

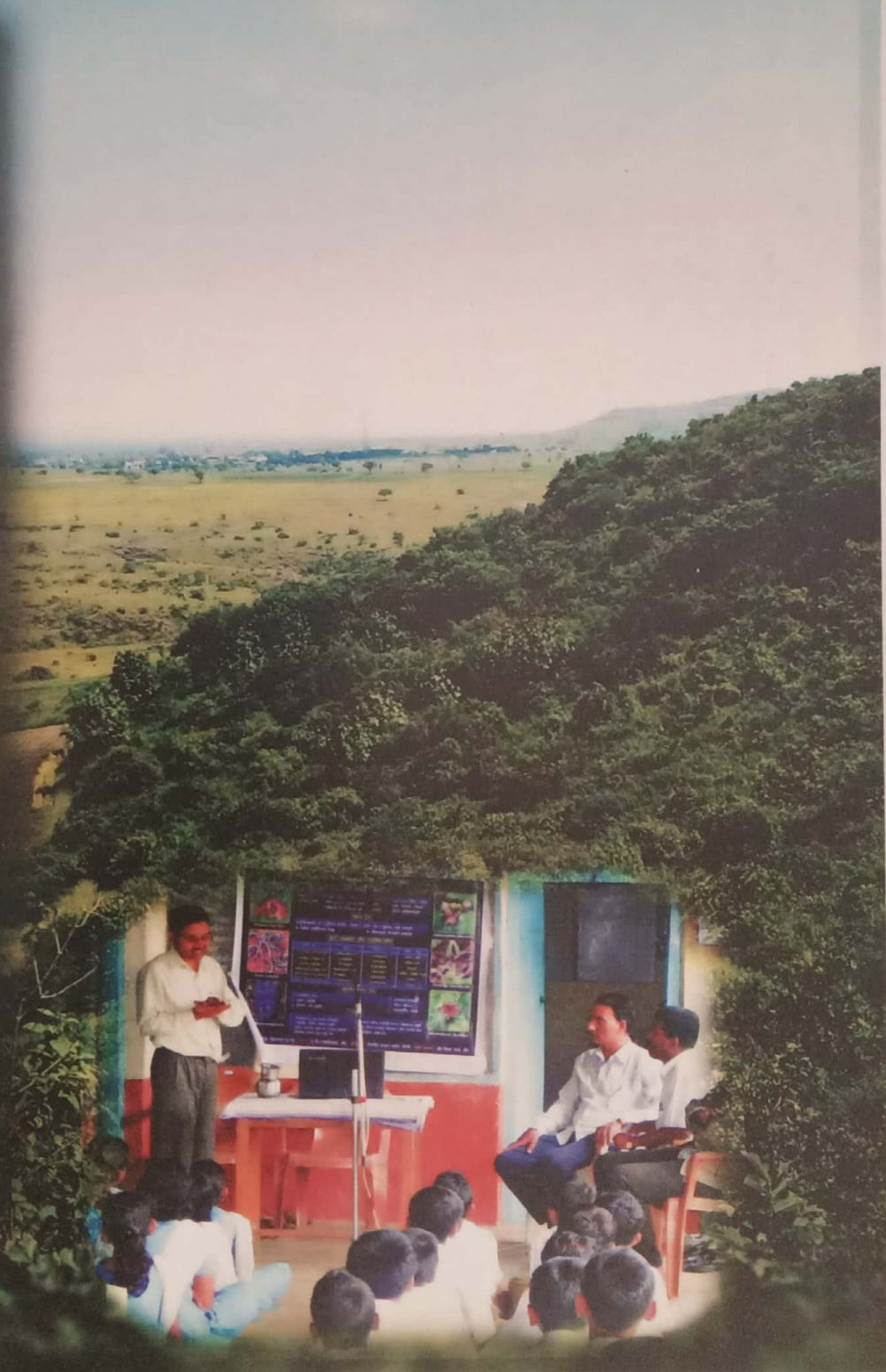
FINAL REPORT OF MINOR RESEARCH PROJECT

ON

" IN SITU CONSERVATION OF RARE AND ENDANGERED PLANTS

RESTRICTED TO SMALL FRAGMENTS IN KHATAV TALUKA OF SATARA

DISTRICT MAHARASHTRA THROUGH AWARENESS AND EDUCATION PROGRAMMES"



