CEPF SMALL GRANT FINAL PROJECT COMPLETION REPORT

Organization Legal Name:	
Project Title:	Cinnamon Plant Resources of the Central Western Ghats: Impact Assessment, Livelihood issues and Conservation through Participatory Approach
Date of Report:	30th September 2011
Report Author and Contact Information	Mr. Narsimha Hegde Sri Laxmi – 579, Shantinagar, Sirsi –581402, Uttara Kannada, Karnataka, INDIA Email: lifetrusts@gmail.com

CEPF Region: **Western Ghats, India**

Strategic Direction: **2. Improve the conservation of globally threatened species through Systematic conservation planning and action**

Grant Amount: **US$ 12000**

Project Dates: **1 September 2009 to 30 September 2011**

Implementation Partners for this Project (please explain the level of involvement for each partner):

Livelihood Integrity and Forest Ecology (LIFE): **Involved in designing of the project and entire responsibility of project execution.**

College of Forestry: Scientists from the college of Forestry, Sirsi, taxonomists and researchers were involved in identification of the various species of Cinnamon, in designing the methodology to understand the impact of harvesting on regeneration and in raising the nurseries. Nursery techniques were developed for Cinnamon species especially that of *Cinnamomum riparium* with the guidance of Dr. R Vasudeva, Associate Professor, College of Forestry, Sirsi.

Karnataka Forest Department: Assistance to identify and locate various cinnamon species in Uttara Kannada district and other districts was obtained from the state forest department. They were involved in seed collection, cuttings and stems collection and in the nursery raising process. Village Forest Committees (VFCs) - formed under Joint Forest Management Plan (JFPM) by the Forest Department and Ministry of Environment and Forests - were involved in raising the nurseries and in organizing the workshops. Project design and implementing strategies were discussed with various level staffs of Forest Department.

Conservation Impacts

Please explain/describe how your project has contributed to the implementation of the CEPF ecosystem profile.

Cinnamomum riparium is an endangered species listed by the IUCN. Other species like *Cinnamomum malabatrum* and *Cinnamomum zeylanicum* are also threatened species due to unsustainable harvest. However, there was lack of data on dependency of local communities on these species, harvesting system, impact of harvesting on regeneration and on nursery techniques. Now with this project we were able to identify the forests in Uttara Kannada and other districts like Shimoga and Chikmaglur that contained individuals of the above species of cinnamon. Study on regeneration status, dependency of local communities on cinnamon species, different stakeholders involved in the entire process of Cinnamon, marketing aspects and possibility of green labeling were carried out under this project.

Workshops and discussion meetings were organized with cinnamon harvesters, Village Forest Committee members, Forest Department officials, research institutions and women self-help-groups (SHG) in various villages. This helped to create awareness on importance of the species and conservation needs. It also provided opportunity for different stakeholders to meet and discuss sustainable utilization of the resources and plan for conservation actions.

Leaves and fruits of cinnamon are harvested during the summer season, which typically lasts from January till May. The fruits ripen between March and May. For harvesting of the leaf, state Forest Department auctions tender in each Range Forest Division and the highest bidder obtains the contract for harvesting the leaf within that Range. Contractors hire labourers to go into the forest and pluck the leaf from the cinnamon trees. Pluckers usually come from outside the localities or nearby villages, normally contracted labourers. In contrast, extractions of cinnamon fruits are usually carried out only by local communities.

The high commercial value of cinnamon has most likely contributed to unsustainable harvesting methods tending towards over-exploitation. Harvesting methods employed for the collection of cinnamon were closely studied and quantified to determine the technique and the extent to which cinnamon is harvested. For harvesting the leaf, entire branches or sometimes whole trees are cut. Harvesters mentioned that collection or plucking buds from the branches is very time consuming, so most collectors resort to cutting the branches and then plucking the small twigs from the branches, to augment the amount of buds collected in the shortest time span. Harvesters then carry the twigs home to remove the buds. In their homes, harvesters separate the fruits from the twigs

and dry them to prepare them for marketing. To collect the bark, the stem of the tree is often left exposed which is obviously harmful to the survival of the tree.

Please summarize the overall results/impact of your project against the expected results detailed in the approved proposal.

Nursery techniques for *Cinnamomum riparium* and other cinnamon species developed (Appendix 1). Regeneration status assessed (Appendix 2). Education/ Awareness created on importance of cinnamon species and community management plans were strengthened (Appendix 3). Existing marketing system were studied (Appendix 4). Seedlings of Cinnamon raised and planted in various agro-forestry systems (Appendix 5).

Please provide the following information where relevant:

Hectares Protected: NIL

Species Conserved: *Cinnamomum riparium*

Corridors Created: NIL

Describe the success or challenges of the project toward achieving its short-term and long-term impact objectives.

Challenge was to identify the endangered species *Cinnamomum riparium* itself. We had to travel a lot in the forests of Sirsi, Honnavar and Karwar Forest Divisions and finally could locate only a few trees in Nilkund forests of Janmane Forest Range in Sirsi Forest Division of Uttara Kannada.

Were there any unexpected impacts (positive or negative)?

NIL

Lessons Learned

Describe any lessons learned during the design and implementation of the project, as well as any related to organizational development and capacity building. Consider lessons that would inform projects designed or implemented by your organization or others, as well as lessons that might be considered by the global conservation community.

1. Firstly *Cinnamom riparium* is a very scarce and difficult species to work with since is distributed in few pockets. Hence time line and funds provided by the funding agency turned out to be too less to achieve substantial assessment for this species.

2. Since the biology of several critically endangered species would be virtually unknown, it is better to make two phased funding. One to indentify the resources and working out basics; second to actually take up the conservation actions
3. It is always necessary to identify and formalize association with academic institutes (such as Forestry College, Sirsi in my case) who can chip in a lot of expertise in dealing various aspects / issues that might crop up during the study. The current format of the project funding does not recognize this aspect clearly.
4. Further support from the forest department is assumed a priori. However only when the PI has good rapport with the department the project can run smoothly.
5. Biggest limitation of the project of lesser duration is that the fruit of the hard work does not translate into conservation action because of the long-time duration of forest tree species. Hence it is necessary that some additional funds are necessary to monitor those seedlings that are planting out in the field.

Project Design Process: (aspects of the project design that contributed to its success/shortcomings)

To assess the dependency of local people on cinnamon resources we have selected people of different incomes, especially the land holding of commercial orchard was the major criteria in each village. Stratified random sampling method was used for the survey and villages in different forest types were included in the data collection.

Stratified sampling ensures that heterogeneity of the habitat is suitably sampled thus making the assessments more robust. Sampling respondents from different income levels/landholding helped in correctly assessing the dependency.

Impact assessment of harvesting on regeneration two patches with contrasting levels of harvesting was marked through a reconnaissance survey and the same was compared for level of regeneration adopting nested quadrate method. Since we would be observing the level of harvesting in the vegetation survey also, impact of harvesting on regeneration could be known by drawing a correlation between the two. This method has both advantages and limitations. Comparing the contrasting levels of harvesting is the simplest and quickest way of getting an idea on regeneration status. However since other factors influencing the regeneration were not controlled in both the sites, the patterns have to be considered cautiously.

In the regenerating quadrates individuals of different height classes were counted at different distance (at intervals of 2 meters each) from the parental tree up to 10 meters.

This helped in understanding any allellopathic influences of mother tree regeneration. Since there are regenerates around the mother plant, there is no

allelopathic effect of the mother plant. Similar results have also been shown for the other *Cinnamomum* species.

Marketing and sustainable harvest:

Sustainable harvesting methods were discussed with various stakeholders by organizing workshops and discussion meetings at various parts of Uttara Kannada districts. Interviews with Village Forest Committee (VFCs) members, individual harvesters, contractors of forest products, Forest Department officials and traders/middlemen who are involved in the marketing of cinnamon fruits and leaves were done. This helped to understand current harvesting practice; problems involved it and possible interventions that are required to make the harvesting sustainable.

Project Implementation: (aspects of the project execution that contributed to its success/shortcomings)

Project was implemented on a participatory basis involving every stake holder such as NGO, VFCs, SHGs, forest department and researchers. Though an individual grant, the project was implemented through an NGO for hassle-free execution. Liaising with forest department helped in getting important leads on the distribution of cinnamon population. VFC and self help groups were involved in assessing the impact of harvesting on regeneration adopting an experimental design developed with the help of researchers. Inputs from the research partners were also crucial in the correct identification of various cinnamon species and in pin pointing the natural populations of this rare species. Further the propagation techniques for this highly recalcitrant species were standardized with the help of expertise from the researchers. The VFC members were involved in disseminating the lessons learnt to larger audience.

Since the *Cinnamomum riparium* resources are scarce in the Western Ghats, liaising with forest department helped in identifying the resource-rich patches for study as well as conservation prioritization quickly. The help of taxonomists and forest scientists was timely to rapidly develop the nursery techniques.

