2 Methods to rear feral cattle and the cattle of the villages:

Various methods and techniques were found to be used by the local people to rear the feral cattle and generate income from them. Some of the methods were marking of the

cattle with the initial alphabet of the owner, making holes in ear and using rings of different types and the unity among the feral rearer group. Making of shed in the reserve downstream (Duban area) for the feral cattle and using the shed when necessity was one of the practices for some of the feral rearer groups. Staying in the reserve at night and milking one or two of the cattle among a large feral herd group was also found. The various methods adopted by the feral rearing group such as marking the cattle were done in order to avoid the risk of loss of the cattle. As there is a large population of the feral cattle inside the reserve and it is a difficult task for the people to identify their cattle when there is any loss inside the reserve. People of the villages were also found to go to the reserve to graze their domesticated cattle and return them back after regular grazing. Some of the people of the villages had started rearing the cattle by paying money or giving some kilograms of paddy per cattle. As people are having free grazing land inside the reserve due to the absence of the reserve staffs since the Maosist insurgency period, it has encouraged the local people to rear cattle with less effort and with enough fodder for their cattle. Even the people who were having less number of family members and had difficult to look after the cattle had increased the number of cattle in their home. This is mainly due to easiness to rear the cattle due to free grazing ground.

5.3 Impact of the feral cattle in the KTWR and the surrounding villages in the buffer zone:

The reserve is not having any benefits from the feral cattle. Feral cattle were responsible for grazing the fodder and had disturbed the biodiversity of the reserve. It has resulted loss of biodiversity of the reserve. The feral cattle are in huge number, so there is great chance of the loss of the fodder ground for the wild animals inside the reserve like that of wild buffaloes, deer, wild boar which are generally seen inside the reserve. These wild animals in the absence of the fodder visit the surrounding buffer zones field to depredate the crops and they often get killed by the local people.

The local people have benefitted a lot from the feral cattle. They are using the reserve to graze their cattle in their great supervision. With the presence of free grazing for the cattle they have increased the number of the feral cattle. Feral cattle have generated a lot of income for the local people. Local people are generally poor and are dependent a lot

on the cattle for their livelihood and with free grazing in the reserve they have increased their number of the feral cattle.

5.4 Benefits from the domesticated cattle to the villagers:

Lots of people of the surrounding villages of the buffer zones and also the villages nearby the reserve were found benefitted a lot by rearing the cattle. In the past the number of cattle in the villages was less in number but the number of the cattle has increased in the recent years. The reason behind the increase in the number of cattle in the reserve could be due to free grazing land since the past few years. Low income of the local people and high density has encouraged them to rear more cattle to increase their income. To increase the quality of life they are rearing more number of the cattle.

5.5 Condition of the wild animals Population:

There was several loss of the wild animals in the reserve after the vacuum of the reserve staffs. The reason behind the loss of the wild animals in the reserve could be the lack of awareness among the people about the importance of the bio-diversity. Poor livelihood and illiteracy could be the reasons of the exploitation of the resources of the reserve.

5.6 Benefits from the KTWR to the local people:

Lots of benefits were generated by the local people from the reserve as reserve were supplying fuel, fodder, thatch grass, fish and other necessary resources. The main reason for the high dependency of the local people in the reserve is due to poor economic condition, and rearing more cattle for the livelihood.

5.7 Bio-diversity condition: Since the reserve has been invaded by the feral and the domesticated cattle and the buffaloes, there have been several losses of the bio-diversity. Overgrazing of the reserve was responsible for the reserve endangered buffaloes to come to depredate the crops of the local people nearby the reserve and was often killed by the local people. Killing of the wild boar, deer, and other animals of the reserve, fish poisoning, hunting birds, clearing of the trees and unwise harvesting of the thatch and other plants resources had lead to the severe loss of the bio-diversity. The major causes

behind the exploitation of these plants and animals resources were due to illiteracy, lack of awareness among the local people, low economic condition of the people.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

From the study of the cattle in the KTWR it was found that there were two types of cattle inside the reserve. One were domesticated which used to go regularly inside the reserve for grazing and were returned back regularly. Other herd of cattle were found to be partial feral and they were found to be reared inside the reserve with continuous observance. These were the cattle that used to behave as wild which used to spend most of the time inside the reserve. The cattle were mostly of the Indian borders villages and they had their relatives in the neighboring villages of the buffer zone. Cattle were also from the buffer zone villages and also from the villages which were near to the KTWR. The cattle were marked with the different signs using the native alphabet like K, Kha, and other letters like A,B,C and other different signs. The purpose of using different signs was to protect the cattle being lost and to identify them easily. In the four VDCs East-Pipra, Jagatpur, Ghoghanpur and Kamalpur 109 households were interviewed and in which the total cattle number was 681 i.e., more than 6 cattle per household. The total domesticated percentage of the cattle was 82.64% domesticated, 8.85% lost cattle, 0.6% lost buffalo and 7.88% of the cattle were feral. The maximum number of cattle in a single home was 60 in Kamalpur which is maximum for a single household. A huge herd used to graze from the downstream to the upstream of the KTWR and this has resulted severe loss of the bio-diversity of the reserve throughout the reserve. Several efforts were done since the past many years to evacuate and control the entry of the grazing animals but it has been fruitless effort. The number of the cattle increased drastically after the shifting of the reserve security army during the Maoist insurgency and from that period the surrounding villages around the reserve started using the reserve as the grazing ground for their cattle and the source of fuel wood and other different wetland resources in great extent throughout the year.