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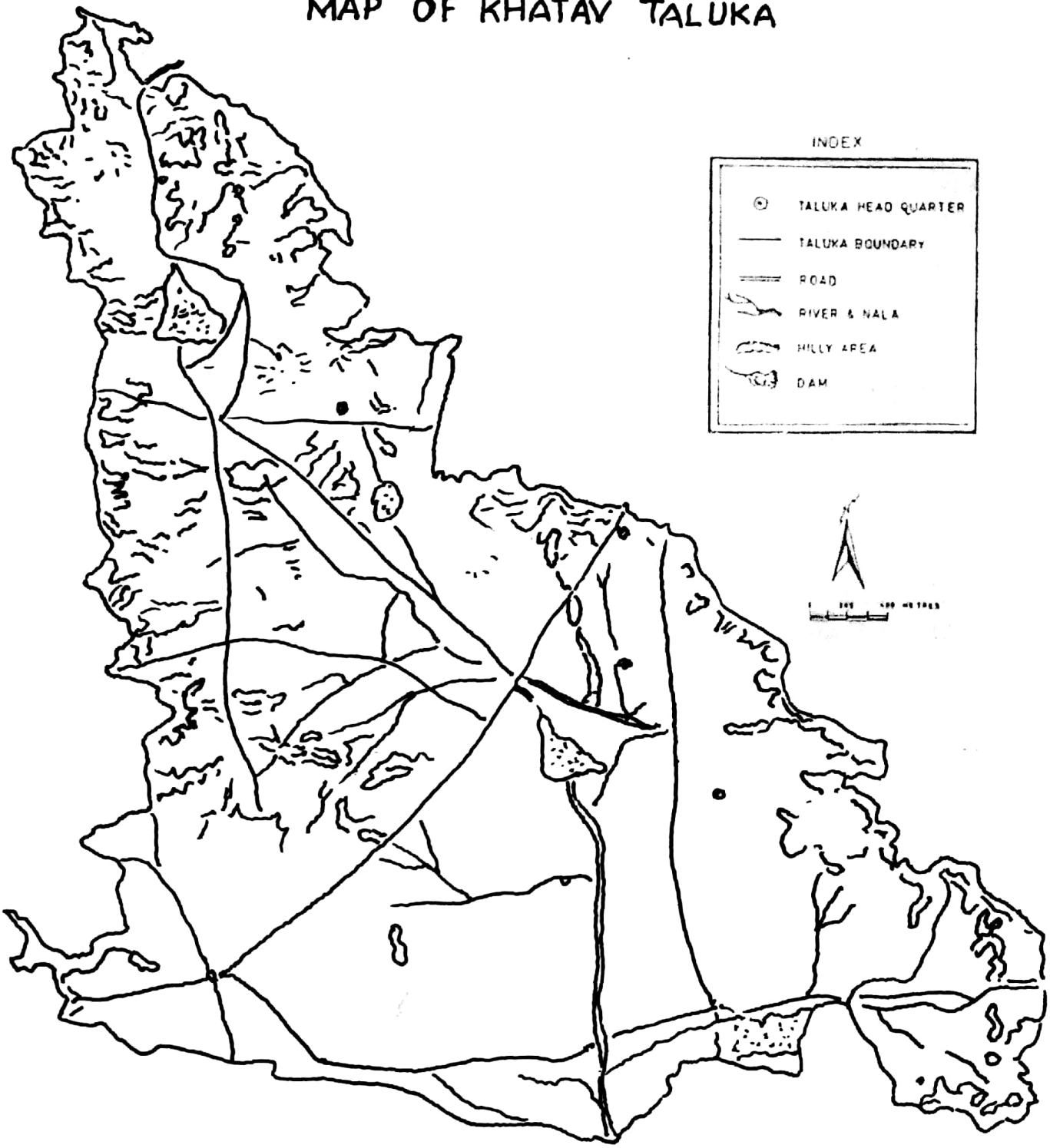
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MAP OF KHATAV TALUKA