Other lessons learned relevant to conservation community:

Strengthening of local community organisations, especially Village Forest Committees (VFCs) formed under Joint Forest Management Plan through the Ministry of Environment and Forests, Women Groups, Biodiversity committees in the Gram Panchayats and youth club would be necessary to effectively manage the cinnamon resources. These local organisations could be provided with

technical skills for nursery rising, planting/cultivating and marketing of eco – labelled products. It seems Cinnamon harvesters, VFC members and villagers themselves may not be in a position to manage the resources especially in bringing sustainable harvesting practices. Even though the leaf harvest is banned in certain forests, we have observed that harvesting is nevertheless occurring. Sometimes entire branches of trees are lopped for harvesting the leaf. It is learnt by discussing with various stakeholders that, permission from one Forest Circle is used to collect and stock cinnamon leaves and fruits from another Forest Circle, and the produce is then traded openly. Lack of transparency and enforcement in the existing system may be the main cause for these practises.

ADDITIONAL FUNDING

Provide details of any additional donors who supported this project and any funding secured for the project as a result of the CEPF grant or success of the project.

Donor	Type of Funding*	Amount	Notes
LIFE	Providing office establishment, organizing workshops	$ 500	Value of resources, staff time, office establishment
College of Forestry	in kind and, for nursery growing	$ 300	Space, expertise
VFCs, farmer's association and local community	In kind	$ 250	Participation in the workshops, time spent during distribution of seedlings

***Additional funding should be reported using the following categories:**

A *Project co-financing (Other donors contribute to the direct costs of this CEPF project)*

B *Grantee and Partner leveraging (Other donors contribute to your organization or a partner organization as a direct result of successes with this CEPF project.)*

C *Regional/Portfolio leveraging (Other donors make large investments in a region because of CEPF investment or successes related to this project.)*

Sustainability/Replicability

Summarize the success or challenge in achieving planned sustainability or replicability of project components or results.

Cinnamon is an important species used mainly as spice, and its contribution to local people's livelihood could be very high, if the harvesting takes place in a sustainable and scientific basis, and proper mechanisms are in place for the marketing of the products. Cinnamon is one of the most popular spices used for flavoring food. The history of spices is an interesting story. From time immemorial

spices had been in regular demand from all parts of the world. The search for drugs and spices was considered to be of no less importance than gold by the early explorers.

Cinnamomum riparium, Cinnamomum zeylanicum and *Cinnamomum malabatrum* are the species that play a vital role in the ecology and economy of the Western Ghats. The stem bark, fruits and leaves of these species are harvested for medicinal and culinary purposes and, therefore, provide important economic and livelihood opportunities throughout the Western Ghats. Cinnamon is regarded as commercially important Non-Timber Forest Product (NTFP) that, if harvested properly, "can be used effectively as a key tool for conservation of remaining tropical forests". Unfortunately, the methods employed to harvest both cinnamon species have long been unsustainable in terms of the plants' ability to regenerate and also, as a viable livelihood option. It is used extensively in flavoring confectionaries, liquors, pharmaceuticals, soaps and dental preparations. It is also used in candies, gums, incenses, dentifrices, antiseptics and astringents. Cinnamon is always in demand by the bakery trade.

The industrial use of cinnamon species is mostly dependent upon the extraction of oil from the stem bark of cinnamon trees. The oil is often found in medicine as a carminative and antiseptic against cold and diarrhea.

Locally, the bark from cinnamon plants is commonly used as a flavoring agent in culinary preparations and in pickles. Likewise, the fruit, or bud, of the trees is harvested and used as a spice. Leaves are also used for flavoring and used in construction of traditional houses as pest repellent.

Identifying the low harvest regime for cinnamon was challenging as most of the trees were lopped for collection of leaf in general and fruit to some extent. However, our team could able to find such trees after trek in the forests for several kilometres.

Due to extended rainfall in this region during the project implementation periods the flowering and fruiting in Cinnamon is very low. We are finding it difficult to get the fruits of cinnamon especially that of focal species *Cinnamomum riparium*. However, we have made all efforts to collect maximum quantity of seeds, stumps and stems from the species and we are using all our previous contacts especially with Village Forest Committees and individual NTFP harvesters for seed collection. Based on the available secondary data from the Forest Department we had selected two Forest Divisions Sirsi and Karwar for study. However after field visits and discussion with forest department officials it is found that in Karwar Forest division Cinnamon species occur in a very less quantity and the focal species *Cinnamomum riparium* was found only in limited pockets. Hence we decided to change the study site from Karwar to Honnavar Forest Division. However, due to lack of availability of seeds and vegetative materials in the

Uttara Kannada district we have collected these from the neighbouring districts like Shimoga and Chikmaglur.

Summarize any unplanned sustainability or replicability achieved.

Results of the project are taken up by Dr B S Somashekhar, Green India through CEPF – ATREE small grant for developing education material in the Uttara Kannada district. College of Forestry, Sirsi have started raising seedlings of *Cinnamomum riparium* and have planted the seedlings of this critically endangered species for education and conservation purpose. LIFE trust would use the results of the project to disseminate the knowledge on cinnamon during workshops and meetings with local people and for awareness building.

Safeguard Policy Assessment

Provide a summary of the implementation of any required action toward the environmental and social safeguard policies within the project.

Not applicable

Performance Tracking Report Addendum

CEPF Global Targets

(Enter Grant Term)

Provide a numerical amount and brief description of the results achieved by your grant.
Please respond to only those questions that are relevant to your project.

Project Results	Is this question relevant?	If yes, provide your numerical response for results achieved during the annual period.	Provide your numerical response for project from inception of CEPF support to date.	Describe the principal results achieved from July 1, 2007 to June 30, 2008. (Attach annexes if necessary)
1. Did your project strengthen management of a protected area guided by a sustainable management plan? Please indicate number of hectares improved.	No			Please also include name of the protected area(s). If more than one, please include the number of hectares strengthened for each one.
2. How many hectares of new and/or expanded protected areas did your project help establish through a legal declaration or community agreement?	No			Please also include name of the protected area. If more than one, please include the number of hectares strengthened for each one.
3. Did your project strengthen biodiversity conservation and/or natural resources management inside a key biodiversity area identified in the CEPF ecosystem profile? If so, please indicate how many hectares.	No			
4. Did your project effectively introduce or strengthen biodiversity conservation in management practices outside protected areas? If so, please indicate how many hectares.	No			
5. If your project promotes the sustainable use of natural resources, how many local communities accrued tangible socioeconomic benefits? Please complete Table 1below.	No			

If you answered yes to question 5, please complete the following table.

Table 1. Socioeconomic Benefits to Target Communities

Please complete this table if your project provided concrete socioeconomic benefits to local communities. List the name of each community in column one. In the subsequent columns under Community Characteristics and Nature of Socioeconomic Benefit, place an X in all relevant boxes. In the bottom row, provide the totals of the Xs for each column.

Name of Community	Community Characteristics								Nature of Socioeconomic Benefit												
									Increased Income due to:												
	Small landowners	Subsistence economy	Indigenous/ ethnic peoples	Pastoralists/nomadic peoples	Recent migrants	Urban communities	Communities falling below the poverty rate	Other	Adoption of sustainable natural resources management practices	Ecotourism revenues	Park management activities	Payment for environmental services	Increased food security due to the adoption of sustainable fishing, hunting, or agricultural practices	More secure access to water resources	Improved tenure in land or other natural resource due to titling, reduction of colonization, etc.	Reduced risk of natural disasters (fires, landslides, flooding, etc)	More secure sources of energy	Increased access to public services, such as education, health, or credit	Improved use of traditional knowledge for environmental management	More participatory decision-making due to strengthened civil society and governance.	Other
Total																					

If you marked "Other", please provide detail on the nature of the Community Characteristic and Socioeconomic Benefit:

Additional Comments/Recommendations

Monitoring the harvest is essential for cinnamon resources or for any other NTFPs. Once the auction for harvesting is given, there is no such system to monitor the harvest and its impact. Probably this has resulted in to unsustainable harvesting of leaf, bark and fruits and resources are over exploited. Resting period for species, the products could be harvested on a rotational basis. Further study to assess impact of harvesting on reproductive out puts could be undertaken and arriving at sustainable harvest could be done after long term monitoring the effect of such methods. Awareness on sustainable harvest and importance of the species conservations is essential to local harvesters and frontline forest department staff. Strengthening the intelligence system within the Forest Department, taking local villagers especially VFCs help could be vital. Resource mapping and quantification of cinnamon resources could be done for proper management. Through the results obtained by these researches adaptive management plans could be derived and implemented. Nursery rising of *Cinnamomum riparium* through KFD could be taken up as there are no reports in the Uttara Kannada district that these species are being grown in the nurseries of either forest department or any other research agencies. It seems this for the first time through this project we could able to raise the seedlings of *Cinnamomum riparium.*

Efforts should be made to introduce cinnamon species in to the Bettaland and agro-forestry systems. With respect to marketing VFCs established at tourist centers could be empowered to market the cinnamon products through green labeling.

