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# Community Based Conservation Education for the Sustainable Conservation of Orchids of Chitwan Valley, Nepal



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A conservation awareness report submitted to  
**SAN DIEGO COUNTY ORCHID SOCIETY**

SAN DIEGO COUNTY ORCHID SOCIETY



**SDCOS**

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## Acknowledgement

The success of this conservation endeavor is made possible by the contribution of students, villagers and conservation organizations working in the Chitwan district without their contribution these efforts would not have been completed.

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My thanks also go to the respective school principal and chairmen of buffer zone community forestry users groups for managing time to share knowledge and information with students and villagers respectively. Special thanks are to students and villagers who patiently listen to our conservation information and actively participate in discussion and giving words of commitment to conserve orchids.

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## 1. Background Information of the Project

Nepal is a small landlocked country with a small area of 147181 km<sup>2</sup>. The biodiversity of Nepal is exceptionally diverse as the country has as low as 60 m. asl and the world highest peak Mt. Everest 8848 m. asl. Therefore, country's climate is diverse resulting in diverse varieties of flora and fauna. About seven thousands vascular plants have been recognized so far and the number is increasing annually. The country is the paradise for orchids because the region has moist atmosphere and cloudy forest that is conducive for the growth of orchids. In Nepal, *Orchidaceae* is the largest family in term of species richness comprising 386 species under 100 genera (Rajbhandari and Dahal, 2004). Rajbhandari et al. (1999) reported about 185 species of epiphytic orchids from Nepal. Press et al. (2000) recorded 323 species including 175 epiphytic orchid species from Nepal. Hara et al. (1978) noted 313 species under 89 genera of orchid from Nepal. Eight species are endemic and *Paphiopedilum insigne*, *Paphiopedilum venustum* are some of the species which are listed in appendix-1 of CITES. However, numbers of epiphytic species are still not distinguished.

Orchids are distributed from tropical to alpine climatic zone in Nepal. Annually large amount of orchids of different varieties are collected and exported to different countries especially India, China and Europe, where these are used for preparation of medicines and stimulating tonics. Chitwan valley harbors more than hundred orchid varieties because the climate of Chitwan is diverse from tropical to temperate and most of the Nepal's orchid varieties harbor in this type of climatic zone. Once orchids in Nepal were banned for collection and sale from the wild but now government has opened for its trading. Villagers can collect from government as well private forest except those species listed in CITES.

Department of Forest, Nepal has set out prescribed techniques for collection of orchids from the wild and released a number of guidelines to be followed by every collector but due to lack of awareness and sufficient extension of collection techniques, orchid's resources are deteriorating in wild at alarming rate. Most of the collectors are rural poor and their livelihoods are based on collection and sale of orchids and other non timber forest products (NTFPs). They have no or little knowledge about sustainable collection of orchids and collect as much as they can without considering sustainability concept and its probable impact in their future livelihood. They have little knowledge that if the resources will extinct what will happen to their livelihoods. Most of the forests in the region are

actually open access resources; therefore, people want to collect as much as they can, it is because if s/he will not collect, other will collect it. Therefore, a high level of conservation awareness among these people is necessary to conserve orchids from being extinct in its wild state. Similarly, high level of awareness is also necessary for the traders who buy these products. These traders are usually road head mid level businessman, who first buy orchids collected by poor villagers. These traders should be given conservation awareness that immature orchids collected by villages should not be bought. Once the product is not taken by traders villagers will probably not collect afterwards. But it is seen that traders bought immature and mature orchids, whatever is brought by villagers.

District Forest Offices in every district is governmental authority for management and regulation of collection of non timber forest products including orchids. Government has set limitation; without carrying Initial Environmental Examination (IEE) in a district traders/villagers cannot collect more than 5 ton/year of each species of NTFPs including orchids and there is also provision to carry out Environmental Impact Assessment (EIA) for the collection of NTFPs more than 50 ton/year. In spite of these legal obligations, orchids are relentlessly collected due to which habitat and survival of orchids in its wild state is in peril. Furthermore, political turmoil in country has exaggerated illegal logging of host trees and collection of orchids. In addition, villagers and some forest technician have wrong perception that orchid harms the growth and development of its host timbers trees and therefore, during forest management operations they detached and throw it.