INDEX

⊙	TALUKA HEAD QUARTER
—	TALUKA BOUNDARY
==	ROAD
~	RIVER & NALA
▨	HILLY AREA
⊣	DAM



Overview

The global concern for preserving the biological diversity for immediate as well as future use has gained momentum after the historic Rio Convention of 1992. The Global Biodiversity Assessment project originated in July 1992. For more than four decades The World Conservation Union (IUCN), through its Species Survival Commission (SSC) has been assessing the conservation status of species, subspecies and varieties on a global scale (<http://WWW.IUCN.org>). The Red List Index will play a vital role in tracking progress towards the 2010 target and beyond. There is great scope for the utilization of indigenous bio resources. The sustainable exploitation of these resources is essential to meet the challenges of the 21 century for socio-economic development. Target 2 of the Global Strategy for Plant Conservation (GSPC) aims at the preliminary assessment of the conservation status of all known plant species, at national, regional and international levels by 2010 (<http://www/biodiv/org>). Less than 3% of the world's known plant species have been assessed so far and the Species Programmes are leading a new approach to Red Listing in order to make more rapid progress. There is need for extensive explorations and study of biodiversity for its utilization in sustainable development and conservation for future needs.

India is one of the signatories of this convention for the conservation of biodiversity; management of biodiversity requires assessments of diversity at all three levels, community, and habitat and species diversity. Community and species level biodiversity provides an overview of the enormous floristic diversity and vegetation types of India.

It is now well realized that due to some natural and anthropological activities the biological resources of this earth are under threat. In India, during last two decades there has been a greater consciousness about the threat to biological species and widely realized that the loss of biological diversity has great economic and environmental impact. It is roughly estimated that 10% of flowering plant species are threatened.

Floristic diversity in India was estimated by Sir J.D. Hooker (1904) that 17,000 vascular plants are recorded in this region. Out of this 5000 species are endemic to this region. (Chatterjii, 1940,1962;Nayar,1980).It is estimated that over 45000 species of plants are recorded in this region which represents 11% of the known plant species of the world. The flowering plants of India

Maharashtra is the third largest state in India. Maharashtra is rich and it was explored by taxonomist, like The flora of Bombay presidency T. Cook (1901-1908) Forest flora of Melghat (Patel, 1968), Flora of Osmanabad (Naik, 1979), Flora of Nagpur (Ugemuge, 1986), Flora of Akola (Kamble & Pradhan, 1988), Flora of Sawantwadi (Almeida, 1990), Flora of Nasik (Laxminarsimhan & Sharma, 1991), Flora of Raigad (Kothari & Moorthy, 1993), Flora of Marathwada (Naik, 1998), Flora of Buldhana (Diwakar & Sharma, 1999), Flora of Maharashtra (Almeida, 1996, 1998; Sharma, et al., 1996; Lakshminarsimhan & Moorthy, 2000; Singh & Karthikeyan, 2000), Flora of Kolhapur (Yadav & Sardesai, 2002); etc. Also a number of research papers have been published on the floristic components of different regions by different researchers in various journals. T. Cook (1901-1908) has reported 2337 species belonging to 944 genera and 146 families out of which 401 species comprising 273 genera and 88 families were reported from the Satara district. Internationally, the Western Ghats are the world's hotspots of biodiversity that are under threat. It is estimated that over 3025 species of plants are recorded in this region belongs to 1081 genera of 187 families, 25 genera and 694 species are endemic to India occur in Maharashtra. Some of critically endangered, endangered and vulnerable.

Endemic and Threatened flowering plants of Maharashtra (Mishra D.K. & N.P. Singh, 2001) reported 215 taxa of these 130 species and 12 infraspecific taxa are endemic to Maharashtra. These taxa further categorised as possibly extinct 8 taxa, critically endangered 53 taxa, endangered 41 taxa, vulnerable 20 taxa, low risk 6 taxa, and data deficient 14 taxa

Flora of Mahabaleshwar and its environs (B.D. Sharma and M.P. Nayer 1983-1985) has reported 1398 species, 697 genera and 141 families. The district as a whole is rich in endemic flora recording 108 species distributed over 9 genera which are endemic to Western Ghats and 30 are rare.