Information Sharing and CEPF Policy

CEPF is committed to transparent operations and to helping civil society groups share experiences, lessons learned, and results. Final project completion reports are made available on our Web site, www.cepf.net, and publicized in our newsletter and other communications.

Please include your full contact details below:

Name: Narasimha Hegde
Organization name: Livelihood Integrity and Forest Ecology (LIFE)
Mailing address: Laxmi Venkatesh Building, T V Station Road, Chowkimath, Sirsi - 581401
Tel: 91-8384-225941
Fax: 91-8384-235450
E-mail:lifetrusts@gmail.com

Appendix 1

Cinnamon Plant Resources of the Central Western Ghats: Impact Assessment of harvesting, Livelihood issues and Conservation through Participatory Approach

Nursery techniques

Nursery propagation of *Cinnamomum verum*

Cinnamomum verum flowers appear in November to February and fruit ripen June to July. Fruit is berry supported by cap like persistent calyx. Seed weight is very variable 2,500 to 3,000 seeds weigh a kilogram. It retains variability for only one and half months. Its germination percentage is about 50%. Seed is pretreated by soaking in lukewarm water for 24 hrs before sowing. Germination is very slow.

Cinnamomum verum is hardy plant which can grow in any soil under a wide variety of tropical condition. A sandy soil mixed with humus is the best.Plants are propagated by seeds, cuttings or by root cuttings. Branch cuttings give poor survival. Plants are usually raised from seeds. The tree fruit abundantly and there is no difficulties in obtaining good seeds for propagation. Ripe fruits are collected and heaped in shade until the pulp turns black and rot. After the seeds turn black it must be washed in cold water and dried in shade for two days.

Seeds are sown in raised nursery beds or in poly bags. The seeds can dibbled at a spacing of 5 x 5 cm in beds. The beds are covered lightly with paddy straw and watered judiciously. Germination is very slow and it takes one to one and half months to germination. Seedlings in the bed of 2 months old should be transplanted to poly bags.

All the seedlings must be kept under shade nets. Watering must be given all the days especially in the summer. It attains a height of half feet in 12 months.

Propagation techniques of *Cinnamomum riparium*

Cinnamomum riparium belongs to the family Lauraceae. The genus *Cinnamomum* Schaeffer, comprises of evergreen trees and shrubs, found from the Asiatic mainland to Formosa, the Pacific Islands, Australia and in tropical America. There are 341 reported binomials in the genus, which according to Kostermans (1957) could be reduced considerably in a revision. According to Willis (1973) the genus comprises of 250 species. In a later publication Kostermans (1964) lists 452 binomials including synonyms under the genus. *Cinnamomum* species play a vital role in the ecology and economy of the Western Ghats. The stem bark, fruits and leaves of these species are harvested for medicinal and culinary purposes. The genus *Cinnamomum* has a centre of diversity in Western Ghats and the adjoining regions of south India. The high commercial value of cinnamon has most likely contributed to unsustainable harvesting methods. ***C. riperium*** is relatively rare species restricted to the water courses (***'Vulnerable'*** as per recent IUCN Red list data, 2008). Though cinnamon have played important roles in human cuisine from ancient times, efforts on research and development of these tree spices have not received the required attention. Some research were mainly
Concentrated on chemistry, quality assessment, on developing agro-technology for
Cultivation and post-harvest processing. Very little work has been carried out on the propagation of cinnamomum. Hence research on sophisticated propagation technique is essential.

Vegetative propagation:

Vegetative propagation is the production of new plants without the use of seed, but using stem, leaf and root material from existing plants. There are many different methods of vegetative propagation including rooting cuttings, grafting, budding, air
layering, planting tubers, planting suckers, stem cuttings, stump cuttings and tissue culture.

Tree species vary greatly in their ability to be propagated vegetatively. Many rainforest species, however, have not been able to be propagated vegetatively. *Cinnamomum riparium* is a cross-pollinated species and viability of the seeds is also very less. Hence Vegetative propagation is best for *Cinnamomum riparium*. Stem cuttings, Root cuttings, Germinated seeds and Stumps were used for the propagation of *Cinnamomum riparium.*

1. **Propagation through Stem cuttings:**

a) **Collection and preparation of cuttings:** Stem cuttings were collected from the natural population. Lower branches were used for the cuttings. Stem cuttings were prepared by using adult plant and wildings. By giving a slant cut at the base and leaves were trimmed off. Stem cuttings of 20-25cm length were used. Adult stem cuttings with 4cm in diameter and wilding stem cuttings with 2cm were used.

Cinnamomum riparium- tree

stem cuttings from adult tree

5 years old wildings

stem cutting from wilding

Stem cuttings

b) **Pretreatments for Cuttings:** Immediately after the collection and preparation of stem cuttings were treated with fungicide bevistin and followed by quick root.

With quick root hormone(IBA 2500ppm)

With fungicide (Bevistine)

c) **Preparation of root trainers:** Root trainers were filled with coir pith and perlite as rooting media. Media is drenched with bevistin. Thus the treated cuttings were placed in the root trainers. All the root trainers containing cuttings were drenched with 1% Bavistine fungicide to avoid microbial attack.

Stem cuttings from adult in root trainers

Stem cuttings from wilding in root trainers

Drenching with fungicide(Bevistin 1%)

d) **Tranfer to Mist chamber:** Finally all the root trainers were placed in mist chamber.

Stem cuttings in mist chamber

Stem cuttings in mist chamber

2. Propagation through Root cuttings:

a) Collection of wildings: 5-6 years wildings were collected from the natural population.

5-6 years wildings

b) Preparation of root cuttings: Root cuttings were prepared by giving the slant cut at the base of the stem and length of the root is reduced to 5-6 c.m.

Root cutting

Root cuttings

c) Pretreatments for Cuttings: Stem cuttings were kept in the quick root solution for 1 minute.

Hormone treatment for root cuttings

d) Preparation of root trains: Root trainers were filled with coir pith and perlite as rooting media. Media is drenched with bevistin. Thus the treated cuttings were

placed in the root trainers. All the root trainers containing cuttings were drenched with 1% Bavistine fungicide to avoid microbial attack.

Root cuttings with root trainers

e) **Transfer to Mist chamber:** Finally all the root trainers were placed in mist chamber.

Root cuttings in mist chamber

3. **Propagation through Stump cuttings :**

a) **Collection of wildings:** 5-6 years wildings were collected from the natural population.

5 year old wildings

b) **Preparation of stump cuttings:** Stump cuttings were prepared by giving the slant cut at both the root and stem regions, 15-30 cm. long stumps were prepared. Leaves were trimmed off.

Stump cutting

c) **Pretreatments for Cuttings:** Stem cuttings were kept in the quick root solution for 1 minute.

d) **Preparation of polybags:** A potting mixture of 1:1:0.5 combination of soil: sand: Farm Yard Manure is filled to the polybags. Large sized poly bags of 5"×8" are ideal for transplanting since the root penetration is deep.

e) **Transplanting:** stump cuttings were planted to the polybags.

Transplantation of stump cuttings

Seed propagation :

Seed propagation is the production of new plants through seeds.

a)Collection of seedlings: 1 year old Seedlings were collected from the natural population.

1 year old wilding

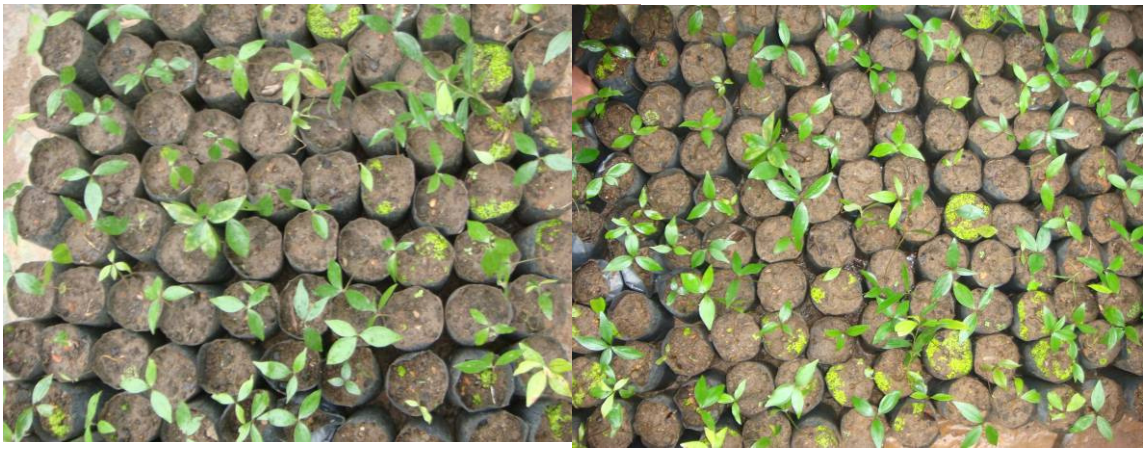
b)Preparation of polybags: A potting mixture of 1:1:0.5 combination of soil: sand: Farm Yard Manure is filled to the polybags.