Nepal is widely recognized for managing its common property resources by people's participation i.e. community forestry. Community forestry in Nepal is now shifting towards conservation and protection to the commercialization of forest products. The condition of forest is improved to a greater extent after the involvement of community people in forest conservation and management. But among the villagers there is belief that orchid hamper growth and development of timber species like *Shorea robusta* and *Dalbergia sissoo*. Therefore, they generally detached and throw orchids away from their host trees while operating forest management activities like pruning, cleaning and thinning in forest. Therefore, the conservation message "*Orchids are in fact epiphytes, not parasitic in nature*" are necessary to transmit among the community forestry users for the sustainable protection of orchids in the study area. Therefore, conservation awareness programme among the community forestry users is necessary to feed them with knowledge

and information that orchids do not harm the plants but it helps in beautifying the forest and balance ecological processes. Field experiences showed that villagers get happy when the orchid's blooms and whole forest looks like a beautiful garden and then people often says "*Orchids are in fact gift of nature*".

The greatest threat to the conservation of Nepalese orchids is due to habitat loss, forest destruction and degradation. Due to over exploitation of these orchids for various purposes, many orchids have become rare. Due to these reasons, the orchids have been categorized in the group of endangered plants, and are legally protected. Despite the ban imposed by Government of Nepal for collection and trade, orchid species that have high medicinal values are being collected illegally (Ghimire 2009). The indigenous wild orchids of Nepal are smuggled to India from where it is exported to the Europe and other countries; therefore there is strong need for *in situ* and *ex situ* conservation for its continued existence in the wild.

## **2. Project site description**

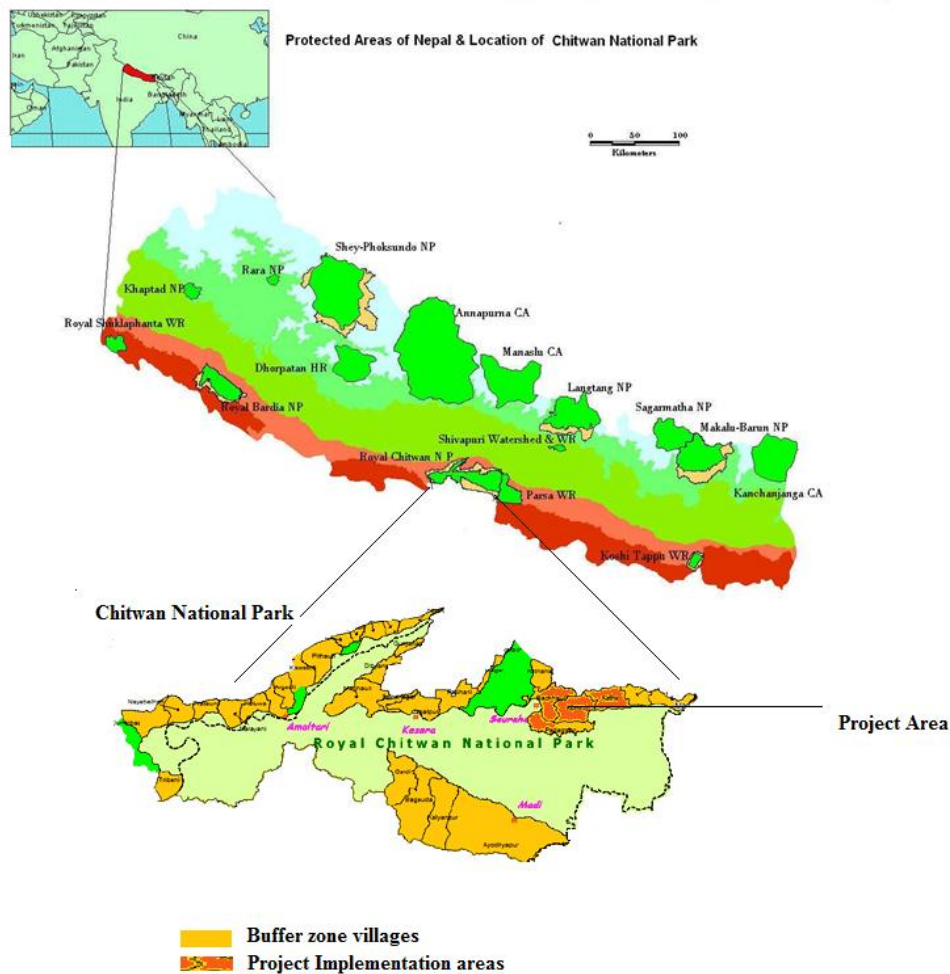
The project site was the part of buffer zone villages of Chitwan National Park (CNP). CNP is situated in south central Nepal, lies between 27°34' to 27°68' North latitude and 83°87' to 84°74' East longitude, while the buffer zone extended further at 27°28' to 27°70' North latitude and 83°83' to 84°77' East longitude. The park was established as the country's first national park in 1973 covering 932 sq. km. The park covers a pristine area of Siwalik Hills and river valley with a unique ecosystem of significant value to the world. Recognizing its unique ecosystems of international significance, UNESCO declared CNP a World Heritage Site in 1984.