On the basis of survey, Western part of Khatav taluka. particularly Ramdongar Hills, Chandkhana Hills, Kartikswami Hills, Yamai Hills, Jotiba Hills and Bhushangad Hills and part of Vardhangad were identified as **“Biodiversity Hotspots for these plants. Western part of taluka facing serious threat of extinction of these plants.**

Conservation cannot work without involvement of the people who depends on plant resources. Therefore, number of educational awareness programmes were held in these areas to make local people aware about the importance and conservation of plants. Local communities were involved to save the species in its natural habitat. Awareness and participation of the local community in conservation efforts are key points to save these plants in collaboration with villagers and schools received warm appreciation from the local villagers and schools. Poor people, especially those living

RET PLANTS IN KHATAV TALUKA (SATARA, MAHARASHTRA)



Delphinium malabaricum (Huth)
Munz var. *malabaricum*
IUCN Status:
Vulnerable



Iphigenia magnifica, Ansari
& Rolla Rao
IUCN Status:
Endangered



Ceropegia noorjahaniae, Ansari
IUCN Status:
Critically endangered

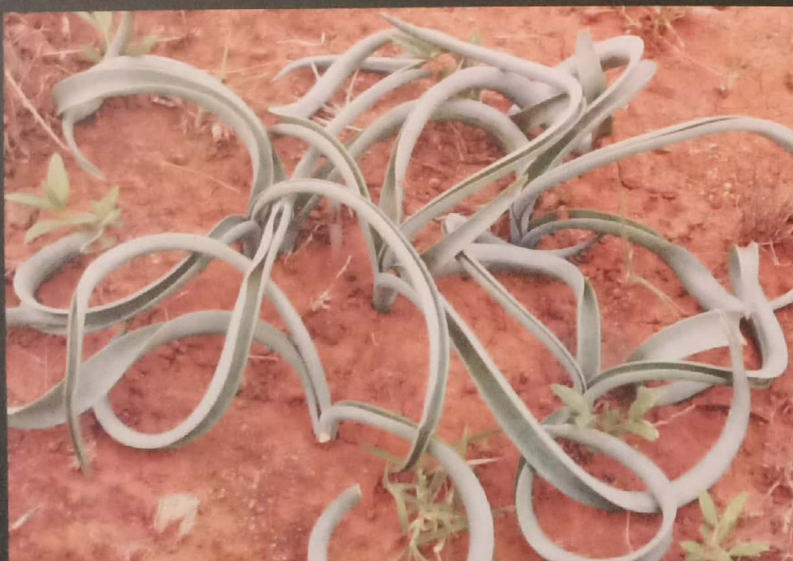
RET PLANTS IN KHATAV TALUKA (SATARA, MAHARASHTRA)



Heterostemma urceolatum, Dalz
IUCN Status:
Endangered



Heterostemma disciflorus, Hook.
IUCN Status:
Endangered



Drimia congesta, Ansari
(Wight) & Raghavan
IUCN Status:
Endangered

in areas with low agricultural Productivity are directly depends on plant resources to support their livelihoods.

Therefore, number of activities have been identified and conducted through the close co-operation of the village level communities, who depends on plant resources. For awareness students and villagers were trained, to disseminate conservation message. A campaign was started with series of activities such as, lectures, slideshows and poster presentations to motivate and conserve these plants and their habitat, their relationship with other wildlife and roll in daily life.

Objectives of Project

- a) To survey rare and endangered plants of khatav taluka
- b) To find out the present status of rare and endangered plants
- c) In situ conservation of rare and endangered plants of khatav taluka through awareness and education programmes