Pot mixture

Polybags

c) Transplanting: Seedlings were planted to the polybags.

Transplantation of seedlings



Transplanted seedlings

Appendix 2

Cinnamon Plant Resources of the Central Western Ghats: Impact Assessment of harvesting, Livelihood issues and Conservation through Participatory Approach

Regeneration study

Introduction:

Non Timber Forest Products (**NTFP**) are gaining importance globally as significant contributors to livelihood and rural development. A number of studies over the last decade have revealed that they are not minor in any sense of the word if their use by the local people is considered. Because of their diverse applicability they have become significant in the context of food security, livelihood improvement and employment opportunities for the local communities. It is generally assumed that extraction of NTFPs is ecologically less destructive than timber harvesting and other forest use and therefore could provide a base for sustainable forest management. However, harvesting of NTFPs triggered by selective nature of the market, and uneven distribution of NTFP resources within a forest can lead to degradation/alteration of the resources (Arnold *et al.*, 2001). For instance, harvesting, collecting, and processing of *Cinnamon* is a significant `off-the-farm-activity' among the indigenous communities in Uttara Kannada during the pre-harvesting season of the agricultural calendar. Preliminary studies have shown an estimated 20,00,000 labour days of employment is generated in Uttara Kannada district through the collection, processing and marketing of *Cinnamomum* species, *Myristica,* and Wild date palm (Narasimha, 2008). Over harvesting of several NTFP species leading to resource depletion has been noticed everywhere. This could lead to a severe decline in the natural regeneration of the species. Unfortunately, the impacts of such over-harvest has been poorly documented in *Cinnamon sp.* Poor knowledge about the non-destructive methods of harvesting and processing coupled with a lack of initiatives for value addition and streamlining the market has turned to be a hurdle in regulating the situation.

Firstly, there is a need to assess the total resource base, understand the impacts of harvesting on regeneration, assess the livelihood dependency on the species by the collectors, involving local groups such as Women self help groups, Youth clubs, Village Forest Committees to establish a community nursery and induction of species into agro forestry systems as a long-term goal to reduce the dependency on natural populations.

Cinnamon is one of the most popular spices used for flavoring food. The history of spices is an interesting story. From time immemorial spices had been in regular demand from all

parts of the world. The search for drugs and spices was considered to be of no less importance than gold by the early explorers.

Cinnamomum riparium, Cinnamomum zeylanicum and Cinnamomum malabatrum are the species that play a vital role in the ecology and economy of the Western Ghats. The stem bark, fruits and leaves of these species are harvested for medicinal and culinary purposes and, therefore, provide important economic and livelihood opportunities throughout the Western Ghats. Cinnamon is regarded as commercially important Non-Timber Forest Product (NTFP) that, if harvested properly, "can be used effectively as a key tool for conservation of remaining tropical forests". Unfortunately, the methods employed to harvest both cinnamon species have long been unsustainable in terms of the plants' ability to regenerate and also, as a viable livelihood option. It is used extensively in flavoring confectionaries, liquors, pharmaceuticals, soaps and dental preparations. It is also used in candies, gums, incenses, dentifrices, antiseptics and astringents. Cinnamon is always in demand by the bakery trade.

The industrial use of cinnamon species is mostly dependent upon the extraction of oil from the stem bark of cinnamon trees. The oil is often found in medicine as a carminative and antiseptic against cold and diarrhea.

Locally, the bark from cinnamon plants is commonly used as a flavoring agent in culinary preparations and in pickles. Likewise, the fruit, or bud, of the trees is harvested and used as a spice. Leaves are also used for flavoring and used in construction of traditional houses as pest repellant.

Geographic area:

It is intended to under take the work in the Sirsi and Karwar forest division of Uttara Kannada district. The district of Uttara Kannada lies between 13` 55' and 15` 31' N latitude and 74` 9' and 75` 10' E longitude. Being one of the thickly forested districts in Karnataka state of south India, it has a total of 8,271 km^2 of forest area from 10,291 km^2 of geographical area which makes about 80 % forest cover (Prajapati, 1997). The annual precipitation is largely confined to the monsoon months of June - September and ranges from 3500 mm along the coast, to 4500-5000 mm on the crest line and declines to 1000 mm on the eastern plateau (District Statistics Bureau, 2001).

Uttara Kannada is the home to many indigenous communities such as Namadharis, Kharevokkaligas, Marathas, Halakki Vokkaligas, Gowlis, Shiligas, Kunbis, Siddis and Patgars who are dependent mainly on wage earning and collecting forest produce. They usually live in close proximity to the forests and depend on them for a variety of their needs. Many of these communities belong to scheduled castes and scheduled tribes and their economic condition lies below poverty line, which is less than Rs.12000 per annum.

However, due to very less number of trees from the species *Cinnamomum riparium* was found in Uttara Kannada district, forest regions near Agumbe, Muduba, Kudremukh, Kadambe and Bhagvati region are also considered for regeneration and other studies.

Results:

Botanic description:

Cinnamomum malabatrum (Burm. f)

Kan. Lavanga patra, Lavangada yele.

South West and South East India. Common in moist deciduous to evergreen forests in Western Ghats; Anamalais; throughout kerala; Sispara and other places in Nilgiris at about 2000 m; Iyerpadi in Coimbaotre; Arabbithittu, Sollekolli, Meenkolly of Kodagu; common in U. Kannada in Sirsi-Siddapur, Manchikeri, Supa, Yellapur, Gund, Anshi etc.; Sagar, Agumbe; Carnatic, Shevaroy Hills of Salem and Kollimalai Hills of Trichinopoly (Gamble).

Field characteristics. Small evergreen trees to 10-12 m tall; bark reddish brown; blaze reddish; aromatic; pet. To 2 cm long; Lvs. Long, large, coriaceous, shining, triply nerved from base; Berry large, globose-oblong reaching nearly 2.5 cm in length and supported by a large thickened cup and pedicel.

Leaves: Elliptic to oblong-lanceolate, acute to acuminate, narrowed at base, to 28 × 8 cm, (usually 3 central ribs from base reaching the leaf apex, often with 2 outermost ending

below the middle or absent; panicle spreading usually shorter than lvs.; perianth ovate in fl.; fruiting short.
Leaves and bark used as a spice for flavoring food.

Cinnamomum riparium (Gamble)

Found in the Western Ghats from Kodagu southwards. Western Ghats from Kodagu to Anamalais and N. Kerala on river banks in the low country. In Uttrara Kannada district of Karnataka state only few trees of this species are found in Nilkund forests of Janmane Range Forests in Sirsi Forest Division. The species is listed as vulnerable by the international conservation union (IUCN).
Field characteristics. Evergreen, graceful, little trees to 8 m tall; branchlets slender, grey-pubescent; Berry bright blue, shining, ovoid.

Leaves. Linear-lanceolate, acuminate at apex, acute at base, glabrous beneath, to 10 × 3 cm, tri-ribbed; panicles of subumbellate cymes; Fls. Grey-pubescent, with villous filaments; Berry ovoid, to 1.5 cm long.

Cinnamomum sulphuratum (Nees)

Western Ghats. W. Ghats, Kodagu and Mysore to N. Coimbatore, Nilgiris and Anamalasis, in Shola forests at about 1333-2000 m (Gamble). Common in wet deciduous to evergreen forests, to 1300 m in Karnataka;

Field characteristics. Evergreen trees, 10-12 m tall; young branchlets and young lvs. Yellow-tomentose; pet. to 1.5 cm long; Lvs. Prominently reticulate and glaucous beneath; perianth yellow-tomentose.

Leaves. Ovate-lanceolate or elliptic-oblong, acute or obtuse at apex, rounded to acute at base, 4.5 -13× 1.5-5.5 cm; panicle to 0.6 cm long; Berry long, 1.5 cm; fruiting pedicel short, smooth.

Specimens from high levels have usually shorter and more rounded leaves.

Cinnamomum verum

J. S. Presl. (*C. zelyancium* Bl.)

Eng. The Wild Cinnamon Tree, Cinnamon; Sans. Tejapatra; Hind. Dalchini; Kan. Lavangapatte, Daalchinni, Nisani, Nisne; Tam. Karua, Karuva, Lavangam; Mal. Edana, Karuva, Lavangam, Vazhana, Karappa; Tel. Sanalinga.

South West India, Sri Lanka, Myanmar, Malaya. W. Ghats from Konkan, U. Kannada southwards to Kerala at low levels, in coastal plains and windward side of W. Ghats to 140 m; very common in Sirsi-Siddapur, Yellapur, Honnavar, Kumta, Gund etc. Sometimes cultivated; extensive plantations of this sp. Raised in Sri Lanka.

Field characteristics. The tree is medium sized, ranging from approximately five to twenty meters and girth size varies from few centimeters to 150 centimeters.

It is an extremely variable, aromatic, small, evergreen tree; branchlets compressed, grooved, glabrous; bark reddish-brown, with warty excrescences, rough, 2 cm thick, soft; blaze brown, aromatic; Lvs. Sub-opposite, bright pink when tender; prominently 3-5-nerved; pet. Stout, flattened above, to 2.5 cm; Fr. Dark purple.