### **2.1 Seasons**

The park is influenced by a tropical monsoon climate with relatively high humidity therefore; the climate is very conducive for the growth and development of epiphytic orchids. Winter, spring and monsoon are the three main seasons. Average monthly temperature ranges from 25°C in January to 42° C in May-June. The monsoon usually begins at the end of June and continues until September. The mean annual rainfall is about 21-50 mm.

## 2.2 Flora and Fauna

Vegetation of CNP can be classified into three main types. Sal *Shorea robusta* forest, occupies seventy percent of the park. Sal comes in pure stand or in association with other trees such as *Terminalia alata*, *Adina cordifolia*, *Terminalia belerica*, *Terminalia chebula*,



**Figure 1 Map of the project site**

*Holrrhena antidysenterica*, *schleichera trijuga* etc. These species are prominent orchid host trees. Riverine forest (*Acacia catechu* – *Dalbergia sissoo* forest) covers seven percent and is found in recently formed alluvial banks, ox bow lakes and on large gravel island. *Dendrobium minutiflorum*, *Vandppsis indulata*, *Ascocentrum* species, *Coelgyne ovalis*,

*Bulbophyllum muscicola*, *Acampe papillosa*, *Aerides multiflora*, *Aerides odoratum* *Agrostophyllum planicaule* are some of the species found in the Chitwan valley. In addition to the rich diversity of orchids Chitwan valley is home for endangered greater one horned rhinoceros, wild elephant, Bengal tiger, Gaur and more than 550 species of birds.

### **2.3 Buffer zone, society and nature interaction around the programme site**

In 1996, an area of 750 sq. km surrounding the CNP was declared as buffer zone which consists of forests and private lands. Over 250,000 people of 35 Village Development Committees and 2 municipalities of Chitwan, Nawalparasi, Makawanpur and Parsa districts fall under the buffer zone area. 21 Buffer zone user committee and 1470 user groups are formed for the effective management of the Buffer zones.

*Bote*, *Musahar*, *Darai*, *Kumal* and *Tharus* are the major indigenous residents of the buffer zone. These ethnic groups have a similar indigenous culture in terms of their birth-death rituals, festivals, and language. They use forest products from birth up to death. *Bote* and *Musahar* draw their livelihoods from fishing, ferrying and collecting major and minor forest products. *Tharus*, *Darai* and *Kumal* are agriculturists whose livelihoods are based on a traditional farming system, collection and sale of forest products and raised different livestock for subsistence purposes.

These indigenous people, who were building their civilizations for several centuries, were later displaced from their land by the dominant migrants from the northern hills. As the colonizers moved ahead these indigenous people were pressed further to the marginal land in the forest fringes and along the flood prone river banks, which was either cheaper or settle freely by encroaching forest land. They heavily depend upon the forest and water resources of the park and its buffer zone. Therefore, these groups are posing high level of threats to the forest and biodiversity and on the other hand they have not any alternative to shift their livelihoods opportunities.

### **3. Objective of the conservation awareness Programme**

The project aims to contribute for the sustainable conservation of orchids in and around Chitwan National Park. The specific objectives of the project is to create awareness and impart knowledge among the school children and buffer zone indigenous community



people for sustainable conservation of magnificent orchids and sensitize them about the importance of orchids in the ecological system. This programme also tries to relocate the orchids that are detached and fallen in the forest on the suitable host trees inside the forest.

#### **4. Target groups of the project**

The target groups of the project are school students and farmers who lives in the fringe of Chitwan National Park and depend upon natural resources for their livelihoods.

