Government of Nepal
Ministry of Forests and Environment
Department of National Parks and Wildlife Conservation
Office of Bardiya National Park
Thakurdwara, Bardiya, Nepal

Preparation of Government Domesticated Elephant (*Elephas maximus*) Management Plan of Bardiya National Park
(2024-2029)

Shivakali and her three live calves

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Cover photo

Shivakali and Her Live Calves

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Acronyms/Abbreviations

BNP	Bardiya National Park
BZ	Buffer Zone
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNP	Chitwan National Park
DM	Dry matter
DNPWC	Department of National Parks and Wildlife Conservation
DoF	Department of Forests
EBTC	Elephant Breeding and Training Centre
GoN	Government of Nepal
HECx	Human Elephant Conflicts
MoFE	Ministry of Forests and Environment
NPWCA	National Parks and Wildlife Conservation Act
NTNC	National Trust for Nature Conservation
SCO	Senior Conservation Officer
TAL	Terai Arc Landscape
WEPA	Working Elephant Program of Asia
WWF	World Wildlife Fund
ZSL	Zoological Society of London, Nepal Program

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Executive Summary

The *Hattisar* is located in Shivapur, Thakurdwara Municipality 9, which is about 3 km south of the park headquarters. Bardia Hattisar, Shivpur was established in the year 2028. Late King Mahendra established the Royal Shikar Reserve in 2026 covering the area between Karnali and Babai rivers in Bardia district. The Royal Karnali Forest Guard was deployed to protect the Royal Shikar Reserve. Besides this, Banke Gulari Hattisar in Banke district was transferred in 2028 and established as Bardia Hattisar Shivpur.

The initiation of BNP to prepare domesticated Asiatic elephant (*Elephas maximus*) Management Plan for Bardiya National Park with the objectives of improving elephant management and utilization issues is first of its kind. The implementation of this plan is expected to help for ex-situ conservation of the species itself as well as to increase the performance of work required for park protection, wildlife rescue, and research and tourism promotion. This plan well serves as an important guiding document in realizing the park objectives.

The key essentials of an ideal *Hattisar* have been identified and recorded in the plan. Shivapur *Hattisar* has been identified as the main *Hattisar* housing 10 elephants managing other satellite *Hattisars* for the management of elephant ration, sheds, tools, water & electricity supplies in coordination with BNP Head Office. Thakurdwara. Park HQ, Dalla, Gaida Machan, Laguna Machan, Parewaodar, Rambhapur, Guthi, Chepang & East Chisapani *Hattisars* are satellite *Hattisar* proposed for housing 5, 2, 2, 2, 4, 2 ,4 ,3 & 2 elephants respectively. It is proposed that BNP *Hattisar* requires a total of 34 domesticated elephants to meet the increased work load and coverage of the BNP.

The Elephant Management Plan has envisaged 10 objectives and set out a number of activities to meet the objectives. The management plan has been prescribed for a duration of five years with a total budget requirement of NPR **160.09** million.

The management plan has been divided into five chapters; the first chapter deals with the background information, the second chapter deals with the literature review, the third chapter highlights the assessment of available infrastructures and proposes new satellite *Hattisars* and the fifth chapter narrates the mission, vision, goal, and objectives with activities and budget plan for the next five years.

The cost for the implementation of the plan is calculated as NPR **5.1500, 2.9750, 3.0500, 2.4450 and 2.4700 Crores** from year 1 to Year 5 respectively. The regular budgetary requirement for the supply of elephant ration, staff salaries and other benefits are not included in the plan. Also not included in the plan is the ways to acquire 21 domesticated elephants required to fulfil the proposed elephant positions in BNP *Hattisar*.

Chapter 1. Introduction

1.1 Background

It has been estimated that the number of captive African elephants is less than 1000, with the majority being harboured in the Western Zoos. They constitute just a tiny fraction of Loxodonta species, estimated at fewer than 500,000; thus, the sustainable management of the captive stock is not of immediate concern. The IUCN/SSC African Elephant Specialist Group has also indicated that this is not a priority issue for the conservation of the species. On the other hand, about one-third population (approximately 14,000-15,000) of the existing Asian elephants (*Elephas maximus*) are held in captivity, mostly in the range state, but also in significant numbers in zoos, circuses, safari parks and other facilities around the world (Sukumar, 2003). Between 1868 and 1980 the available figures of captures in the Indian Sub-continents add up to 19,000 elephants assuming that an annual average of 400 elephants were captured in Assam for ten years during the late nineteenth century. It is estimated that between 30,000 and 50,000 elephants either have been captured or killed in control measures during this period.

The accurate numbers of captive Asian elephants in the range states are still ambiguous. According to most recent estimates their total population numbers are about 14,000 animals. The largest population is found in Myanmar (40% of the total population from the range states), followed by India (26%) and Thailand (19%). At least 1,047 Asian elephants are kept worldwide in zoos and circuses. Therefore, the total captive population includes at least 15,000 elephants. But the captive population is dwindling rapidly as a result of many' factors such as low reproduction and high (juvenile) mortality, restriction of capturing operations, or lack of employment opportunities as logging was banned in many South Asian countries. Nevertheless, there are exceptions. In India, Myanmar and Nepal, the populations of captive elephants appear to be stable (Fred and U Mar, 2003).

From historical records, it is evident that 31 government *Hattisar* existed in Nepal which stretched from Jhapa to Kanchanpur districts in the Terai. Historical evidences also shows that Nepal *Hattisars* also had capabilities, tools and techniques to capture and train wild elephants; the practice of capturing wild elephants had been abandoned after 1969 considering a decline in the wild population (JBK, 1985; Gopali, 2003).

Elephants are enlisted in the appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This is primarily because they are at risk from habitat loss, poaching for ivory, and other threats. The National Parks and Wildlife Conservation Act 1973 has also enlisted the domesticated elephant in the “Protected species.” list and designated it as an “Endangered” species of Nepal.

About one-third population (approximately 14,000-15,000) of the existing Asian elephants (*Elephas maximus*) are held in captivity, mostly in the range state, but also in significant numbers in zoos, circuses, safari parks and other facilities around the world (Sukumar, 2003). Between 1868 and 1980 the available figures of captures in the Indian Sub-continents add up to 19,000 elephants assuming that an annual average of 400 elephants were captured in Assam for ten years during the late nineteenth century. It is estimated that between 30,000 and 50,000 elephants either have been captured or killed in control measures during this period.

Domesticated elephants can potentially contribute to conservation efforts i.e. breeding programs aimed at increasing the population of endangered or threatened elephant species; conducting scientific research and educational purposes; conservation awareness; tourism promotion, human wildlife conflict mitigation and also play vital role in rescue and rehabilitation during disaster and cultural and religious ceremonies.

The recent population of domestic elephants in Nepal is 184 including those of private owners (Pers. communication, Mr. Manpuran Chaudhary, August 2023). The 107 government elephants (41 male, 54 female and 11 calves) have been kept at six stables, coined as *Hattisars* of protected areas of Terai. Out of 184 domestic elephants 77 domesticated elephants are owned by private agencies (5 male and 72 female). About 50 percent of domesticated government elephants are placed in Chitwan National Park and the rest is placed in *Hattisars* of five protected areas.

1.2 Status of Hattisar in BNP

The *Hattisar* is located in Shivapur, Thakurdwara Municipality 9, which is about 3 km south of the park headquarters. Bardia Hattisar, Shivpur was established in the year 2028. Late King Mahendra established the Royal Shikar Reserve in 2026 covering the area between Karnali and Babai rivers in Bardia district. The Royal Karnali Forest Guard was deployed to protect the Royal Shikar Reserve. Besides this, Banke Gulari Hattisar in Banke district was transferred in 2028 and established as Bardia Hattisar Shivpur.

Temporarily a couple of elephants are placed at Park HQ, Gaida Machan area and occasionally at Guthi area and Parewaodar area. These captive elephants serve various roles, including patrolling, engaging in eco-tourism activities, participating in research activities, conducting rescue operations for problematic animals, and occasionally being used for fairs and religious ceremonies. The management and care of these captive elephants are entrusted to a team of 39 skilled staff members. The roles include Gazetted Subba (Gazetted 3rd class), Subba (Non-gazetted 1st class) Daroga (Non-gazetted 2nd class), Phanit (Non-gazetted 4th class), and Pachhuwa, and Mahouts (classless).

1.3 Major Problems of Bardiya *Hattisar*

There are several critical infrastructure and resource challenges faced by the Shivapur *Hattisar*, where captive elephants are managed. The absence of proper

staff quarters at satellite *Hattisars* can make it challenging to attract and retain qualified personnel for the care and management of captive elephants. With 10 staff positions for captive elephant management remaining vacant, it places additional strain on the existing workforce, potentially impacting the welfare of the elephants. The lack of proper shelters at satellite *Hattisars* for the elephants can have implications for their well-being, especially in extreme weather conditions. Poor fencing may pose security risks and challenges in maintaining the elephants within a defined area. Inadequate drinking water and sanitation facilities can affect the living conditions for both the elephants and the staff. The absence of a tourist information center can limit the ability to provide visitors with information about the captive elephants and their role in the park. The reduced availability of fodder due to the transfer of nearby forest areas to community forests is also a significant concern.

1.3.1 Problems of Food for Elephants

There are several issues with the feeding of elephants at the *Hattisars*. These issues include the quality of the rations i.e. paddy, salts, molasses provided, the presence of soil in the food, poor monitoring systems, and a lack of proper control mechanisms. The park authority has not developed a proper mechanism for controlling the elephants' rations in terms of quantity and quality (field observation 1999, 2002). The existing rations may not provide the required energy and nutrition for the elephants, which is essential for their health and well-being. It is suggested that the existing ration scale should be amended to ensure that the elephants receive the proper nutrition they need.

1.3.2 Staff Casualties and Injuries

The domestic elephants have been involved in fatal incidents, resulting in the death of a mahout due to alcohol-related incidents. This highlights the need for safety measures and responsible care of the elephants. Staff working with elephants are at risk of injuries due to interactions with these animals. Elephants can be unpredictable and may pose physical dangers to their handlers. Some staff members have fallen from trees while collecting fodder for the elephants. This indicates the need for proper safety protocols and training for such activities. Some staff members have become disabled as a result of falling from trees during their work. This not only impacts their well-being but also their ability to continue working. It's concerning that there is no life insurance in place for the elephant staff. Life insurance is an important safety net for individuals who work in high-risk environments.

1.3.3 Limited Medical Facility

Elephants mostly eat soils with paddy, which enhance the worms in their stomach. With only one Veterinary Officer available for all the elephants, there may be

challenges in providing timely and comprehensive medical treatment to all the animals, especially in cases of illness or injury. Mahouts are at risk of injury during tasks like grass cutting. It's essential to provide them with proper safety training and equipment to prevent injuries. The absence of first aid for injured staff members is a significant concern. Immediate medical attention is crucial in the event of injuries. The staff, including Pachhuwa and Phanit, work long hours, which can lead to exhaustion and reduced efficiency. Such working conditions are not sustainable in the long run. Subba, Kharidar, Daroga, and Raut handle general administration and ration management. Their workload and responsibilities should be reasonable and in line with their job descriptions. Aggressive bull elephants pose a serious risk to mahouts, and such situations have resulted in fatalities. Ensuring the safety of staff working with elephants is paramount. The combination of hard work, lack of physical facilities, and safety concerns is causing staff members to become discouraged and, in some cases, leading to resignations.

1.3.4 Limited Funds for Elephant Wellbeing

Training for new borne elephant calves starts at 3 years of age. This is a standard practice for introducing young elephants to human interaction and tasks. There is a need for additional funds to support both mother elephants and their calves for the well-being and proper development of the young elephants. There is no provision for extra rations for mother and calves. Proper nutrition is essential for the health and growth of both the mother and her calf. Calves are reported to start feeding of grasses after 5 months of birth. Providing foods like bananas and rice pudding to newborn calves is reported to cost around NRs. 10,000.0 to NRs. 15,000.0 for the first 3-5 months (per comm. G. S. Ram Ishawar Chaudhary, Bhaggu Tharu and S. M. Shrestha). The expenditure required for the training of a calf is reported to be approx. 2 lakh rupees.

1.3.5 Asare Puja & Dashain Puja

The traditional belief in performing pujas (rituals) for the well-being and safety of elephant staff is important and reflects the cultural and religious significance of such practices. In this case, Dashain puja and Asare Puja are celebrated to ensure the safety of elephant staff during their work. The existing budget allocated for these pujas in 1989 (2046/10/08) has become insufficient over time. The budget allocated 35 years ago may not adequately cover the costs associated with these rituals today. The allocated budget has not been adjusted to account for inflation and the changing costs associated with these rituals.

1.4 Rationale for Preparation of Management Plan of BNP Hattisar

Domesticated elephants are quite essential for regular park patrol, research and monitoring activities and tourism promotion activities such as elephant safaris. In addition, they are constantly used for wildlife rescue work, material deliveries in remote areas as well as rescuing park staff during emergencies. For the purpose of

facilitating research activities, elephant shed houses have already been constructed at few guard posts and managed. The domesticated elephants in *Hattisars* have been occasionally attacked by wild elephant bulls leading to serious injuries. Also, the health status of domestic elephants has been seriously hampered due to infectious diseases such as Tuberculosis (TB). To address all these issues related to domestic elephants and its care takers in BNP, a well thought out plan is still lacking. Hence, improvement in the infrastructures for both the staff and elephants and to maintain the health and nutritional status and welfare a well-illustrated management plan is mandatory as a guiding document for execution and implementation so that the best outcomes can be produced to achieve the conservation goals. The following activities have been identified and prioritized in the proposed management plan.

- Renovate and build new elephant shed houses at the Shivapur Hattisar and other satellite *Hattisars* where domestic elephants are permanently/ periodically kept for various purposes;
- Pilot solar fencing to protect domestic elephants at *Hattisars* from frequent attacks of wild elephants;
- Provide clean drinking water and maintain high sanitary condition at *Hattisars*
- Manage necessary tools and equipment for health checkup and assure regular supply of medicines for elephants; and;
- Manage supplementary food for new borne calves and sick elephants;
- Supply tools and gadgets required for using elephants promptly;
- Provide best elephant management skills to care taker staff through awareness and trainings;
- Protect life and properties in the nearby village areas where wild elephant bulls are coming frequently because of presence of domesticated females in the *Hattisar*;
- Provide visitor amenities and safety at *Hattisar* for visiting tourists.

The management plan will aim to create congenial environment and protect the domesticated elephants as well as their caretaker staff for the benefit of the park and ex-situ conservation of elephants.

1.5 Project Area

Bardiya National Park is the largest national park in the lowland Terai covering an area of 968 km^2. The park situated in Nepal's Western Terai was established for protecting the representative ecosystems and conserving the habitat of tiger and its prey species. Initially, a small area was gazetted as the Karnali Wildlife Reserve in 1976. At that time, 1500 households of the Babai valley were relocated outside the park allowing the vegetation and wildlife to flourish. In 1982, it was renamed as Bardiya Wildlife Reserve, and in 1984 it was extended to its current size. The reserve was given the status of a National Park in 1988. 91 Greater One-horned Rhinoceros were translocated from Chitwan National Park to Bardia National Park in 1986, 1991, 1999, 2000, 2001, 2002, 2003, 2016 and 2017. In 1997, an area of 327 km^2 surrounding the park was declared as a buffer zone, which consists of forests and

private lands. The park and local communities jointly manage the buffer zone. 61 species of mammals, 513 species of birds, 42 herpetofauna and 120 fishes have been recorded from the park area.

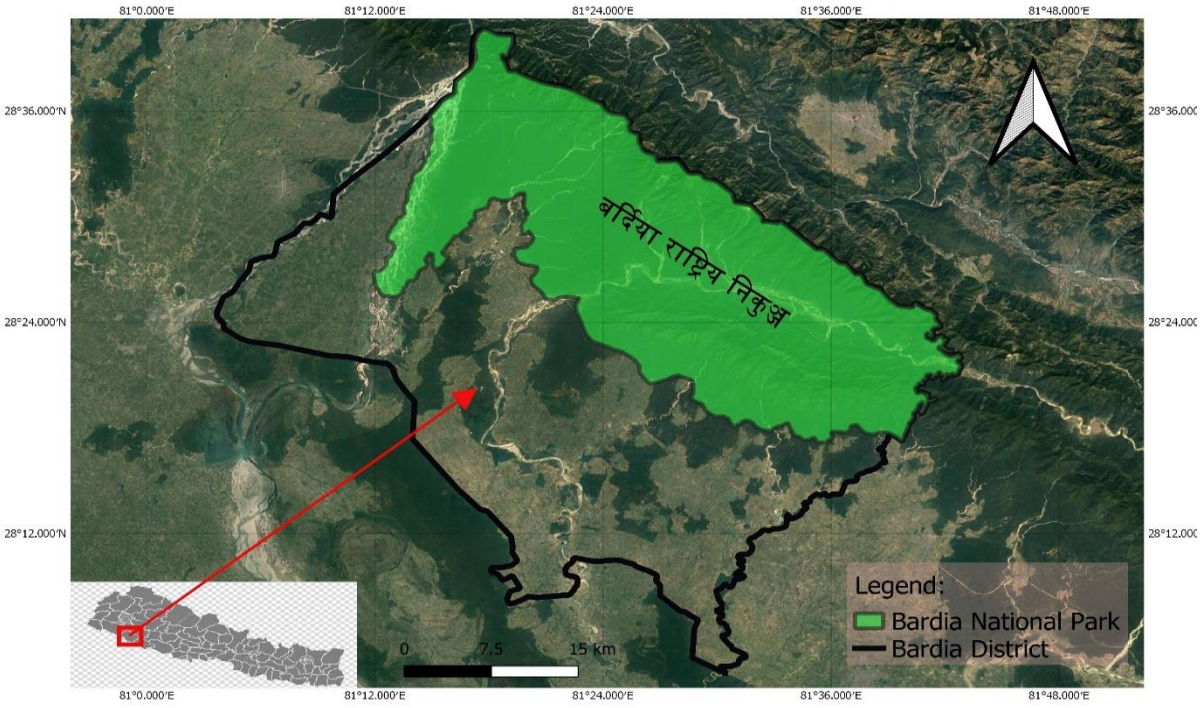

Figure 1. Map of BNP showing project area in Bardiya district

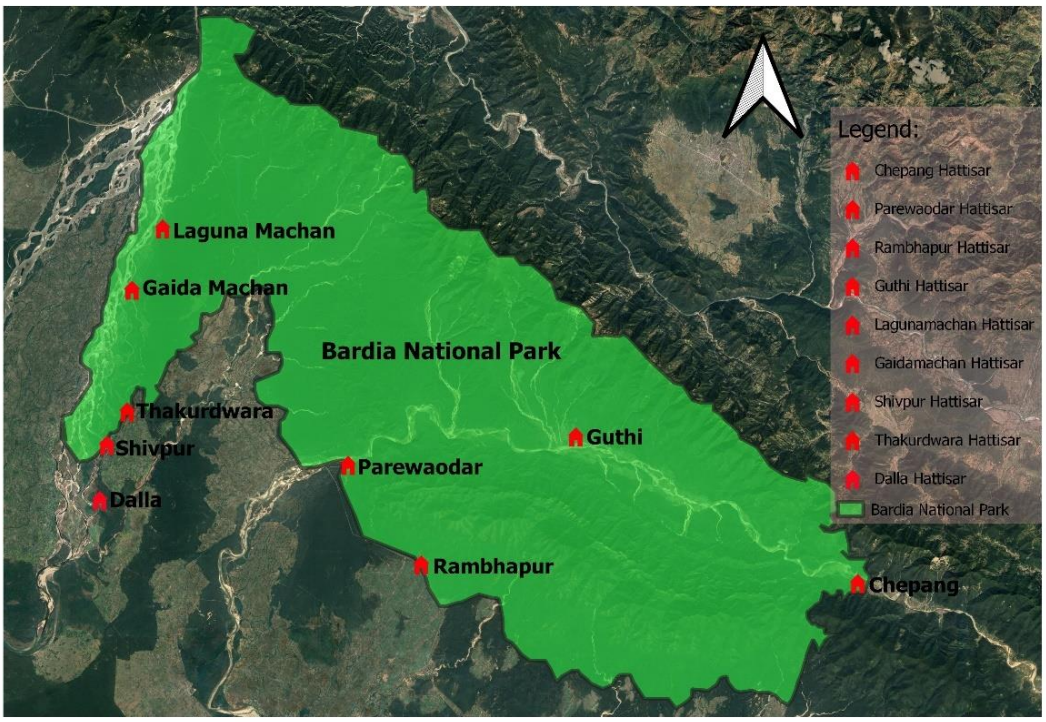

Figure 2. Map of BNP showing location of *Hattisar*s

1.5.1 Topography & Drainage

The topography of the park is quite diverse with flood plains, river valleys and gorges, and the Churia hill. The park's northern boundary is the crest of the Churia range, which is well above 1219 m. The highest elevation is 1441 m at Sukramala and the lowest elevation is 152 m (Manau Ghat) in the south. The southern slope of the Churia range is quite steep, falling steadily to ca 350 m and merging into the flat land, below 152 m. Almost 42% of the area lies between 250-500 meters whereas about 5.4% areas lies between 750-1000 meters.

The Karnali and Babai Rivers are perennial river systems that flow through the park. The eastern branch of the Karnai River forms the western boundary of the park where as the Babai River drains the park in the northeastern sector. The Ourai River and Gumnaha Nala and Ambasa Khola drain the park area between the Karnali and Babai rivers. Maan Khola, Karolia Nala and many other seasonal rivers drain the southern face of the Churia between Babai and the eastern border of the park.

1.5.2 Geology

The dominant slope of the park is above 300 m with more then 20-cm deep soil that covers almost 34% of the park area, whereas the dominant slope of the buffer zone is below 10 m with deep soil that covers ca 66% of the buffer zone area. The geological formation of the Churia range is the determining factor for the soil types of the park. The Churia is of late tertiary in origin. Exposed rocks consist of fine-grained sand stone with pockets of clay, shale, conglomerate and freshwater limestone. Soils are young, shallow and subject to high rates of erosion and landslides. The Bhabar zone consists of boulder, cobbles, gravels and coarse sand interbedded with silt and clay from the Churia. Most of the park belongs to the Bhabar zone. The alluvial soils in the flat lowland below the Bhabar are quite deep.