Leaves. Variable, large, oblong at low levels, small and oval at high levels with intermediate sizes and forms, 7-25×3-10 cm, coriaceous, glabrous above, dull below; panicles about as long as lvs.; Fls. grey or pale yellow; Fr. 2 cm long, oblong ovoid, supported by ribbed accrescent perianth.

Objective 1:
To assess the impact of harvesting on regeneration of *Cinnamon* species.

In the regenerating quadrates individuals of different height classes (Table 1.) were counted at different distance from the parental tree up to 10 mtr.

Impact of harvesting on regeneration of *Cinnamon* species.

In both *C. malabathrum* (Fig 1.) *and C. verum* (Fig 4.) better regenerating population were observed in low harvested area than the high harvested area. In low harvested region 49% of the regenerating individuals of *Cinnamomum malabatrum* were in the class- I category and rest of others classes were more than 15% where as in high harvested region only 28% and less than 15 % of regeneration was recorded in Class – 1 and Class 3rd and 4th respectively. It is clearly indicating the high extraction of Cinnamon buds widely affect the regenerating individuals.

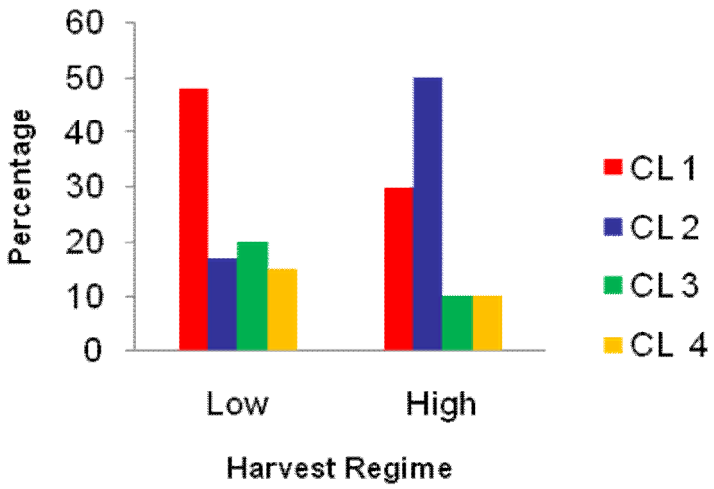


Fig 1. Percentage regenerating individuals of *C. malabathrum*

Uniform distribution of all the classes of regenerating induals of *C. malabatrum and C. verum* (Fig 2, 3, 5, & 6) at diffeferent distance from parental trees were observed in low harvested region where as in high harvested region regenerating individuals were very few in the 8 meter and 10 meter from the parental tree in high harvested region than the low harvested region where the regenerating individuals were uniformly distributed after the 2 m from the parental tree clearly indicating the impact of haigh extraction.

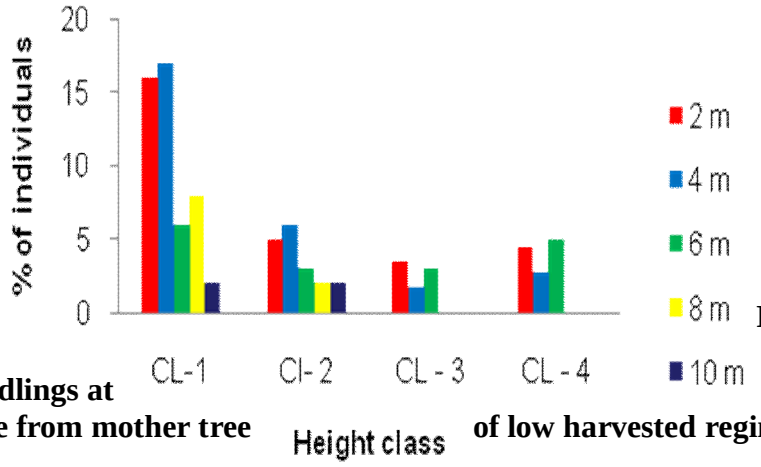


Fig 2. Percentage individuals of *C. malabathrum* seedlings at different distance from mother tree of low harvested regime

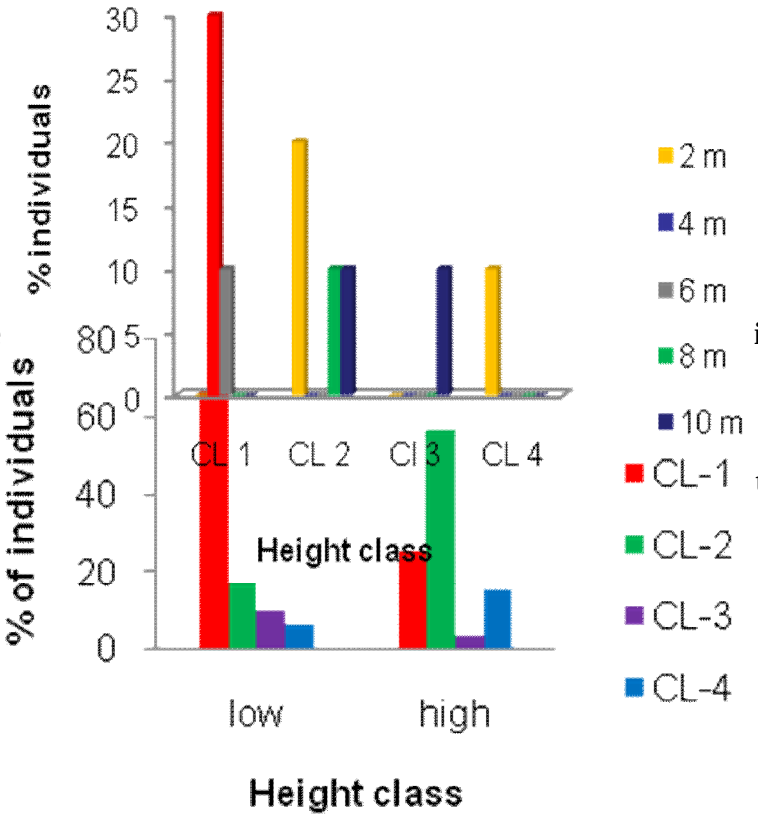


Fig 3. Percentage individuals of *C. malabathrum* seedlings at the different distance from mother tree of high harvested regime

Fig 4. Percentage regenerating individuals of *Cinnamomum verum*

`

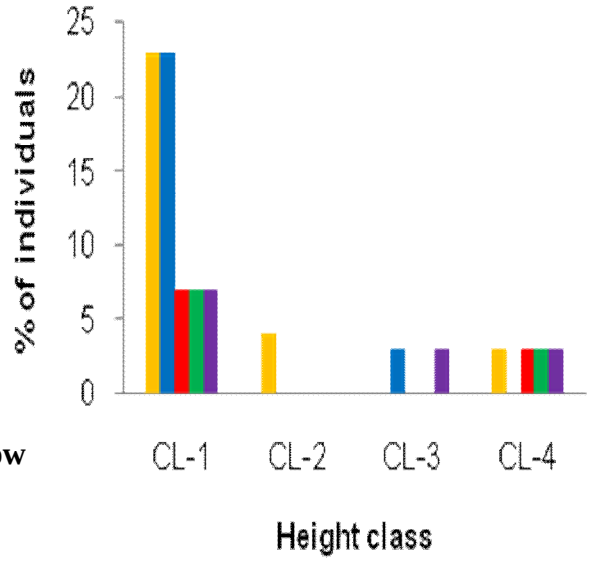


Fig 5. Percentage individuals of *C. verrum* seedlings at the different distance from harvested mother tree of low high regime

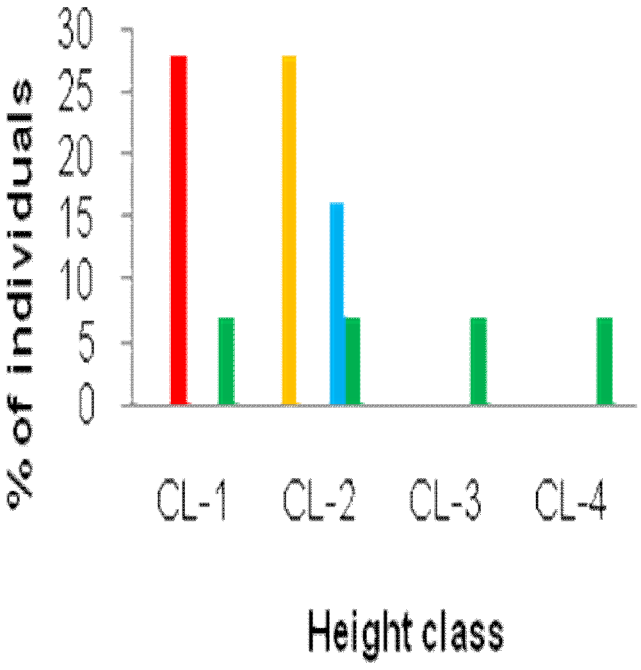


Fig 6. Percentage individuals of *C. verrum* seedlings at different the distance from mother tree of high

harvested regime

Regeneration status of *Cinnamomum riparium*

Status of regeneration of *Cinnamomum riparium* was studied in three sites of Kuduremukh national park namely Muduba, Kadambi and Bhagavathi of Chikmagalore district and Nilkund site in Uttara Kannada district respectively.

