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**Ministry of Energy and Natural Resources**  
**Department of Forests and Park Services**



## **Key Biodiversity Area Pakhan Beth Bir, Tading**

*Paphiopedilum fairrieanum*, Lady's Slipper orchid



**Conservation Action Plan**  
**July 2023 to June 2033**

**Divisional Forest Office, Samtse**



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**Ministry of Energy and Natural Resources**  
**Department of Forests and Park Services**



**Royal Government Endorsement and Approval**

Pakhan Beth Bir Key Biodiversity Area Conservation Action Plan 1<sup>st</sup> July 2023 – 30<sup>th</sup> June 2033.

*“In accordance with and as per the provisions of the Forest and Nature Conservation Act of Bhutan, 1995”*

*Submitted for Approval*

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*Forwarded for Approval*

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**Approved by**

**DIRECTOR**  
**Department of Forests and Park Services**



དཔལ་ལྷན་འབྲུག་གཞུང་། རྒྱལ་ཁྲིམས་དང་རང་བཞིན་ཐོན་སྐྱེད་རྩྭ་ལྗང་།  
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Royal Government of Bhutan  
Ministry of Energy and Natural Resources  
**Department of Forests and Park Services**



## FOREWORD

Bhutan's rich biodiversity has been secured by the network of protected areas for the past many decades. However, the state of forests and biodiversity are equally rich beyond the protected areas in Bhutan. On the contrary, the areas beyond protected areas faces considerable threats from anthropogenic disturbances and economic development, and this poses risk to many globally threatened habitats and species found therein. Across the globe, such areas of conservation significance have been addressed by the "other effective area-based conservation measures" or OECMs, an area set aside towards achieving the long term and effective in-situ conservation of biodiversity outside of protected areas. OECMs complement protected areas through sustained, positive conservation outcomes, even though they may be managed primarily for other reasons.

The Key Biodiversity Areas (KBA) in Bhutan, at a global scale is part of the OECMs and is, therefore, adopted towards securing conservation of areas and species that are of conservation significance in Bhutan. Of the many potential KBA sites in the country, the Department has identified and prioritized 11 sites in various Divisional Forest Offices, that requires urgent conservation interventions. For these 11 sites, key interventions have been identified, and has been and is being presented in this conservation action plan as per the guidelines on KBA. The KBA sites classified will serve as in-situ conservation of biodiversity beyond the protected areThese classified KBAs are expected to bring in improved conservation outcomes, that are crucial for the functioning of the environment through the provision of essential ecosystem services. It is essential for the processes that support all life on Earth, including humans. These KBAs are expected to address the issues of biodiversity loss and ecosystem degradation due to threats such as pollution, overexploitation of natural resources, introduction of invasive species and habitat loss.

I am happy to note that we continue to prioritize conserving our natural resources, while balancing ourselves with the need to economically develop the nation. I applaud all concerned officials from the Department for coming up with this conservation action for the first set of KBAs classified in the country and wish you all success in implementing the actions.

(Lobzang Dorji)

**Director**

## **Acronyms**

|       |                                                      |
|-------|------------------------------------------------------|
| CE    | Critically Endangered                                |
| DoFPS | Department of Forest and Park Services               |
| FNCA  | Forest and Nature Conservation Act                   |
| FNCRR | Forest and Nature Conservation Rules and Regulations |
| IUCN  | International Union for Conservation of Nature       |
| KBAs  | Key Biodiversity Areas                               |
| masl  | meter above sea level                                |
| M&E   | Monitoring and Evaluation                            |
| NCD   | Nature Conservation Division                         |
| NWFP  | Non-Wood Forest Produce                              |
| PAs   | Protected Areas                                      |

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## CHAPTER 1: INTRODUCTION

### Background

According to the IUCN, Key Biodiversity Areas are “sites contributing significantly to the global persistence of biodiversity”(IUCN, 2016). In Bhutan KBA emphasizes the conservation of sites outside the Protected Area network that have significant global biodiversity and are under increasing threat from various anthropogenic activities, putting them at greater risk of losing species diversity (DoFPS, 2021).