1.5.3 Climate

The park has three distinct seasons, winter, summer, and monsoon. From October through early April, the weather is dry. The days are warm and the nights are cool and pleasant. From April to June the temperatures gradually rise up with a peak temperature up to 45 °C. in May. The hot sticky days give way to the monsoon rains in July that lasts until September.

Bardia National Park has a sub-tropical monsoon climate with three distinct seasons in the annual cycle: hot season (March-June), Monsoon (July-October) and winter (October-February). About 90% of the precipitation occurs during the months of July, August and September. The absolute maximum temperature of 41 ºC and minimum temperature of 31 ºC were recorded in May and January respectively. The highest rainfall of 2798 mm and lowest rainfall of 1592 mm has been recorded respectively.

1.5.4 Biodiversity

The park is known for its rich floral diversity. It contains diverse ecosystems ranging from tall alluvial floodplain grassland of early successional stage to climax stage Sal-forest established on uplands. A vegetation study conducted by Dinerstein (1979) classified six major vegetation types. Jnawali and Wegge (1993) later modified this into seven major vegetation types. Sharma (1999) has classified the vegetation of southwestern section of the park into 15 different microhabitats. Major vegetation types found in the park are summarized below:

Sal (*Shorea robusta*) forest makes above 70% of the forest cover in the park and grows on well-drained uplands. *S. robusta*, Terminalia sp., *Buchanania latifolia*, *Careya arborea* and *Dilenia pentagyna* are common species found in this vegetation type.

Khair-sissoo Forest is established on relatively old floodplain and consist of *Dalbergia sissoo* and *Acacia catechu* as dominating tree species. Other tree species found in this association include *Ehretia laevis*, *Trewia nudiflora* and *Mallotus philippinensis*, *Murraya koinigii*, *Callicarpa macrophylla* and *Colebrookia opposotofolia* are important shrub species that form dense under story cover.

Moist riverine forest extends along water courses. *Syzigium cumini*, *Mallotus philippinensis*, *Ficus glomerata*, *Trewia nudiflora*, and *Dalbergia sissoo* are among commonly found tree species in this type of vegetation. The ground is relatively open and contains humid soil. Climbing palm (*Calamus tanusi)* and Karot (Teliacora sp.), both climbers are indicator species of moist riverine forest. Mixed hardwood forest grows in well-drained areas. *Adina cordifolia*, *Casearia tomentosa*, *Lagerstroemia parviflora* and *Mitragyna parviflora* are among tree species found in this type of habitat.

Wooded grasslands are similar to Savanna type where ground vegetation is dominated by grass species with sparsely distributed tree species. Common grass species found in this vegetation type are *Saccharum spontaneum*, *Imperata cylindrica* and *Saccharum bengalensis*, *Desmostachia bipinnata* and *Vetiveria zizanoides*. Sparsely distributed tree species include *Bombax ceiba*, *M. philippensis*, *A. cordifolia*, *Largerstroemia parviflora* and *Dalbergia sissoo*.

Phantas are the open short grassland area on previously cultivated fields. *Imperata cylindrica*, *Saccharum spontanum* and *Narenga perphrocoma* are the dominating grass species in phantas. Baghaura and Lamkoili Phantas in the southwestern section, and Guthi, Shivapur, Sanosiri, Thulosiri and Chepang phantas are the typical example of this type. Tall alluvial floodplain grassland grows on the riverbeds of Geruwa, Ourai and Babai Rivers. The dominating species of these grasslands include *Saccharum spontaneum*, *Saccharum bengalensis*, *Phragmites karka* and *Arundax sp*.

The park supports exceptionally diverse wildlife populations. It harbours a total of 53 species of mammals, ca 400 species of avifauna, 25 species of reptiles and amphibians and 121 species of fishes.

Several wildlife species found in the park are listed as protected species according to the NPWC Act 1973. The protected mammals in the park include Bengal Tiger (*Panthera tigris tigris*), One-horned Rhinoceros (*Rhinoceros unicornis*), Asiatic Elephant (*Elephas maximus*), Swamp deer (*Cervus duvauceli duvauceli*), Gangetic dolphin (*Platanista gangetica*), Striped hyena (*Hyaena hyaena*), Four-horned antelope (*Tetraceros quardricornis*) and Chinese Pangolin (*Manis pentadactyla*). Similarly, the protected birds recorded in the park are Giant Hornbill (*Buceros bicornis*), Black Stork (*Ciconia nigra*), Sarus Crane (*Grus antigone*), Bengal Florican (*Eupodtis bengalensis*), and Lesser Florican (*Sypheotides indica*). Gharial (*Gavialis gangeticus*) and Phyton (*Molurus sp.*) are reptiles in the similar category. In addition, large populations of spotted deer, barking deer and wild boar together with avian, herpeto-fauna and invertebrates enrich the biological diversity of the park.

As a part of species conservation, 58 greater one-horned rhinoceros were translocated (1986-13,1991-25,1999-4 and 2000-16) from Chitwan National Park and released in Karnali and Babai River basins (Jnawali, 2000). The current population of Rhinoceros including 16 individuals released in 2000 is estimated at 73. Of them, 41 are residing in the Babai valley and 32 in the Geruwa floodplain.

Similarly, tigers occupy the floodplains of Geruwa, Ourai and Babai as well as Sal Forest between the Geruwa River and foothills of the Siwalik range of the East-West Highway. The tiger population in the park is estimated at about ca 50 breeding adults.

The elephant population in the park consists of both migratory and resident individuals. The elephant population until 1992 was estimated at only 2 males roaming in the southwestern section of the park. The size of elephant population was increased as 23 individuals migrated during 1993/94 dry season. Later in 1999 the number of wild elephants in Bardia was found to be above 40 individuals. The only wild population of Black buck (ca 45 individuals) survives at Khairapur (outside the park), ca 40 km southeast from the park HQ. Back bear (*Selenarctos thibetanus*) was recorded for the first time in the Babai valley during the dry season of 2000. Sloth Bears (*Ursus melursus*) are found in some areas and a small population of blue bull (*Boselaphus tragocamelus*) is found in the southern part of the park.

The park offers a variety of experiences in its vast undisturbed wilderness. About 70% of the forest consists of Sal tree (*Shorea robusta*) with a mixture of grassland and riverine forests. Sal leaves are used as traditional plates in festival and religious

offering. The park is home to endangered animals such as the Royal Bengal tiger, wild elephant, greater one-horned rhinoceros, and swamp deer, The other endangered species include gharial and marsh mugger crocodiles and Gangetic dolphin. Endangered birds found in the park are Bengal florican, lesser florican and sarus crane. More than 30 different mammals, over 230 species of birds and several species of snakes, lizard and fishes have been recorded in the park area. In addition to the resident species, several migratory birds visit the park during winter.

The park is bordered with Ratna Highway (Nepalgunj-Surkhet road) in the east. Geruwa River, the eastern branch of the Karnali river system forms the western boundary of the park. The crest of the Churia range forms the northern boundary of the park and the southern boundary adjoins cultivated lands, settlements, buffer zone forest and part of the East-West Highway. A narrow strip of buffer zone covering an area of about 327 km^2 adjoins the park in the west and in the south. More than 100,000 people of diverse ethnicity inhabit the buffer zone. Tharu are the indigenous group and comprises above 60% of the total population. Other ethnic groups in the buffer zone include Brahmin/Kshetri, occupational castes and the people from Mongoloid origin (Magar, Gurung, Tamang, etc.). Agriculture is the main occupation of buffer zone communities.

For the better protection and management of the park, HMG has developed 132 park staff, 2 companies of Nepalese Army and 10 elephants and their drivers. Similarly, a wide range of interventions has also been made to manage the park's bio-diversity. Habitat management is among the major initiatives taken to improve the foraging grounds for large and medium sized mammals.

1.5.5 Tourism & Interpretation Centers

There are two Visitor Information Centres (VIC) at Thakurdwara–one at Park headquarter, and the other at Bardiya *Hattisar* at Shivapur. The VIC at *Hattisar* provides information only about elephants. Efforts have also been made to establish a third VIC in Lalmati. Apart from these, interpretation is also available at the crocodile and turtle breeding centers, wildlife museum and Tharu cultural museum based at the park headquarters. Likewise, tourism entrepreneurs and local hotels provide Park information to the visitors through nature guides.

Captive elephants are essential for patrolling and monitoring activities within the park, particularly during the monsoon season. In addition, it is also used in Park research, rescue, and visitor safari. Bardiya *Hattisar* was established about 1 Km south of Park HQ in Shivapur, Thakurbaba-9 in the year 2034 B. S. At present BNP has 13 elephants out of them 5 are kept in Shivapur, 3 in Thakurdwara, 2 in Gaida Machan, Geruwa floodplain and 2 are stationed in Guthi, Babai valley. Male Wild elephants often visit the *Hattisar* and stay in and around for longer periods for breeding. The newborns are the product of these wild elephants. A veterinary doctor

is employed for the health management of domesticated elephants whereas three staff (called Mahout, Pachhuwa and Phanit) are deployed for daily care and mobilization for field patrolling.

1.6 Existing Policies for Domesticated Elephant Management in Nepal

The government of Nepal has put in place a variety of policies in an attempt to conserve this endangered species. These include the listing of elephants as a protected species in the National Parks and Wildlife Conservation Act 1973 (NPWCA, 1973), producing the Elephant Conservation Action Plan (2008) and, importantly, adopting the Terai Arc landscape-level conservation program (Koirala, 2015). This program aims to manage the elephants as a metapopulation through the restoration of corridors, and improve their chances of long-term survival in their current habitats (DNPWC, 2008).

The government elephant stables, or Sarkari *Hattisar*, is an integral component of the national parks and wildlife reserves of Nepal's lowland Terai region, and the Elephant Breeding and Training Center at Khorsor, Chitwan. During the rule of the Ranas from the mid-19th to mid-20th centuries, *Hattisar* were maintained to facilitate royal hunting expeditions at which foreign dignitaries were hosted to hunt tigers, rhinos, leopards and bears (Locke, 2008; 2011). Then in the 20th century, Nepal's domesticated elephant management apparatus was deployed in service to the new agendas of conservation and tourism. As a result, the Sarkari *Hattisar* became an organ of the DNPWC within the Ministry of Forests and Environment. Since the early 1970s, the era of the national park, domesticated elephants have been used for anti-poaching patrols, large mammal monitoring, conservation programs, and also to foster nature tourism. Each elephant is ideally attended by a three-man care team. This comprises a *Mahout*, a *Pachhuwa*, and a *Phanit*.

Management plan of Chitwan National Park (2015) has stated that space, hygiene, food and medicine are the basic requirement to take care of domesticated elephants and regular health checkups are stated to be provided for infectious and zoonotic diseases such as elephant tuberculosis, Elephant Endotheliotropic Herpes Virus (EEHV) infection, etc. Elephants in captivity need improved housekeeping, regular and casual health checks up and their care taker along with vaccination against common diseases like anthrax, foot and mouth disease, black quarter and hemorrhagic septicaemia in a specified interval and de-worming at an interval of every six months (CNP, 2015).

The 5-year management plan (2075/76-2079/80) of Bardiya National Park has set program for strengthening domesticated elephant health (BNP, 2018).

1.7 Challenges for the Hattisar Management

1.7.1 Lack of Proper Funding

Hattisars all over Nepal are deprived of appropriate funding and the BNP *Hattisar* cannot be the exception. Recruitment of *Hattisar* staff has been on a temporary basis called 'Karar Niukti'. There are still many Mahouts working for more than one and half decade with elephants and waiting to be posted as permanent staff. There are more personal benefits for the permanent staff of Nepal government at retirement, and this facility brings within them the spirit of elephant management works with dedication, sincerity and honesty.

The availability of trained manpower for elephant work is also decreasing. There are no training institutions for elephant working skills in the country. The skills required for managing elephants is unique and thus park has managed its man power by training recruits free of costs within the *Hattisar*.

Likewise, because of the poor funding, the elephant management and supply of day-to-day tools have been inconsistent. The veterinary care is also not very responsive because of lack of tools and medicines for treatment of health problems.

1.7.2 Infectious and Non-infectious Diseases

Asian elephants are susceptible to various infectious and non-infectious diseases. Infectious and parasitic diseases include tetanus, tuberculosis, haemorrhagic septicaemia, salmonellosis, anthrax, foot and mouth disease, rabies, pox, herpes virus infection, mycosis, surra, piroplasmosis, 'bots', toxoplasmosis, helminthiasis and ectoparasites (Fowler & Mikota, 2006; Firyal & Nureen, 2007; Chandrasekharan et al., 2009; Gairhe, 2012).

A recently recognized herpesvirus, EEHV (Elephant endotheliotropic herpes virus), can cause severe haemorrhagic disease in elephants, and is associated with a high fatality rate in young Asian elephants (1-8 years of age). Death frequently occurs within 1-2 days of the first visible signs, and early diagnosis and treatment is critical to survival. The disease has been diagnosed in wild population of elephants in India and thus may hamper the growth of population density (Zachariah et al., 2013). Similarly, elephant tuberculosis, an ancient disease of humans and animals, can reduce the reproductive efficiency and limit the growth rate of the Nepalese elephant population (Poudel et al, 2019; Amin et al., 2018, Zachariah et al., 2017). Both the diseases are prevalent in Nepalese domesticated elephant population and require a deeper study affecting wild population.

More than 12 domesticated elephants have died of tuberculosis since 2002 (Mandal & Khadka, 2013; Thapa, et. al, 2017; Szydlowski, M., 2021) yet infected individuals remain within shared spaces, increasing the risk of further transmission (Gairhe, 2012; Szydlowski, 2022).

1.7.3 Ration Supply for Domesticated Elephants

At times, contractors do not supply ration timely for elephants which brings up additional challenges for feeding. The 'Kutchi' made up of rice, molasses and salt is a good tip for elephants to obey the commands of mahouts while preparing elephants for patrolling or safari activities. The quality of supplied ration is not always satisfactory. Generally, elephant rations are purchased annually through bidding of contractors. Nepal government manages concentrate ration for elephants which includes 15 kg of rice, 1.5 kg of molasses and 25 grams of salt for each elephant. Several attempts to amend the ration items and scale for these animals and to include vitamin and protein rich items have failed. Despite monthly monitoring of supplies by contractors and daily monitoring of quantity of ration distribution to each elephant, discrepancies do occur which must be controlled by strict monitoring to discourage malpractices.

1.7.4 Delayed Supply of Elephant Tools

Generally, the utility items essential for preparing elephants for patrol and safaris are supplied by park head quarter. But it has taken months to supply these goods and tools after the demands are made by the respective mahouts.

1.7.5 Delayed Recruitment of Staff

Vacant posts for elephant care staff have taken months or sometimes even years to be fulfilled; this impacts the increased duty loads of the working staffs of the respective elephant and decreased care of the animal.

1.7.6 Scarcity of Fodder

During drier winter months, the availability of lush green grasses is decreasing and as reported by Mahouts of BNP the palatable vines for elephants are vanishing.

1.7.7 Maintenance of Traditional Rituals

Moral, courage and inspiration among *Hattisar* staffs are based upon their traditional rituals and beliefs as the majority of them are from Tharu communities. They traditionally practice Asare and Dashain Puja and periodically Bandevi Puja, to boost their faith and courage to work for elephants. Insufficient funding and incentives to maintain and continue such Pujas and celebrations have posed a serious threat in boosting their morales.

1.8 Assessment of Required Number of Domesticated Elephants for BNP

Bardiya National Park is the largest national park in the lowland Terai covering an area of 968 km^2. The park situated in Nepal's Western Terai was established for protecting the representative ecosystems and conserving the habitat of tiger and its

prey species. Initially, a small area was gazetted as the Karnali Wildlife Reserve in 1976. At that time, 1500 households of the Babai valley were relocated outside the park allowing the vegetation and wildlife to flourish. In 1982, it was renamed as Bardiya Wildlife Reserve, and in 1984 it was extended to its current size. The reserve was given the status of a National Park in 1988.

The number of domesticated elephants and approved positions of staff to be used in BNP were made during the establishment period of Bardiya Wildlife Reserve in 1984. After this, series of time bound changes has occurred such as increased number of wild elephants, tiger and rhinos because of rigorous protection efforts including the extension of area by in Babai valley. Thus, the number of domesticated elephants should be increased to cater to the increasing work load such as park patrolling, mitigating human wildlife conflicts and wildlife rescue events. The demand of domesticated elephants in Shivapur, Guthi and other potential touristic points such as Babai valley, of Bardiya district and Chepang post are increasing to foster wildlife-based tourism near the park boundaries.

This justify that the current officially approved domesticated elephant number is not enough. As discussed, this issue with BNP and BZ User Committees, the number of domesticated elephants should at least be doubled for the sake of park protection, tourism promotion and wildlife rescue events. But, in a discussion meeting with BNP officials, the domesticated elephant number for BNP be increased to 34 individuals, as some young and elderly animals may not be able work efficiently. Increasing the number of domesticated elephants to 34, BNP will be liable to bear large budget for staff salaries, elephant food, health care, housing infrastructures and elephant operation equipment. Therefore, proper discussion with DNPWC, Ministry of Forest and Environment and probably with Ministry of Finance is advised. The number of domesticated elephants to be positioned in specific satellite locations of BNP has been decided on the basis of workloads to address demands for patrolling, tourism, and involvement in the developmental activities within the national park. The proposed location of satellite *Hattisars* and the number of elephants required is illustrated in Table 1.

Table 1. Main and satellite *Hattisar* with proposed number of elephants (Field Assessment, 2024)

S. No.	Location of Hattisars	*Hattisar* type	No. Proposed	Staff Position						
				G. Subba	Subba	Daroga	Mahout	Pachhuwa	Phanit	Total
1.	Shivapur	Main	10	1	1	1	10	10	10	33
2.	Dalla	Satellite	02	-	-	-	02	02	02	06
3	Thakurdwara	Satellite	04	-	-	-	04	04	04	12
3.	Gaida Machan	Satellite	02	-	-	-	02	02	02	06
4.	Laguna Machan	Satellite	02	-	-	-	02	02	02	06
5.	Parewodar	Satellite	04	-	-	-	04	04	04	12
6.	Rambhapur	Satellite	02	-	-	-	02	02	02	06
7	Guthi	Satellite	04	-	-	-	04	04	04	12
8	Chepang	Satellite	02	-	-	-	02	02	02	06
9	E. Chisapani (Banke)	Satellite	02	-	-	-	02	02	02	06
Administration and Vet Technician										
10.	Veterinary Doctor	Main	-	1	-	-	-	-	-	1
11.	Veterinary Technician	Main	-	1	-	-	-	-	-	1
12.	Kharidar	Main	-	1	-	-	-	-	-	1
	Total		**34**	**3**	**1**	**1**	**34**	**34**	**34**	**107**

1.9 Methodology

The management plan of Bardiya National Park and the relevant literatures, field level and central level consultations and field visits provided the basis for the preparation of this management plan Literature review of prevalent policies relevant to domesticated elephant management in Nepal and the BNP and DNPWC annual reports, Asian Elephant Conservation Action Plan (2009) was reviewed and analysed. Field level consultations with stakeholders such as BNP and *Hattisar* officials, BNP buffer zone user committees, local tourism entrepreneurs, political leaders, citizens etc. were consulted to devise objectives, strategies and activities for domestic elephants and also to reduce local conflicts that occur due to visiting

wild elephants to the main *Hattisar* at Shivapur. Information and feed backs were collected from these consultative meetings and incorporated to develop management plan framework, operational strategies and to document management activities for domesticated elephant management. Regular formal and informal discussions and communications made with DNPWC and BNP provided the basic guideline to develop the organizational structure. The draft management plan was rigorously reviewed by experts from BNP, DNPWC, MoFSC, DoF, and NTNC and presented to a wide range of audience to solicit inputs and feedbacks.

Direct observation of existing main *Hattisar* at Shivapur and its satellite *Hattisars* were carried out to assess the existing management conditions. New infrastructures to be constructed for proposed additional elephants and its staff were identified by Expert Team.

Focus Group Discussion (FGD) were carried out to find the solutions for conflicts created by wild bull elephants between *Hattisar* and local people residing in the vicinity.

Chapter 2. Literature Review

Literature reviews were carried out extensively to obtain information on the policy, experiences and best practices on domesticated Asiatic elephant management and gain insight how they could be replicated for sustainable *Hattisar* management in BNP.

The domesticated elephants have long been associated with religious beliefs and practices in Nepal and elsewhere in Asia. Domesticated elephants were regarded as symbol of wealthiness of an owner in the past and the species in Nepal had been captured, trained and utilized since ancient times (Kharel, 2001) the mega size and ability to obey vocal and touch commands and easily teach many skills, they have been useful for forest excursions, and a safe and close view of majority of dangerous wildlife and their rescue missions. Five elephant camps that have been established in the low land terai by integrating scattered and semi personal elephant camps in the 1980s after the establishment of DNPWC in 2030. After the inclusion of the species in CITES list I in 1975, the Nepal established an Elephant Breeding Center in Chitwan in 1984.

The only formal document and report that occurs before us is the report of a Task Force that was commissioned in 1985 by the Senior Secretariat of His Majesty the King to study & recommend suitable techniques for management, breeding, welfare and utilization of domesticated elephants in Nepal (JBK, 1986). This document, written in Nepali in a book format, briefly describes the history of *Hattisars* in Nepal, describes the job responsibilities of each post as well as it enlists number & location of *Hattisar* and points out the number of elephants in a logical order. Other than these this document, we do not find domesticated elephant related documents though several scientific articles can be found published in scientific journals regarding disease conditions of domesticated elephants in Nepal (Pyakural et al., 1976; Gairhe, 1998; Locke 2006, 2011; DNPWC, 2011). As a result of the recommendations contained in the Task Force Report (1985), an elephant breeding center was established at Khorsor in RCNP in 1985. The objectives of the breeding center were to begin scientific breeding and carry out research on elephants. It was also expected to gain experience in elephant management and their use in the management of protected areas. Initially, the elephant breeding center was established with 22 elephants (16 from India, four from Thailand and two from Myanmar). The above-mentioned elephant camps and breeding center have played a key role in conserving this species through domesticated breeding (Kharel, 2001). In captivity, elephants are subjected to varying degrees of human control.

