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REPORT

WORK SHOP ON BEE KEEPING

IN

WESTERN GHATS (MARCH 27 AND 28, 2001)

With Financial Assistance from:
SWALLOWS (SWEDEN)

Organised by:

PRAKRUTI
HULEMALGI BUILDING
CHOWKIMATH
SIRSI - 581 401
UTTARA KANNADA
KARNATAKA
INDIA

WORK SHOP ON BEE KEEPING IN WESTERN GHATS

REVIVING BEE KEEPING IN THE TROPICAL FORESTS OF WESTERN GHATS, SOUTH INDIA

The tropical forests of Western Ghats in Karnataka, South India are one among the eighteen-biodiversity hotspots in the world. The plant and floral diversity has helped to evolve the diversity of bees in this region. There are mainly three species of honeybees in the region. *Apis cerana*, *Apis dorsata* and *Trigona*. All these species live in the wild. For the past five decades there is systematic effort to domesticate bee keeping with *Apis cerana* and *Trigona* bees. The Rock bees (*Apis dorsata*) are found in the forests and Rocky Mountains and migrate long distances. The honey hunters harvest both the rock bees and *cerana*.

The biological diversity of Western Ghat has helped to establish bee keeping in this region. However, there is a declining trend in bee keeping in recent years. The destruction of the forests, arrival of Thai Sack Brood Virus (TSBV) are the two main cause for the decline. In order to revive the interest bee keeping two-day workshop was organised in Sirsi in Uttara Kannada district, Karnataka on 27th and 28th of March 2001.

The financial assistance for the workshop was provided by Swallows (Sweden).

The objective of the workshop was to assess the bee keeping status in the region and initiate steps to revive the bee keeping in Western Ghats. There were 105 participants in the workshop with twelve women beekeepers. The participants included beekeepers, scientists, forest officials, NGOs and people interested people in conserving honey bees. Most of them were from Western Ghats. Specifically the objectives are:

Objectives:

The objective of the workshop was to discuss the following issues:

- ⇒ The problem of bee keeping in the Western Ghats
- ⇒ To discuss the effect of Thai Sack Brood Virus (TSBV) disease in *Apis cerana*.
- ⇒ To assess the impact of introduction of exotic *Apis mellifera* in the Western Ghats.

Accordingly the following sessions were arranged:

27 March 2001

Session 1: History of bee keeping and experience of beekeepers in Western Ghats.

Session 2: Problems in bee keeping (including TSBV)

Session 3: Is exotic bee *mellifera* the solution?

Session 4: Sustainable harvesting of wild bees (Rock bee, *Apis cerana* and *Apis florea*).

28 March 2001

Morning field visits: Two different Bee Keeping locations

Session 5: Solutions to the problems

Session 6: Action plan

Closing function

Inauguration:

The workshop was held in Sirsi, a small town in midst of the forest region of Western Ghats. Mr. Dyumani Shastri a local beekeeper inaugurated the workshop. He pointed out the need to revive bee keeping to pollinate the crops and to procure higher yields. Pandurang Hegde, one of the organiser of the workshop explained the idea behind the workshop and emphasised the need to exchange the experiences among the bee keepers and honey hunters. He pointed out that bee keeping should become integral part of the agricultural system, similar to livestock. He also stated that the production of honey has decreased from 4,64,236 kilograms during 1990 to 78,944 kilograms in 1996 in Karnataka state.

Review of Bee keeping:

The first session was to review the status of Bee keeping in Western Ghats,

The traditional method of bee keeping with *Apis Cerana* was in logs and earthen pots. The systematic bee keeping with bee boxes started in Coorg in 1929 and in Dakshina Kannada region in 1939. The bee keeping is widely practiced in the hill districts of Western Ghats, Uttara Kannada, Shimoga, Chikamagaluru. Coorg was famous for bee keeping and Coorg honey was in great demand due to the special taste and quality.

During the years of 1950's to 1970's there was awareness and keen interest in keeping bees. The extension staff of bee keeping supported the spread of bee keeping. However, after seventies there is gradual fall in bee keeping in the region. The main reasons for the decline in bee keeping is:

- ◆ Deforestation
- ◆ Use of pesticides in agriculture
- ◆ Conversion of natural tropical forest to mono-culture plantations
- ◆ Change in land use from diverse crops to mono cropping.
- ◆ Decrease of foraging plants
- ◆ Lack of interest among younger generation
- ◆ Lack of adequate extension staff
- ◆ Thai Sack Brood Virus

K.S. Bhat Angod: In Yellapur taluk the bee colonies are facing threat due to spraying of pesticides to cotton. He said extensive pesticides is being sprayed including metacid. This is causing severe problems for Bee Keeping in the region.

Ravindra Shetty Honnavar: 'We are engaged in giving training of bee keeping to women beekeepers. We provided 70 bee boxes to them. However, the Thai Sac Brood disease had destroyed all the colonies'. 'The honey available in the market today is either mixed with the honey from Rock bee or with sugar syrup', he added.

S.G. Hegde: Bees always expect a good environment. The modern ISI types of bee boxes do not have the required quality, the light and air enters the box. The frames would bend after few years. So, with the defective boxes it is difficult to do Bee Keeping.

B.K. Seetaram: He started bee keeping with 15 boxes. However during 1990-91 all the colonies were lost due to Thai Sac Brood disease.