Study area

Khatav, one of the eleven talukas of Satara district has 136457 hectors of area. It is situated in south east region. Major portion of this taluka is occupied by mahadeo ranges of western ghats. The most prominent are Ramdongar Hills, Chandkhana Hills, Kartikswami Hills, Yamai Hills, Jotiba Hills and Bhushangad Hills and part of Vardhangad. Remaining part comprises of plains with open savannas having red and black soil. The hills and rivulutes of Khatav Taluka are rich in biodiversity with some very rare and endangered plant species. This taluka has geographical location having highest elevation of 956 MSL with $17^{\circ} 5'$ to $18^{\circ} 1'$ latitude to $73^{\circ} 33'$ to $74^{\circ} 74'$ longitude having dry deciduous shrubby forest. *Ceropegia noorjahaniae* Ansari, *Heterostemma disciflorus*, *Heterostemma urceolatum* Dalz. *Delphinium malabaricum* (Huth) Munz ,var. *malabaricum* , *Iphigenia magnifica* Ansari & Rolla Rao, and *Drimia congesta* Ansari (Wight)&Raghavan are naturally found in Khatav Taluka

Methodology

In the first step of project, brief survey was undertaken for proper assessment of six species. The survey was conducted from June 2010 to March 2012. The main aim of survey was to know the actual status of all these six species. At different locations of khatav taluka and to look into diversity of plant resources that are used by local rural peoples. In addition, responses from the knowledgeable villagers, tribal groups, traditional healers and shepherds were also obtained to have a preliminary knowledge about the presence and population trend of the these plants. People from rural/tribal areas *i.e.* traditional healers, farmers, shepherds were found to have good knowledge of medicinal uses of plants.

On the basis of survey, western Part of Khatav taluka particularly Ramdongar Hills, Chandkhana Hills, Kartikswami Hills were identified as “Biodiversity Hotspots for *Ceropegia noorjahaniae*, *Heterostema disciflorus*, *Heterostema urceolatum*, *Delphinium malabaricum* var. *malabaricum*, *Iphigenia magnifica* and *Drimia congesta*. The Western part of Khatav Taluka is facing serious threat of extinction of these plants. Conservation cannot work without the involvement of the people who depend on biodiversity. Therefore number of educational awareness programmes were held in these areas to make local people aware about the importance and conservation of plants. Local communities were involved to save the species in its natural habitat.

1. Field Survey and present status assessment of RET Plants

The proposed project was for duration of two years. In first year, general survey was carried out in Khatav Tahasil to collect data regarding the occurrence, habitat, causes of depletion and medicinal importance of these plants. During this survey six plant species were collected and identified as RET plants.

2. Educational awareness programmes

During second year conservation programmes were organized in in different villages of Khatav Tahasil. Conservation of any organism in human dominated area directly depends on the involvement of school children's, locals villagers, at every stage of protection. For achieving this target, we approached to nearby schools, villagers and long discussions were held to involve them in this programme. To aware local rural and school children's about the importance and conservation of plants, number of awareness programmes were organized in different villages of Khatav Tahasil.

Why these plants in IUCN's Red List? What are causes of endangerment?

On the basis of deliberations with villagers and field survey, following reasons can be attributed for rarity of *Ceropegia noorjahaniae*, *Heterostemma disciflorus*, *Heterostemma urceolatum*, *Delphinium malabaricum* var. *malabaricum*, *Iphigenia magnifica* and *Drimia congesta*.

Construction of Windmills.

Forest fires.

Deforestation.

Over grazing.

Existence of Invasive species.

Construction of Buildings near wind mills.

Outcomes of Awareness Programmes

Community-based approaches to decision-making in the management of protected areas are being implemented in many areas. Awareness and participation of the local community in conservation efforts are key points to save the *Ceropegia noorjahaniae*, *Heterostemma disciflorus*, *Heterostemma urceolatum*, *Delphinium malabaricum* var. *malabaricum*, *Iphigenia magnifica* and *Drimia congesta* in collaboration with villagers and schools. This programme received warm appreciation from the local villagers. Poor people, especially those living in this areas with low agricultural productivity directly depends on plant resources to support their livelihoods. Therefore, number of activities have been identified and conducted through the close co-operation of the village level communities, who depend on biodiversity. For awareness amongst the students, villagers and groups were prepared of different age to disseminate conservation message.