Varma & Ganguly (2011) evaluated the welfare status of domesticated elephants of Bardia National Park *Hattisar* through a study and critically reviewed the elephant training programme. The objectives of their study were to assess the welfare status of domesticated elephants in Bardia National Park by considering the physical and biological features, in addition to the availability of veterinary care for the

elephants. Domesticated elephants cannot be considered to be domesticated as they have not undergone selective breeding and there is always influx of wild gene pool into a domesticated scenario with the introduction of wild caught/rescued elephants/ mating by domesticated females with wild males. Thus, their behavioural and ecological requirements are comparable with those of their wild counterparts. Providing a "natural" environment as a condition to maintain positive welfare of domesticated animals is advocated by several authors.

WEPA (Working Elephant Program of Asia) evaluated welfare of domesticated elephants in BNP on the basis of provision of space/shelter, food and water sources, chaining event/ movement/ opportunity to walk, work, grazing and social interactions. Poor sleeping conditions due to insufficient / improper substrates, restricted movement/ chaining, etc. can have negative impact on the elephants' physical health. Chaining either by tethering to one place or by hobbling the animals' legs restricts walking which is an important activity of elephants and is associated with foot problems and the involvement to perform various work provides opportunities to express species typical behaviours.

Elephants were found well trained as mahouts could even sleep on the back of the elephants while grazing the animals without dropping on the ground and the elephants could get the grasses of their interest for feeding.

WEPA evaluated traditional training methods of young elephant calves in BNP *Hattisar* as severe which involved a change in living conditions, separation from mother, severe restraint by tying the animals' forefeet and neck, deprivation of sufficient food and water, exposure to unfamiliar sounds and thus forced to respond to commands due to the pain inflicted by the ankus and by being unable to move freely due to adult elephants restraining its movements. Such methods may be traumatic and imparting stress on the animal which may, in future, be responsible for developing abnormal behaviors.

Trained elephants are stress on required to perform various human oriented activities under the supervision and control of Mahouts. And a training method that does not inflict injuries and minimum adverse effects on animal's psychologic status was introduced to teach elephant calves to perform desired tasks through combination of vocal and touch commands and rewards.

A study carried out by Yadav (2003) stated that fodder supply to domesticated elephants at Elephant Breeding Center in Chitwan National Park has dropped down due to handing over of many nearby forests to communities where harvesting is controlled. He reports that infrastructures for elephant staffs is inadequate and government policies for insurance and compensation of the injured or deceased elephant staff is lacking. Also emphasized about the inadequate elephant health issues due to poor government funding on medicine and diagnostic facilities in the center. This report provides a comprehensive comparative difference in the duty hours and payment scale between elephant staff and other civil servants of Nepal. It was calculated that Mahout's duty hour was 2.83 times more than the other civil

servants of the same level, but without justifiable salaries paid to them by the government. The situation, as the time passed away, are progressing to better conditions for the care and management of domesticated elephants in EBTC, however a guiding document such as Domesticated Elephant Management Plan could not be traced for review.

The elephant Management Rules, 2020 B. S was promulgated to manage and regulate domesticated elephants in Nepal. The rules prioritized about management of elephant camps, addressed the health care issues, and emphasized on feeding and proper utilization without compromising on their health status. However, later on these rules were abolished as their proper care and utilization was covered within the NPWC, Act, 2029.

Domesticated Elephant Management Policy (MoFE, 2003) mainly aimed to maximize economic and environmental benefits, minimize negative impacts in biodiversity through proper management of domesticated elephant involving private sectors. The policy equally focused on equitable distribution of economic benefits arising from management of domesticated elephants. However, this policy was not acted upon because of incompleteness in bureaucratic channel of Nepal Government.

Elephant Conservation Action Plan for Nepal (DNPWC, 2009) has briefly talked about the role of domesticated elephants in the protected area management and tourism. The plan shows that domesticated breeding of elephants may help to maintain viability of domesticated elephant population in Nepal as wild elephant bulls are contributing for genetic enhancement of the new borne calves in the Elephant Breeding Center and other elephant camps of the terai protected areas. This plan reflects the effort of GoN to conserve primarily wild elephants as flagship species from extinction by addressing habitat loss and control HEC through viable measures. The plan highly emphasizes on landscape level conservation by creating/maintaining ecological corridors, so that fragmented elephant populations can be linked for genetic viability.

The study of Yadav & Chalise (2013) revealed that the annual fodder/ grasses consumption by domestic elephants is very high whereas Lehmkuhl (1989) found that an average of 153 kg fresh weight of fodder was cut for each domestic elephant per day in CNP and about 20 kg dry weight was estimated to be consumed during free grazing.

Despite these limited number of studies carried out on management of domesticated elephants and the care taker staff in Nepal, no documents could be retrieved from the stockpiles of scientific literatures. The lack of documents on domesticated elephant management issues is primarily due to the remoteness of the elephant stables for researchers and lack of motivation for writing and publications in scientific journals.

Chapter 3. Assessment of Existing Infrastructures

3.1 Existing Facilities at Shivapur (Main) Hattisar

Domesticated elephants in BNP have been managed primarily by Shivapur *Hattisar*. Elephants and their staffs are posted to satellite *Hattisars* located at *Thakurdwara, Guthi, Parewaodar, Rambhapur, Laguna Machan, Gaida Machan, and Dalla Hattisar*. The graphical representation of the existing facilities of respective *Hattisars* (elephant shed, staff quarters, water supply, ration and tool storage facilities) are given in Figure 3 - 11 respectively.