V.G. Shastri, Balagar: He is practising bee keeper since 1960. Average colonies were 15. He is also engaged in selling the colonies at a price of Rs.50 per colony during 1990s. Average yield per colony was 8 to 12 Kilograms. He trained seven youths and two-woman in bee keeping. He said that in this region people feel that honey should be 'used either as medicine or to make *'panchamrutha'* for religious purpose. This trend should be changed and honey has to become part of daily diet.' In his home the family is using two kilograms of honey each month. He requested the participants that each farmer should take an oath that they will have at least two colonies per family.

V.S. Sharma, Gokarn: He is engaged in Bee Keeping in coastal region. Sugar syrup mixed with turmeric and *Tulsi (Osimum sanctum)* should be given to honey bees at regular intervals to the colonies attacked by Thai Sac Brood disease. This would control the disease. Besides juice of *Nelanelli* leaf (*Phyllanthus niruri*) with sugar syrup has to be given to affected bee colonies.

N.V. Sharma, Hosnagar: He invented an *Ayurvedic* medicine to control the Thai Sac Brood disease. "I had treated several colonies, which was affected by this virus and succeeded to cure it. I can give the treatment to any colonies. However, scientists should authorize this, then only I can give the details of the medicine."

With the arrival of TSBV in 1992, the bee keeping has come stand still. The present scenario is bleak as the overall condition of bees, beekeepers as well as foraging resources is depleting. The workshop identified the problems and accepted the challenge to revive bee keeping in Western Ghats.

Problems in Bee keeping:

In the second session the specific problems faced by the beekeepers were discussed. The participants identified the following problems faced by beekeepers:

- ◆ Use of pesticides in several crops.
- ◆ Degradation of forest has resulted in the reduction of floral species to which honeybees visit for nectar and pollen.
- ◆ Monoculture plantation established by Forest Department.
- ◆ Unsustainable harvesting of honey from wild.
- ◆ TSBV
- ◆ Absconding of *Apis cerana*
- ◆ Wax moth

- ◆ Bee management
- ◆ Non availability of quality and standard type of boxes

The beekeepers shared their experience of TSBV as the main reason for decline in the bee keeping. Many farmers have tried indigenous plant based medicine. But they have not been effective. A beekeeper N. V. Sharma said that he has developed herbal medicine that successfully controls TSBV. The participants expressed the need to test this medicine and take steps to make this available to the beekeepers to control TSBV.

Is *mellifera* the solution?

In the third session participants discussed the relevance of *Apis mellifera*, the exotic honeybee introduced in Western Ghats.

Members of Honnavar Bee Keepers society explained that they brought 20 *mellifera* boxes from Kerala in the year August 2000. They distributed 18 of them to beekeepers. However, within four to five months all the colonies have died due to various reasons.

Sripad Bakkemane, Dharmendra Mashigadde, V.S.Sharma and some others participated in the discussion. All these farmers reared *mellifera* colonies but failed to get honey from it. They felt that Bee Keeping with *mellifera* is difficult in Western Ghat region. Bee colonies do not develop during October to March. They are unable to collect the nectar and pollen from diverse floral species in this area. Due to their mildness and they are easily attacked by pests like lizards, wasp and birds.

In response to the spread of TSBV, the Karnataka government took initiative to introduce *Apis mellifera* in Western Ghats. It was claimed that *Apis mellifera* is resistant to TSBV and it will produce more honey. For past eight years the introduction of *mellifera* in Western Ghats (from North India and Eastern parts of India) has shown that it is a failure. Beekeepers who kept *A. mellifera* colonies observed the following reasons for its failure.

- It is slow in movement and is not adapted to tropical conditions as it falls prey to birds and predators
- It does not forage on local plants, especially in hill region of Western Ghats.
- The *Apis mellifera* does not develop the colony from October to March
- They are susceptible to mites and needs constant medication
- Boxes are bigger and consumes more wood, increasing the fixed cost of the box
- The cost of box as well as purchasing the colony is very high, beyond the reach of marginal farmers and land less laborers
- Needs sugar feeding in rainy season. This adds to the cost
- The mating of *A. mellifera* queen is a problem, as in many cases new queen takes long time to mate or does not mate
- The colony does not produce honey when there is enough foraging (or when local bees are working!)
- The colony is to be imported from North India and they are costly
- They do not work during monsoon or when there is heavy rainfall
- Prone to mites (*varora*), needs constant medication

- As it feeds on mono foraging, the taste of honey is bland in comparison to local honey(traditional medicine men prefer local honey from *cerana*)
- Not suited to small farmers/landless labourers due to high capital costs

Dr. Mogens shared his views and said that it is difficult to keep *Apis mellifera* in Western Ghats. M.S.Reddy, from the Bee keeping department said that this can succeed only by regular migration to areas where foraging is available in plenty.

There was heated debate on whether *Apis mellifera* should be further introduced in Western Ghats. The government official stressed on the positive aspects of *A. mellifera* and said that it can succeed in Western Ghats if it is properly managed. However, majorities of the participants were against introduction of *Apis mellifera* and the beekeepers decided that they would not keep *Apis mellifera*! The participants as well experts were concerned that *Apis mellifera* might lead to importing of unknown disease like AFB or EFB to this region.

Solutions to the Problems:

Mr. Chinnappan (Palini Hills Conservation Council, Kodai Kanal). He described the procedures to control the Thai Sac Brood disease in *cerana* bees.