Engaging local people in conservation

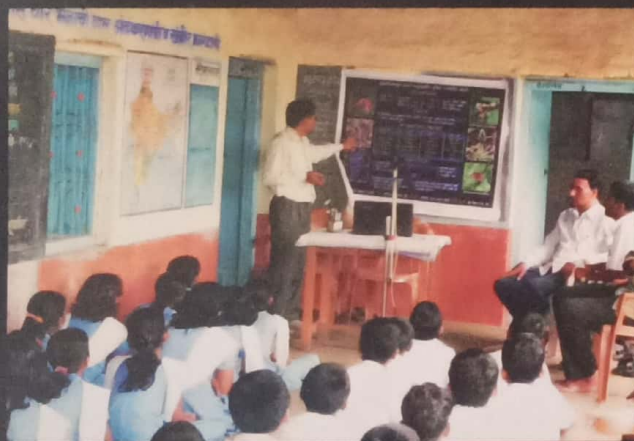
Through meetings, talks and discussions, the local community are now more aware of the threats faced by *Ceropegia noorjahaniae*, *Heterostemma disciflorus*, *Heterostemma urceolatum*, *Delphinium malabaricum* var. *malabaricum*, *Iphigenia magnifica* and *Drimia congesta* plants and how endangered they are. The project has received favorable response and strong support from the schools and local villagers.

A series of activities were conducted targeting the local school children's. Subsequently, several slide shows and poster exhibitions were conducted at different villages and in local schools.

List of villages where awareness programs were organized

Sr.no.	Name of Village	Number of programmes organised
1	Vardhangad	03
2	Visapur	04
3	Jamb	05
4	Jakhangoan	03
5	Kokrale	01
6	Ambheri	06
7	Aundh	02
8	Jaigoan	03
09	Varud	01
10	Amlewadi	02
11	Khabalwadi	04
12	Gosavachiwadi	02
13	Girjashankarwadi	02
14	Ladegoan	01
15	Ner	02
16	Bitlewadi	03
17	Pusegoan	02

AWARENESS AND EDUCATION PROGRAMMES



Ceropegia noorjahaniae, Ansari.

Family - Asclepiadaceae
Locality - Kartikswami
Fls. & Fruits - July to September



Gross Morphology:

It is usually erect, sometimes climbing herb. 15-40 cm in height when erect. stem terete. Leaves sub sessile to petiolate; glabrous, linear-lanceolate glabrous beneath, margins minutely hairy. Flowers usually 3, in axillary or extra-axillary umbellate cyme, peduncles 4-8mm long, terete, corolla 2-3 cm long. Slightly curved, tube inflated at the base, green inside with longitudinal purple lines. Follicles in pairs, 9-10 cm long, tapering at both ends. Tubers globose, spherical to sub spherical

Status:

Critically endangered; probably due to habitat destruction because of widening of ghat roads etc.

Other localities:

Wai - Panchagani, ghat, Munavale Jarandeshwar.

Habitat and Ecology:

Found along the ghat slopes with grasses and herbs in well-drained rocky - gravelly soil over 1000m altitude. Requires cool, misty, moist climate. It grows among tall grasses during peak monsoon season. Landslides and risky habitat make its collection more hazardous

Heterostemma disciflorus, Hook.

Family :Asclepiadaceae
Locality :Ramdongar
Fls. &Fruits :August to September



Gross Morphology:

A twining under shrub, glabrous, young parts pubescent. stem hairy, hairs very short. Leaves opposite, 6.5-11x4-6.2 cm, elliptic oblong or ovate oblong, base subcordate; petioles 1.5-2.5. long. Flowers in shortly pedunculate cymes. Calyx minute, 5-partite, segments 0.2 cm long, with wooly hairs. Corolla, disciform vertically depressed; 5-lobed, corona 5-lobed with incurved apex, reddish purple outside, dark purple within, corona arising from stamina column.

Follicles 8-12x.05-0.7 cm, smooth, reddish in colour, broad at the base, tapering towards apex. Seeds brown, broadly winged, coma white.

Status:

Endangered; probably due to habitat destruction because of wind mill construction

Habitat and Ecology:

Found along the slopes with grasses and herbs in well-drained rocky – gravelly soil. It grows in thorny bushes of Lantana camera

Heterostemma urceolatum, Dalz.