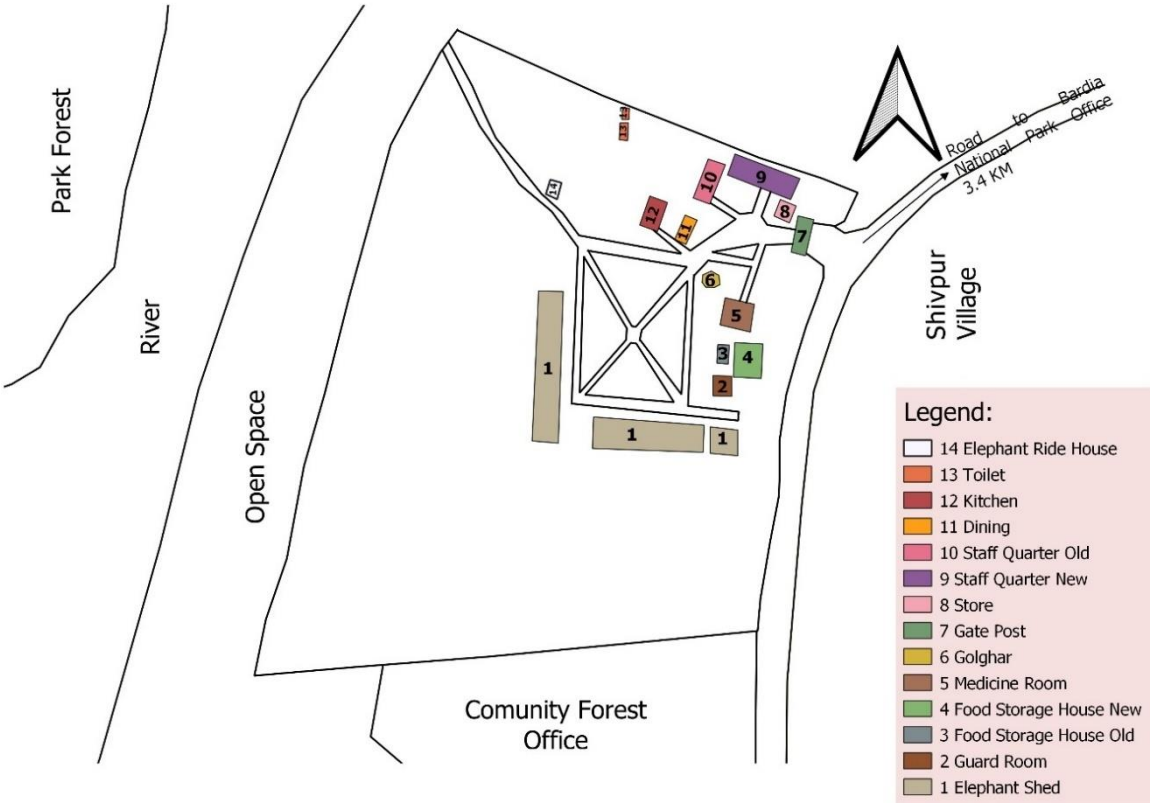

Figure 3. Diagrammatic sketch of existing infrastructures at Shivapur Hattisar

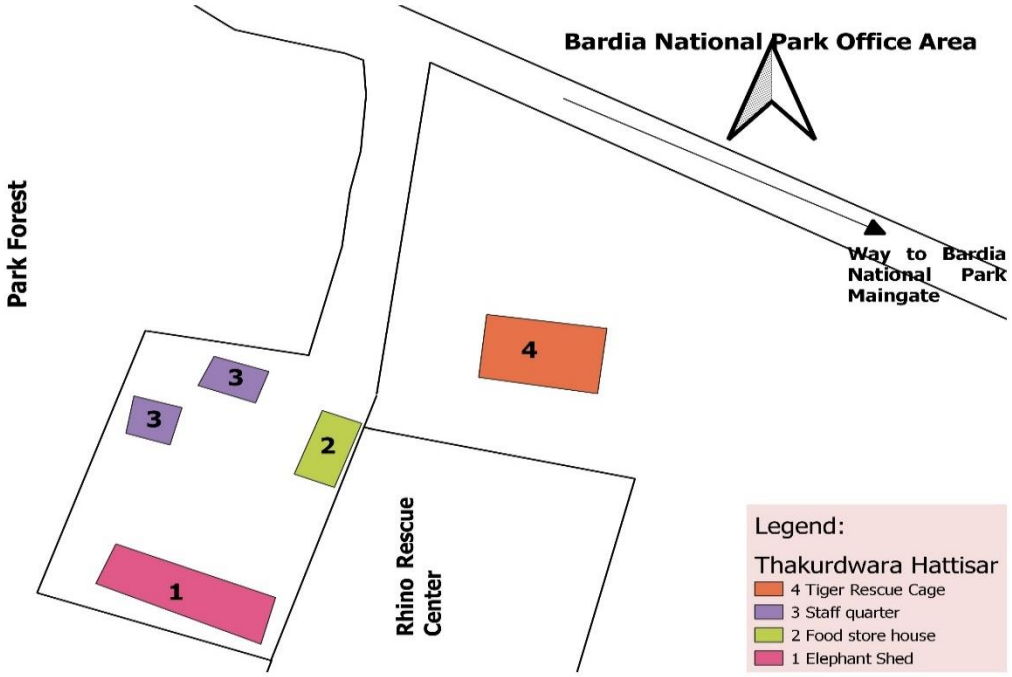

Figure 4. Existing infrastructures at Thakurdwara *Hattisar*

Figure 5. Existing infrastructures at Dalla Hattisar

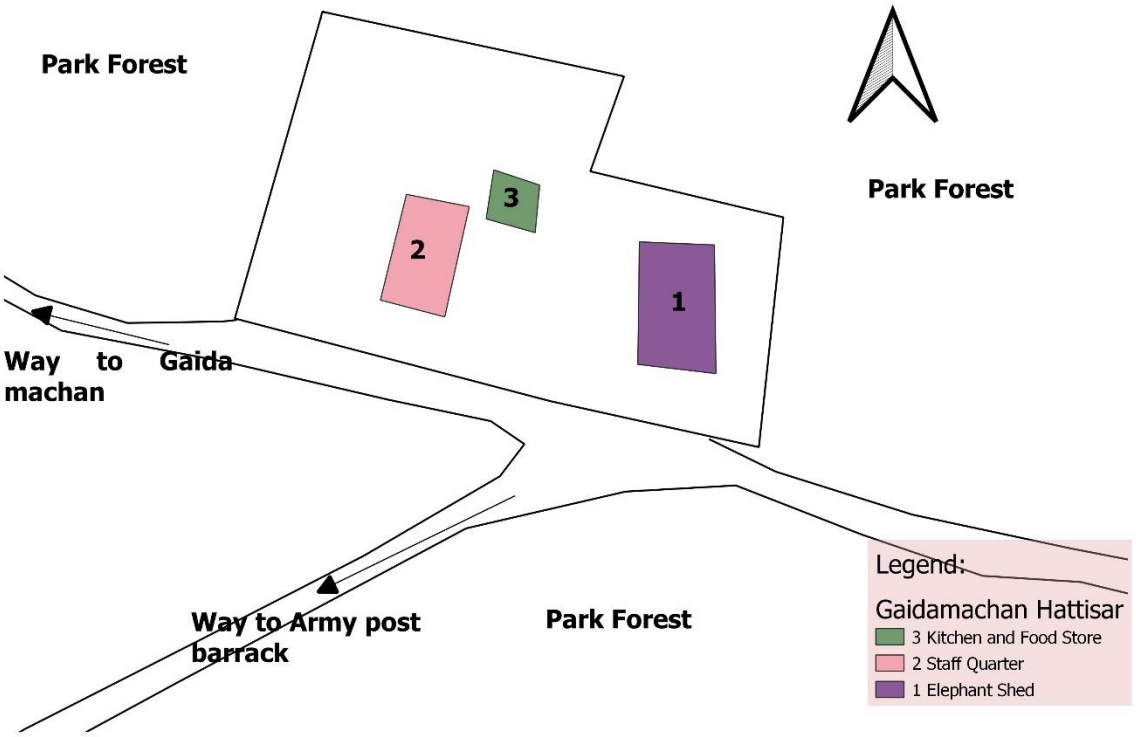

Figure 6. Existing *Hattisar* infrastructures at Gaida Machan area

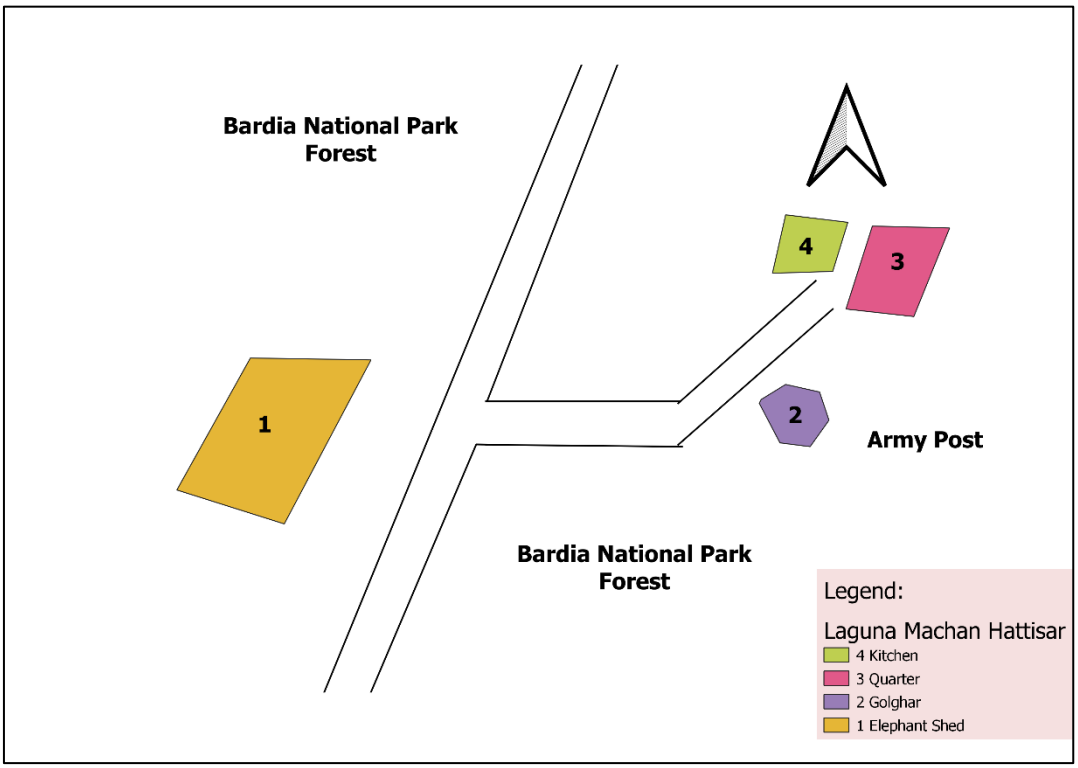

Figure 7. Existing *Hattisar* infrastructures at Laguna Machan area

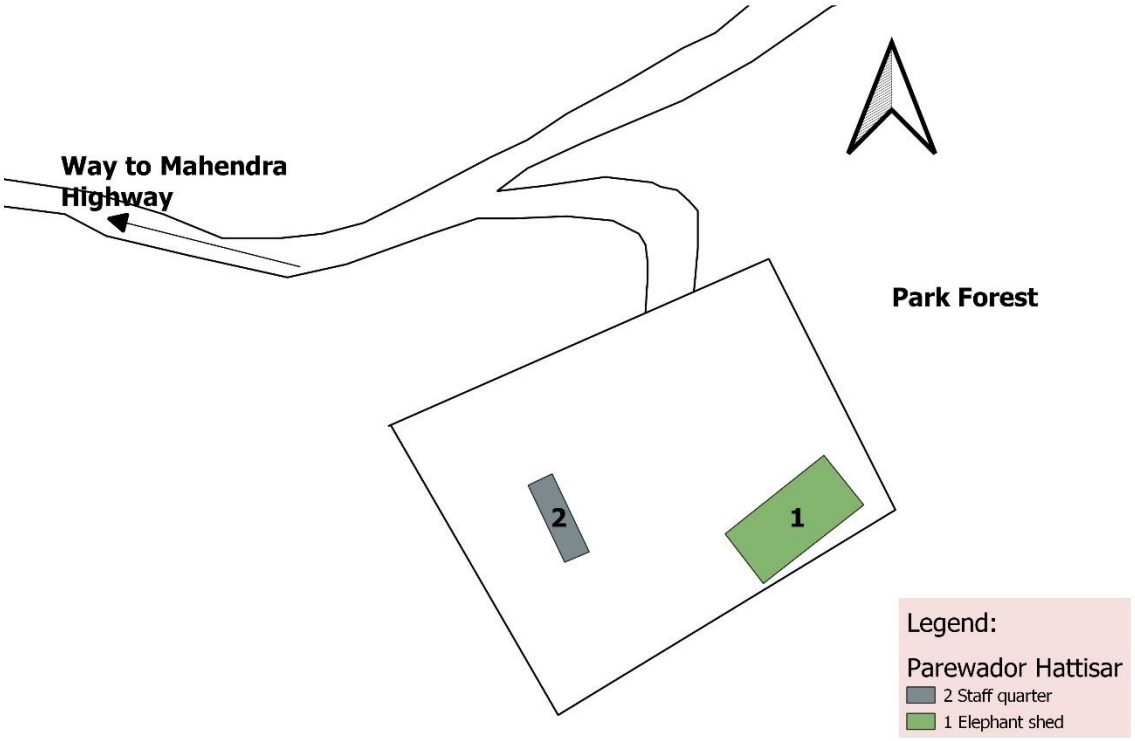

Figure 8. Existing *Hattisar* infrastructure at Parewaodar area

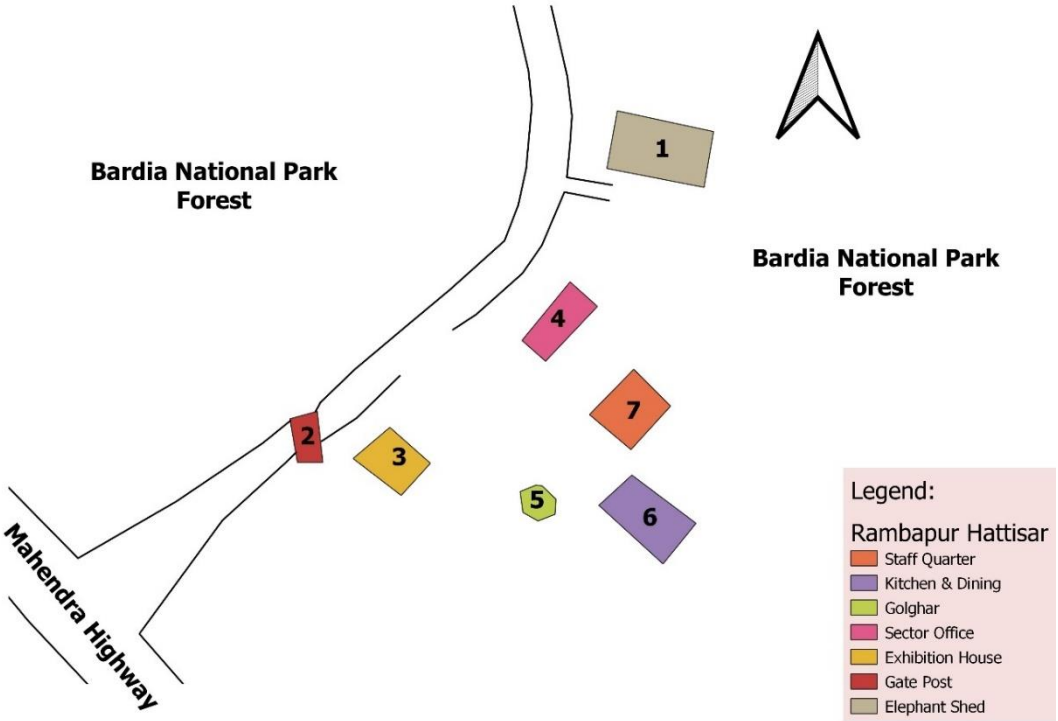

Figure 9. Existing *Hattisar* infrastructure at Rambhapur area

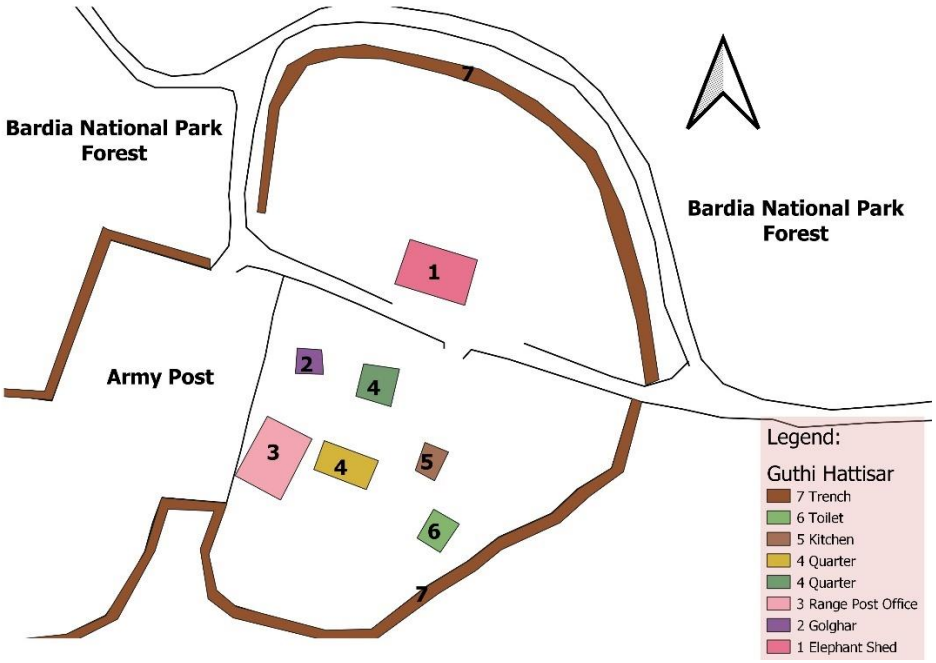

Figure 10. Existing *Hattisar* infrastructure at Guthi area

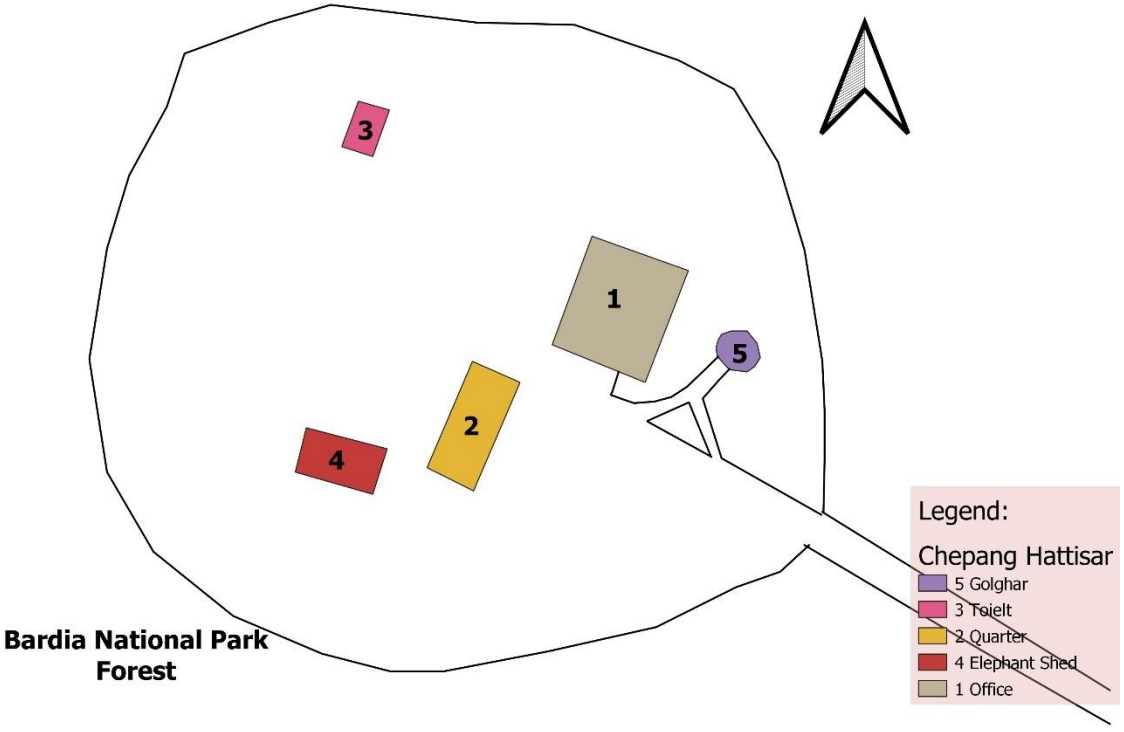

Figure 11. Existing *Hattisar* infrastructure at Chepnag area

3.2 Accommodation Facilities for Elephant Staff

Elephant staffs have been generally given very marginal accommodation facilities at all *Hattisars* in the country. There are good accommodation facilities at Shivapur and Thakurdwara *Hattisar*. Accommodation facilities at other satellites *Hattisars* are insufficient, *Hattisar* staff quarters are not available they are adjusted with park staff.

3.3 Existing Infrastructures for Domesticated Elephants

3.3.1 Sheds for Domesticated Elephants

There are quite a good number of domesticated elephant sheds in Shivapur and Thakurdwara *Hattisar*, whereas there is only one shed for two elephants at other satellite *Hattisars* such as Guthi, Parewaodar, Rambhapur, Gaida Machan, Laguna Machan and Dalla. A sketch of existing plan for elephant sheds is presented in Figure 12.

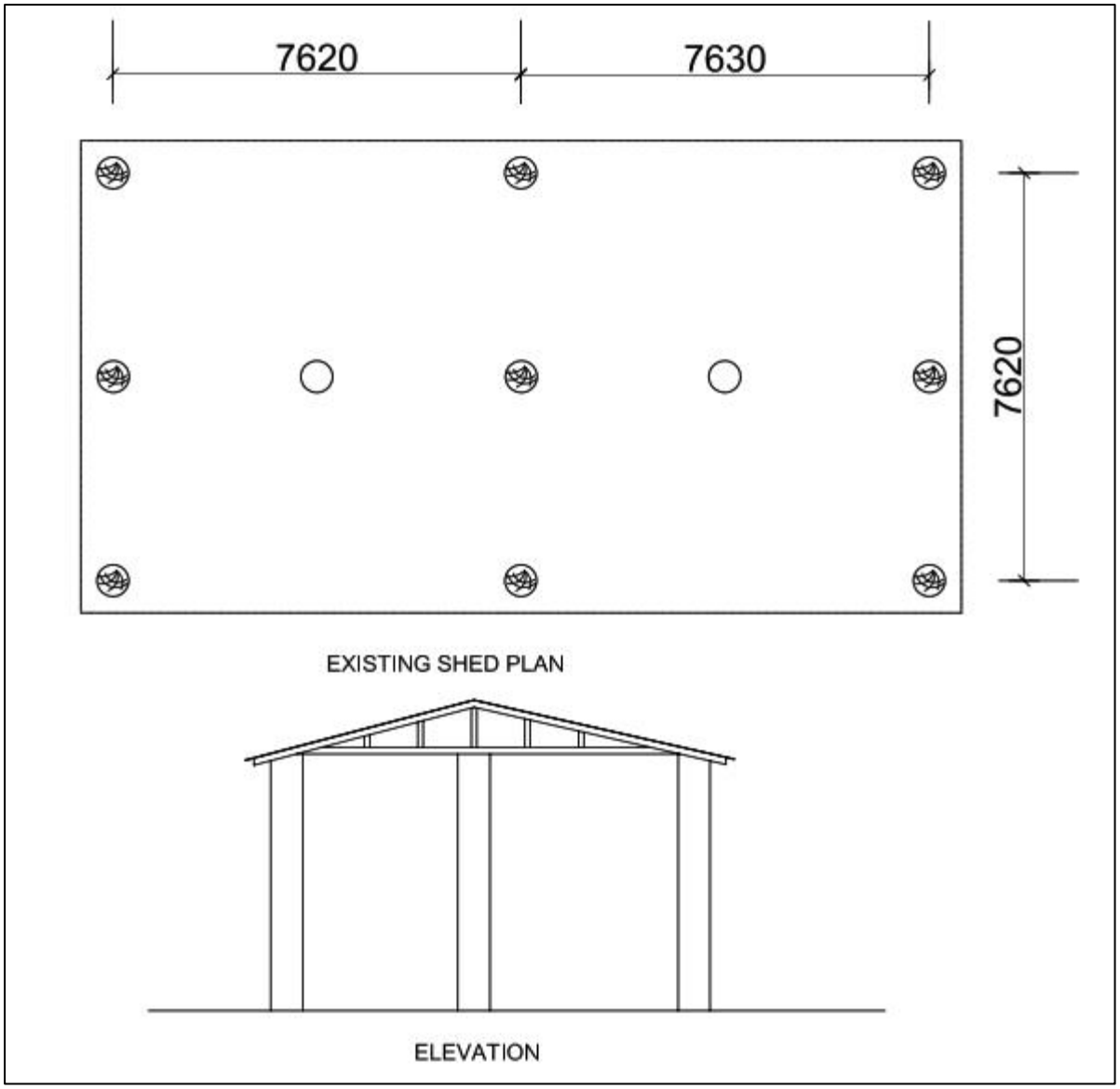

Figure 12. Plan of Elephant Sheds

3.3.2 Water and Electricity

To address the water deficit during dry season, one water tank having 1000 litre capacity has been constructed to ease drinking water of elephants and staff at Shivapur *Hattisar*. Most of the satellite *Hattisars* having rivers for water to drink except Rambhapur and Dalla satellite *Hattisars*.

Electricity in Shivapur and Thakurdwara area is readily available and is used for lighting the *Hattisar*. Electricity at other satellite area is not available but solar energy is available for lighting the *Hattisars*. Therefore, a solar powered electricity may be managed for lighting and household purposes. A sketch of existing plan of solar powered fence & drainage is provided (Figure 13).

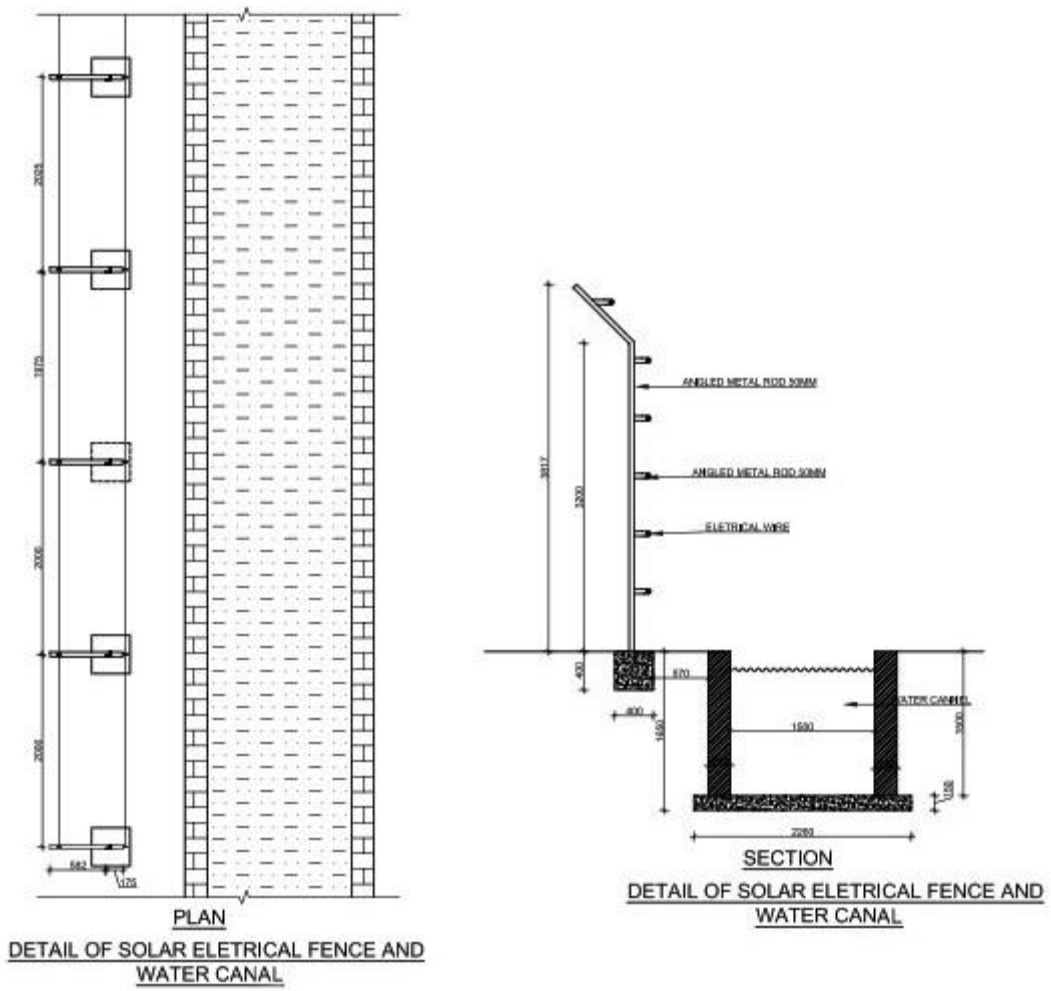

Figure 13. Plan of Solar Powered Fence & Drainage Canal

3.3.3 Grasses and Fodder Tree Management

Elephants on the wild browse and graze on a variety of plants but the time spent foraging and the proportions of the plants consumed vary depending on season and availability. In tropical dry forest during the dry season over 70% of the diet is browse, while grasses comprise the majority of the diet when they are plentiful during the wet season (Sukumar, 1989). Elephants may also eat bark, which contains minerals, such as calcium, and provides roughage.

Recent study revealed that wild elephants in Chitwan and Bardiya National Parks eat fifty-seven species of plants. This includes 13 species of grasses, five shrubs, two climbers, one herb and 36 species of trees. The species that contributed the greatest proportion of the elephant's diet were *Spatholobus parviflorus* (20.2%), *Saccharum spontaneum* (7.1%), *Shorea robusta* (6.3%), *Mallotus philippensis* (5.7%), *Garuga pinnata* (4.3%), *Saccharum bengalensis* (4.2%), Cymbopogan spp. (3.7%), *Litsea*

monopetala (3.6%) and *Phoenix humilis* (2.9%) (Koirala et al., 2016; Yadav et *al*., 2013).

Domesticated elephants of BNP cannot have free access to foraging activities; they rely on Mahouts' grant on accessing preferred grasses and plants to eat. However, most of the Mahouts know what the elephant under their command prefer to eat. Depending upon the availability of grasses as per the season, elephants are taken to best tall grass lands for grazing. The best choice of grasses is Reti/Kans/Jhaksi (*Saccharum spontaneum*), Baruwa (*Tripidium bengalense*), Narkat (*Phragmites karka*), Siru (*Imperata cylindrica*), Bader, Bermuda grass/ Dubo (*Cynodon dactylon*), Pater (*Typha angustata*), etc. The additional privileges through Mahouts that domesticated elephant enjoys is collection of preferred fodder tree branches and twigs they allowed to eat. This includes Simal (*Bombax ceiba*), Bar/ Banyan (*Ficus bengalensis*), Pipal (*Ficus religiosa*), Sami (*Ficus benjamina*), Gullar/Dumri (*Ficus racemosa*), Khanieu (*Ficus semicordata*), Badhar (*Artocarpus lacucha*), Kavro (*Ficus lacor*), Gajahar (*Ficus affinis*), Jingad (*Lannea coromandelica*), Datiwan tree (*Salvadora persica*), Dabdabe (*Garuga pinnata*), Kera (Musa spp.), Rohini (*Mallotus philippensis*), Khayer (*Acacia catechu*), Babul (*Vachellia nilotica*), Khoksa (*Ficus hispida*), Bamboo, Amriso/Broom grass (*Thysanolaena latifolia*), Thakal (*Phoenix humilis*) etc. and a couple of vine species such as Debre Lahara/ Paras Latti (*Spatholobus parviflora*), and Bhorla (*Bauhinia vahlii*).

Grasslands and jungle in BNP experiences high drought during winter months and finding good graze for elephants is difficult. Domesticated elephants in the dry season have to rely upon the fodder and vines collected by Mahouts to feed their respective elephants.

3.3.4 Elephant Health Facilities

Domesticated elephants face health related issues while working in the park to accomplish duties correctly. This may be some form of trauma, wounds and abscesses, tusk injuries, etc.; other forms of elephant health problems are from infectious diseases and internal and external parasites. Surgical equipment, foot care equipment, portable weighing machines, foot dipping facilities and various veterinary medicines are required to manage their health in perfect shape. For prevention of many infectious diseases, they need annual vaccination programs. Comatose elephants also need lifting chains for the correction of postures. Besides requirements for maintaining elephant health, equipment for post mortem examination and sample collection and diagnostic procedures are equally important.

3.3.5 Veterinary Facilities

A proper building designated as veterinary hospital or clinic for domesticated elephants does not exist at Shivapur *Hattisar* until now, however the veterinary services to domesticated elephants such as regular deworming, foot care, minor surgeries and collection of biological samples and postmortem examinations were

performed by Veterinary Officers from Chitwan National Park and NTNC/BCC, Sauraha, Chitwan or by attending para-veterinarians . A recent development is the appointment of a Veterinary Officer specifically for BNP has become a milestone for elephant care in BNP.

3.3.6 Foot Dipping Tanks

As working elephants do suffer significant number of foot problems such as cracked nails, pododermatitis, and penetration of sole by foreign bodies, arthritis, etc. an elephant dipping tank is very crucial. However, such structure is not available in the Shivapur *Hattisar* premises.

3.3.7 Tools for Elephant Handling & Mobilization

Even though elephants were used for forest excursions and hunting programs in Nepal since long ago, it is known that. they were used for the protection and management of national parks/reserves after 2045 B. S. In park/reserve management, elephants are used for patrolling, transporting goods, visiting tourists and protecting wildlife and occasionally for human rescue. Wild elephants, tigers, leopards, rhinoceroses, gaur roam in the parks/reserves, so it is considered safe to ride an elephant in the forest while patrolling or performing conservation related tasks.

Domesticated elephants of BNP require the use of various kinds of tools and gadgets for forest patrolling and tourist rides. These items are listed and categorized as following:

a) Tools for tethering elephants in the Hattisar: This includes Dharna, Chhanuwa, and Khamari

b) Tools for grass cutting and collection: Attargal, Gaddhi, Jharni, Majha rope, Tarha, Khurpa and Sickle

C) Carriage tools: Houda (placed on a gaddi on the elephant's back and secured by ropes running down the animal's chest), Attargal, Lampat, Petar, Kathi, and Dosal

d) Items needed for forest patrol or being involved at special events: Toka, Ankus, Lohat, Latkan and Tengari

e) Equipment needed to control elephant in musth: Spear, Paikar, Bell, Jharkantha, etc.

f) Tools required while taking the elephant long away from the Hattisar: Ghazia, Jhokha, Korka, Sajh, Khurji, Jota, etc.

g) Equipment needed for training a young elephant: Kutni, Chothi, Banda, Agrahan, Petmajha ropes, etc.

Similarly, even though elephants are domesticated by us, they do not behave like domestic animals. If the elephants are free from bondage, they will run away from the *Hattisar* to the forest, so they are tethered under elephant sheds for the above-mentioned activities. To use the elephant for riding, a safe seat (Gaddhi, Houda) is

placed on the back of the elephant and fixed there by Petar, Agot-pachhot and other type of ropes. Similarly, various tools are required for elephant control as well as for training of young elephants.

3.3.8 Elephant Food/Ration

Elephants in the wild keep on eating for more than 18 hours while they cannot do so in domesticated conditions. Therefore, Nepal government has approved a supplementary diet scale for domesticated elephants. This includes 15 kg of rice, 1.5 kg of molasses and 15 grams of salt. The elephant ration is supplied to each elephant camp through contractors. The ration of elephants given to them is thus not balanced and addition of protein and vitamin rich ingredients such as Bengal gram, carrots and some vegetable and fruits are required. Elephants are monogastric herbivorous, non-ruminant, hindgut fermenters and generalized feeders and use the digestive strategy of passing large amounts of low-quality forage through their gut within a relatively short period of time. Asian elephants digest approximately 40–50% of the forage they consume. Elephants are generalized feeders that consume 1.5–2% of their body weight in DM daily, and spend up to 80% of their day feeding (Sukumar 2003; 2006).

3.3.9 Elephant Boarding & Visitors' Platforms

Tourists and other visitors very often are given elephant rides, boarding on elephant back takes place from the elephant boarding platforms. These simple platforms either made up of wooden or concrete structures also saves time, improves safety while boarding and landing, and facilitate the comfort for carrying elephant. Shivapur, Thakurdwara *Hattisar* have already one boarding platform at each *Hattisar*, however in other *Hattisar* Elephant boarding platforms did not exist.

Visitors with a desire to observe elephant's activities at *Hattisar* may be provided a safe place referred as visitor platforms. Such structures were absent on all BNP *Hattisars*.

3.3.10 Steel Barricade & Walkways

Steel barricade at a safe distance in front of the elephant shed attached with a walking path ensures safety that no visitors approach chained elephants directly. A walkway and wooden barricade were built at a safe distance at Shivapur *Hattisar*; however, such structures were absent in other satellite *Hattisars*.

3.3.11 Perimeter Fencing

Perimeter fencing with solar power are present in the Shivapur, however, such fencing is absent in other satellite *Hattisars*.

3.3.12 Elephant Information Center

An elephant information centre, though very useful for national and international visitors, researchers and students, is yet to be established in BNP *Hattisar*.

3.3.13 Waste Disposal Pits

Waste disposal pits were not built and hence not available in designated *Hattisars*, and all waste materials including the elephant dungs were piled up about few meters away behind the respective elephant sheds and burned frequently after drying.

Chapter 4. Proposed Infrastructures for BNP *Hattisar*

4.1 Background

Domesticated elephants in BNP have been proposed to keep at nine locations. Earlier, elephants were kept in 2 locations permanently and other rest locations temporarily and utilized for various activities. One new locations (**East Chisapani area**) has been identified and proposed for keeping elephants.