- ❖ Avoiding the queen from laying eggs in the diseased colony. This can be done by bringing the queen bee to a corner of the box and then putting a cover.
- ❖ Shifting of bee box to a different place.
- ❖ Removing the affected queen from the colony and giving new young disease free queen to the colony.

He explained the method to be followed to have a new queen artificially as follows:

1. The colony selected should be strong and in good condition.
2. Egg laying queens should be selected.
3. In the colony the presence of male bees should be less.
4. The colony has to be totally disease free.
5. Quantity of pollens must be less.
6. Number of stinging bees should be less.
7. Two colonies have to be selected one mother colony and other nurse colony.
8. While making new queen artificially the present queen should be kept outside the colony for two to three hours.
9. The frame consisting the larvae of 2 to 3 day old has to be selected.
10. The one-day-old larvae should be placed in the queen cell. While placing the larvae should be taken and larvae should be held care from the back side.
11. Direct sunlight has to be avoided on the box.

Field Trip:

As part of the workshop and in order to provide the practical insight into bee keeping in the region a field trip was organised to local Apiary. The participants were divided into two groups and were taken to two different villages to get first hand experience the situation of bee keeping.

One group visited *Mashigadde* and *Kangod* villages to see the bee keeping by Dharmendra. He has 32 colonies, including two *A. mellifera* colonies. He is a young beekeeper (35 years) with experience in both *Apis cerana* and harvesting *Apis dorsata* colonies in the wild. He has also invented his own ingenious method of controlling TSBV. He has collected the *Apis cerana* colonies from the plains (it is a different strain than the *cerana* in hill region of Western Ghats) which has resistance to TSBV.

The second group visited *Koppesara* village to see bee keeping by Venkatramana. He had 10 colonies but due to TSBV he lost nine colonies. Even the present colony is infected by TSBV. Though the incidence of TSBV is on decline, there are cases when they appear and destroy the colonies.

The field visit provided an opportunity for participants to see and experience the bee keeping status in the region and the problems faced by beekeepers. As one participant said "The area has vast potential for bee keeping development and I am impressed the skills of bee keepers. They know what they are doing".

Sustainable harvesting of Rock Bees:

The fourth session was on harvesting of Rock bees (*Apis dorsata*). The major source of honey in the Indian market is from the honey harvested from rock bees (*Apis dorsata*). As there were honey hunters who participated in the workshop a session was held to understand the ways towards sustainable harvesting of rock bees.

Dr. Tarak Kate, from *Dharamitra* (NGO) Wardha, Maharashtra presented his experience of sustainable harvesting of *Apis dorsata* colonies. He showed how this can be achieved with minimum damage to bees as well keeping the quality of honey. Removing only the honeycomb and leaving behind the rest of the comb on the tree is one of the methods of sustainable harvesting. This allows for second and third harvesting of a single *dorsata* colony. He also explained the simple technique for processing *dorsata* honey. It is:

- ◆ The honey hunter wears cotton cloth from head to foot with a mask.
- ◆ Instead of using smoke or fire, water is sprayed to bees while harvesting.
- ◆ In the comb, a clip will be put beneath the portion that has honey and above the comb portion, which has larvae.
- ◆ Only that portion of the comb is harvested which has the honey and remaining comb portion is tied to the tree branch with the clip.
- ◆ In case the honey portion is present separately in the comb, only that part is harvested keeping other portion intact.
- ◆ Instead of squeezing the comb after harvesting, the comb is tied in a cloth and kept under sunlight. This method it is possible to get good quality of honey.

Pratim Roy from *Keystone Foundation* (NGO) explained their experience of harvesting *dorsata* colonies in Nilgiri hills in Tamil Nadu. He also shared his experience of honey processing and marketing which helps honey hunters to fetch more prices for their efforts. All the participants appreciated the video presentation on honey hunters.

These presentations were followed by an intense debate on how to harvest honey from *Apis dorsata* without damaging the colonies. Many honey hunters actively took part in the debate.

Action Plan:

The final session was to evolve an action plan to revive bee keeping in Western Ghats. The workshop discussed the possibilities for revival of bee keeping in Western Ghats. They asked the government officials as why the facilities provided in previous years were withdrawn and how the neglect of bee keeping has had negative impact on the bee keeping. The beekeepers pointed out that training given by bee keeping department is inadequate and useless. They also expressed their displeasure about the bee boxes provided by the department, which is of bad quality. The participants expressed the need for an affective training programme and a regular follow up to support and sustain the interest in bee keeping.

The following action plan emerged.

1. To spread bee keeping by motivating at least 5 new beekeepers in each cluster of villages.
2. Bee foraging spices need to be planted by farmers.
3. Help in creating awareness on honeybees.
4. To lobby for appropriate forest policy that supports bee-keeping activities.
5. To organise beekeepers to form a federation and to fight for positive bee policy.

Resolutions:

The following resolutions were passed in the workshop

1. Bee keeping is essential to enhance and conserve the bio-diversity of the tropical forests of Western Ghats. The participants expressed the need to motivate younger generation into Bee keeping. Each beekeeper will initiate at least five new persons into bee keeping in the coming years.
2. Floral calendar will be made for every region and based on this the farmers will plant/raise nurseries of bee foraging plant species.
3. Bee keeping should become an integral part of the agricultural system. Like animal husbandry (That gives FarmYard Manure). The bees are essential for pollination of crops. Each *areca* farmer should keep at least one bee colony for each acre of *areca* garden. This will enhance the crop yield.
4. The medicine developed by Shri. N. V. Sharma to cure TSBV should be tested, and authenticated and beekeepers should be given this medicine to control TSBV.
5. It is essential to develop the colonies, which have resistance to TSBV. The government should take initiative to identify and propagate such disease resistant colonies.
6. Privatisation of bee keeping has adverse impact on the industry. The government should not privatise the bee keeping.