This encroaching of the human beings for the various purposes has degraded the resources of the reserve and it has depleted the biodiversity of the reserve. The free entry

of the people inside the reserve has encouraged the poaching of wild animals like wild boar, deer and birds, fish poisoning and felling of trees and over extraction of the resources. It has created threat to the endangered wild buffaloes whose population is gradually declining. It has raised a great question of sustainability and the wise use of the resources. Over grazing of the resources like thatch has affected the people livelihood as some of the local people were living their livelihood by selling them. Uncontrolled harvesting of the thatch has led people to harvest thatch immature and it has not been good raw material for roofing for its short life for roofing.

6.2 Recommendations

The problem of the grazing of the cattle of the local people has created conflict with the park and the people since the establishment of the reserve. Local people surrounding the buffer zones are poor and are mainly dependent for their livelihood by rearing cattle. In the recent years the number of the cattle has been increased in the surrounding villages due to the absence of the reserve staffs with the political instability and the availability of the grazing ground for the cattle.

The main reason behind the increase of the feral cattle is due to lack of any restriction to the cattle and the people inside the reserve, poverty and lack of awareness.

Following measures should be taken in order to evacuate the feral cattle and enhance the biodiversity.

- KTWR buffer areas users should be taught about the economic value of the biodiversity and the importance of sustainability so there won't be over-exploitation of resources and invasion of cattle or other domesticated animals inside the reserve.
- Alternative means of livelihood should be provided to the people of the village who are living in subsistence level of livelihood and are highly dependent on the reserve for fodder and grazing their animals.
- Forage ground should be provided to the grazing animals of the village to minimize the cattle going in the reserve for grazing.
- Improved milking cattle should be provided to the local people which will

- decrease the pressure for the fodder for the cattle.
- Feral cattle and buffaloes should be evacuated from the reserve which will promote the biodiversity.
 - Several rural development measures like uplifting the livelihood of the people through agriculture training, providing improved seeds, and other income generating skills and finding the market of the local products will discourage the unwise and illegal use of the resources from the reserve.

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APPENDIX I

Sample Questionnaire

- 1) Name of the informant:.....
- 2) Age:.....
- 3) Sex: a. Male b. Female
- 4) How many cattle do you have?.....
- 5) i) Do you graze your cattle in the reserve? a) Yes b) No
ii) If yes then how far do you take inside the reserve?.....
iii) Do you bring your cattle back to home regularly after grazing? a) Yes b) No
iv) If no then for how many days do you leave them in the reserve?.....
- 6) Have you left your cattle completely in the reserve for grazing? a) Yes b) No
i) If yes then how many are they?.....
ii)How do you get benefit from them?
- 7) Have you lost any cattle in the reserve since you start grazing? a) Yes b) No
i)If yes then how many cattle have you lost in the reserve?
(types of the cattle.....)
- 8) i)Have you brought any cattle from the reserve for domestication or selling?
a) Yes b) No
ii)If yes then how many have you brought?
Did u see any behavioral change ? If yes mention about the change?
.....
- 9) Have you seen feral cattle in the reserve when you go for the grazing? a) Yes b) No
i) If yes then how often have you seen them in the reserve?.....
ii) How many feral cattle could be there in the reserve?.....
- 10) What could be done to prevent the increase in number of the feral cattle?.....
- 11) Do you have any ideas to evacuate the feral cattle?.....
- 12) Is it good for the reserve to have the feral cattle? a) Yes b) No
- 13) Do feral cattle come to depredate the crops of the villagers?) Yes b) No
- 14) Do feral buffalo come to depredate the crops? Yes b) No

15) In which season do the feral animals come to damage the crops?.....

16) What is your opinion towards KTWR?

17) What are the merits and demerits from the reserve?

.....

17)Do you think there is any change in biodiversity of the Reserve? a) Yes b) No

i) If yes then what are the changes that you observed after KTWR project?

ii) Any change in the number of wild animal population? a) Yes b) No

iii) If yes then what are the animals that have changed in population?

a).....b).....c).....d).....

18) Have you any benefit from the feral cattle? a) Yes b) No

19) If yes then what are the benefits?.....

20) If no then what are the disadvantages?.....