The main *Hattisar* is at Shivapur and other proposed satellite *Hattisars* are located at Thakurdwara, Dalla, Gaida Machan, Laguna Machan, Guthi, Parewaodar, Rambhapur, East Chisapani and Chepang . The Shivapur *Hattisar* is the main *Hattisar* and is close to the park head quarter holding all responsibilities including administrative, ration supply and elephant health care. The main *Hattisar* at Shivapur as well as other satellite *Hattisars* has common needs to address the accommodation needs of elephant staff, appropriate sheds for elephants, security of the premises from wild elephant bulls, water and electricity supply, facilities for elephant health care and waste management, facilities for pregnant elephants, facilities for female elephants to mate with wild bulls, interpretation centres and viewing platform for tourists are all common necessities for modernization of *Hattisar* facilities. Improvement and construction of these infrastructures and facilities are crucial for proper care and management of elephants as well as safety and wellbeing of elephant staffs employed for elephant management. By addressing these issues and implementing necessary improvements, it is possible to enhance the overall well-being of elephants and the working conditions of the dedicated staffs. Advocacy, collaboration, and a commitment to the welfare of both elephants and the personnel involved are essential for positive change.

4.2 Basic Infrastructures of *Hattisar*

Rigorous discussions with park authorities and field visits and verifications led to the finding that each elephant camp require to have the following general setups of infrastructures (Table 2).

Table 2. Basic infrastructures required in a *Hattisar*

S. No.	Infrastructures	Need and Features
1.	**Elephant shed house**	Elephant sheds are extremely useful to protect domesticated elephants from extreme weather such as extreme heat and cold. The Khamari is placed on the center of the shed where the elephants can be tethered so that move on all sides. The floor of the elephant shed around the Khamari is known as 'Than' and it should be dome shaped gradually slopping on the sides where by the dung and urine drains to the side easily and can be cleaned and sanitized easily. The grasses and fodder

		are also supplied at this floor regularly and effectively. Occasionally the sheds are broken down by domesticated elephant bulls while in musth by pressing the wooden posts or pulling the beams or infrequently by wild bulls visiting the *Hattisars*. Hence, sheds with strong pillars and proper roofing have to be constructed. Elephant sheds accommodating at least two elephants are preferred at least to house mother and the calf. However, larger sheds may be constructed where elephants can have visual and smell communications with each other. There are two options for use of construction materials either RCC pillars or wooden posts. Obviously, the wooden structures would cost cheaper than RCC structures but they are prompt to be damaged by wild elephant bulls frequently visiting the *Hattisar* for mating with female elephants.
2.	**Special elephant shed**	Wild elephants have seasonal visits to domestic elephant camps for mating with domesticated female elephants. This is a very positive impact on the reproduction of domesticated females and for maintaining the viable domesticated elephant population in Nepal. However, wild elephant bulls while visiting the elephant camps not only mate with cow elephants but also come into close contact of the infrastructures such as sheds, ration store and staff quarters. This activity renders the daily life in the camp difficult and risky. Generally wild bulls during their visit spend most of the time wandering here and there in and around the elephant camp and when thirsty visit nearby creeks and ponds for drinking water. Also, they move to the local agriculture fields to gain quickly the lush green fodder or stored grain and return back to the female. Hence an elephant shed shall be constructed outside the boundary of the elephant camp and supplied with female in oestrus and some Kuchi food so that all undesirable consequences due the activities of wild elephant bull is minimized.
3.	**Safety steel barricade and walkways**	A heavy pipeline barricade in the front side of each elephant sheds to retard the visitors from approaching tethered elephants for safety is proposed. Along the safety barricade a paved walkway is proposed.
5.	**Drainage**	Elephant shed must be kept dry foe elephant foot health and easier manoeuvring of elephants. elephant staff need approaching the elephant spaces for tethering, preparing elephants for duties or for providing food and treatments to the sick elephants. The improper drainage system at or near the elephant sheds aggravates the muddy conditions specially during monsoon due to frequent movement of the concerned elephant in and out of the shed, making staff walking difficult and uncomfortable.

6.	**Water supply and Elephant Bath Pond**	Water is an essential component for elephants as well as for attending staff living in the *Hattisar*. Elephants drink a high amount of water and also, they need water for daily bathing. The amount of water needed is higher in hot season. Generally domesticated elephants drink water from the Khola and pokhari while in the work or when they are grazing. But in BNP, such water bodies are very few, hence water supply is very important to maintain elephants living. A pond large enough for elephants bathing has been proposed for construction.
7.	**Ration and Tool Store**	An appropriate building for storing the ration and various tools for elephants is mandatory in every *Hattisar*, the size of the structure depending upon the number of elephants and their care takers. Nepal government provides ration facilities for the elephant care taker too, hence the ration store can be shared for both the subjects. Besides a shared ration store, a small store room is necessary for the storage of ropes, houdas /gaddis, chains, etc. for elephant use and mobilization. A room for ration generally is managed in each *Hattisar* for these purposes, but may require repair and maintenance and measures for pest control.
8.	**Staff Accommodation Facilities**	As care taker staff have to be accompanied with their specifically designated elephant, a proper residential building is needed most preferably on shared room basis. The size of the facility is dependent on the number of domesticated elephants and corresponding staff number; proper staff quarter for 39 elephant staffs with dining facilities has to be provided.
9.	**Office Building**	An office building is mandatory for storage of office documents as well as to perform official works, including a large hall with audio visual equipment for meetings.
10.	**Kitchen and Dining Hall**	As all the elephant staff are staying within the elephant camp, a proper kitchen and dining hall is required. All type of cooking and dining wares are also mandatory. Some sick, lactating and calf elephants need special foods to be prepared every day for them also make use of the same facilities.
11.	**Veterinary Hospital cum Office & Residencies**	The main *Hattisar* for instance in this case, Shivapur *Hattisar*, need a proper medium sized veterinary hospital with office, laboratory and storage rooms for storing medical equipment and veterinary medicines for elephants, Services to satellite *Hattisars* will be provided from this hospital. The veterinary staffs need a special quarter within or near the *Hattisar* compound to deliver veterinary services to domesticated elephants.
12.	**Dipping Tanks**	*Hattisar* need to build a strong dipping tank with three chambers fitting four feet of elephants in each chamber. The dipping tanks floor must be leaking proof and can be drained

		easily through outlets. Veterinarians generally use three types of chemicals for treating elephant foot problems keeping elephant's foot 30 minutes in each compartment of the tank every day until complete recovery. A photograph of a standard dipping tank is provided (Annex 5)
13.	**Electricity Supply**	Electricity is needed for lighting and may be provided by solar system if the main's line is not available.
14.	**Chain-link Fencing with Solar Powered Wire Strands**	Whole *Hattisar* needs a perimeter fencing to protect domestic elephants from wild elephant bulls and other wild animals as well as to prevent unauthorized entry of peoples. It is better to have a strong wall around the *Hattisar*, but since it is expensive, a chain link fence with vertical iron or wooden support at specific distances and a concrete base may be sufficient. These must be enhanced by 3 or four parallel strands of GI Wire with solar powered system of electric fence.
15.	**Visitor Platforms**	Domesticated elephants have been a major source of attraction for tourists and local and foreign visitors travelling to *Hattisar* for observation of these unique animals. Many visitors are fascinated by elephant activities that involves the movement of trunk, ears, legs and tail. Other activities such as such as feeding, urination and defecation, eating kuchi, etc. are also interesting for visitors. Care takers' work such as de-chaining, putting Houdas on the back of elephants and cleaning the stable may be of interest to some visitors. Visitors would like to see these activities as closely as possible. To avoid accidents related to unpredictable behaviours of elephants, a safe platform dedicated to visitors would be extremely useful.
16.	**Elephant Boarding Platform**	Elephant rides are popular among visitors and tourists and is a way to generate revenues for the park. An elephant boarding platform within the *Hattisar* would enhance different categories of visitors such as women, children and elderly visitors.
17.	**Waste /Dirt Disposal Pits**	Elephants in captivity generate a large amount of waste materials. Their habit of eating fodder and grasses are unique and leave a large amount of leftover grass and tree branches that builds up to a big heap within few weeks of time. Also, their faecal balls accumulate to huge piles within few weeks. The *Hattisar* need a special place to deposit all these waste products.
18.	**Elephant Information Center**	An information center focused on elephant management and utilization, behaviour, breeding and conservation status is needed in the main *Hattisar* for visitor education.

4.3 Proposed Infrastructures Budget for Shivapur and Satellite *Hattisars*

After an in-depth study, various consultative meetings and field visit to Shivapur *Hattisar* and respective satellite *Hattisar*s, the team assessed the infrastructures to be built as new (described in Section 4.1) and tabulated as follows (Table 3) and the new plan for Shivapur *Hattisar* and other satellite *Hattisar*s are provided (Figure 14-22, Table 4).

Table 3. Assessment of number of infrastructures required for BNP *Hattisar*

S.N.	Infrastructure	Main	Satellite *Hattisars*									Total
		Shiva *	THQ	Dal	Gaida	Lagu	Pare	Ram	Chep	Chisa	Guthi	
1.	Elephant shed	0	1	0	0	0	1	0	-	1	1	4
2.	Shed maintenance with wooden ceilings	3	1	1	1	1	1	1	1	1	1	11
3.	Steel barricade and walkways	1	1	1	1	1	1	1	1	1	1	10
4.	Pond	1	-	-	-	-	-			1		2
5.	Ration store	-	-	1	1	1	1	1	1	1	1	8
6.	Mahout quarters	-	-	1	1	1	1	1	1	1	1	8
7.	Maintenance staff quarter	-	-	-	-	-	-			1		1
8.	Overhead Water tanks	1	1	1	1	1	1	1	1	1	1	10
9.	Electricity/Solar electricity	1	1	1	1	1	1	1	1	1	1	10
10.	Veterinary hospital	1	-	-	-	-	-	-	-	-	-	1
11.	Quarter for Vets	1	-		-	-	-	-	-	-	-	1
12.	Foot dipping tank for elephants	1	1	1	1	1	1	1	1	1	1	10
13.	*Hattisar* fencing	1	1	1	1	1	1	1	1	1	1	10
14.	Visitor platforms	1	1	1	1	1	1	1	1	1	1	10
15.	Boarding platform	1	1	1	1	1	1	1	1	1	1	10
16.	Information Center	1	-	-	-	-	-	-	-	-	-	1
17.	Village fencing (Shivapur)	1	-	-	-	*	-	-	-	-	-	1
18.	Waste disposal site	1	1	1	1	1	1	1	1	1	1	10
19.	*Hattisar* Kitchen	1	1	1	1	1	1	1	1	1	1	10
20.	Drainage channel around *Hattisar*	1	1	1	1	1	1	1	1	1	1	10
21.	Water supply scheme	1	1	1	1	1	1	1	1	1	1	10
22.	Animal ambulance	1	-	-	-	-	-	-	-	-	-	1

* Shiva=Shivapur,-THQ= Thakurdwara Head Quarter, Dal = Dalla, Gaida= Gaida Machan, Lagu = Laguna Machan, Ram = Rambhapur, Parewa = Parewaodar, Chep = Chepang, Chisa= East Chisapani

Chapter 5. Proposed Infrastructures for Domesticated Elephants and Staffs at BNP *Hattisars*

The budget for Bardiya NP *Hattisars* is estimated by engineers and biologists on the basis of field observations and direct measurements. During the field work the research team has consulted with *Hattisar* staff, park staff, and hotel association members. The following proposed estimated calculation is also based on the DOMESTICATED ELEPHANT MANAGEMENT PLAN of PARSA NATIONAL PARK which was submitted in March 2024.

The total budget calculated for the infrastructures of main Shivapur *Hattisar* and other 9 satellite *Hattisars* is for five years. The estimated budget totals NPR **90,779,776.93** where as it accounts an average sum of NPR **18,155,955.39 per annum.**

The highest amount of budget estimated is of Shivapur (Main) Hattisar (NPR 17,499,497.0) where 10 domesticated Asian elephants will stay for different purposes. The lowest budget incurred is for East Chisapani Hattisar (NPR 4,376,686.0) which has been proposed especially for tourism purposes. This budget calculation is included in the corresponding tables (Table 4-13).

Table 4. Proposed cost of infrastructures at Shivapur (Main *Hattisar*)

A.	**Shivapur *Hattisar* (10+1)**			
		No.	Rate	Total
1.	Existing Sheds - Repair and Maintenance for 10 elephants with wooden ceiling	10	300000.0	3,000,000.0
2.	Steel barricade and walkways in front of sheds	1	500,000.0	500,000.0
3.	Sheds for Mating (Wild bull Elephant, wooden ceiling)	1	1,200,000.0	1,200,000.0
4.	Veterinary Doctor Quarter and Clinic	1	4,000,000.0	4,000,000.0
5.	Food preparation & Storage	1	1,000,000.0	1,000,000.0
6.	Hatti Boarding Platforms	2	414436.0	828,872.0
7.	Drainage canal around boundary	565	125.0	70,625.0
8.	Water supply scheme	1	500,000.0	500,000.0
9.	Animal Ambulance	1	4,500,000.0	4,500,000.0
10.	Water Storage Tank	1	500,000.0	500,000.0
11.	Waste disposal pit construction	1	700,000.0	700,000.0
12.	Pond construction for baby elephants	1	700,000.0	700,000.0
	Grand Total			17,499,497.0

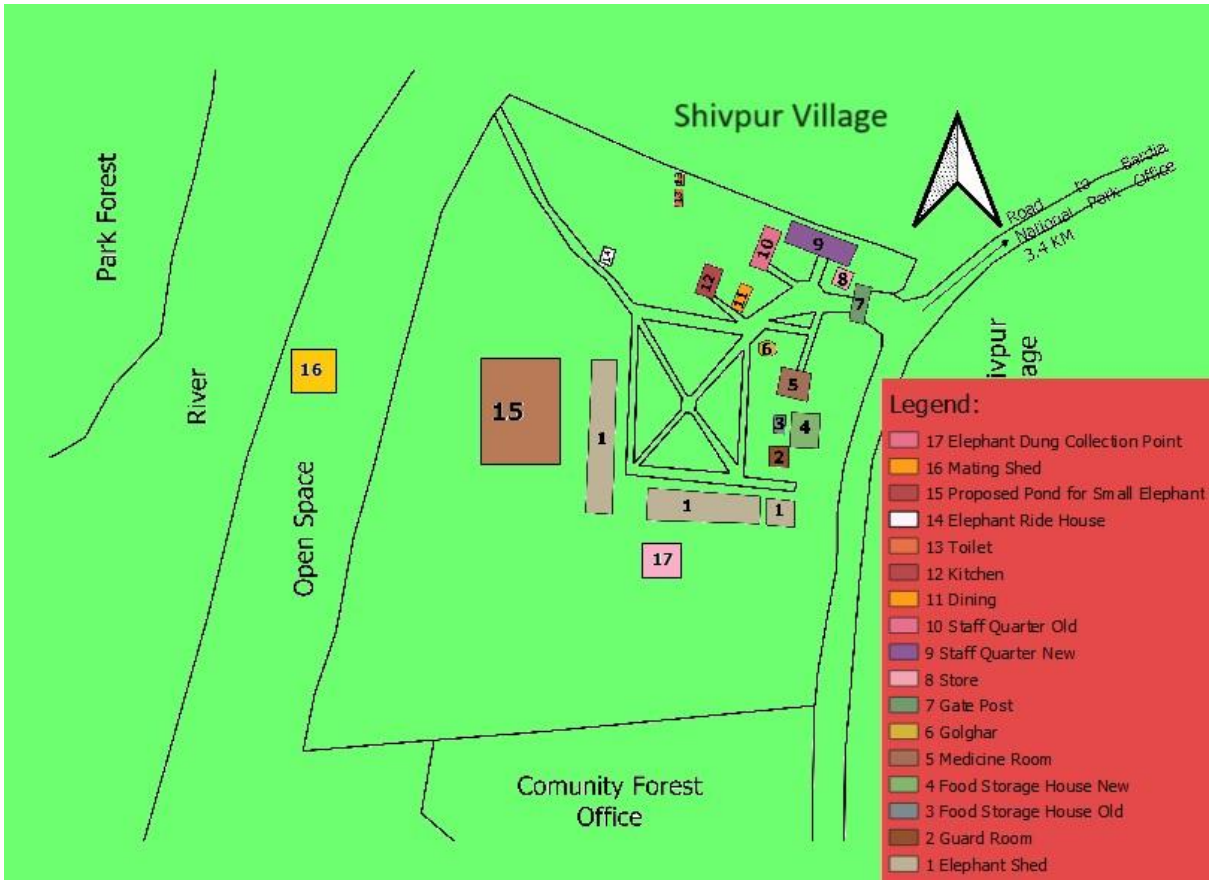

Figure 14. Proposed plan and *Hattisar* infrastructures for Shivapur *Hattisar*

Table 5. Proposed Cost of infrastructures at Guthi (Satellite *Hattisar*)

B.	**Guthi satellite Hattisar (4)**			
		No.	Rate	Total
1.	Shed const. for captive Elephant (with wooden ceiling for two elephants)	1	1,200,000.0	1,200,000.0
2.	Shed maintenance with wooden ceiling for 2 elephants	2	300,000.0	600,000.0
3.	Steel barricade and walkways in front of sheds	1	300,000.0	300,000.0
4.	Shed for mating (Wild bull Elephant) with wooden ceiling	1	1,200,000.0	1,200,000.0
5.	Staff Quarter new (7 Rooms with kitchen)	7	873,276.33	6,112,934.33
6.	Food preparation & storage	1	700,000.0	700,000.0
7.	Hatti Boarding Platform – new	1	414,436.0	414,436.0
8.	Solar Electrical Fence (m.)	100	3,500.0	350,000.0
9.	Solar Energiser Machine	2	28,000.0	56,000.0
10.	Water canal around boundary (m.)	100	125.0	12,500.0
11.	Water Storage Tank	1	500,000.0	500,000.0
11	Waste disposal pit construction	1	500,000.0	500,000.0
	Grand Total			**11,945,870.3**

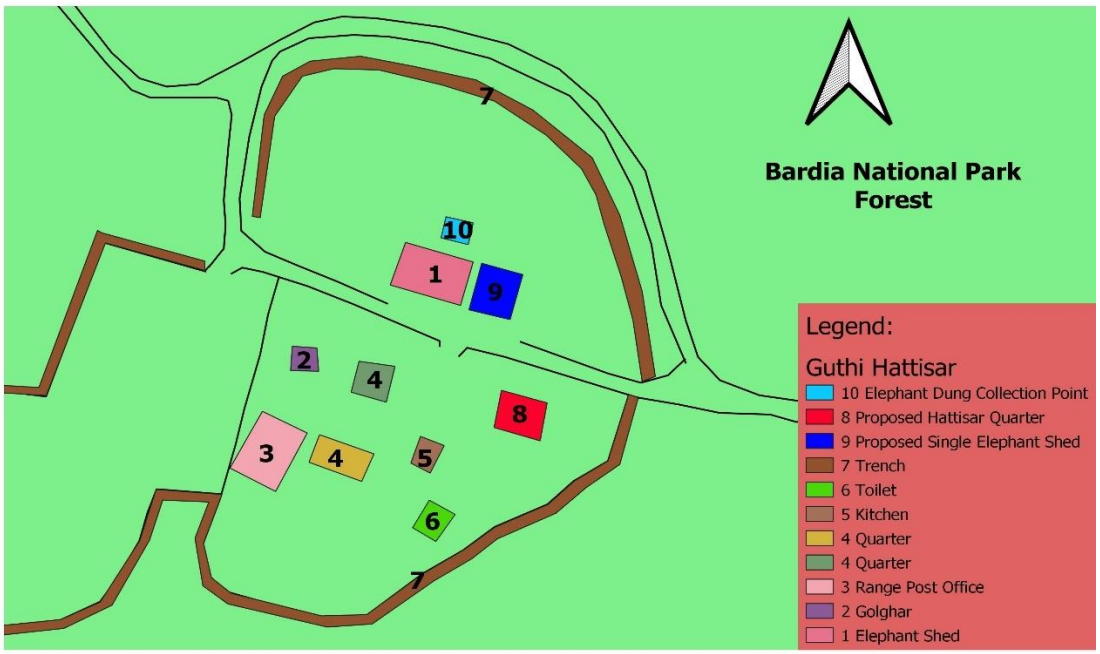

Figure 15. Proposed *Hattisar* plan at Guthi

Table 6. Proposed Cost of infrastructures at Chepang for *Hattisar*

C.	**Chepang Satellite *Hattisar*(2)**			
		No.	Rate	Total
1.	Existing shed maintenance for Elephant (Wooden Ceiling for two elephants)	2	300,000.0	600,000.0
2.	Steel barricade and walkways in front of sheds	1	300,000.0	300,000.0
3.	Staff Quarter & store (5 room for 6 staff)	5	873,276.33	4,366,381.66
4.	Hatti Boarding Platform	1	414,436.0	414,436.0
5.	Solar Electrical Fence	250	3,500.0	875,000.0
6.	Solar Energiser Machine	2	28,000.0	56,000.0
7.	Drainage canal around boundary	250	125.0	31,250.0
8.	Water Storage Tank	1	500,000.0	500,000.0
9.	Waste disposal pit construction	1	500,000.0	500,000.0
	Grand Total			**7,643,067.66**