7. It was unanimously resolved that the beekeepers in Western Ghats will not keep *A.mellifera*. They also urged the government to stop introduction of *A.mellifera* in Western Ghats.
8. The government should take measures to plant bee foraging species in the forests and in afforestation schemes.

Follow up Meeting of beekeepers:

Follow up meeting was held on April 30, 2001 as desired by the beekeepers during the Workshop.

Meeting was held in Prakruti Office, Sirsi.

The agenda of the meeting was:

- ⇒ Need to have a Federation of beekeepers in Western Ghats.
- ⇒ Possible ways to promote Bee Keeping.
- ⇒ Bee equipment's.
- ⇒ Arranging Honey Festival in villages.
- ⇒ Establishing protected forests for honeybees (as suggested by some Bee Keepers)
- ⇒ Establishing '*Madhuvana*' (honey bee parks)

To provide a platform for BeeKeepers and to fulfil their requirements, the participants decided to have a federation of beekeepers in Western Ghats of Karnataka. (called *Jemu Okknta*). To promote the bee keeping and to disseminate the knowledge as well to create interest among younger generation they decided to organise Honey Festivals in different villages.

Bee flora: Beekeepers along with *Prakruti* team decided to make a floral calendar to which the bees visit for nectar and pollen. Further the seeds of these species will be grown in BeeKeepers farm. They also decided to request Karnataka Forest Department to establish nurseries for above species and then distribute it to the BeeKeepers at a subsidized rate.

Balgar villagers said that they were interested to establish a protected forest for honeybees in their village. They requested others assistance in doing so. Like wise Mashigadde villagers showed their interest to establish Honeybee Park, *Madhuvana* in their village.

Honey Festivals:

In order to create interest among youngsters and to give an opportunity to beekeepers, in villages to share their knowledge and discuss problems in bee keeping along with technical people, Honey Festivals were arranged in rural areas.

Festivals were organised in *Hulemalgi, Balgar, Balekoppa* and *Hartebail* villages.

Introduction to bees, bee boxes and other equipment, bee flora, extracting of honey, was organised during the festivals. Honey was distributed to all that had present on the occasion. On average 40 to 50 people including women, children, bee experts participated in each Honey Festival.

Besides a demonstration program on sustainable harvesting method for Rock bees was held in *Baleokoppa* village. Forest officials participated in the Honey Festivals.

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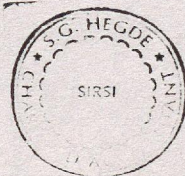
**SALLOWS GRANT
RECEIPTS AND PAYMENTS ACCOUNT
FOR THE YEAR ENDING 31ST MARCH 2001**

RECEIPTS	AMOUNT	PAYMENTS	AMOUNT
Grant from SWALLOWS	90550.00	HONEY BEE WORKSHOP	
		Accommodation	5366.00
		Food	9235.00
		Travelling Expenses	25870.40
		Honorarium	7800.00
		Stationary and Communication	4974.50
		Overheads	2733.00
		COMPUTER	
		Hardware	6000.00
		Printer	5425.00
		Closing Balance	
		State Bank of India	23146.10
TOTALRs.	90550.00	TOTALRs.	90550.00

* AS PER BOOKS OF ACCOUNTS*

FOR AND ON BEHALF OF MANAGEMENT

SUBRAHMANYA G. HEGDE
CHARTERED ACCOUNTANT
MEMBERSHIP No. 023643



SUBRAYA S. HEGDE
(SECRETARY)
PRACRUTI

SIRSI
28TH MAY 2001

List of Participants
Work Shop on Honey Bees (March 27, 28, 2001)

Sl.No.	Name	Place
1.	Vighneshwar Shastri	Balgar, (Uttara Kannada)
2.	K. S. Bhat	Angod, Yellapur, (Uttara Kannada)
3.	Srikant S. Hegde	Chipagi, Sirsi, (Uttara Kannada)
4.	Narendra A. Dev	Chipagi, Sirsi, (Uttara Kannada)
5.	S.M. Hegde	Huggikoppa, Sirsi (Uttara Kannada)
6.	M.G. Hosmani	Balakoppa, Siddapur, (Uttara Kannada)
7.	M. T. Hegde	Herabile, Siddapur (Uttara Kannada)
8.	A.G. Hegde	Hegnur, Siddapur (Uttara Kannada)
9.	Ravindra M. Hegde	Aggibal, Sirsi (Uttara Kannada)
10.	Rajesh S. Hegde	Huggikoppa, Sirsi (Uttara Kannada)
11.	G. Timma Gouda	Bangalore
12.	N. Anjan	Bangalore
13.	Smt. Kolehane	Bangalore
14.	C. Ethirajan	Bangalore
15.	V. Aruna Ethirajan	Bangalore
16.	Roopa Prakash	Bangalore
17.	Prakash	Bangalore
18.	R.G. Bhat	Islur, Sirsi (Uttara Kannada)
19.	CHS. Shankar	Bangalore
20.	Chandrakala Manil	Bangalore