Orchidaceae is a family of flowering plants that constitute five subfamilies with approximately 870 genera and 30,000 species worldwide. They are saprophyte, lithophytes, terrestrial or epiphyte in nature (Dressler, 1993). Bhutan hosts almost 469 species of orchids, some of which are endemic to Bhutan, and some are listed as threatened (DoFPS, 2019).

*Paphiopedilum fairrieanum* (Lindl.) Stein commonly known as the lady slipper orchid, is one such species listed as critically endangered by the IUCN in 2015 due to the rapid shrinking of its' habitats and harvesting from the wild for commercial purposes (Rankou & Kumar, 2015). *Paphiopedilum fairrieanum* (Lindl.) Stein in Bhutan is reported to be found along the subtropical region of Bhutan with an altitude range from 800m to 1700m (Gurung et al., 2019). The terrestrial orchid species prefers to grows in a habitat with arid grassy limestone, gneiss, and loose gravel with a very good drainage system (Wangchuk & Dorji, 2022). Their occurrences are reported from 10 dzongkhag (Gurung et al., 2019) and its first occurrence was reported by Pradhan in the year 1978 under Tading Gewog under Samtse Dzongkhag.



Figure 1. Habitats of *Paphiopedilum fairrieanum* (Lindl.) Stein at Pakhan-Beth Bir

The local area where the KBA is located is known by Pakhan-Beth Bir due to the presence of *Bergenia* sp. locally known as Pakhan Beth, which is highly sought by the local community because of its medicinal value. The KBA is located an hour uphill walk towards southwest from the nearest Sisney Goan/ Zochaling village, under Tading Gewog, (26°51'44.69"N 89°14'38.31" E) and covers an area of 4.15 acres.

The area falls under the subtropical zone with an altitude range from 1400 masl to 1500 masl. The vegetation is largely dominated by trees species like *Wendlandia* sp. and *Rhus succedanea*, shrubs like *Rubus ellipticus*, *Pseudocaryopteris bicolor*, *Melastoma* sp., and *Desmodium* sp., and herbs species like *Bergenia* sp., *Inula* sp., *Eulaliopsis* sp., *Bidens pilosa*, *Strobilanthes* sp., *Hedychium* sp., *Hypericum* sp., and *Thysanolaena* sp. were grown closely with *Paphiopedilum fairrieianum*. Other significant orchid species like *Paphiopedilum venustum* and *Spathoglottis* sp. were also found in the KBA.