Status of Regeneration:

Good regeneration status (Fig of *C. riparium* was observed in Muduba of Kuduremukh National Park. However, this region is highly protected from any disturbance activity. Since the intensive tourism pressure in Kadambi and Bhagavathi of Kuduremkh National Park observed poor regeneration of *C. riparium* and where as in Nilkund of Uttara Kannada, there are only 2 mature tree in the site may be the main reason for the poor regeneration.

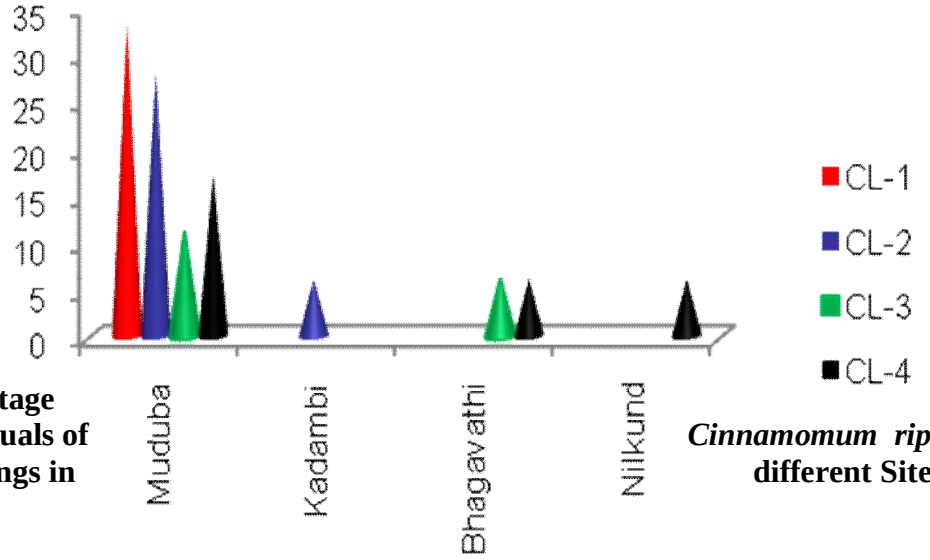


Fig 7. Percentage individuals of seedlings in *Cinnamomum riparium* different Sites

Appendix 3

Cinnamon Plant Resources of the Central Western Ghats: Impact Assessment of harvesting, Livelihood issues and Conservation through Participatory Approach

Dependency, harvesting, awareness and education programs.

History of collection:

Cinnamon has been harvested within Uttara Kannada for commercial purposes for many years now. As depicted in Figure 1, the quantity of cinnamon harvested in the region gradually increased between the mid-1980s and the early to mid-1990s. In 1994, the Principal Chief Conservator of Forests (PCCF) Bangalore banned the tender to collect the leaves, explaining the significant decrease of collection beginning in the mid-1990s (Letter number M.F.P: CR-96: 89-90 dated September 19, 1994). The ban was, however, imposed only in certain forest divisions, excluding Shimoga, Sagar and other Forest Divisions in the Western Ghats, therefore not entirely halting the unscientific and unsustainable harvesting of cinnamon in certain forest divisions. Due to this loophole,

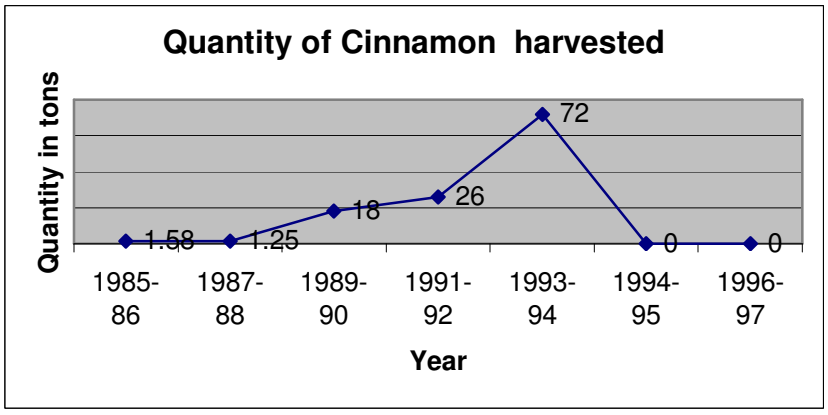


Figure 1. Quantity of Cinnamon harvested over the years in Canara Circle. (Source: KFD annual reports).

Permission from one forest division is used to collect and stock cinnamon leaves and buds illegally from Sirsi division. It is clear on multiple levels that the ban on cinnamon

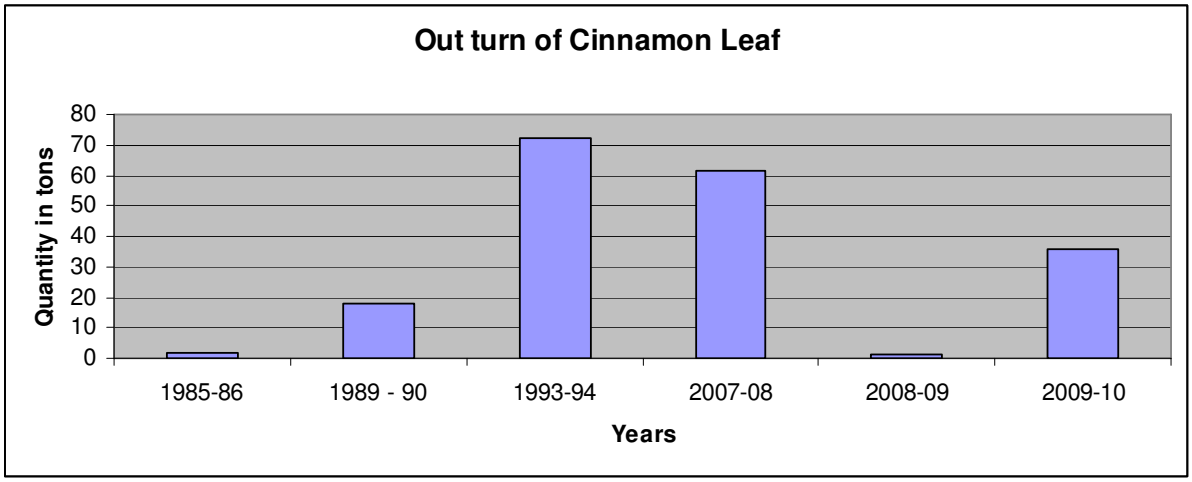
collection proved to be ineffective. The economic incentive to collect cinnamon was not eradicated, and therefore, people continued to harvest irresponsibly in the face of ineffective and poorly implemented government policy. The need to find a balance between ecological and economic sustainability needs to be considered as well as reasonable execution of the law. In 2004, the ban on cinnamon collection was lifted.

Socio-economic benefits:

Fruits of the cinnamon species are important source of income for the NTFP harvesters. Villages selected to assess the dependency on cinnamon species are Muregar, Gonsar, Guruvalli, Kakkalli, Hemgar, Manadoor, Kudgund, Koligar, Dodmane and Hemgaar.

In each village nearly 15 percent of families were selected for the study. These families were categorized based on the land holding pattern especially the commercial orchards. Broad classification was i) land less people and households having less than half an acre of commercial orchards including (mainly area orchards), ii) households having 0.5 to 2 acres iii) households having commercial orchards in between 2 to 4 acres iv) farmers with more than 4 acres of commercial orchards. However, there have been slight changes in the categorization in different villages depending on the land holding pattern. Khare

Vokkaligas, Marathis, Siddis, Namdharis, Havyak Brahmins, Haslars, Patgars are the main communities involved in the survey.



Out of 130 NTFP harvesters we studied in Uttara Kannada district thirty-five harvesters are involved in collecting cinnamon fruit. Maximum of 18 kilograms of fruits are harvested by a collector in Gonsar village in Hulekal Range Forest in Sirsi Forest Division with income of nine thousand rupees. Few villagers have collected the leaf as per the direction of contractors and they were paid two rupees per kilogram of leaves and ten to fifteen rupees for the dried leaf. On an average collection of Cinnamon fruit and leaves contributed up to 10 percent of total income from harvesting of NTFPs. There is no minimum support price for leaf and fruit. The price is fixed by the contractor based on the demand from traders and industries and supply at harvest level.

Weducation and awareness building programes

Workshop on sustainable harvest and prospectus for green labeling of Cinnamon

A one day workshop was held in Karooru, Devanalli Panchayat, Janmane Forest Range Sirsi Forest Division on November 17, 2009. Karooru is a hamlet in Siruguppa village Uttara Kannada district with one of the backward community Khare vokkaligas.