Sl.No.	Name	Place
21.	B. Subhashini	Bangalore
22.	S.T. Ashwat Narayana	Bangalore
23.	S.M. Hegde	Bisalakoppa, Sirsi (Uttara Kannada)
24.	Pratim Roy	Tamilnadu
25.	Mogeus Jensen	Tamilnadu
26.	Chidanadaiah G.	Tumkur
27.	Jagadeesh T.N.	Tumkur
28.	A. Chinnappan	Kodaikanal (Tamil Nadu)
29.	Shripad M. Bhat	Sirsi (Uttara Kannada)
30.	Balachandra Hegde	Siddapur (Uttara Kannada)
31.	Venkataraman	Ankola (Uttara Kannda)
32.	P.M. Ravi	Mandya
33.	Kiran Kumar	Tumkar
34.	B.K. Sitaram	Chikkamagaloor
35.	P. D. Venkatesh	Panakanhalli, Mandya
36.	G. L. Janardan	Hosnagar, Shimoga
37.	G. M. Hegde	Hegnur (Uttara Kannada)
38.	V. Santosh	Bangalore
39.	Y.S. Hegde	Onikeri, Sirsi (Uttara Kannada)
40.	Dr. M. S. Reddy	Bangalore
41.	Venkataraman T. Hegde	Mattigr, Sirsi (Uttara Kannada)
42.	Purandhar S. Hegde	Salkani, Sirsi (Uttara Kannada)

Sl. No.	Name	Place
43.	Ragavendra S. Hegde	Salkani, Sirsi, (Uttara Kannada)
44.	Anant M. Hegde	Salkani, Sirsi (Uttara Kannada)
45.	Vedashrav S. Sharma	Gokarna (Uttara Kannada)
46.	Dyumani Shastri	Manajulli, Sirsi (Uttara Kannada)
47.	Shivaraj C. Hengend	Dharwad
48.	Shivappa Narayan	Katgal, Siddapur (Uttara Kannada)
49.	Boorlinge Gouda	Panakanalli, Mandya
50.	Venkataraman M. Hegde	Santemane, Sirsi (Uttara Kannada)
51.	Satyanarayan N. Shet	Hosakuli, Honnavar (Uttara Kannada)
52.	Balachandra P. Hegde	Sirsi (Uttara Kannada)
53.	N. D. Raghuvittala	Karwar
54.	Venkataraman S. Bhat	Honnavar (Uttara Kannada)
55.	Ganapati R. Bhat	Honnavar (Uttara Kannada)
56.	Narayan Hegde	Hoosamath, Honnavar (Uttara Kannada)
57.	Venkappa Naik	Navilgoon, Honnavar (Uttara Kannada)
58.	Suresh M. Shet	Kavalakki, Honnavar (Uttara Kannada)
59.	Nagesh E. DeshBhandari	Hoodikeroor, Honnavar (Uttara Kannada)
60.	Ganesh S. Hegde	Hoosakuli, Honnavar (Uttara Kannada)
61.	Nagappa Gouda	Navilgon, Honnavar (Uttara Kannada)
62.	Raju Naik	Santeguli, Honnavar (Uttara Kannada)
63.	Darmendra G. Hegde	Kangood, Sirsi (Uttara Kannada)
64.	Ramakrishna P. Hegde	Sirsi (Uttara Kannada)

Sl. No.	Name	Place
65.	Ganapati D. Hegde	Onikeri, Sirsi (Uttara Kananada)
66.	Rajesh S. Hegde	Oniker, Sirsi (Uttara Kananada)
67.	Nagapati G. Hegde	Mattigar, Sirsi (Uttara Kannada)
68.	M.N. Hegde	Mattigar, Sirsi (Uttara Kannada)
69.	M.R. Hegde	Mattigar, Sirsi (Uttara Kannada)
70.	Shankarnarayan N. Hegde	Ajjibal, Sirsi (Uttara Kannada)
71.	C.M. Shastri	Sirsi (Uttara Kannada)
72.	T.K. Hegde	Chipagi, Sirsi (Uttara Kannada)
73.	Seetaram K. Hegde	Onikeri, Sirsi (Uttara Kannada)
74.	Shripati Sharma	Bhakkal,
75.	Ravindra Shetty	Kasarod, Honnavar (Uttara Kannada)
76.	Rajesh Nayaka	Ankola (Uttara Kannada)
77.	Narayana K. L. Hegde	Achave, Ankola (Uttara Kannada)
78.	Deepak J. Marathe	Yallapur (Uttara Kannada)
79.	M. N. Boorakar	Dharward
80.	Indamma Belaganvankar	Haliyal (Uttara Kannada)
81.	Vandana Patil	Haliyal (Uttara Kannada)
82.	Mahabaleshwar Nirnalli	Nirnalli, Sirsi (Uttara Kannada)
83.	Suhas Hegde	Hulemalgi, Sirsi (Uttara Kannada)
84.	Subray Bhat	Kansoor, Sirsi (Uttara Kannada)
85.	V.G. Hegde	Ajjibal, Sirsi (Uttara Kannada)