##### **4.1 School students**

School students are the main focus of this programme. Students are the future leader to shape the conservation and development of the area. It is well known that students can learn new things easily, if the students know about and realize the importance of caring for nature; they will carry this wisdom with them through their entire lives and act according to this wisdom. So, if we plant the seeds of conservation of orchids today, a tree will grow up in future. And from that tree, we will all share the precious fruits, the fruits of conservation of orchids and biodiversity. Moreover, students are linked to the whole society what they learn they share it with their parents and for the whole class a whole village may get the information what student get in the class room. Therefore, teachings in school mean to teach a whole village.

##### **4.2 Members of Buffer Zone Forestry Users**

Most of the forest areas of the Chitwan valley especially around the Chitwan National Park are managed as community forest or buffer zone community forest and rest is managed as protected area or government managed forest. Most of the community forest users are the indigenous *Tharua*, *Chepang* and *Bote*. Therefore, this programme focuses in these indigenous groups for the delivery of conservation programme. Joining conservation awareness programme with school children and buffer zone farming community tries to motivate entire village for the conservation of biodiversity and orchids.

#### **5. Preparation for the field level implementation**

##### **5.1 Coordination with Schools**

A record of secondary schools was collected from the District Education Office of Chitwan district. Five secondary schools were purposively selected and priorities were

given to the schools which were close to Chitwan National Park. Each school was orally communicated and principal of the respective schools were requested to manage time for conservational education session related to biodiversity conservation focusing on orchids.

### **5.2 Co ordination with Buffer Zone Community Forestry Users Groups (BCFUG)**

Meetings and frequent visit to BCFUGs were made to fix time for village level conservation awareness camp. Five Buffer Zone BCFUGs were selected to deliver conservation awareness programme. The selection criteria for the buffer zone were random and efforts were made to select buffer zone community forest with maximum number of indigenous people and nearness to park.

### **5.3 Interaction with local authority**

Local governmental authority especially sector office of the Chitwan National Park and buffer zone forest committees were consulted and their views and suggestions were taken into account while implementing the conservation programme especially for buffer zone forest users group level workshops and while conducting conservation excursion in local forest area.

### **5.4 Publication of the leaflet**

Flyers on orchid conservation were prepared and published in Nepalese language with some key English words. The content of the flyers were, facts about orchids, how orchids can be conserved at locally and that could be benefited globally. Theses flyers were distributed in the school level and village level conservation programme. People believe on that they read and see. Flyers, leaflets and orchid excursion were effective in motivating people for orchid conservation.



**Figure 2: Leaflet and Flyer on orchid conservation**

A colorful leaflet on ‘Orchid Conservation’ was published with the support of other two international organizations namely Rufford Small Grant Foundation and Audubon Naturalist Society. The leaflet contains the useful information about the conservation of orchids, its uses and conservation measures to be taken in future.

## 6. Preparation of curriculum for school level and village level teachings

Common session plans were prepared for conservation education programme for school children and villagers. The sessions were delivered without using any technical jargons so that every student and villagers can get the messages very clearly and easily. The medium of delivering the session were in local language. One local resource person having good knowledge in orchids was hired to get assistance in programme activities.

### Glimpse of the session plan

1. Have you heard/see orchids
2. What are orchids? (locally called *Sungabha/sunakhari*)
3. Where you can find orchids?
4. Habitat of orchids in your forest.
5. Importance of orchids
  - a. As an ornamental plant and,
  - b. As an indicator of ecosystem health and vitality.
6. Current government rules, regulation, directories and guidelines related to Non Timber Forest Products in general and orchids in particular.
7. Local, national and international use of orchids for medicinal and decorative.
8. Sustainable conservation - concept

9. Sustainable conservation of orchids and why it is necessary- for regular supply of orchid as source of livelihood and for ecological functioning. (some tips)
10. Management of forest considering orchids and carry out thinning, pruning and cleaning considering orchids.
11. Role of student, NTFP collectors, traders and farmers in the conservation and management of orchids and other natural resources.

## 7. Activities carried out to attain the project objectives

### 7.1 Orchid Conservation Programme in Schools

Three orchid conservation awareness programmes were organized in three secondary school of buffer zone of Chitwan National Park. Though in project proposal five conservation programmes were stated to conduct but due to budget limitation only three conservation sessions were conducted in three different schools. The principal of the schools asked us to conduct such conservation session in all the classes above grade six but due to lack of sufficient budget we could not conduct conservation programme in all grades.