Narasimha Hegde while explaining the objective of the workshop mentioned the importance of Non Timber Forest Products (NTFP's) to the household income of forest dependent communities. He described the objectives and activities of project like establishing nurseries, understanding the impact of harvest on regeneration, existing harvesting methods, need for sustainable harvest and prospectus for green labeling of Cinnamon species.

Dr. R. Vasudeva associate Professor, College of Forestry, Sirsi said that livelihood improvement of local poor community has to be done and on the other hand forests should be conserved because of their multi dimensional uses and services. He explained NTFPs are the best available options and described how a small scale enterprise development for processing and value addition to NTFP's could bring better price at primary collecting center. He shared the experience of his recent Malaysia visit where lots of indigenous people were making handmade soaps locally available oil in organic methods.

Mr. Ramesh Hegde, Kangod an expert in training local groups in value addition to fruits and species explained how local communities could be involved in enterprise development and marketing of forest products. He said that forest fruits are good source of seasonal, vitamins, minerals and carbohydrates. They are seasonal, highly perishable and begin to deteriorate soon. Hence processing and preserving it using classical methods or by any other methods would increase the cash income to collectors or supply the nutrients for more number of days. He gave short training on preparation of Jams, Jellies, pickles chutneys and ready to serve drinks using forest fruits and spices including Cinnamon. Further the participants decided to make a priority list of species and their products that could be considered for value addition and marketing.

Narsimha Hegde agreed to organize training camps for enterprise development of such products, train local Village Forest Committee and Women Self Help Group Members in near future.

A detailed discussion was held on cinnamon by the participants. Following issues were discussed in detail.

1. Cinnamon species available in the forest region around Karoor.
2. Harvest practices and existing management plans.
3. Dependency of the local community on the Cinnamon resources.
4. Threats and Opportunities.
5. Possibility of establishing a community nursery and to domesticate the species and cultivate in VFC area.

Now the harvesting of Cinnamon leaf is banned due to over harvesting and unscientific harvesting of the resources. Villagers were allowed to collect only the fruits of cinnamon species. However, collection of leaf has resulted into death of several trees and quantity of fruits available has reduced drastically. As some participants opined that earlier almost twenty five years ago they used to collect 45 to 50 kilograms of dried fruit of Cinnamon per family every year where as now it has reduced to less than 5 kilograms per family in a year. During those days each tree yielded approximately 10 to 12 kilograms of fruit, where as now it has reduced to just 2 to 3 kilograms. The contractors who obtained the tender to harvest the product had collected the leaves by chopping the branches and sometimes even the entire tree was cut down. The participants said that because of this method of harvest for several years it resulted into death of several trees in the forest surrounding the village. Leaf from a part of tree should be harvested and at least some 40 % of the growth should be retained. Even for harvesting the fruit by individual collectors they said only small twigs should be cut with sharp sickles.

Establishing a women lead Village Forest Committees:

Now people from outside the villages were coming to the forests and having little concern over the resources they want to harvest as much as possible at the earliest. This is evident with the species like *Garcinia gummigutta*, *Myristica malabarica*, black creeper, cane and cinnamon. This is Karoor hamlet with nearly 275 residents is located in a remote area and has less connection with the other part of the village. There are already proposal from the village panchayat to the state government to set up Karoor as a separate revenue village considering its geographic features. In this connection the participants of the workshop decided to form women Village Forest Committee to protect and manage the forest resources as well as to undertake value addition, marketing and enterprise development activities.

Possibility for green labeling of the product especially that of fruits harvested adopting sustainable methods was discussed. Harvesting of fruits at right time, cutting of only the small twigs and allowing some part of fruits for regeneration and not to harvest the fruits from younger trees are recommended in the workshop as best harvesting practice.

It is also decided to give training on value addition, packaging and marketing of Non Timber Forest Products especially fruits from which harvesting would cause minimum threat to the resources.

Ms. Triveni, Scientist College of Forestry, Gangadhar Bhat, vice president of Devanalli gram panchayat, members of women groups, farmers and large number of NTFP gatherers were present in the workshop.

Summary of workshops/meetings held at other villages (Gonsar, Guruvalli, Benagaon, Dodmane, Savale Manjguni)

Workshops and discussion meetings were organized along with Cinnamon harvesters, Village Forest Committee members, Forest Department officials, research institutions and women self help groups.

Leaves and fruits of cinnamon are harvested during the summer season, which typically lasts from January till May. The fruits ripen between March and May.

For harvesting of the leaf state Forest Department auctions tender in each Range forest Division and the highest bidder becomes the contractor for harvesting the leaf. Contractors hire laborers to go into the forest and collect the leaf from the cinnamon trees. Collectors usually come from outside the villages, normally a contract laborer.

Extractions of fruits are normally done by local communities.

The high commercial value of cinnamon has most likely contributed to unsustainable harvesting methods that are equivalent to over-exploitation. Harvesting methods employed for the collection of cinnamon to determine how and the extent to which cinnamon is harvested. For harvesting the leaf entire branches or some times trees are cut. Harvesters mentioned that collection or plucking buds from the branches is very time consuming, so most collectors resort to cutting the branches and then plucking the small twigs from the branches to augment the amount of buds collected in the shortest time span. Harvesters then carry the twigs to the house to remove the buds. In their homes, harvesters separate the fruits from the twigs and dry them to prepare them for marketing.

To collect the bark, the stem of the tree is often left exposed which is, likewise, harmful to the survival of the tree.

Cinnamon has been harvested within Uttara Kannada for commercial purposes for centuries now. The quantity of cinnamon harvested in the region gradually increased between the mid-1980s and the early to mid-1990s. In 1994, the Principal Chief Conservator of Forests (PCCF) Bangalore banned the tender to collect the leaves, explaining the significant decrease of collection beginning in the mid-1990s (Letter number M.F.P: CR-96: 89-90 dated September 19, 1994). The ban was, however, imposed only in certain forest divisions, excluding Shimoga and Sagar forest divisions, therefore not entirely halting the unscientific and unsustainable harvesting of cinnamon in certain forest divisions. Due to this loophole, permission from one forest division is used to collect and stock cinnamon leaves and buds illegally from Sirsi division. It is clear on multiple levels that the ban on cinnamon collection proved to be ineffective. The economic incentive to collect cinnamon was not eradicated, and therefore, people continued to harvest irresponsibly in the face of ineffective and poorly implemented government policy. The need to find a balance between ecological and economic sustainability needs to be considered as well as reasonable execution of the law. In 2004, the ban on cinnamon collection was lifted. Now again since 2008 ban was imposed in certain forest divisions and it is open in several other forest divisions.

. Following issues were discussed in detail.

1. Cinnamon species available in the forest region around the villages.
2. Harvest practices and existing management plans.
3. Dependency of the local community on the Cinnamon resources.
4. Threats and Opportunities.

Possibility of establishing a community nursery and to domesticate the species and cultivate in VFC area. Villagers and contract laborers said that a maximum of 200 kilograms of leaf could be harvested from a single tree where as average could be some what 30 kilograms.

Efforts are being made to establish a woman lead Village Forest Committees in Karoor village.

Possibility of eco – labeling for marketing of the products, responsible harvesting practices, nursery raising and introducing it in to the agro-forestry systems are also discussed during these meetings.

Photo 1: Participants of workshops held at Karoor Village

Photo 2: Photos of workshop held at Gonsar

Photo 3: Workshop participants at Gonsar

Photo 4. Western Ghats task force chairman visiting the workshop venue held at Yedalli

Marketing system for cinnamon resources in the district of Uttara Kannada, Karnataka state.

Harvesting of cinnamon leaf and fruits has been done in the district of Uttara Kannada for commercial purposes for many years now (per communication with harvesters and contractors 2010). However, another important product, the bark harvesting is not being done in the forest in a commercial scale. Most of the cinnamon leaf and fruits are harvested within the state forests. With respect to the cinnamon leaf, forest department auctions the product through tender system once in two years in every range forest. Highest bidder would become the contractor and would get the tender. Further, he recruits agents for collection of the cinnamon leaf. These agents either hire labors from the local village or bring the labors from out side for the collection of leaf. On the other hand harvesting of fruits was mainly done by the local villagers. The harvested fruits are either sold locally to the forest contractors or in the near by town to the shop keepers.

The purchasing price of cinnamon from the collector to the harvester is very low, for the dry leaves it is fifteen rupees per kilogram and for the fruit 500 to 600 rupees per kilogram. However, some times it went up to rupees 1100 per kilogram in the year 2011. Between the sub-agents and contractors, the prices are slightly higher. The contractors sell the dry leaves at 38 rupees per kilogram. Ultimately, the price of that cinnamon products sell for between the contractor and the consumer are significantly higher. And fluctuation in the price over the years and within a year during different season it is too high.

Following table explains the marketing channel of cinnamon leaf in general in the district of Uttara Kannada. Here the cinnamon harvester could be either a local villager or a labor appointed by the contractor or his sub-agent.