Sl. No.	Name	Place
86.	Narasimba Chapakhand	Patrakarta
87.	Kanchikai Viroopaksha	Patrakarta
88.	T. B. Harikant	Patrakarta
89.	Dr. Harihar Hegde	Santemane, Sirsi (Uttara Kannada)
90.	Shivanand Kalve	Kalve, Sirsi (Uttara Kannada)
91.	S. G. Hegde	Sirsi (Uttara Kannada)
92.	M. K. Hegde	Patrakarta
93.	R.S. Hegde	Hulemalgi, Sirsi (Uttara Kannada)
94.	Aagnel B. Fernandis	Sirsi (Uttara Kannada)
95.	Kirankumar	Sirsi (Uttara Kannada)
96.	Subray G. Hegde	Heggarani, Sirsi (Uttara Kannada)
97.	Raghavendra G. Hegde	Onikeri, Sirsi (Uttara Kannada)
98.	N. Venkappa Sharma	Hosnagar, Honnavar (Uttara Kannada)
99.	Gourish K. Hegde	Kulakood, Honnavar (Uttara Kannada)
100.	D.N. Hegde	Sugavi, Sirsi (Uttara Kannada)
101.	Subray	Balagimane (Uttara Kannada)
102.	R.N. Kolegi	Sirsi (Uttara Kannada)
103.	Prashant K. Shastri	Yallapur (Uttara Kannada)
104.	Dr. Taratkate	Maharashtra
105.	Devaraj Neelkhantappa	Chitradurga
106.	Prakash Alleningappa	Kerehosalli
107.	Vasant S. Hegde	Tattikai, Siddapur (Uttara Kannada)

Sl. No.	Name	Place
108.	S.N. Hegde	Onikeri, Sirsi (Uttara Kannada)
109.	Nagaraj S. Hegde	Balagar, Sirsi (Uttara Kannada)
110.	G. S. Hegde	Islur, Sirsi (Uttara Kannada)
111.	K. Prakash	Chitradurga
112.	N. Raju	Chitradurga
113.	Satish	Yallapur (Uttara Kannada)
114.	Pandurang Hegde	Sirsi (Uttara Kannada)
115.	Balachandra Hegde	Saimane, Sirsi (Uttara Kannada)
116.	N. R. Hegde	Sirsi, (Uttara Kannada)

PSK
F3

Impact of extracting dead and fallen trees from tropical wet evergreen
forests of Western Ghats; A case study from Gersoppa Range

By: Parisara Samrakshana Kendra , Sirsi

Background: Extraction of dead and fallen trees from the tropical forests is one of the old management practices in tropical forests of Western Ghats. Although the green felling was stopped during last decade, dead and fallen trees are being extracted by the forest department in natural forests.

There are hardly any studies focusing on impact of such extraction of dead and fallen trees in tropical evergreen forests. Here we have attempted to study the same.

Objectives: To assess the impact of extracting dead and fallen trees on biodiversity in a tropical wet evergreen forest of Western Ghats. We also try to bring out patterns of possible damage, which might have far reaching implications on the delicately balanced ecology of evergreen forests.

Materials and methods:

Study site: Study was carried out in the wet evergreen valley of Sharavathi river. It is situated in the border of Shimoga and Uttara Kannada District, near the Jog falls. The study site is about six kilometers from the Mavinagundi village. It lies at latitude $14^{\circ}15'N$ and longitude $74^{\circ}50' E$. (approximately)

Method: An area where dead and fallen trees were previously extracted was identified. Area clear felled for extracting dead and fallen trees were measured. A new road has been constructed for transporting the logs. The forested area clear felled for the construction of the road was measured. Three sampling quadrates of 20x20 meters dimension were laid inside in natural forests on either side of the road, about 15 meters. away from the road. In each quadrate, all stems above 30 cms GBH (Girth at Breast Height) were noted; their GBH and height measured. In addition, two 2x2 mts quadrates were laid and small plants counted. Also number of dead and fallen trees extracted were noted based on the remaining portion of trees. All along the side of road area cleared for the extraction of dead/dried, trees were identified and area measured.

Results:

It is observed that about 14 dead and fallen trees were extracted from the region. They were extracted on either side of the specially constructed road. About 4140 sq. mts of area was clearfelled for making road. Another 7612.76-sq mts area was cleared for extracting the dead and fallen trees (including the area destroyed by tree while felling). Totally about 1.18 ha of natural forest was cleared in process of extraction.

From the quadrat data it is found that average density of trees (with GBH more than 30 cms) per hectare in the region is 575 nos. (23 nos in 400 sq mts). The average density of small plants including regenerating plants, are 34068 per ha (85.17 in 25 sq. mts).

Hence estimated number of trees felled in the total of 1.18 ha was 675.78 and those of small plants were 46039.30 numbers.

Average height of all trees is 12.2 m and average GBH from all trees is 65.31 cm. Average basal area per ha is 1.125 sq. m. average crude volume per hectare 18.3 m³. hence crude volume extracted from 1.18 ha is 21.59 m³.

In other words for extracting one dead and fallen tree, about 48.27 green trees and 2860 small plants were felled.

In other words , on an average, for extracting	
One dead and fallen tree	<ul style="list-style-type: none">➤ About 48.27 green trees cut.➤ 2860 small plants were clear felled➤ 70 x 4.5 mts of road was made➤ 840 sq. mts of forest was cleared
One cubic meter of timber	<ul style="list-style-type: none">➤ 1.96 cubic meter of tree is felled.