### **KBA for *Paphiopedilum fairrieianum* conservation at Pakhan Beth Bir under Tading Gewog, Samtse**

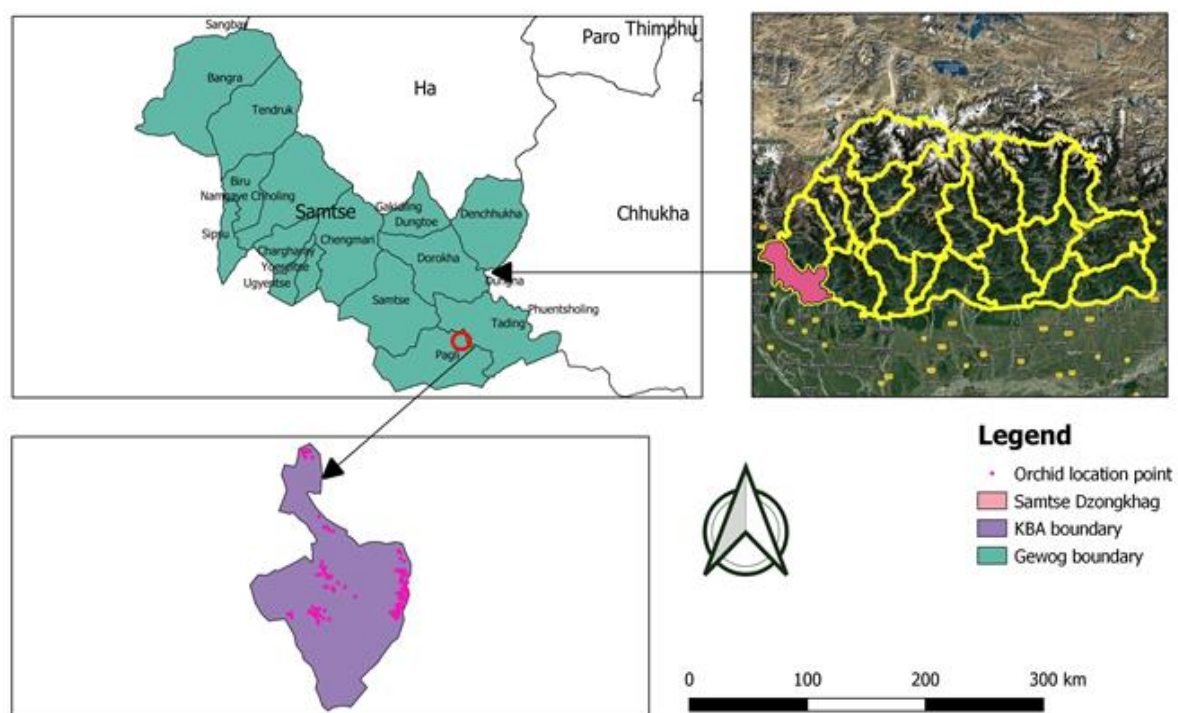


Figure 2. Location of KBA for *Paphiopedilum fairrieianum*

## CHAPTER 2: THREATS AND CHALLENGES

### 2.1. Threats Identification

The population of *Paphiopedilum fairrieianum* (Lindl.) Stein has been facing numerous threats to its survival, mainly due to excessive collection for domestication and trade, exploitation for horticulture, habitat degradation, and other anthropogenic pressure on its habitats (Kumar, 2015). Habitat destruction due to the construction of roads and deforestation for developmental activities are some of the main factors. Although the KBA of Pakhan Beth Bir for *Paphiopedilum fairrieianum* conservation is located in a remote area, the site is disturbed by human activities and natural disturbances.

The following threats were identified in the KBA area:

#### 2.1.1. Harvesting for domestication and trade

Due to their rarity and beauty in nature, the species has been collected from the wild and commercialized to such an extent that the number of individuals growing in the wild was been significantly reduced to the brink of extinction. During the community and stakeholder consultation meeting, the locals shared the story of people coming from Sikkim and the nearby Indian border area to collect the orchid between the 1960s and 1970s. Even to these days, people are still seen collecting the orchid and propagating it at home for decoration. This unchecked trend of allowing the collection of this orchid is seen as one of the major threats to the survival of species.

#### 2.1.2. Habitats Degradation and Fragmentation

Degradation and fragmentation of habitats are the main threats to the survival of any species. Potential threats can be categorized into both manmade and natural causes in the designated area. Some of the threats from human causes include road construction, harvesting of timber, collection of firewood and NWFPs, livestock grazing, and threats of forest fires. The species is also prone to natural threats like a landslide, domination by invasive plant species, and browsing by wild animals.

The KBA for *Paphiopedilum fairrieianum* is susceptible to all these threats, as the people of Zochaling village depend on the area for various reasons. It was observed that the species mostly prefers to grow well on steep slopes /gradients around the presence of loose rocky outcrops, that are prone to landslides which may significantly contribute to the degradation of its habitat.



Figure 3. Degraded habitats in the KBA site

### 2.1.3 Sparse distribution and low frequency of regeneration

The frequency of regeneration and wide spreading of a species depends on the conditions of the site. Natural factors like competition with other associated species, wildlife browsing, and landslides limit the population of the species. During the assessment, the team recorded high presence of the species in areas surrounding a landslide, but it was found to be absent from sites where landslides had occurred, indicating a strong influence of slides in the spread and distribution of the species. During the winter, the location is also prone to forest fires as the vegetation turns very dry and is covered with dead herbaceous combustible materials spread around the site. According to local people, fire incidences had occurred in the 1990s, burning the whole ridge. These incidences have probably limited the regeneration and distribution of the species.