Family : Asclepiadaceae
Locality : Ramdongar
Fls. & Fruits : August to September

Gross Morphology:

A perennating twiner, stem terete, leaves, opposite, 7-13.5x4-8.6cm, subcoriaceous, ovate lanceolate. Inflorescence sessile or sub sessile umbellate cyme arising between petioles, 5-25 flowered. Flowers purplish red, bracteates, bract-linear. Calyx 5-partite. Corolla ovoid urceolate or tubular, ventricose at the base, dark purple inside with or without hairy threads. Corona adnate to the staminal column. Follicles usually in pairs, 6-12x0.5-0.7 cm, smooth, usually reddish in colour. Seeds broadly winged, coma white, 2-3cm long.



Status:

Endangered; probably due to habitat destruction, because of wind mill construction

Other localities:

Raigad, Thane

Habitat and Ecology:

Found along the slopes with grasses and herbs in well-drained rocky – gravelly soil. It grows in thorny bushes in open shrubby forest

Delphinium malbaricum, (Huth) Munz.

Family : Ranunculaceae
Locality : Kartikswami, Ramdongar, Chandkhana
Vernacular name : Nilamberi
Fls. & Fruits : August to September



Gross Morphology:

Erect herb, stem hollow, terete hairy. Radicle leaves large, reniform, 5-7 lobed, cauline divided into narrower segments. Petioles sheathing. Flowers bright blue, spur conical, long. Filament's much dilated at the base. Follicles straight, many seeded. It is rare plant found at particular altitude growing on slopes.

Status:

Vulnerable

Other localities:

Yawateshwar, Junner, Khandala, Purander, Raigad, Jarandeshwar, Thane

Habitat and Ecology:

On hills Slopes with grasses and herbs in well-drained rocky –gravelly soil over 1000m altitude. Requires cool, misty, moist climate. It grows among tall grasses during peak monsoon season. Landslides and risky habitat make its collection more hazardous.

Iphigenia magnifica ,Ans.&Rao.

Family : Liliaceae

Locality : Kartikswami, Ramdongar, chandkhana

Vernacular name:

Fls. &Fruits : August-September



Gross Morphology:

Robust, perennial cormatous herb. Stem usually branched, terete. Leaves many linear-lanceolate or lanceolate. acute at apex, grass like. Inflorescence raceme. Flowers purple, filiform linear-subulate 1-3 nerved.. Stamens 6; filaments glabrous. Capsules subglobose. seeds subglobose, dark brown.

Status:

Endangered; Though the seeds do not contain high quantity of colchicine, the yield in terms of number of fruits and seeds is more than in other species of the genus. Hence, it appears to be equally high in demand, causing depletion of population

Other localities:

Yaveteshwar, Pachgani, Dhule, Kolhapur, Raigad, Ratnagiri

Habitat and Ecology:

On exposed grassy slopes of hills in gravelly soil with *ca* 150cm annual rainfall.

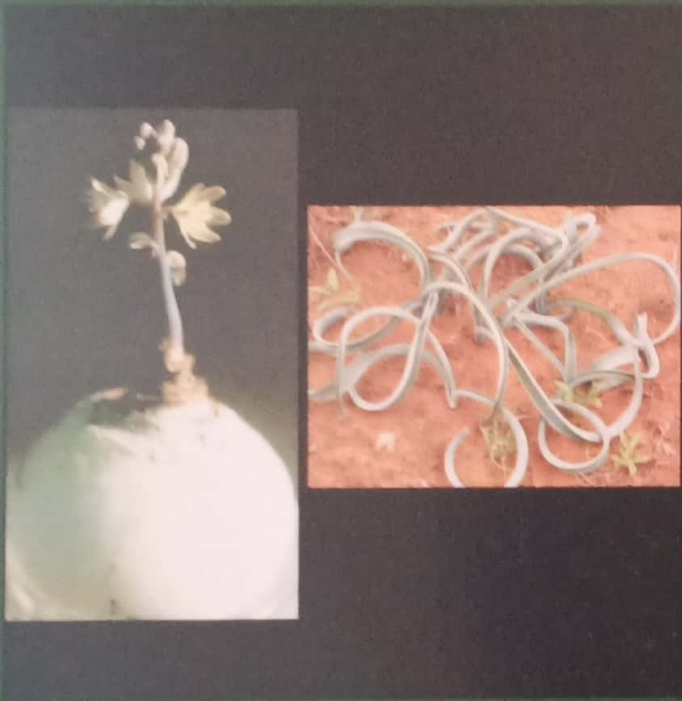
Drimia congesta, Wight.