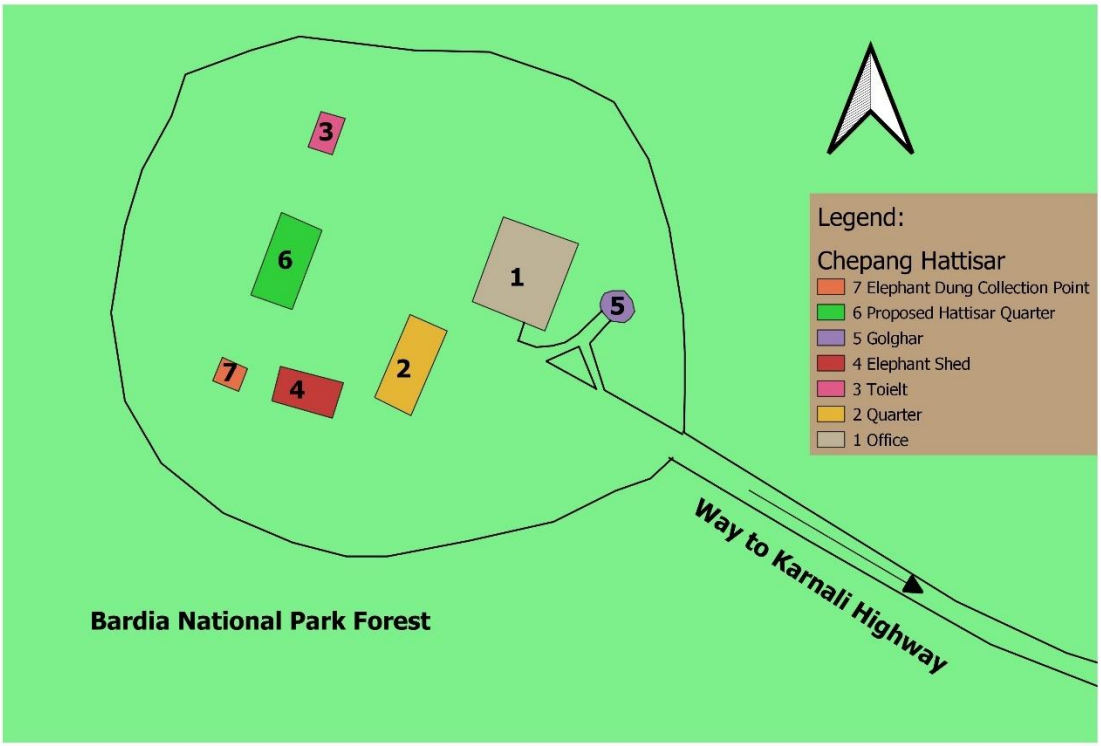

Figure 16. Purposed plan & *Hattisar* infrastructures at Chepang

Table 7. Proposed cost of infrastructures at Parewaodar *Hattisar*

D.	**Parewaodar Post (4)**			
		No.	Rate	Total
1.	Shed for Elephant (with Wooden ceiling)-new	1	1,200,000.0	1,200,000.0
2.	Maintenance existing shed with wooden ceiling	1	600,000.0	600,000.0
3.	Steel barricade and walkways in front of sheds	1	300,000.0	300,000.0
4.	Staff Quarter New (7 Rooms with kitchen)	7	873,276.33	6,112,934.33
5.	Food preparation & storage	1	700,000.0	700,000.0
6.	Hatti Boarding Platform	1	414,436.0	414,436.0
7.	Solar Electrical Fence	250	3,500.0	875,000.0
8.	Solar Energiser Machine	2	28,000.0	56,000.0
9.	Drainage canal around boundary	250	125.0	31,250.0
10.	Water Storage Tank	1	500,000.0	500,000.0
11.	Waste disposal pit construction	1	500,000.0	500,000.0
	Grand Total			**11,289,620.33**

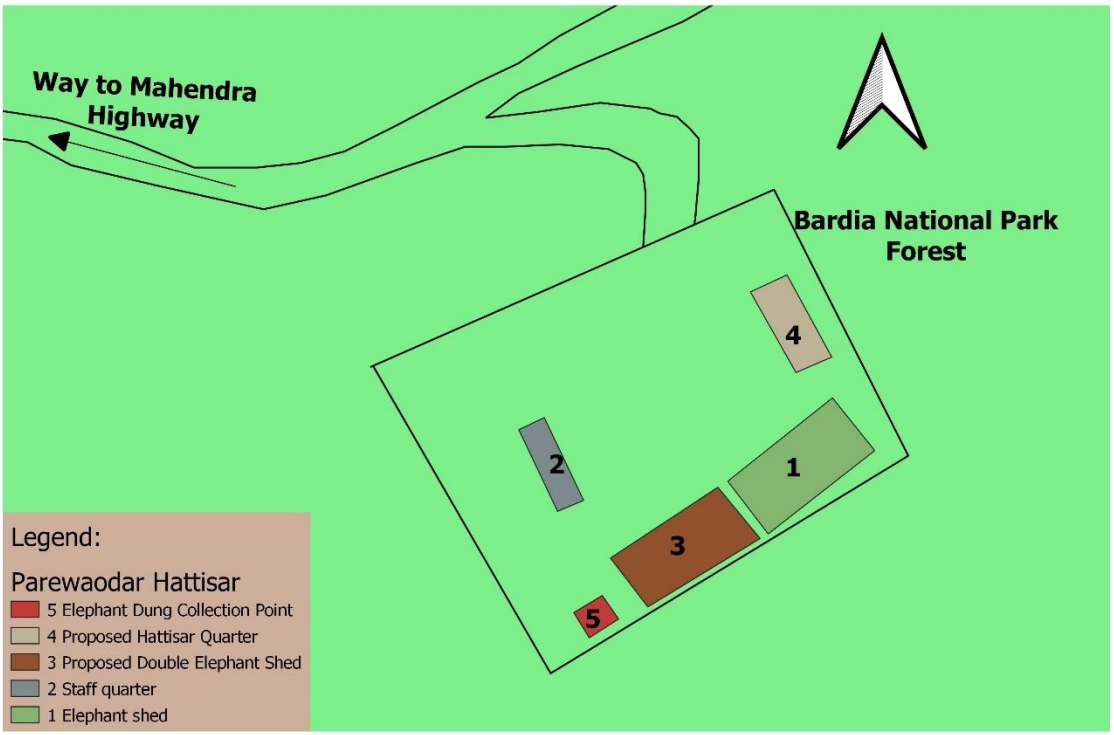

Figure 17. Proposed plan and Hattisar infrastructures at Parewaodar

Table 8. Proposed cost of *Hattisar* infrastructures at Rambhapur

E. Rambhapur Post (2)				
1.	Maintenance of existing shed with wooden ceiling	No.	Rate	Total
2.	Steel barricade and walkways in front of sheds	1	600,000.0	600,000.0
3.	Staff Quarter & Store (5 room for 6 people- new)	1	300,000.0	300,000.0
4.	Hatti Boarding Platform	5	873,276.33	4,366,381.66
5.	Solar Electrical Fence	1	414,436.0	414,436.0
6.	Solar Electrical Fence	250	3,500.0	875,000.0
7.	Solar Energiser Machine	2	28,000.0	56,000.0
8.	Drainage canal around boundary	250	125.0	31,250.0
9.	Water Storage Tank	1	500,000.0	500,000.0
10.	Waste disposal pit construction	1	500,000.0	500,000.0
	Grand Total			7,643,067.66

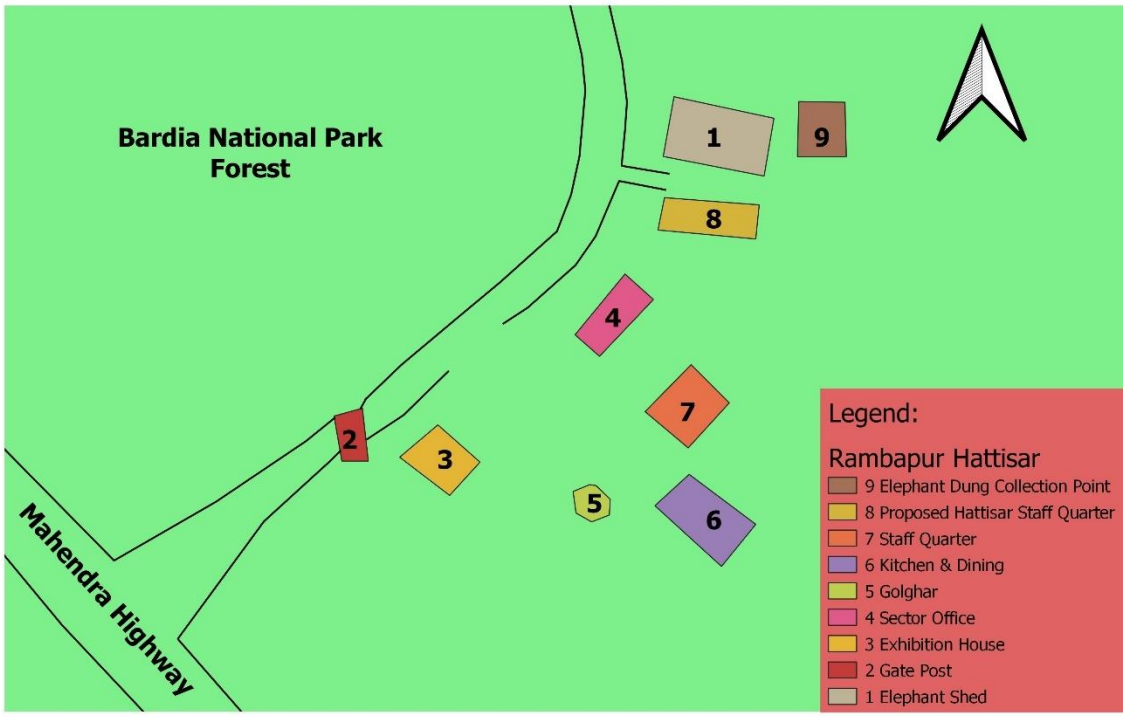

Figure 18. Proposed plan for Hattisar infrastructures at Rambhapur

Table 9. Proposed Cost of *Hattisar* infrastructures at Gaida Machan area

F.	**Gaida Machan Post (2)**			
		No.	Rate	Total
1.	Maintenance existing shed with wooden ceiling	1	600,000.0	600,000.0
2.	Steel barricade and walkways in front of sheds	1	300,000.0	300,000.0
3.	Staff Quarter & Store (5 room for 6 people- new)	5	873,276.33	4,366,381.66
4.	Hatti Boarding Platform	1	414,436.0	414,436.0
5.	Solar Electrical Fence	250	3,500.0	875,000.0
6.	Solar Energiser Machine	2	28,000.0	56,000.0
7.	Drainage canal around boundary	250	125.0	31,250.0
8.	Water Storage Tank	1	500,000.0	500,000.0
9.	Waste disposal pit construction	1	500,000.0	500,000.0
	Grand Total			**7,643,067.66**

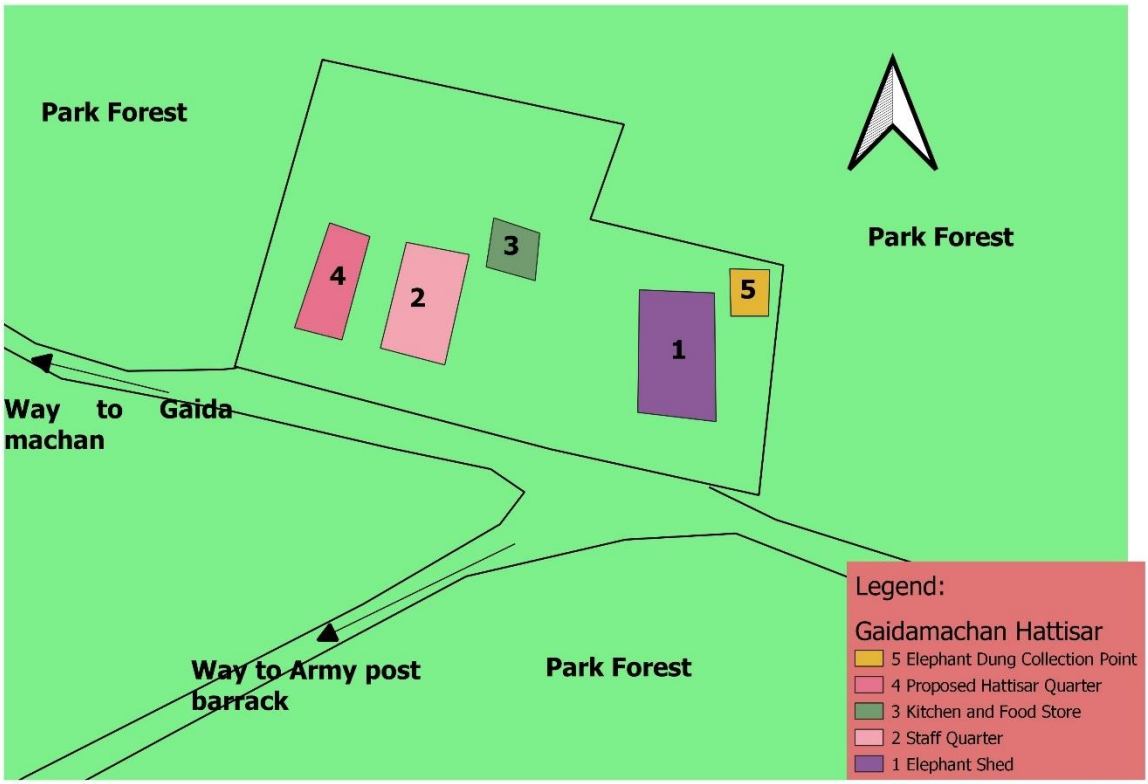

Figure 19. Proposed Hattisar plan for Gaida Machan area

Table 10. Proposed Cost of S. *Hattisar* infrastructures at Laguna Machan area

G.	**Laguna Machan Post (2)**			
		No.	Rate	Total
1.	Maintenance existing shed with wooden ceiling	1	600,000.0	600,000.0
2.	Steel barricade and walkways Infront of sheds	1	300,000.0	300,000.0
3.	Staff Quarter & Store (5 room for 6 people- new)	5	873,276.33	4,366,381.66
4.	Hatti Boarding Platform	1	414,436.0	414,436.0
5.	Solar Electrical Fence	250	3,500.0	875,000.0
6.	Solar Energiser Machine	2	28,000.0	56,000.0
7.	Drainage canal around boundary	250	125.0	31,250.0
8.	Water Storage Tank	1	500,000.0	500,000.0
9.	Waste disposal pit construction	1	500,000.0	500,000.0
	Grand Total			**7,643,067.66**

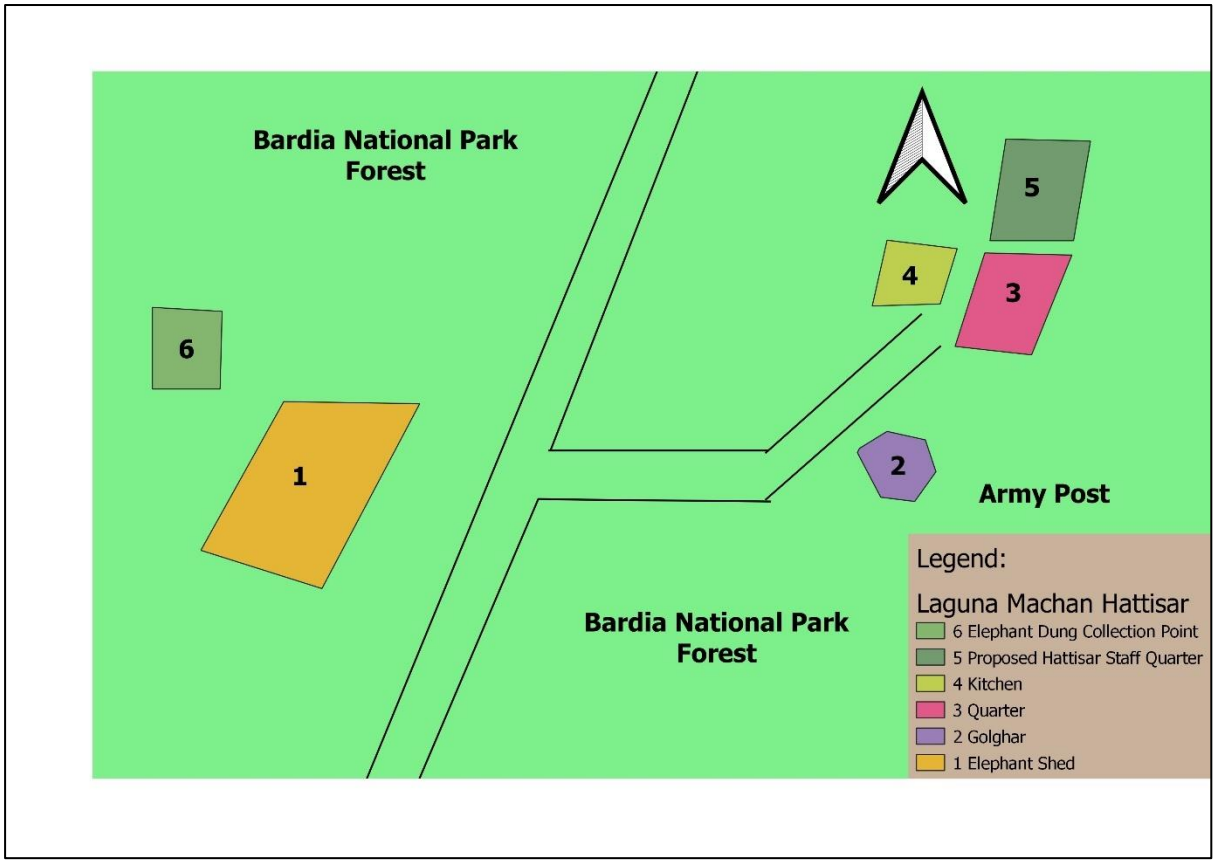

Figure 20. Proposed plan for Hattisar infrastructures at Laguna Machan

Table 11. Proposed cost of Hattisar infrastructures at Dalla area

H.	**Dalla Post (2)**			
		No.	Rate	Total
1.	Maintenance existing shed with wooden ceiling	1	600,000.0	600,000.0
2.	Steel barricade and walkways Infront of sheds	1	300,000.0	300,000.0
3.	Staff Quarter & Store (5 room for 6 people- new)	5	873,276.33	4,366,381.66
4.	Hatti Boarding Platform	1	414,436.0	414,436.0
5.	Solar Electrical Fence	250	3,500.0	875,000.0
6.	Solar Energiser Machine	2	28,000.0	56,000.0
7.	Drainage canal around boundary	250	125.0	31,250.0
8.	Water Storage Tank	1	500,000.0	500,000.0
9.	Waste disposal pit construction	1	500,000.0	500,000.0
	Grand Total			**7,643,067.66**

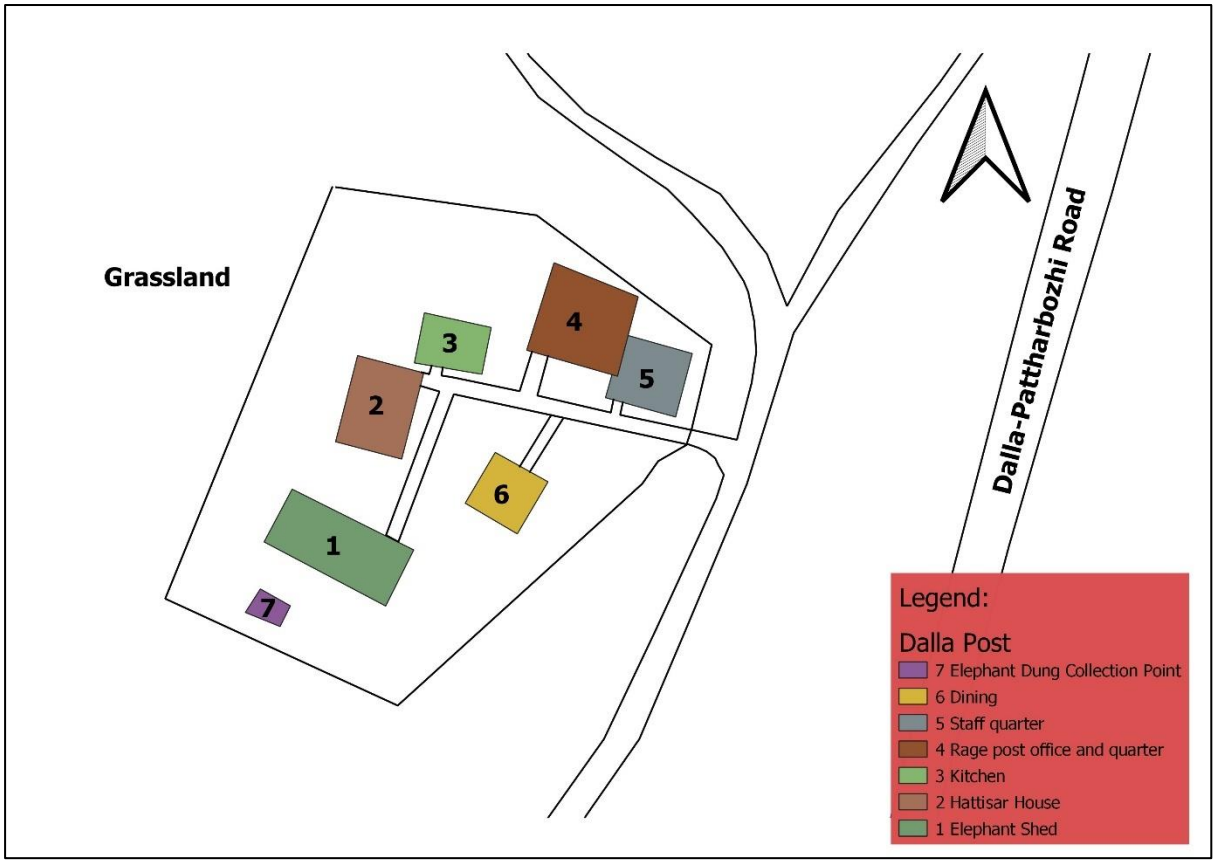

Figure 21. Proposed plan for Hattisar infrastructures at Dalla *Hattisar*

Table 12. Proposed cost of Hattisar infrastructures at East Chisapani area

I.	**East Chisapani Post (2)**			
		No.	Rate	Total
1.	Construction of shed with wooden ceiling	1	1,200,000.0	1,200,000.0
2.	Steel barricade and walkways in front of sheds	1	300,000.0	300,000.0
3.	Maintenance of Staff Quarter & Store (old office)	5	1,000,000.0	1,000,000.0
4.	Hatti Boarding Platform	1	414,436.0	414,436.0
5.	Solar Electrical Fence	250	3,500.0	875,000.0
6.	Solar Energiser Machine	2	28,000.0	56,000.0
7.	Drainage canal around boundary	250	125.0	31,250.0
8.	Water Storage Tank	1	500,000.0	500,000.0
9.	Waste disposal pit construction	1	500,000.0	500,000.0
	Grand Total			**4,876,686.0**