Possible impacts of extracting dead and fallen trees from evergreen forests of Western Ghats:

New encroachments for agricultural lands: in the process of extraction, much of the area is clearfelled. The valley plains are attractive for encroachers to cultivate for agriculture. As availability of highly commercialised NTFP like Uppage (*Garcinia gummigutta*), Rampatre (*Myristica malabarica*) is higher in these forests, a family can earn considerable income form collecting NTFPs only. In such cases these clearfelled regions help them to settle in the middle of the forests even without much of the income from cultivating the encroached land. In fact during the study period, a few collectors were encountered suggesting that the road is already being used.

The road constructed for transporting the dead and fallen trees opened a large area inside the natural forest. Out of the total forest area destroyed about 35.26% of forest was clear felled for construction of the road itself. Perhaps this is one of the most inefficient and crude methods of extraction. This road opens the forests for smugglers, poachers, and illegal traders to deep inside the forests.

Soil erosion is another major threat occurring in the clearfelled region. We have observed the erosion of mud from the road and also from the valley pains. The fertile topsoil is being washed off during the first rains. It should be noted that the study was conducted during the first week of June. The region had rain for only a week of rainfall. The amount of soil erosion might be much higher in the heavy rainy season. (This region normally gets rain more than 5000 mm annually)

Loss of Biodiversity: The region rich in biodiversity; several endemic plant and animal species are found in this region. The density of the trees above 30 cms GBH is 575/ Ha. And that of small plants is 34068/ Ha. Plants represented from species like *Dipterocarpaceae sp*, *Diospyros sp*, *Garcinia sp*, *Michealia sp*, *Calicarpa sp*, *Holigarna grahami* etc. Most of food plants of butterflies are seen here.

Destruction of habitats: The region is the *extreme northern known habitat* for the lion tailed macaques, which are endemic to Western Ghats. There are only a few groups of these primates in the region. Entrance of human beings in forests may destroy the ideal habitats.

About 12 types of woodpeckers, malbar pied hornbills, jungle mynas, etc were recorded from this region (Directory of National park and sanctuaries) which make their nests mainly in hollows of dead trees. Besides, variety of mushrooms, lichens insects find their life on these dead and fallen trees.

All these species are affected by the extraction of dead and fallen trees from the forests.

Opening of canopy cover: Opening of canopy-cover leads to the recruiting of plants of early succession stages. Plants species like *Meceranga peltata*, *Strobilanthus* that are light demanding pioneer species might colonise in the gap. Also there are possibilities of recruiting of exotic and weed species like *Eputorium* inside the forest, which may result in slowing down the regeneration of natural forest to attain the climax evergreen forests.

It is argued that ' selective felling of about 10 big trees per hectare (single low-damage -logs hauled by elephants--) does not greatly alter the structure and functioning of forest on short term' (Pondy papers on Ecology, 1,1997, pp. 13). However, other impacts of such process, explained in previous paragraphs were overlooked. Also reconstitution of the forest depends on the extent of damage made to the forest. In present case, two clearings were much bigger. About 3864.3 sq. Mts. were opened to extract three trees. Canopy cover was badly opened in the area, which may lead to soil erosion, recruitment of weed species, or even it may attract the encroachers to the region.

Further, repetition of such harvesting might have a long-term impact on the forest composition dynamics; the commercially interesting emergent and upper canopy species being replaced by understory species.

We have observed one of the earlier paths, which was made during the last extraction from the same region. The regeneration in the road was poor with only few species. There are no trees (above 30 cms GBH) on that earlier road. Besides, the road was damaged by severe soil erosion. . It is also observed that each time a separate road was made to transport the timber easily. This resulted in damage/disturbance of whole region of the forest.

(There is a discrepancy in the exact number of species extracted from the forest. When we asked forest department sources for exact number of dead and fallen trees, they told that, only eight trees were extracted from the region. However, we have counted fourteen tree trunks in the region.)

Conclusion:

The policy of extraction of dead and fallen trees in the forests of Western Ghats is causing extensive damage to the natural forests. The study has confirmed that in order to remove one dead tree a large number of live trees (above 30 cms girth) and regenerating plants are destroyed. About 35 percent of the area are clear felled for road construction. Opening up of the canopy may cause changes in the nature of the forests leading to decrease in the biodiversity and affecting the soil. The timber extracted in this region has long term negative affects on the ecology of the region.

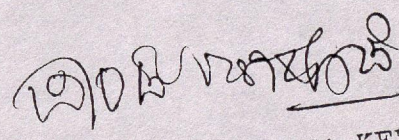
Recommendations:

Extraction should be stopped immediately to preserve our remaining small patch of natural forests.