### 2.1.4 Trampling and removal of species

The local community residing near the KBA was mostly found to be dependent on agriculture and livestock for their livelihood. The area where the KBA is located is mainly used for the collection of fodder for their cattle. Some of the fodder species found growing in the habitats of *Paphiopedilum fairrieanum* are *Sorghum halepense*, *Inula* sp., *Wallichia densiflora*, other unknown fodder grass species, and they also visit the area to collect *Bergenia ciliata*, which is used as a medicinal plant. Therefore, trampling and removal of species while collecting fodder in the area have been identified as one of the threats to the survival of the species.

## **2.2 Challenges**

### **2.2.1 Limited financial and technical resources**

To implement conservation action, adequate human and financial resources are necessary. The Department of Forest and Park Services is mandated to provide services related to public service delivery and spearhead conservation activity. However, full-time dedication towards conservation efforts becomes challenging due to the substantial workload focused on public service delivery. Divisional Forest Office, Samtse has more than 15 active dredging sites along the border. Additionally, due to the very high population within the jurisdiction, staff are mostly engaged in providing public services, which leaves minimal time dedicated to conservation efforts.

### **2.2.2. Topographical barrier**

Good accessibility to the area is crucial for collecting adequate data about the species. However, easy access is limited, as only two entrance sites are available to enter the site. The habitat is characterized by a steep slope and rocky outcrops hindering access. Additionally, the area is located in a far-flung remote area, which makes regular visits to monitor the area challenging, unless there are adequate human resources in place.

### **2.2.3. Weak stakeholder engagement**

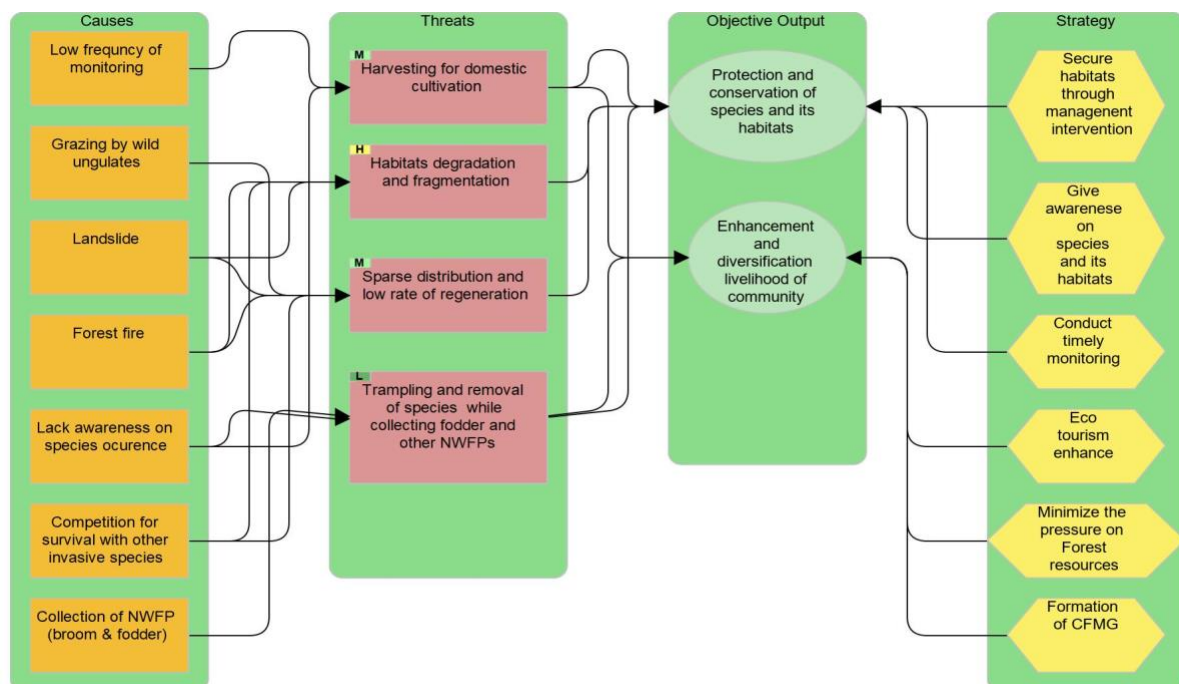
Engagement of local stakeholders and the community is crucial to bring them closer to understanding the importance of species and their role in conservation, and for exchanging knowledge to implement conservation activities. However, the KBA is located far from the concerned Gewog center and other institutes, which makes imparting awareness and engaging stakeholders in conservation-related activities challenging.