Table 13. Proposed cost of Hattisar infrastructures at Thakurdwara area

J.	**Thakurdwara (Main) Hattisar (4)**			
		No.	Rate	Total
1.	Sheds const. for captive Elephant (with wooden ceiling for one elephant)	1	600,000.0	600,000.0
2.	Wooden ceiling for 3 existing elephant sheds	3	300000.0	900,000.0
3.	Steel barricade and walkways in front of sheds	1	300,000.0	300,000.0
4.	Staff Quarter New (3 Rooms with kitchen)	3	873,276.33	2,619,829.0
5.	Food Preparation & Storage	1	700,000.0	700,000.0
6.	Hatti Boarding Platform – new	1	414,436.0	414,436.0
7.	Solar Electrical Fence (m.)	100	3,500.0	350,000.0
8.	Solar Energiser Machine	2	28,000.0	56,000.0
9.	Water canal around boundary (m.)	100	125.0	12,500.0
10.	Water Storage Tank	1	500,000.0	500,000.0
11.	Waste disposal pit	1	500,000.0	500,000.0
	Grand Total			**6,952,765.0**

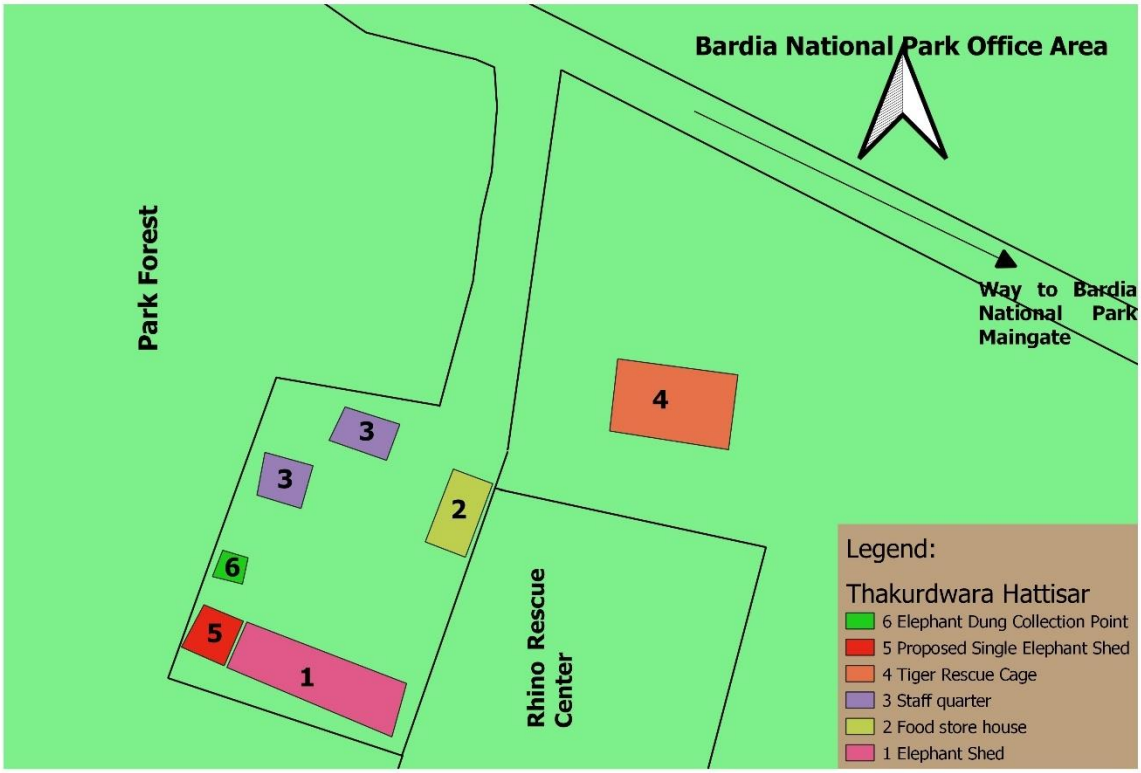

Figure 22. Proposed plan for *Hattisar* infrastructures at Thakurdwara *Hattisar*

Chapter 5. The Management Plan of BNP Hattisar

5.1 Background

Preparation of Management Plan for *Hattisar* is a quite new concept and it has been prepared for the first time for a period of 5 years. The objectives are directed towards both the domesticated elephants and their staffs as they are interlinked in terms of housing, safety, performance and welfare of each elephant and concerned staff. The activities are pointed out based upon the interviews of park personnel, elephant handling staff and experiences of retired peoples that were engaged in the *Hattisar* management for more than two decades. The *Hattisar* management plan has primarily been prepared focusing on domesticated elephants to render safe and efficient elephant handling, service deliveries and provision of best welfare activities to elephants. A periodic review will further polish the actions to be taken to achieve the goal.

5.2 Vision

The domesticated Hattisar Management Plan for Bardiya National Park serve as a guiding document to maintain its *Hattisar* and domesticated elephants and be a part of CITES enlisted (Appendix II) Asiatic elephant (*Elephas maximus*) conservation in domesticated state. The plan is envisaged to provide best husbandry and welfare practices to domesticated elephants and its staffs. It also envisioned for the gene pool conservation of Asiatic elephant in Ex-situ conservation and management.

5.3 Goal

The goal of BNP *Hattisar* Management Plan is to establish domesticated elephants in a healthy working environment together with elephant handling staffs facilitating best housing, feeding, health care and utilization so as they are best managed for the protection of natural resources. Another goal of this management plan is to transform the existing traditional elephant handling knowledge to younger generation of BNP *Hattisar* the knowledge is inevitable to address biodiversity conservation, research promotion and minimize wildlife related conflicts in BNP areas.

5.4 Objectives

The main aim of the BNP *Hattisar* Management Plan is to encourage safe and efficient elephant handling to facilitate day to day work of the park protection including promotion of eco-tourism within the park and its buffer zone area. Besides this, the domesticated elephants themselves are highly valuable animals under endangered species list, hence equally important aim is to provide them proper care through improved management practices. Equally important objective is to provide tools and equipment specific to elephant use and management as well as emphasize on safety of elephant handling staffs as well as that of visitors.

Objective

The main objective is to assess the existing management status of domesticated elephants and their staffs at *Hattisar* of Bardiya National Park (BNP) and recommend for improvement.

A. Specific objectives:

- To provide best husbandry and welfare practices to domesticated elephants at Shivapur and other satellite *Hattisars* (Thakurdwara, Dalla, Gaida Machan, Laguna Machan, Guthi, Parewaodar, Rambhapur, East Chisapani and proposed Chepang) in BNP.

Rationale

Domesticated elephants are CITES Appendix II listed animals and they are under human control most of the time. They have been deputed for human service after capture and training. As they are used for park management and tourism activities, timely feeding, grazing, bathing, etc. are mandatory for efficient working. For better sleeping at night, it is better to tether them under a proper shed without any unwanted fears, for which they are brought to *Hattisar* camp despite wherever they were taken for pursuance of duties. BNP elephant camps are frequented by wild elephant bulls and sometimes, the domesticated elephant sheds are broken by them. Hence, sheds with strong posts (preferably concrete) and heat proof roofing materials are to be selected. Water is a basic need for domesticated elephants which is greatly deprived in BNP habitats. There are minimal wetlands in BNP restricting working elephant drinking water while at work of patrolling. The main *Hattisar* at Shivapur is also facing scarcity of water during winter as the Geruwa Karnali is changing its course to the western boundary of the park. Water availability in BNP areas is highly fluctuating as per the wet and dry seasons. The park normally undergoes through prolonged drought period during hot summer season.

It is well known that elephants need plenty of quality water for drinking and bathing and it is obvious that BNP and its *Hattisar* at new locations may face scarcity of water during dry season. Hence, water supply scheme has to be improved through either pumping and storing in an overhead tanks or creating water reservoir facilities by damming smaller streams in the local area.

Output

The domesticated elephants in BNP *Hattisar* will have longer life because of better housing, balanced diet, health care and justifiable use for park protection and tourism. Frequency of elephants being useless for work, increased costs for diagnostic and treatment, and finally replacement costs for new elephants will be minimized.

Activities

1. Construction of appropriate elephant sheds at Shivapur and other satellite *Hattisars* such as Dalla, East Chisapani, Chepang and Guthi posts.

2. Construction of capacious over the ground water storage tank at Shivapur and other satellite *Hattisars*.
3. Develop elephant bath facilities at Shivapur and other satellite *Hattisars*.
4. Construct elephant dung and other wastage disposal facilities at each elephant camp.
5. Establish electricity supply from electricity cable sources, if not by solar energy collection.
6. Establish solar powered fencing along with chain linked mesh wire network along the perimeter of Shivapur as well as other satellite *Hattisars* to retard contact of feral wild animals as well as wild elephant bulls.
7. Establish proper drainage in the *Hattisar*.
8. Construct a robust Ration store for elephants and staff at satellite *Hattisars*
9. Construct elephant boarding platforms for easy elephant rides and vice versa.
10. Water supply for elephants as well as staffs. Alternative sources for water are investigated and channelled to *Hattisars* by proper means.
11. Construct visitor platforms to prevent tourist elephant accidents as well as a place for observation and rest.
12. Construct Steel barricade and walkways in front of the elephant shed to check direct contact of elephant and tourists and as a beautifying step for *Hattisar*.

B. To provide standard accommodation and other facilities for elephant staffs

Rationale

Accommodation facilities for elephant staffs at satellite *Hattisars* in BNP are not of standard quality except at Shivapur *Hattisar*. The standard and dedicated humane services to domesticated elephants are indirectly affected by the quality of accommodation and fair administration practices for elephant staffs in the camp. This includes availability of at least shared rooms, lighting, good toilets and bath room, kitchen and dining facilities as well as meeting hall facilities. Also, elephant boarding/ visitor platforms, barricades and a paved walkways will increase safety and aesthetic values of *Hattisars*.

Output

Standard living and dining facilities are prerequisite for a human being either elephant staff or any other. An improvement in existing accommodation and dining facilities in the *Hattisar* will give a positive impact on the physical and mental health status of elephant staffs and there by a good care service to domesticated elephants.

Activities

1. Improve or construct shared staff quarters with lighting, dining and bathroom facilities at Shivapur and other satellite *Hattisars*.
2. Provide sanitizers and disinfectants for cleaning kitchens and toilets, and electricals for lighting and bed (Khat) for sleeping.

3. Provide water buckets, tea cups, cooking and serving utensils (plates, cups and drinking glasses), and axes and wood saws.

C. To provide utility tools for elephant operation

Rationale

Various kinds of tools are involved in the management and utilization of domesticated elephants to perform given tasks. This includes tethering chains, tools for controlling elephants in musth, gadgets to carry grass loads and passengers as well as visitors and tools for training young elephant calves. Various types of ropes, grass cutting tools, taraha, lampat, gaddi and houdah are among them. These tools are generally supplied by the parent office, however timely supply have to be considered.

Outputs

Prompt supply of tools and gadgets required for utilization of domesticated elephants shall afford safe and prompt performance of given duties.

Activities

1. Timely purchase, storage and distribution of elephant tools and gadgets to concerned *Hattisar*.

D. Prompt supply and amendment of existing ration items of domesticated elephants with addition of protein component and fruits and expedite the recruitment process of vacant posts (Mahout, Pachhuwa, Phanit and others) and establish life insurance facilities for elephant staffs.

Rationale

Additional ration supplement to domesticated elephants have been regularly supplied to Hattisars through contractors. The ration comprises of 15 kg of rice, 1.5 kg of molasses and 25 gram of table salt daily. Seasonal fruits such as carrot, apple, banana, etc. and protein (gram) and mineral supplement are lacking in their approved ration scale. An amendment in the list of rations items would enhance the health and working efficiency of domesticated elephants.

Output

The amendment in the existing elephant ration scale with inclusion of fruits, mineral and protein supplement would strengthen the health and well-being of domesticated elephants in the camp.

Activities

1. BNP office will recommend and process the amendment of existing ration items and scale of domesticated elephants as it cost extra expenses for the government.
2. Lobbying with DNPWC and line ministry for the creation of Elephant Service Group in Civil Service Act.
3. Prompt official processing for recruitment of vacant staff positions.
4. Liaison with insurance companies to ensure the elephant staff life insurance.

5. Incentive /overtime allowances for elephant staff through BZMC, BNP, Local govt, etc.

E. To address the shrinking elephant grazing area, and scarcity of palatable grasses, vines and tree fodder for domesticated elephants within the park.

Rationale

Grass and fodder for domesticated elephants is depleting year by year. The distance for collection of fodder and grazing areas from Shivapur *Hattisar* is increasing every year due to over exploitation of resources. A new grazing land or grassland should be created for the shake of grazing of domesticated elephants in BNP. Because of low rainfall and poor soil fertility compared to Chitwan area, the grass lands in BNP are not productive and thus, fodder and grasses has become scarce gradually. Lehmkuhl (1989) reported that an average of 153 kg fresh grass fodder was cut for each domestic elephant per day in CNP and about 20 kg dry wt. was estimated to be consumed during free grazing. Fodder at stall feeding consumed by domesticated elephants in BNP was found minimum of 565750 kg and maximum of 700800 kg annually. Grazing amount consumed by domesticated elephants was calculated at minimum of 98,550 kg and a maximum of 129575 kg in BNP (DNPWC, 2009; Yadav, 2013).

Output

Grass and fodder for domesticated elephants of BNP will be available all year round through a man-made new grassland within the park at convenient location. Annual requirement of grasses and fodder for elephants will be met through plantation or protection of common fodder tree species and palatable grass species in appropriate locations. This is not so important for elephants that live in Karnali flood plains but is crucial for some other areas such as Chepang and East Chisapani posts.

Activities

1. Creation and management of additional grazing areas (10-15 hectares) for the domesticated elephants within the park at convenient locations.
2. Palatable fodder trees are planted and protected in and around the grasslands so that elephant fodder is available in future.

F. To construct domestic elephant information centre for visitors/tourists.

Rationale

Elephant back safaris in the park are popular tourist activities. Tourism friendly elephant information center at least at Shivapur and Thakurdwara *Hattisars* will enhance the knowledge of the visitors and would impress on repeated visits. Additionally, this would aid on generation of park royalties too.

Output

Visitor's level of understanding on role of domesticated elephants on conservation, protection, and visitor entertainment in BNP will be promoted. The park will have increased fame over the national and international community.

Activities

1. Construction of at least one Elephant Information Centre on each Shivapur and Thakurdwara *Hattisars*.
2. Printing of leaflets or brochures for distribution to visitors/tourists

G. To train elephant staffs about occupational safety and hazards and train wild elephant affected local peoples about HECx

Rationale

Adult and sub adult wild elephant bulls frequently visit domesticated elephant camps for courtship and mating. In the meantime, they are confronted with local villagers if there are any in the vicinity. These elephants sometimes eat crops and may damage houses or accidentally kill peoples. Examples can be found at Shivapur *Hattisar*

of BNP. Occasionally, local peoples react wildly against such behaviour of wild elephants visiting *Hattisars*. Elephant staffs also sometime chase the visiting wild elephant bulls so as to prevent human injuries and killing, but occasionally misbehaviour or mistreatment to wild elephants make them more vicious and aggressive to peoples.

Output

Elephant staffs gain additional skill to adapt occupational hazards while working for domesticated elephants and then the accidents due to negligence and misbehaviour to elephants will be reduced. Similarly, local peoples around the *Hattisar* will be trained to co-exist with visiting wild bulls and utilize the opportunity of attracting tourists and local visitors. Local people will understand how behaviour change can contribute to the safety of both elephant and residents. The utility of solar powered fence all around the village to protect the life of peoples will be well understood in the due course of time.

Activities

1. Organize short talk program on elephant behaviour to elephant staffs and villagers couple of times in a year.
2. Train elephant staffs and visitors not to produce noises while the wild bull is mating or with female.
3. Arrange food items to feed the visiting wild bull while it is in the *Hattisar* so that it does not move to the village in search of food.
4. Construct an extra elephant shed outside the camp boundary where domesticated elephant in oestrous can be tethered and wild bull elephant can have the opportunity of mating with female.
5. Construct a strong solar power fence around all *Hattisars* for the safety of elephant staffs and their residences from wild elephants.
6. Construct solar power fence around Shivapur village for the shake of the protection from wild bull elephants. This can be constructed in collaboration with BNP, buffer zone users committee, local government and hoteliers.

H. Addition of number of domesticated elephants, handler positions and elephant posts for BNP and to expedite the recruitment process of vacant posts (Mahout, Pachhuwa, Phanit and others) and establish life insurance facilities for elephant staffs.

Rationale

The care, wellbeing and working efficiency of domesticated elephants for patrolling, wildlife rescue, wildlife research and participation in special wildlife events such as wildlife census, wildlife translocations, etc. solely depend upon the fulfilment of elephant staffs' post for each domesticated elephant. This has been a cumbersome since long time and many posts are fulfilled on contract basis. The staffs employed on contract basis leave job erratically and the post remains vacant for long time. This result additional working load for remaining staffs of the specific domesticated elephant. hence fulfilment of the post through Civil Service Commission permanently is the best way to offer care and services to the elephants present at *Hattisar*. As the civil duties with domesticated elephants is a risky one, the provision of accidental or life insurance of key positions would aid elephant's care and performance.

Output

Supplementation of trained elephants in the BNP *Hattisar* network will enhance the park protection and delivery of related services through the use of trained domesticated elephants and their staffs. Working efficiency and lifetime of domesticated elephants and moral of elephant staff is strengthened.

Activities

1. Prompt official processing for recruitment of vacant posts. Prompt processing of demands of more trained domesticated elephants for BNP through official decisions.
2. Liaison with insurance companies to insure the elephant staffs for accidental or life insurances.
3. Amendment of O & M of BNP *Hattisar*
4. Capacity building of the elephant staffs has not been adequately addressed. The park management has still relied on same number of Mahouts and other support staffing from its inception, structure, technical competencies, infrastructures, logistics and equipment and motivation. Therefore, a wide range of institutional and infrastructural capacity building is required along with a tour of elephant camps in the neighbouring countries.
5. Training program for elephant staff (7 days long, 20 participants each year).

I. Establish standard domesticated elephant health care facilities at Shivapur *Hattisar*

Rationale

BNP has a position of Veterinary doctor in its administrative structure for the purpose of welfare of domesticated elephants with curative as well as preventive health

management, wildlife rescue and management of orphan animals. Wildlife work is mostly team work hence the positions under him such as Junior Technician, Junior Technical Assistant, etc. need to be added. All requirements including availability of Ambulance, clinics building, surgical and diagnostic tools, foot care tools and dipping tank, darting tools and microchipping tools are to be provided. Veterinary medicines required for capture and treatment of wild animals including domesticated elephants should be maintained at the BNP *Hattisar*. This facility and experts will also take care of the injured and sick domesticated elephants of other satellite *Hattisars*. Deadly infectious disease such as elephant TB and EEHV has been found prevalent in domesticated elephant population of Nepal with significant negative impacts on work performance and mortalities. These have to be addressed well through early diagnosis and standard treatment regimes.

Output

A hospital equipped with skilled veterinary doctor, technicians and all types of veterinary medicine and surgical tools would help to keep domesticated elephants healthy and efficient in working.

Activities

1. Construct a veterinary block building in Shivapur *Hattisar*.
2. Construct residential quarters for veterinary team near the Veterinary hospital
3. Equip the Veterinary block with wildlife darting equipment, foot care tools, surgical tools, basic diagnostic equipment, sample collection and transport tools, storage refrigerators and all types of medicine and accessories.
4. Purchase an Ambulance for rescue and transport of wild animals including wild elephant calves and confine the service to *Hattisar* Veterinary block.
5. Continue research on infectious diseases and husbandry practices of domesticated elephants by involving donors and researchers.
6. Establish dipping tanks for the treatment of foot problems of elephants.

J. To plan for the maintenance of viable population of captive/domesticated elephants in BNP by allowing to breed in captivity.

Rationale

Nepal government has established an Elephant Breeding and Training Center (EBTC) in Chitwan for the specific purpose of breeding elephants in captivity. Despite these, young elephant calves have born in many of the *Hattisars* including that of BNP. Breeding elephants have to be promoted by giving access to wild elephant bulls for mating domesticated females considering measures to protect domesticated male elephants in the *Hattisar*. Breeding elephants with wild bulls will enhance heterozygosity in the calves ensuring longer survival rates.

Output

Asiatic domesticated elephant population is sustained and domestication of Asiatic domesticated elephants will be enhanced in ex-situ conservation in BNP.

Activities

1. Maintain safety of elephant staffs and domestic males while allowing the wild bulls in the elephant camps a (for search lights and others).
2. Improve health care and management of all female domesticated elephants through treatment so as they do not transmit diseases to wild male.
3. Ensure good quality service to raise domesticated borne elephants.
4. Research on infectious diseases and husbandry practices.
5. Ensure safety of public life and property in the vicinity by teaching elephant behaviour and fitting solar fencing.

5.5 Budget Plan and Sources

5.5.1 Summary of the Budget

The total estimated budget to implement this 5-year Management plan is NPR 16.09 Crores, in words: Sixteen Crore Nine Lakh Nepalese Rupees only (Table 4, Annex 1). The highest amount (NPR 5.15 Crore) is offered in the 1st year and the lowest NPR 2.44 Crore in the 4th year. This budget does not include the sum of staff salaries, their uniforms and other benefits, and the regular ration for elephants as those are included in the regular government budget program. The budget is estimated based on the current practice and market rate.