**Figure 3: School level conservation workshops**

We pull together all eco-club member students and deliver information about the conservation of orchids. The students of grade eight and nine were chosen as the target groups for the conservation teaching programme. Two sessions each in three schools were conducted. Session was last for two to three hour. Before starting the conservation sessions' pre evaluation were conducted to know the level of knowledge on biodiversity focusing on orchids. Similarly, post evaluations were also carried out to know how much

they have benefited from the conservation awareness programme. While comparing the level of knowledge before and after the teaching programme it has been seen that the level of knowledge of students were significantly increased. Name of the participating Schools:-

1. *Kathar* Secondary School, Kathar Village,
2. *Adarsh* Secondary School, Bhandara Village
3. *Bachhuli* Secondary School, Bachuli village

## 7.2 Village level orchid conservation programme

Chitwan valley is dominated by the indigenous *Tharu*, *Bote*, *Mushar* and *Chepang*. These people are dependent upon forest resources for their livelihood. These are the people whose livelihood are based on collection of orchids, NTFPs and used to sell in the local market. Five buffer zone community forest users groups were selected on the basis that these indigenous groups of people represented in higher proportions.



Fig: 4a Participants



Fig: 4b Informal group discussion

### Figure 4: Village level conservation workshops

Chairperson of the buffer zone community forestry users groups were consulted for their interest in attending and informing the group members.

The leisure time of the group members were most important because this project did not give daily allowances to attend the conservation programme. The conservation programmes were delivered for 2- 3 hours. The programmes were participatory and villagers took active participation in discussion and curious about knowing different facts about orchids. In most of the conservation programme people were interested to know

about the uses of orchids. People generally used orchids as bedding material for cattle and some time to feed the goat and sheep and also used some times to cure the loose stool of their cattle.

The name of the buffer zone community forest users groups were:-

1. *Shanti* Buffer Zone Community Forestry Users Group
2. *Kumroj* Buffer Zone Community Forestry Users Group
3. *Baghmara* Buffer Zone Community Forestry Users Group
4. *Bandevi Barandabhar* Buffer Zone Community Forestry Users Group
5. *Rambel* Community Forestry Users Groups

### **7.3 Orchid conservation essay competition**

Inter school essay competition was organized to know the capacity of the students to share their knowledge in written form. It was organized in *Bachhuli* secondary school and altogether 20 students from the three schools took part. The topic of the essay completion was “Role of Student in Biodiversity Conservation”. Four members evaluation committee were formed comprised of one teacher from each school and independent evaluator from a local NGO. *Bachhuli* School won the competition and she was honored with a conservation prize comprises of a set of stationery and an orchid book.

### **7.5 Orchid Conservation Excursion**

A three hours jungle excursion was organized in the *Kumroz* buffer zone forest. Some students and villagers take part in this excursion. The programme was organized in the morning as the participants also wanted to observe birds. In the excursion, villagers and students were made acquainted with some varieties of orchids. Participants were claiming that they always visit forest to collect forest products like timber, fodder, fuelwood but they had never paid attention towards orchids. Participants were enthusiastic to know different varieties of orchids, their uses and potentiality to use these resources sustainability to generate income for the community.

Orchids which were detached by herders and children were also collected which were latter relocated on the sustainable host trees inside the forest.





**Figure 5: Orchid Conservation Excursion (Villagers and Forest Technician)**

*We were exploiting orchids without thinking of its sustainability; we collect orchids and sell it to the traders. Because of this orchid awareness programme, I have understood ecological importance of these small species and now we have to conserve it for our future.....*



**Figure 6: Villagers sharing their views**

## 7.6 Participatory Restoration of Orchids

Detached and thrown orchids during forest management operations were collected and were relocated on the suitable host trees. Villagers are really efficient on tree climbing so they helped to relocate the orchids on suitable host trees and sometime ladder were also used for difficult trees to climb. Altogether 38 tufts of orchids were relocated in its wild state and 10 tufts of orchids were also relocated in the office premise of Area Forest Office.