## Threats Ranking

To understand the main threat to the conservation of *Paphiopedilum fairrieanum* and its habitats, the mentioned threats were ranked based on scope, severity, and irreplaceability using Miradi tools (Table 1). According to the result of the Miradi tools, degradation and fragmentation of the species' habitats pose a higher threat, while harvesting for domestication, sparse population, and low rate of regeneration were rated medium threats. Moreover, trampling, and removal of species while collecting fodder and other NWFPs were rated low threats. Therefore, overall, the ranking of threats in this KBA is medium.

**Table 1:** Miradi table of threats for each target ranked based on scope, severity, and irreplaceability.

| Threats \ Targets                                                        | Protection and conservation of species and its habitats | Enhancement and diversification livelihood of community | Summary Threat Rating          |
|--------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|--------------------------------|
| Trampling and removal of species while collecting fodder and other NWFPs | Low                                                     | Medium                                                  | Low                            |
| Sparse distribution and low rate of regeneration                         | High                                                    |                                                         | Medium                         |
| Harvesting for domestic cultivation                                      | High                                                    | Low                                                     | Medium                         |
| Habitats degradation and fragmentation                                   | Very High                                               |                                                         | High                           |
| Summary Target Ratings:                                                  | High                                                    | Low                                                     | Overall Project Rating: Medium |



**Figure 4.** The conceptual model of *Paphiopedilum fairrieanum* conservation plan at Pakhan Beth Bir

## CHAPTER 3: INTERVENTIONS/PLANS

### 3. 1 Vision and Goal

**Vision:** Secure the natural population of and their habitats both from natural and anthropogenic threats.

**Goal:** By 2033 the Pakhan Beth Key Bio Diversity Area for the *Paphiopedilum fairrieanum* shall be well thriving in its natural habitat.

### 3.2 Objective(s):

#### **3.2.1 Objective 1: Conservation and protection of species and their habitats**

For the perpetual existence of the species, its population and habitats must be secured from any threats from natural or anthropogenic pressure. One of the main objectives is to ensure and secure the population of the target species and its habitats through various mitigation measures. One of the activities includes the removal of invasive plants and restoration of degraded habitats through bio-engineering works.

#### **Output 1.1** Secure habitats through management intervention

1.2 Conduct an awareness program for stakeholders and the community

1.3 Timely monitoring of KBA sites and maintaining reports for reference

#### **3.2.2 Objective 2: Enhancement and diversification of livelihood for the local community**

The involvement of the local community in implementing any conservation activity is vital for a successful result. The community must share equal responsibility for the protection and conservation of species and their habitats. The action plan shall also encompass the provision of certain benefits to the local community.

#### **Output 2.1** Develop eco-tourism by constructing proper footpaths at the KBA site

2.2 Minimize the pressure on forest resources through the supply of improved fodder sapling

2.3 Formation of CFMG for locality and inclusion of conservation action with their CF management activity plan.

### **3.3 Dos and Don'ts**

With the declaration of the area as a KBA for the conservation and protection of *Paphiopedilum fairrieianum*, the following measures should be followed to strengthen KBA management.

#### **3.3.1 Dos**

- All visitors other than the local people shall seek approval from the concerned forest office or CFMG to enter the area
- Community people shall be allowed to collect NWFP from the peripheral sites of KBA only
- Felling, lopping, and removal of any plant species in the area can be done based on the management plan

#### **3.3.2 Don'ts**

- Camping and lighting of fire inside KBA shall be strictly prohibited
- Collection of NWFP from the KBA site shall be restricted
- Grazing inside the KBA shall be restricted
- No visitors shall be entertained without prior approval from the concerned agency
- Camping overnight shall be strictly prohibited near the KBA periphery
- Littering on the KBA site shall be strictly prohibited
- Developmental activities shall be limited to the prescribed conservation plan