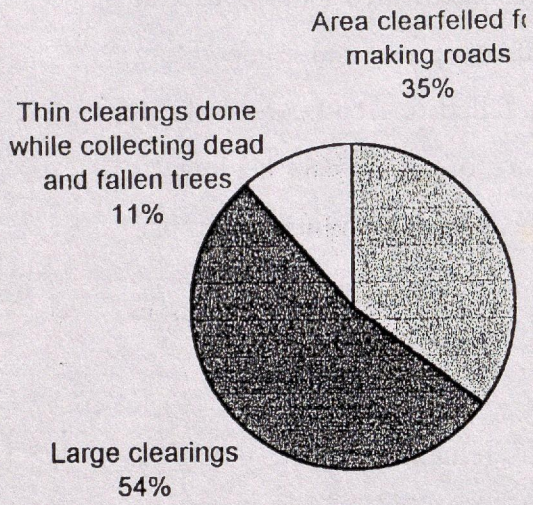
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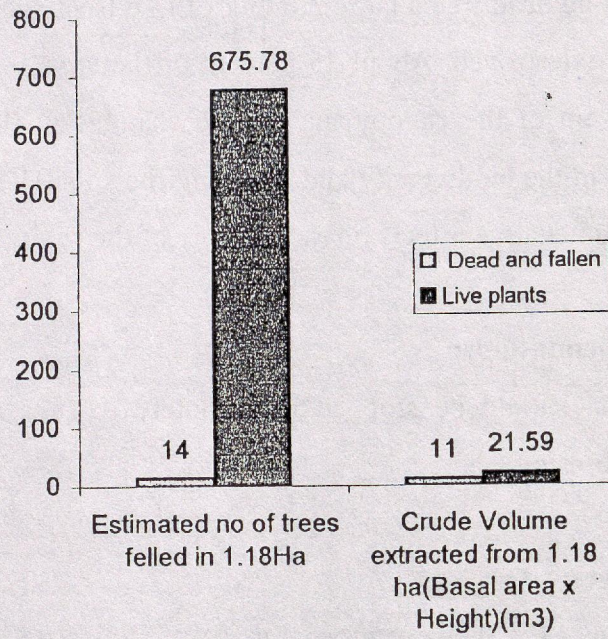
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Area clearfelled while extracting dead and fallen trees



Damage done while extracting dead and fallen trees



11760
 4410

 16170

Spot No1
After 250 mts from begening of the road

S.No.	Name of Species	GBH	Height
1	harige dio	92cm	12m
2		42cm	11m
3	Macasauga poltata	52cm	11m
4	D-2	44cm	13m
5	D-2	52cm	15m
6	Garcinia talboti	41cm	10m
7	Michelie sp	85cm	15m
8		44cm	11m
9		93cm	15m
10		82cm	16m
11	Climber	32cm	
12	Calicarpa tom	35cm	7m
13	M.Peltarta	61cm	17m
14		67cm	12m
15		97cm	16m
16		48cm	8m
17		30cm	10m
18	D indicus	47cm	8m
19		164cm	17m
20		119cm	24m

Spot No.3

After 750 mts from begening of Road

S.No.	Name of Species	GBH	Height
1		55cm	12m
2		35cm	10m
3		40cm	12m
4		65cm	11m
5		39cm	10m
6		40cm	9m
7		31cm	8m
8		48cm	12m
9		46cm	12m
10		72cm	14m
11		30cm	7m
12		64cm	15m
13		30cm	5m
14		44cm	12m
15		102cm	14m
16		40cm	12m
17		61cm	12m
18		106cm	12m
19		82cm	20m
20		41cm	4m
21		210cm	25m
22		38cm	10m
23		30cm	8m
24		42cm	11m
25		43cm	7m

Spot No 2

After 500m from begening of road

S.No.	Name of s	GBH	Height
1		41cm	7m
2		88cm	15m
3	H.grahami	155cm	20m
4		49cm	10m
5		71cm	18m
6		37cm	18m
7		30cm	7m
8		33cm	8m
9		33cm	7m
10		74cm	15m
11		41cm	7m
12		43cm	9m
13		37cm	9m
14		113cm	15m
15		81cm	15m
16		152cm	18m
17		95cm	13m
18		139cm	17m
19		47cm	10m
20		73cm	11m
21		31cm	8m
22		147cm	15m
23		78cm	13m
24		45cm	10m

No of Species below 30 cms GBH in 5x5 mts plots

Plot	Nos
1	51
2	66
3	116
4	51
5	96
6	131
Total	511

Density: 85.17 individuals for 25 m2 = 3,406 /ha

Clearfelled areas in Mahime

Logged area Plot 1. 25mX11m right
after 250m area 2 17mX4.5m left
after 350m area 3 20mX5.5m right
area 4 9.8mX6.7m left
after 500m area 5 33.4mX5m left
area 6 44.70X4.5m left
after 650m area 7 40.2X3.7m left
after 750m area 8 18.0mX2.5m right

Road ends at 800m at Mahime stream

after 800m 32.80mX4.25m
110X20.7m

Another road goes left after 775m.
That lay itself is 120m An extended 73.70X6.3
Mainbody harvested 85mX40m

EXTRACTION OF DEAD AND FALLEN TREES IN MAHIME

	Leangth	Breadth	Total road area Unit
1. Road area	920	4.5	4140 sq. mts
2. Clearings	11 small and two 2 large clearings		
	Total area of clearings		7612.76 sq. mts
3. Road + Clearings area			11752.76 sq. mts
4. Plot data	Average. No	Avarage density/Ha	
trees >30 cms gbh	23 (in 400 sq. mts)	575/Ha	
Small plants(<30cm gbh)	85.17 (in 25 sq mts)	34068/Ha	
Estimated no of trees felled in 1.18Ha		675.78	
Estimated no of small plants felled in 1.18 Ha		40039.3	
Avaerage height of all treesin mts		12.2	
Avaerage GBH from all trees in cms		65.31	
Average Basal area per Ha(sq mts)		1.125	
Average crude Volume per Ha (Basal area x Height) (m:		18.3	
Crude Volume extracted from 1.18 ha(Basal area x Heig		21.59	

	Dead and fallen	Live plants
Estimated no of trees felled in 1.18Ha	14	675.78
Crude Volume extracted from 1.18 ha(11	21.59
Estimated no of small plants felled in 1	0	40039.3