Family : Liliaceae

Locality : Kartikswami, Ramdongar, Chandkhana

Vernacular name: Sapkanda

Fls. & Fruits : February to March



Gross Morphology:

A bulbous scapigerous herb, the bulbs are ovoid, subglobose with fleshy scales. Leaves usually 3 per plant, dark green. Scape slender, purplish green, glabrous. Flowers in simply congested raceme in cluster. Perianth segments 6 arranged in two whorls. It grows in rocky open grounds

Status:

Endangered, known on the basis of several gatherings. It has not been seen anywhere since 1945 though the region has been very thoroughly explored during this period. Due to developmental activities the original habitats might have undergone changes leading to loss of population of the species

Other localities:

Endemic to western ghats. So far known from Dule, Raigad and Pune.

Habitat and Ecology:

Grows on exposed grassy slopes of the hills on gravelly soil with *ca* 150Cm annual rain fall

Findings

The present project work is result of survey of **RET Plants** in khatav taluka .In two years **extensive** and **intensive** field visits were made in all sites of khatav taluka.

During field visits six plants were collected from this area ,according to **IUCN category** and their status .Out of six, four species are **Endangered**,one is **Critically endangered** and one is **vulnerable**.

Sr. no	Botanical name	Family	IUCN Status	Locality
1	<i>Ceropegia noorjahaniae</i> , Ansari	Asclepiadaceae	Critically endangered	Kartikswami
2	<i>Heterostemma disciflorus</i> , Hook.	Asclepiadaceae	Endangered	Ramhills
3	<i>Heterostemma urceolatum</i> , Dalz.	Asclepiadaceae	Endangered	Ramhills and Chandkhana hills
4	<i>Delphinium malabaricum</i> (Huth) Munz var. <i>malabaricum</i>	Ranunculaceae	Vulnerable	Kartikswami and Ramhills
5	<i>Iphigenia magnifica</i> , Ansari & Rolla Rao	Liliaceae	Endangered	Kartikswami
6	<i>Drimia congesta</i> , Ansari (Wight) & Raghavan	Liliaceae	Endangered	Kartikswami and Ambheri

Recommendations

Based on the experience gained while executing this project, following recommendations are made for the conservation of *Ceropegia noorjahaniae*, *Heterostemma disciflorus*, *Heterostemma urceolatum*, *Delphinium malabaricum* var. *malabaricum*, *Iphigenia magnifica* and *Drimia congesta* and other important plant species of Khatav Tahasil.

1. Western part of Khatav Tahasil is facing serious threats such as **construction of Wind mills, Forest fires, Deforestation, Over Grazing, Existence of Invasive species and Construction of Buildings**

This area should be monitored on priority basis for conservation of these plants

2. The protection measure taken by locals should be appreciated at the higher level. And some sort of prize could be given to motivate.

3. Awareness programs must be conducted time to time at schools and rural areas of Khatav Tahasil, to make aware about the importance and conservation of RET Plants.

4. Conservation cannot work without involvement of the people; therefore Community based conservation programmes must be conducted to conserve the Biodiversity of this area.

Conclusions

Ceropegia noorjahaniae, *Heterostemma disciflorus*, *Heterostemma urceolatum*, *Delphinium malabaricum* var. *malabaricum*, *Iphigenia magnifica* and *Drimia congesta* are important plant of herbal heritage of India. Unfortunately, these plants has become endangered because of its slow growing nature, poor seed setting, lack of cultivation, poor seed germination rate, Habitat destruction and excessive and unscientific use in folk medicines and religious purposes.

Based on the experience gained while executing this project, it is concluded that RET plants can be conserved through the involvement of local people. Efforts should be done to conserve these plant species in their natural habitats. Community based approaches are highly effective for conservation of Rare, endangered and threatened plants.

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