Table 1: Implementation framework

| Objectives                                                                      | Strategies                                                                         | Action                                                                                              | Year along with budget (in Nu. million) |      |      |    |      |    |      |    |      |     |           |
|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------|------|------|----|------|----|------|----|------|-----|-----------|
|                                                                                 |                                                                                    |                                                                                                     | Y1                                      | Y2   | Y3   | Y4 | Y5   | Y6 | Y7   | Y8 | Y9   | Y10 | Sub-total |
| <b>Objective 1</b><br>Protection and conservation of species and their habitats | <b>Strategies 1</b> Secure habitats through management intervention                | 1.1.1. Identify and map key habitats of <i>Paphiopedilum fairrieianum</i>                           | 0.06                                    |      |      |    |      |    |      |    |      |     | 0.06      |
|                                                                                 |                                                                                    | 1.1.2. Mitigate climate change impacts on habitats (revival of landslide area, water sources)       |                                         | 0.2  |      |    | 0.2  |    |      |    |      |     | 0.4       |
|                                                                                 |                                                                                    | 1.1.3. Removal of invasive species                                                                  | 0.04                                    |      | 0.04 |    | 0.04 |    | 0.04 |    | 0.04 |     | 0.2       |
|                                                                                 | <b>Strategies 2</b> Engagement of local community and stakeholders in conservation | 1.2.1. Conduct consultation meeting with stakeholders                                               | 0.05                                    |      |      |    | 0.05 |    |      |    |      |     | 0.1       |
|                                                                                 |                                                                                    | 1.2.2. Awareness about the species and KBA area to the community                                    | 0.05                                    |      |      |    | 0.05 |    |      |    | 0.05 |     | 0.15      |
|                                                                                 |                                                                                    | 1.2.3. Facilitate community-based management of habitat through initiative taken by local community |                                         | 0.16 |      |    |      |    |      |    |      |     | 0.16      |

|                                                                               |                                                                   |                                                                                                           |             |             |             |             |             |             |             |             |             |             |             |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                                                                               | <b>Strategies 3</b><br>Conduct timely Monitoring                  | 1.3.1. Appointment of Resoop from the community to take the lead role in providing first-hand information | 0.012       | 0.012       | 0.012       | 0.012       | 0.012       | 0.012       | 0.012       | 0.012       | 0.012       | 0.012       | 0.12        |
|                                                                               |                                                                   | 1.3.2. Conduct annual monitoring and SMART patrolling by the concerned office and submit the report       | 0.05        | 0.05        | 0.05        | 0.05        | 0.05        | 0.05        | 0.05        | 0.05        | 0.05        | 0.05        | 0.5         |
| <b>Objective 2</b><br>Enhancement and diversification of community livelihood | <b>Strategies 1</b><br>Enhance eco-tourism                        | 2.1.1 Improve existing footpath with locally available materials (eco-trail)                              |             | 0.2         |             |             |             | 0.15        |             |             |             |             | 0.35        |
|                                                                               | <b>Strategies 2</b><br>Minimize the pressure on Forest resources. | 2.2.1. Supply fodder and agroforestry saplings to the community                                           | 0.13        |             |             |             | 0.13        |             |             | 0.13        |             |             | 0.39        |
|                                                                               |                                                                   | <b>Total</b>                                                                                              | <b>0.39</b> | <b>0.62</b> | <b>0.10</b> | <b>0.06</b> | <b>0.53</b> | <b>0.21</b> | <b>0.10</b> | <b>0.19</b> | <b>0.15</b> | <b>0.06</b> | <b>2.43</b> |

## Chapter 4: Monitoring and Evaluation

### 4.1 Monitoring and evaluation mechanisms

The Divisional Forest Office in Samtse will execute the activities based on the approved management plan in consultation with other stakeholders. The Range Office in Samtse and staff from Tading Beat Office will implement the activities according to the management plan. The Divisional Forest Office will submit both financial and physical progress reports as per the schedule. Nature Conservation Division shall play a major role in providing technical and facilitating in financial assistance towards conservation efforts. The Divisional Forest Office, Samtse will also monitor KBA sites as per the prescribed conservation plan and further forward to DoFPS through NCD. Monitoring shall be carried periodically during the implementation of the activities which shall be led by field office under supervision of Nature Conservation Section of the Division.