**Figure 7: Destruction of Orchids during harvesting of timbers**



**Figure 8: Collection of orchids from the harvested timbers for relocation**



**Figure 9: Collection of fallen and detached orchids in forest**



Orchids were fastened on the trees with the help of jute ropes and the roots were made moisture with water for survival and easy attachment with host trees. It is seen that in course of time jute rope will decompose automatically.



**Figure 10: Relocation of fallen orchids on a tree**

## **8. Outputs and indicators of success**

The focus of this conservation programme was students and villagers. It is hard to change the attitude of the local people in a short period of time and with few conservation awareness programmes. On the other hand, conservation awareness camp focusing on orchid is first of its kind in the project area. Actually, it need continue efforts for a long time to make people aware of their day today activities so that they can change their behavior and attitude for good and ultimately act in environmental sensitive way. For enhanced result, I perceive that this type of awareness camps should be continued.

The success of conservation programme is hard to measure and quantify. In this programme success is measured on the basis of participation of students, villagers and forest technician during the implementation of project activities. Some are directly involved where some are indirectly involved.

Therefore the people who are directly benefited from the programme are one of the ways to evaluate the success of the conservation endeavor.

- About 350 students and 5 teachers from the three secondary school of buffer zone of Chitwan National Park were benefitted from the conservation awareness programme in school. Teachers were though not directly involved.
- More than 210 villagers of the buffer zone of the park are now aware of the importance of orchid conservation. Their commitment to conserve orchids and host trees is obviously an important achievement for the conservation of targeted species. By seeing the relocated orchids, it is hoped that other villagers who were not directly involved in the conservation awareness workshops were also encouraged for the conservation of orchids.
- The distribution of a flyer and leaflet prepared in local language will certainly help them to remind their commitment often when they see flyer or leaflet.
- Relocation of 48 orchid tufts on host trees inside forest not only conserve orchids but also flow a conservation message in the community that orchids should be conserved.

# SAVE ORCHIDS: SAVE NATURE



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छैन । नेपालमा सुनगाभा/सुनाखरीको स्रोतमा ह्रास आउनुका प्रमुख कारणहरूमा दिगो संकलन पद्धतिलाई ध्यान नदिई अत्यधिक मात्रामा संकलन गर्नु, जथाभावी यसको host रुखहरूको कटान वा विनास गर्नु, सर्वसाधारण मानिसहरूमा संरक्षण सम्बन्धी जनचेतनाको अभाव हुनु, वन क्षेत्रमा अत्यधिक मात्रामा चरिचरण तथा लगातार वन क्षेत्रमा आगलागी हुनाले सुनगाभा/सुनाखरीको प्राकृतिक वासस्थानमा दिनानुदिन ह्रास आउदै गईरहेको छ ।

तसर्थ सुनगाभा/सुनाखरीको दिगो संरक्षण तथा व्यवस्थापनका लागि जनसमुदायमा जनचेतनाको विकास गर्नुका साथै संरक्षण



सुनगाभा भएका रुखका ठुटाहरु

सम्बन्धी केही साधारण कुराहरू मनन गरेमा सुनगाभा /सुनाखरीका विभिन्न प्रजातिहरूलाई लोप हुनबाट जोगाई यसमा आश्रित मानिसहरूको जीविका सुधार्न सकिन्छ ।

**दिगो संकलन तथा व्यवस्थापनका लागि ध्यान दिनु पर्ने केही कुराहरू** Things to remember for the sustainable conservation of orchids

- जथाभावी सुनगाभा भएका रुखका हागाहरू नभाचौ । Do not lop the branches of tree with orchids on it.
- वनमा संस्पर्द्धनका कामहरू गर्दा सुनगाभा/सुनाखरी भएका रुखहरूलाई सकेसम्म नहटाऔ । यसले काठको गुणस्तरमा कुनै पनि किसिमको असर पर्दैन । Do not remove or cut the trees which have orchids. Always remember they don't damage the quality of timber.
- जथाभावी व्यापारिक वा अन्य प्रयोजनको लागि सुनगाभा/सुनाखरी संकलन नगरौ । स्रोत सर्वेक्षण गरी दिगो रूपमा मात्र संकलन गर्ने बानीको विकास गरौ । Inventory orchid resource

in forest and always follow the principle of sustainability.