Table 12. Summary of the Budget of 5-year *Hattisar* Management Plan (NPR '000)

S. No.	Budget Headings	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.	To provide the best husbandry and welfare practices to captive elephants at Shivapur and other satellite *Hattisars*	**11000**	**11100**	**11900**	**9400**	**9700**	**53100**
2.	To provide standard accommodation and other facilities for elephant staff	**9300**	**9300**	**8000**	**8600**	**7900**	**43100**
3.	To provide utility tools for elephant operation	500	200	200	200	200	1300
4.	Prompt supply and amendment of existing ration items of captive elephants	1300	1200	400	300	300	3500
5.	To address the shrinking elephant grazing area, and scarcity of palatable grasses, vines, and tree fodder for domesticated elephants within the park	4600	600	4600	600	0	10400
6.	To construct domestic Elephant Information Center for visitors/tourists	1300	1300	300	400	400	3700
7.	To train elephant staff about occupational safety and hazards and train wild elephant-affected local peoples about HECx.	5700	700	700	700	700	8500
8.	Addition of a number of domesticated elephants, staff positions and elephant posts for BNP	1300	2000	800	800	1900	6800
9.	Establish standard domesticated elephant health care facilities at Shivapur *Hattisar*	**14700**	**1400**	**1400**	**1200**	**1200**	**19900**
10.	To plan for the maintenance of the viable population of captive/domesticated elephants in BNP by breeding in captivity	1800	1950	2200	2250	2400	10600
	Grand Total (1 to 10)	**51500**	**29750**	**30500**	**24450**	**24700**	**160900**

5.5.2 Source of Fund

The majority of the fund for the implementation of the plan will be obtained from Nepal Government. However, the budget may be accessed from donors such as NTNC, TAL, ZSL, UNDP, USAID, World Bank and others.

5.6 Plan Implementation, Monitoring and Evaluation

5.6.1 Plan Implementation

Bardiya National Park administration is responsible for coordination and implementation of the management plan. Park protection unit and buffer zone institutions will support in their respective areas. NTNC, WWF and ZSL along with Nepal government will support to implement the planned activities.

5.6.2 Monitoring and Evaluation Mechanism

A monitoring committee shall be formed to monitor the implementation of *Hattisar* management plan for effective performance of both staff and domesticated elephants in BNP. The committee is composed of Senior Conservation Officer, representative from DNPWC, and representative from donor agencies and tourism entrepreneurs of the area. The committee annually monitors the implementation of activities of the management plan before the end of each fiscal year. The monitoring activities comprise site visits, discussions, review of reports, etc. Monitoring committee reviews the progress against the plan and may prioritize monitoring indicators. In addition, regular monitoring by DNPWC and MoFE shall be carried out. Mid-term evaluation of the plan will be carried out by the committee in 2027 and final external evaluation in 2029. Achievements and challenges of the evaluation will be used in further plan preparation process.

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Annexes

Annex 1. Detail Objectives and Activity Plan and Budget for BNP *Hattisar* (NPR '000)

	Objectives and Activities		Year I	Year II	Year III	Year IV	Year V	Total
Objective 1.	To provide the best husbandry and welfare practices to captive elephants at Shivapur and other satellite *Hattisars* (Thakurdwara, Dalla, Gaida Machan, Laguna Machan, Guthi, Chepang, Parewaodar, East Chisapani & Rambhapur) in BNP.							
	Activity 1.	Construction of elephant sheds with wooden celling (3.5)	900	900	900	900	900	4500
	Activity 2.	Maintenance of elephant sheds with wooden ceilings (34)	2000	2000	2000	2000	2000	10000
	Activity 3.	Construction of overhead water tanks (11)	1100	1100	1100	1100	1100	5500
	Activity 4.	Construction of elephant bath facilities (Ponds 1)	-	1000	-	-	-	1000
	Activity 5.	Construction of waste disposal pits (11)	1100	1100	1100	1100	1100	5500
	Activity 6.	**Electricity sources/Main or solar-powered (11)**	1100	1100	1100	1100	1100	5500
	Activity 7.	***Hattisar* fencing with chain link wire and solar power strands (11 sites)**	700	1400	1400	900	900	5300
	Activity 8.	**Drainage channels around *Hattisar* (9)**	100	100	100	100	100	500
	Activity 9.	**Elephant ration store (11) @ NPR 3 lakh**	600	600	600	600	900	3300
	Activity 10.	**Const. of the elephant boarding platform (7)**	900	900	900	900	900	4500
	Activity 11.	**Water supply scheme (2)**	2000	-	2000	-	-	4000
	Activity 12.	**Steel barricade and walkways in front of sheds (11) Shivapur @5 lac and other is @3 lakh**	500	900	700	700	700	3500
		Sub Total	**11000**	**11100**	**11900**	**9400**	**9700**	**53100**
Objective 2.	To provide standard accommodation and other facilities for elephant staffs.							
	Activity 1.	Construction of Mahout quarters (8)	7000	7000	7000	7000	7000	35000
	Activity 2.	Repair/maintenance of existing staff quarters (for Chisapani)	500	500	-	-	-	1000
	Activity 3.	Construction of *Hattisar* kitchen (8)	1400	1400	700	1400	700	5600
	Activity 4.	Supply of sanitary utilities, kitchen & dining tools	400	400	300	200	200	1500
		Sub Total	**9300**	**9300**	**8000**	**8600**	**7900**	**43100**
Objective 3.	To provide utility tools for elephant operation.							
	Activity 1.	Timely purchase, storage and distribution of elephant tools and gadgets	500	200	200	200	200	1300

	Objectives and Activities		Year I	Year II	Year III	Year IV	Year V	Total
		Sub Total	**500**	**200**	**200**	**200**	**200**	**1300**
Objective 4.	Amendment of existing ration items with the addition of protein components and fruits, and expedite the recruitment process of vacant posts (Mahout, Pachhuwa, Phanit, and others), and establish life insurance facilities for elephant staff.							
	Activity 1.	Official process for amendment of existing ration items and scale of domesticated elephants	400	300	-	-	-	700
	Activity 2.	Lobbying for the creation of Elephant Service Group in Civil Service Act	500	500	-	-	-	1000
	Activity 3.	Prompt official processing for recruitment of vacant posts.	100	100	100	-	-	300
	Activity 4.	Liaison with insurance companies to ensure the elephant staff life insurance	300	300	300	300	300	1500
	Activity 5.	Incentive/Overtime allowances for elephant staff (BZMC, Local govt.) (Total Budget =12000)	-	-	-	-	-	-
		Sub Total	**1300**	**1200**	**400**	**300**	**300**	**3500**
Objective 5.	To address the shrinking elephant grazing area, and scarcity of palatable grasses, vines, and tree fodder for domesticated elephants within the park.							
	Activity 1.	Creation and management of elephant grasslands (10-15 hectares) for elephant grazing (2 site)	4000	-	4000	-	-	8000
	Activity 2.	Casualty replacement of planted grass and fodder seedlings annually at three sites (Shivapur & other appropriate areas)	600	600	600	600	-	2400
		Sub Total	**4600**	**600**	**4600**	**600**	**-**	**10400**
Objective 6.	To construct captive elephant information center for visitors/tourists.							
	Activity 1.	Construction Elephant Information Centre	1000	1000	-	-	-	2000
	Activity 2.	Printing of leaflets or brochures	300	300	300	400	400	1700
		Sub Total	**1300**	**1300**	**300**	**400**	**400**	**3700**
Objective 7.	To train elephant staff about occupational safety and hazards and train wild elephant-affected local peoples about HECx.							
	Activity 1.	Awareness program for elephant staffs and villagers	300	300	300	300	300	1500
	Activity 2.	Awareness program to elephant staff for welcoming wild elephant bulls	200	200	200	200	200	1000
	Activity 3.	Food provision for visiting wild elephant bull	200	200	200	200	200	1000

	Objectives and Activities		Year I	Year II	Year III	Year IV	Year V	Total
	Activity 4.	Construction of solar-powered fence around Shivapur village 1.5 Km (out of 2.5 Km length, 1 Km built on collaboration with BZMC & local govt.)	5000	-	-	-	-	5000
		Sub Total	**5700**	**700**	**700**	**700**	**700**	**8500**
Objective 8.	Addition of a number of domesticated elephants, staff positions and elephant posts for BNP							
	Activity 1.	Prompt processing of demands/requirements of trained staff for domesticated elephants for BNP	100	100	-	-	-	200
	Activity 2.	Amendment of O & M of BNP *Hattisar*	500	200	-	-	-	700
	Activity 3.	Capacity building of the elephant staff (Tour outside the country for 10 days)	0	1000	-	-	1000	2000
	Activity 4.	Training program for elephant staff (7 days for 20 trainees)	700	700	800	800	900	3900
		Sub Total	**1300**	**2000**	**800**	**800**	**1900**	**6800**
Objective 9.	Establish standard domesticated elephant health care facilities at Shivapur *Hattisar*.							
	Activity 1.	Construction of a veterinary Hospital in Shivapur *Hattisar*	4000	-	-	-	-	4000
	Activity 2.	Quarter for Vets	3000	-	-	-	-	3000
	Activity 3.	Darting equipment & accessories	800	500	500	500	500	2800
	Activity 4.	Purchase an Ambulance (Bolero Pickup 1)	4500	-	-	-	-	4500
	Activity 5.	Veterinary equipment and medicines (Foot care tools, surgical tools, basic diagnostic equipment, sample collection and transport tools, storage refrigerators, and all types of medicine and accessories, budget for medicines in subsequent years).	2200	700	700	700	700	5000
	Activity 6.	Dipping tank for domesticated elephants	200	200	200	-	-	600
		Sub Total	**14700**	**1400**	**1400**	**1200**	**1200**	**19900**
Objective 10.	To plan for the maintenance of the viable population of captive/domesticated elephants in BNP by allowing them to breed in captivity.							
	Activity 1.	Maintain the safety of elephant staff and domestic males while allowing the wild bulls in the elephant camps (for Searchlight and others).	200	250	300	350	400	1500
	Activity 2.	Improve health care and management of all female domesticated elephants through treatment	500	600	700	800	900	3500
	Activity 3.	Ensure good quality service to raise captive borne elephants.	100	200	200	200	300	1000
	Activity 4.	Research on infectious diseases and husbandry practices	300	300	500	500	500	2100

	Objectives and Activities		Year I	Year II	Year III	Year IV	Year V	Total
	Activity 5.	Ensure the safety of public life and property in the vicinity by teaching elephant behavior and fitting solar fencing.	500	400	300	200	100	1500
	Activity 6.	Asare and Dashain Puja	200	200	200	200	200	1000
		Sub Total	**1800**	**1950**	**2200**	**2250**	**2400**	**10600**
		Grand Total	**51500**	**29750**	**30500**	**24450**	**24700**	**160900**

Annex 2. Estimate of medical, laboratory and surgical equipment for Bardiya *Hattisar*

S. No.	Name of Item	Unit	Qty Req.	Rate (NPR)	Total
1.	Autoclave machine	No	1	30000	30000
2.	Centrifuge machine	No	1	10000	10000
3.	Cool box	No	2	3000	6000
4.	Deep freezer	No	1	30000	30000
5.	Dressing table	No	1	20000	20000
6.	Drug box	No	2	2000	4000
7.	Electric water heater	No	1	3000	3000
8.	Foot trimming tools including rasps	Set	1	15000	15000
9.	Gas stove and cylinder	L/S	1	4000	4000
10.	Hemocytometer and counting chamber	Set	1	20000	20000
11.	Hot air oven	No	1	15000	15000
12.	Incubator	No	1	15000	15000
13.	Lab reagents & glass wares	L/S	1	100000	100000
14.	Lab chair	No	5	2000	10000
15.	Medical consumables (syringes, needles, IV set, cannula, tourniquet, disinfectants, antiseptics, ointments, chemicals, vaccines, culture media, antibiotics, anthelmintics, cotton, gauge cloth, disposable gloves, adhesives, glass slides, plaster of Paris, thermometer, etc.)	L/S	1	1000000	1000000
16.	Microscope binocular, Olympus	No	1	175000	175000
17.	Oxygen cylinder with connecting units	No	2	2000	4000
18.	Pulse oximeter with rectal probe	No	1	67500	67500
19.	Refrigerators	No	2	22500	45000
20.	Safety garments & boots	L/S	1	5000	5000
21.	Spray tank (plastic) for wound dressing	No	2	2500	5000
22.	Stethoscope	No	2	3000	6000
23.	Stretcher	No	2	3500	7000
24.	Surgical instruments (blade, handle, holders, suture, forceps, etc.)	L/S	1	50000	50000
25.	Surgical table	No	1	19000	19000
26.	Transponder implants and applicator	No	100	100	10000
27.	Weighing balance (500 gram)	No	1	10000	10000
28.	Weighing beam portable (for elephants)	No	1	500000	500000
29.	Wooden weighing platform (Home built)	No	1	14500	14500
	Grand Total				**2200000**

Annex 3. List of Elephant & Staff in Bardiya National Park Hattisar

क्र. सं.	हात्तीको नाम	कर्मचारीको नाम थर	पद	श्रेणी तह
१.		डा.आयुस मर्हजन	पशु चिकित्सक	रा. प. तृ. प्रा.
२.		खाली	ग्या. सु.	रा. प. तृ. प्रा.
३.		दिनेश देवकोटा	भेटेरिनरी कम्पाउण्डर	रा.प. अनं. प्र. प्रा.
४.		सुनिल तामाङ्ग	नायब सुब्बा	रा.प. अनं. प्र. प्रा.
५.		सुरेन्द्र प्रसाद शर्मा	खरिदार	रा.प. अनं. द्वि. प्रा.
६.		खाली	दरोगा	रा.प. अनं. द्वि. प्रा.
७.	शिवकली	धीरेन्द्र चौधरी	फणित	श्रेणी विहिन (करार)
		महेश चौधरी	माहुत	श्रेणी बिहिन (स्थाई)
८.	चतुरगज	प्रसाद थारु	फणित	श्रेणी बिहिन (करार)
		रामनारायण चौधरी	पछुवा	श्रेणी बिहिन (करार)
९.	रामकली	बलिराम थारु	माहुत	श्रेणी बिहिन (स्थाई)
		हिरा सिंह	पछुवा	श्रेणी बिहिन (करार)
१०.	गुलावकली	थलिराम थारु	पछुवा	श्रेणी बिहिन (करार)
		संजय थारु	पछुवा	श्रेणी बिहिन (करार)
११.	जात्राकली	चित्रबहादुर खत्री	माहुत	श्रेणी बिहिन (स्थाई)
		पुसाराम थारु	माहुत	श्रेणी बिहिन (स्थाई)
		राजेश थारु	पछुवा	श्रेणी बिहिन (करार)
१२.	चम्पाकली	मिनराज आचार्य	पछुवा	श्रेणी बिहिन (करार)
		शिव शंकर थारु	माहुत	श्रेणी बिहिन (स्थाई)
		कलशराम थारु	पछुवा	श्रेणी बिहिन (करार)
१३.	लक्ष्मीकली	बलाजोगी थारु	माहुत	श्रेणी बिहिन करार)
		सुमित थारु	माहुत	श्रेणी बिहिन (स्थाई)
		अन्जय चौधरी	पछुवा	श्रेणी बिहिन (करार)
१४.	श्यामकली	रबिलाल थारु	माहुत	श्रेणी बिहिन (स्थाई)
		अजय चौधरी	पछुवा	श्रेणी बिहिन (करार)
१५.	दिपेन्द्रकली	हिमानी थारु	माहुत	श्रेणी बिहिन (स्थाई)
		चुडामणि थारु	पछुवा	श्रेणी बिहिन (करार)
		राधाकृष्ण थारु	पछुवा	श्रेणी बिहिन (करार)
१६.	कुमारगज	रामगोपाल थारु	माहुत	श्रेणी बिहिन (स्थाई)
		मिनबहादुर मगर	पछुवा	श्रेणी बिहिन (करार)

	गंगाराम थारु	माहुत	श्रेणी बिहिन (करार)
१७. ठाकुरगज	ईश्वर बि. क.	माहुत	श्रेणी बिहिन (स्थाई)
	बिष्णु थारु	पछुवा	श्रेणी बिहिन (करार)
	कृष्ण थारु	पछुवा	श्रेणी बिहिन (करार)
१८. पवनकली	छेदुवा थारु	पछुवा	श्रेणी बिहिन
	रोहित चौधरी	पछुवा	श्रेणी बिहिन (करार)
१९. बबईगज (वच्चा सानो)			

Annex 4. Elephant Foot dip Tank

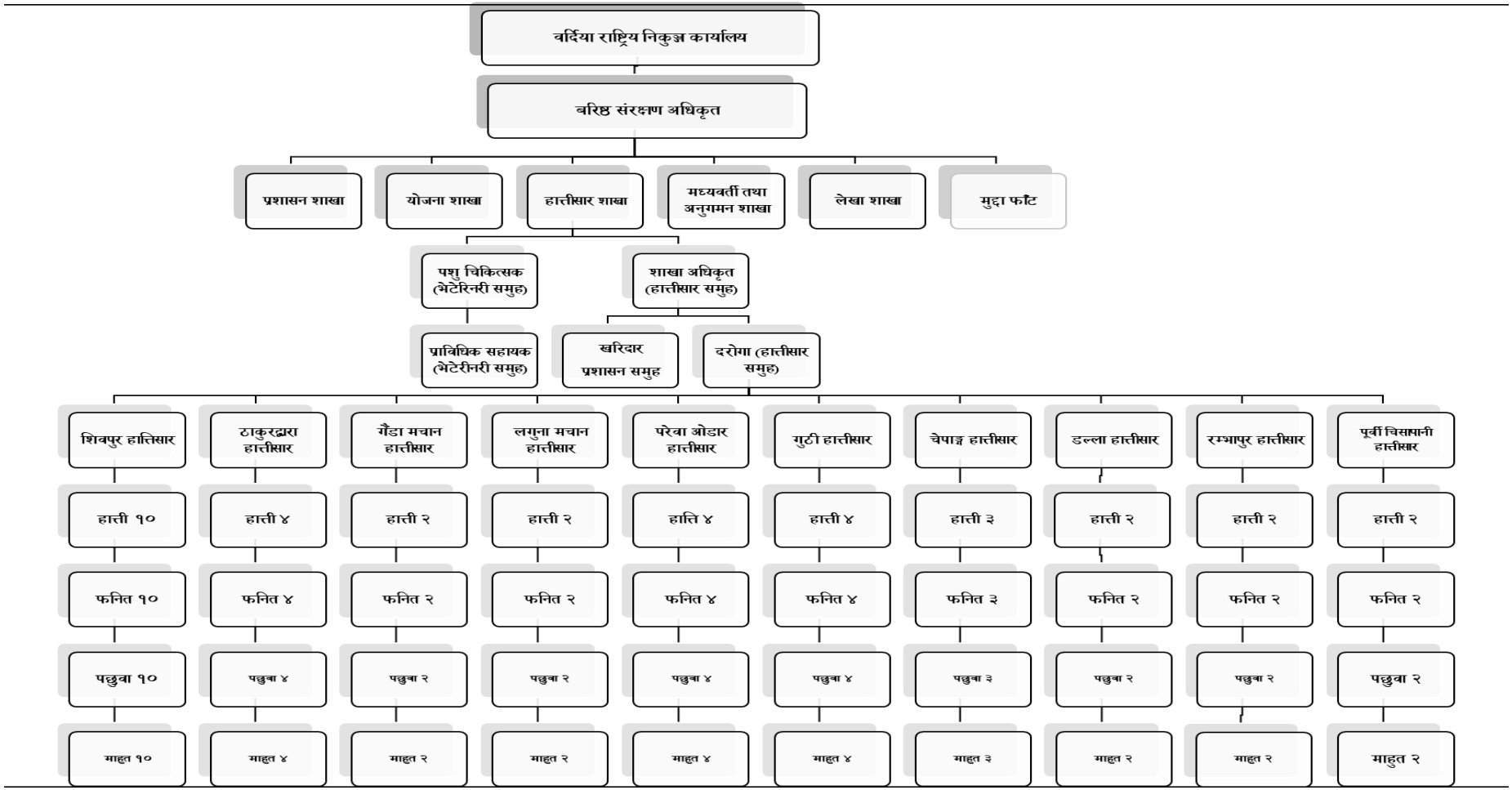
An elephant foot dip tank constructed in Chitwan Hattisar, Sauraha (Photo credit: K. P. Gairhe, 2024)

Annex 5. List of Deceased Elephants of BNP

बर्दिया राष्ट्रिय निकुन्जमा मृतः हात्तीहरुको विवरण

सि. नं.	मृतः हात्तीको नाम	लिङ्ग	मृत्यु मिति	जन्म मिति	कैफियत
१.	गोपालकली	पोथी			
२.	पारसकली	पोथी			
३.	लोककली	पोथी			
४.	प्रेम प्रसाद (माउ शिवकली)	भाले	१६।०८।२०१६	१४।०२।२०१३	ई.ई.एच.भि. संक्रमण
५.	ओमगज (माउ श्यामकली)	भाले	१६।०८।२०१७	०४।०१।२००७	पेटको संक्रमण
६.	लक्ष्मी प्रसाद (माउ लक्ष्मीकली)	भाले	१६।०८।२०१८	०३।११।२०१३	ई.ई.एच.भि. संक्रमण

Annex 6. Organizational Chart of BNP *Hattisar*



Annex 7. Glimpses of Field Visit and Interaction Activities in BNP *Hattisar*

Photo: 1. Elephant sheds at Shivapur *Hattisar*

Photo: 2. Elephant sheds to be repaired at Shivapur *Hattisar*, showing wooden bar and walkways in front of the sheds

Photo: 3 Interaction with BNP Army personnel at Rambhapur

Photo: 4. TL BR Gopali Yadav & Ranger Ashik Thapa at Gate of Shivapur *Hattisar BNP, Bardiya*

Photo: 5. Research team at Laguna Machan, BNP, Bardiya

Photo: 6. TL Interaction with Elephant expert Ramesh Thapa former Chief Warden BNP at elephant shed, Thakurdwara *Hattisar*

Photo: 7. Hattisar gate at Shivapur *Hattisar BNP , Bardiya*

Photo: 8. Elephant shed at Parewaodar *Hattisar , BNP Bardiya*

Photo: 9. Elephant shed at Thakurdwara, Badiya

Photo: 10. Old Assistant Warden Quarter at East Chisapani *Hattisar , Banke*

Photo: 11. Observation of old Elephant Shed at Chepang Sector, Badiya

Photo: 12. Elephant Shed at Thakurdwara Park HQ

Photo: 13. Team Leader BR Gopali Yadav & Team member Er. Chir Ayu Thapa, Ujyalo Nepal

Photo: 14. K. B. Khadka former accountant of BNP with TL BR Gopali Yadav, who brought hattisar from **Banke Gulari Hattisar in 2028** in BNP