To assess on the impacts of the intervention evaluation shall be conducted during mid (5<sup>th</sup> year) and at the end of the plan period. The final evaluation shall give us information on the overall impacts of the action plan on achievement of target to set for new plan.

### 4.2 Financial and Timeline

The conservation action plan for the protection of *Paphiopedilum fairrieianum* and other significant species in the KBA has been developed for a 10 years period from 1<sup>st</sup> July 2023 to 30<sup>th</sup> June 2033. The plan outlines a series of conservation activities aimed at mitigating threats to the KBA. The budget required to execute these activities is estimated to be **Nu. 2.43 million (Ngultrum Two Million Four Lakhs Thirty Thousand)** only.

Table 2: Monitoring Framework

| Objectives                                                                | Action                                                                  | Output indicator                                                                                          | Baseline | Unit   | Yearly Target |    |      |    |      |    |      |    |      |     |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|----------|--------|---------------|----|------|----|------|----|------|----|------|-----|
|                                                                           |                                                                         |                                                                                                           |          |        | Y1            | Y2 | Y3   | Y4 | Y5   | Y6 | Y7   | Y8 | Y9   | Y10 |
| Objective 1.<br>Protection and conservation of species and their habitats | 1.1. Identify and map key habitats of <i>Paphiopedilum fairrieianum</i> | Conduct a detailed survey and delineate the key habitat                                                   | 0        | Report | 1             |    |      |    |      |    |      |    |      |     |
|                                                                           | 1.2. Implement erosion and land management measures                     | Management of degraded habitats through Bio-engineering methods.                                          | 0        | Ac     |               | 1  |      |    | 1    |    |      |    |      |     |
|                                                                           | 1.3 Removal of invasive species                                         | Removal of an invasive plant that gives threats to the habitats                                           | 0        | Ac     | 0.50          |    | 0.50 |    | 0.50 |    | 0.50 |    | 0.50 |     |
|                                                                           | 1.4. Conduct consultation meeting with stakeholders                     | Deliver information about the species and render support in implementing conservation programs in the KBA | 1        | number | 20            |    |      |    | 20   |    |      |    |      |     |

|                                               |                                                                                                        |                                                                                                           |   |           |    |     |   |   |    |     |   |   |    |   |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---|-----------|----|-----|---|---|----|-----|---|---|----|---|
|                                               | 1.5 Provide awareness about the species and KBA to the community                                       | Deliver information about the species and render support in implementing conservation programs in the KBA | 1 | Household | 20 |     |   |   | 20 |     |   |   | 20 |   |
|                                               | 1.5 . Facilitate community-based management of habitat through initiative taken by local community     | Formation of CFMG and inclusion of KBA conservation activities in the CF plan                             | 0 | number    |    | 1   |   |   |    |     |   |   |    |   |
|                                               | 1.6 Appointment of resoop from the community to take the lead role in providing first-hand information | Nomination of resoop for the timely information sharing and to guard the KBA                              | 0 | number    | 1  |     |   |   |    |     |   |   |    |   |
|                                               | 1.7 Conduct annual monitoring by the concerned office and submit the report                            | Submission of SMART report                                                                                | 0 | Report    | 1  | 1   | 1 | 1 | 1  | 1   | 1 | 1 | 1  | 1 |
| Enhancement and diversification livelihood of | 2.1 Improve existing footpath with locally available materials                                         | Ensure easily accessible for visitors/tourists by maintaining footpath                                    | 0 | Meters    |    | 750 |   |   |    | 750 |   |   |    |   |

|                  |                                                   |                                                                        |   |        |      |  |  |  |      |  |  |      |  |  |
|------------------|---------------------------------------------------|------------------------------------------------------------------------|---|--------|------|--|--|--|------|--|--|------|--|--|
| the<br>community | 2.3 Supply fodder<br>saplings to the<br>community | Variety of<br>improved fodder<br>saplings supplied<br>to the community | 0 | number | 1000 |  |  |  | 1000 |  |  | 1000 |  |  |
|------------------|---------------------------------------------------|------------------------------------------------------------------------|---|--------|------|--|--|--|------|--|--|------|--|--|

## References

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