- वन क्षेत्रमा जथाभावी तथा अत्यधिक चरिचरण नगराऔ । Control grazing and browsing
- वन क्षेत्रलाई आगलागीबाट जोगाऔ । Protect forest from fire

हामी सचेत जनसमुदायले यी साधारण उपायहरूलाई आफ्नो व्यवहारमा ल्याएमा केही मात्रामा भए पनि प्रकृतिका यी अमूल्य धरोहरलाई संरक्षण गर्न सकिन्छ । त्यसकारण आजै देखी सुनगाभा/सुनाखरी संरक्षणमा हामी सबै मिली हातेमालो गरौ ।



ऋपक्क फूलेको सुनगाभा फोटो: सुनिता उलक

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**दुर्लभ सुनगाभाहरूको संरक्षण गरौ**

**Lets' Conserve Orchids**

**Conservation: It Begins with You....**



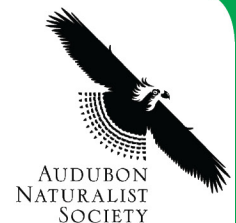
ऋपक्क फूलेको सुनगाभा

फोटो: सुनिता उलक

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&

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नेपालमा धेरै थरीका बिरुवाहरू पाइन्छन् ती मध्ये सुनाखरी पनि एक हो । नेपाल सुनगाभा /सुनाखरीका (orchids) लागि स्वर्ग नै भन्न सकिन्छ । यहाँको विविध हावापानी तथा मौसमले गर्दा नेपालमा ३८८ भन्दा धेरै किसिमका सुनगाभा/सुनाखरीका प्रजातिहरू अभिलेख गरिएको छ र अझै थप नयाँ प्रजातिहरू पहिचान हुन सकिने अनुमान वानस्पतिविद्हरू बताउँछन् । IUCN अनुसार नेपालमा पाइने ११ वटा प्रजातिका सुनगाभा/सुनाखरी हरूलाई सकंटाग्रस्त तथा लोपोन्मुख सूचीमा समावेश गरिएको छ । नेपालमा भौगोलिकरूपले सुनगाभा/सुनाखरीका विभिन्न प्रजातिहरू



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tropical देखि subalpine सम्मको उचाइमा पाइन्छ । पर्वत, कास्की तथा स्याङ्जा जस्ता सीमानामा पर्ने पञ्चासेमा मात्र ११३ प्रजातिका सुनगाभा/सुनाखरीका प्रजातिहरू अभिलेख गरिएको छ । नेपालको भौगोलिक बनावट तथा हावापानीको विविधताले गर्दा वानस्पतिक विविधतामा (floral diversity) पनि नेपाल निकै धनी रहेको छ । ११ वटा प्रजातिका सुनगाभा/सुनाखरीहरू नेपालको endemic orchid प्रजातिको रूपमा अभिलेख गरिएको छ । प्रकृतिमा रहेका सबै प्राणीहरूको आ-आफ्नै भूमिका हुन्छ त्यसैगरी सुनगाभा/सुनाखरी साना किसिमका प्रजाति भएतापनि पारिस्थितिकीय सन्तुलनमा यसको ठूलो भूमिका हुन्छन् ।

सुनगाभा/सुनाखरी Orchidaceae परिवारमा पर्ने वानस्पति हो । यी प्रजातिका बिरुवाहरू अरु प्रजातिका बिरुवाहरू भन्दा आकार (morphology) तथा mode of growth मा भिन्नता हुन्छन् । सुनगाभा/सुनाखरीहरूमा मुख्यत दुई प्रकारले वृद्धि विकास भएको पाइन्छ

। पहिले Sympodial growth जसमा बिरुवामा pseudobulb हुन्छन् र दोस्रो Monopodial growth जसमा बिरुवाहरूमा pseudobulbs हुँदैनन् र बिरुवाहरूको एउटा मात्र तना हुन्छन् र पातहरू alternative रूपमा आएका हुन्छन् । सुनगाभा/सुनाखरीका फूलहरू अन्य बिरुवाका फूलहरू भन्दा भिन्न प्रकृतिका हुन्छन् जस्तै:

➤ Petal हरू labellum मा परिवर्तन भएका हुन्छन् । Modification of petal into plate-form like structure called labellum.

➤ स्त्री तथा पुरुष प्रजनन अंगहरूको मेलबाट gynostegium भन्ने अंग बनेको हुन्छ र एउटामात्र fertile stamen हुन्छन् । Union of male reproductive organ to form a single structure called gynostegium.

➤ विऊहरू धेरै तर साना साना हुन्छन् र तिनिहरूमा endosperm अथवा organized embryo हुँदैनन् । सुनगाभालाई विऊबाट उत्पादन गर्न गाह्रो हुन्छ तर vegetative reproduction सजिलै हुन्छ । Presence of numerous tiny seeds without endosperm or organized embryo.

➤ अंकुरण को लागि Mycorrhiza संग सहजीवी समागम महत्त्वपूर्ण हुन्छन् । Symbiotic association of mycorrhiza is important for seed germination.

नेपालमा सुनगाभा/सुनाखरीको स्थानीय स्तरमा खासै प्रयोग भएको पाइँदैन । केही ठाँउहरूमा यसलाई कम्पोष्ट, सोत्तर तथा गाई बस्तुलाई खुवाउनका लागि प्रयोग गरिएको पाइएको छ भने केही ठाँउहरूमा स्थानीय स्तरमा हात भाँचिएको, मर्केको, पोलेको, आँतको ज्वरोमा औषधिको रूपमा र गाई बस्तुको उपचारमा प्रयोग गरेको पाइएको छ । धेरै जसो सुनगाभा/सुनाखरी epiphytic हुने भएकोले यसमा सन्तुलित मात्रा नाइट्रोजन (nitrogen), फास्फोरस (phosphorous), तथा पोट्यास (potassium) हुने भएकोले कम्पोष्टको रूपमा प्रयोग गरेको पाइँन्छ । स्थानीय स्तरमा खासै प्रयोगमा नआए पनि नेपालबाट वर्षेनी

लाखौं टन सुनगाभा/सुनाखरी कानुनी तथा गैह्र कानुनीरूपमा विदेश निकासीहुने गरेको छ । केही मात्रामा नेपाल तथा धेरै मात्रामा पश्चिमेली देशहरूमा सुनगाभा/सुनाखरीलाई सजावटी बिरुवा (decorative plants) को रूपमा प्रयोग गरिन्छ साथै चिन लगायतका मुलकहरूमा



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*Dendrobium, Cymbidium* प्रजातिका सुनगाभा/सुनाखरी हुन् । आईसकिम लगायत विभिन्न पेय पदार्थमा प्रयोग हुने भेनिला स्वाद (vanilla flavour) समेत *Vanilla planifolia* नाम गरेको सुनगाभा/ सुनाखरीबाट निकालिन्छ ।

केही वर्ष पहिले वन ऐन तथा नियमावली अनुसार सुनगाभा/सुनाखरी प्रतिबन्धित प्रजाति अन्तर्गतको सूचीमा राखिएको थियो भने अहिले CITES सूचीमा परेका प्रजाति बाहेकका प्रजातिहरूलाई कानुनी प्रक्रिया पुरा गरेर सकंलन तथा बिक्री वितरण गर्न सकिने प्रावधान रहेको छ । नेपाल सरकार ले CITES सूचीमा *Paphiopedilum insigne, Paphiopedilum venustum* प्रजातिलाई सुचीकृत गरेको छ र यी प्रजातिहरूको सकंलन तथा बिक्री वितरणमा पूर्णरूपले प्रतिबन्ध लगाएको छ । वन विभागले वन जगलबाट दिगो रूपमा सुनगाभा/सुनाखरी संकलन गर्नको लागि वन क्षेत्रको स्रोत सर्वेक्षण, वर्षेनी सकंलन गर्न सकिने परिमाण निर्धारण, ५० टन सम्म संकलन गर्न प्रारम्भिक वातावरणीय परिक्षण (IEE) तथा ५० टन भन्दा बढी संकलन गर्नु परेमा वातावरणीय प्रभाव मुल्यांकन (EIA) गर्नु पर्ने जस्ता प्रावधान तथा मापदण्डहरूको व्यवस्था गरेको भएतापनि सुनगाभा/सुनाखरीको दिगो रूपमा संरक्षण तथा व्यवस्थापन हुन सकेको

यसलाई विभिन्न किसिमका औषधी बनाउनुमा समेत प्रयोग भएको पाइँन्छ । औषधीमा प्रयोग हुने प्रमुख प्रजातिहरूमा