Besides cinnamon fruits are harvested by the local people and harvesters and sold to the contractors or shop keepers in the nearby city. It seems that there was not any such ban or restrictions in harvesting the fruits from any cinnamon species in the district.

Project Title:
Cinnamon Plant Resources of The Western Ghats: Impact Assessment, Livelihood Issues and Conservation through Participatory Approach

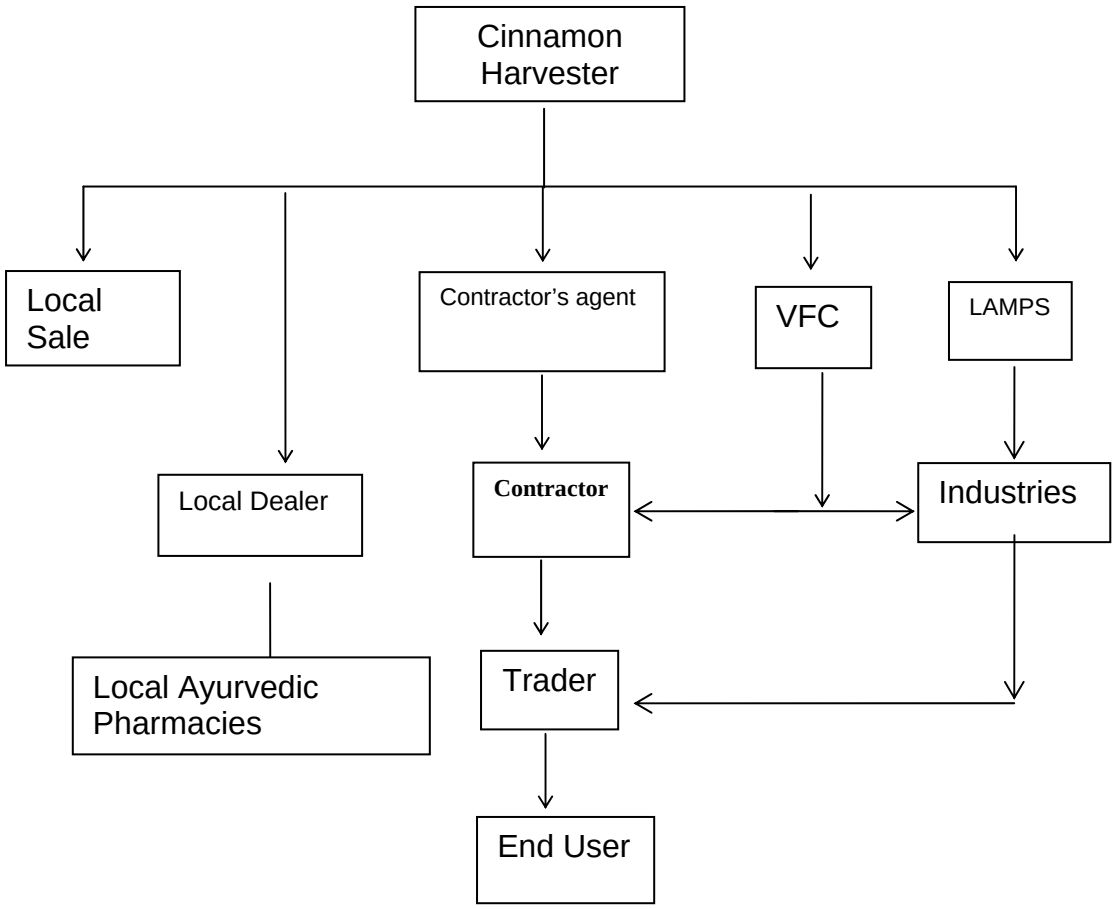


Photo 1: VFC members showing the harvested cinnamon fruits ready for sale

Photo 2: Dried cinnamon fruits ready for sale

Even though LAMPS (Large Scale Adivasi Multipurpose Society) and VFCs (Village Forest Committees, formed under Joint Forest Management Plan, Forest department) are operating in the district most of the cinnamon products, about 90 percent are marketed through the contractors system.

Considering the fact that harvesting of either cinnamon leaf or fruit is being done unscientifically it is may be necessary to strengthen the local community organizations like VFCs to monitor the harvesting of products. This could include awareness building, training on sustainable harvest practices, providing incentives for those groups who harvest the products more adopting sustainable practices. It is important to take measures to harvest, process, market, alternate product development, value chain development and providing micro-financing to take up these activities.

To reduce the pressure on wild resources measures could be taken to promote *in situ* and *on-farm* conservation, empowering and strengthening capacity of community based institutions to realize in situ, on-farm conservation of cinnamon.

Photo 3: Harvesting of Cinnamon by a tribal person

Photo 4: Harvesting cinnamon fruit by Khare Vokkaliga community people

Appendix 5

Cinnamon Plant Resources of the Central Western Ghats: Impact Assessment of harvesting, Livelihood issues and Conservation through Participatory Approach

Raising nursery and planting

Nursery of cinnamon species were grown using seeds and by stump cuttings. Seedlings were raised in decentralized community nurseries. Then the plants were distributed to members of village forest committees and to the farmers group in the villages Gonsar, Guruvalli, Muregar, Sirsimakki and Kudgund. Apart from planting the seedlings were planted in famrs filed, bettaland and in agro-forestry systems.

Photo 1: Seedlings in the nursery

Photo 2: Nursery at Gonur

Photo 3: Distribution of seedlings to VFC members

Photo 4: Planting of cinnamon seedlings

Photo 5: Nursery in Devkar

Photo 6: Nursery at Shigehalli

Interventions required

In order to effectively maintain the growth, production, economic and ecologic survival of Cinnamon in the Western Ghats, certain measures must be implemented to augment these different facets of the species. On the large scale, appropriate government action through forest policy is needed to promote NTFP broadly, and cinnamon species extraction and regeneration specifically. The significance of regeneration must be recognized considering the current and impending paucity of cinnamon plants throughout the Western Ghats. Cinnamon species are dependent upon a natural forest habitat and therefore, cannot grow under the current notion of monoculture plantations as economic panacea. Promotion of diverse home gardens with appropriate economic benefits for NTFP production is therefore, essential.

Activities to promote domestication of cinnamon species are necessary to allow for farmers to grow cinnamon plants in their home gardens or orchards. Establishing a forest nursery that provides such important economic and ecological species would increase access to such plants and relieve pressures on the natural forest. Because of the high commercial value of cinnamon, it is likely to be a popular selection among farmers.

Photo 7: Planting of cinnamon seedlings

Project Title:
Cinnamon Plant Resources of The Western Ghats: Impact Assessment, Livelihood Issues and Conservation through Participatory Approach

Workshop on Sustainable Harvest and Prospects for Green-labeling of Cinnamon

Photo 1: Participants of workshops held at Karoor Village

A one day workshop was held in Karooru, (N 74.6394, E 14.6364) Devanalli Panchayat, Janmane Forest Range Sirsi Forest Division on November 17, 2009. Karooru is a hamlet in Siruguppa Village, Uttara Kannada district inhabited by one of the backward community Khare vokkaligas.

Narasimha Hegde, while explaining the objective of the workshop, emphasized the importance of Non-Timber Forest Products (NTFP's) to the household income of forest dependent communities. He described the objectives and activities of project like establishing nurseries, understanding the impact of harvest on regeneration, existing harvesting methods, need for sustainable harvest and prospects for green-labeling of Cinnamon species.

Dr. R. Vasudeva, Associate Professor, College of Forestry, Sirsi said that livelihood improvement of local poor community has to be prioritized, while at the same time forests should be conserved because of their multi-dimensional uses and services. He explained NTFPs are the best available options and described how a small scale enterprise development for processing and value addition to NTFP's could bring better price at primary collecting center. He shared the experience of his recent Malaysia visit where lots of indigenous people were making handmade soaps using locally available oil by organic methods.

Mr. Ramesh Hegde, Kangod, an expert in training local groups in value addition to fruits and spices, explained how local communities could be involved in enterprise development and marketing of forest products. He said that forest fruits are good source of vitamins, minerals and carbohydrates.

They are seasonal, highly perishable and begin to deteriorate soon. Hence processing and preserving them using classical methods or by any other methods would increase the cash income to collectors at the same time preserving the nutrients for longer durations of time. He gave a short training on preparation of jams, jellies, pickles, chutneys and ready-to-serve drinks using forest fruits and spices including cinnamon. Further, the participants decided to make a priority list of species and their products that could be considered for value addition and marketing. Narsimha Hegde agreed to organize training camps for enterprise development of such products, train local Village Forest Committee and Women Self Help Group Members in near future.

Photo 2: Photo of workshop held at Gonsar

A detailed discussion was held on cinnamon by the participants. Following issues were discussed in detail.

1. Availability of Cinnamon species in the forest region around Karoor.
2. Harvest practices and existing management plans for cinnamon.
3. Dependency of the local community on the Cinnamon resources.
4. Threats and Opportunities for cinnamon conservation.
5. Possibility of establishing a community nursery and to domesticate the species and cultivate in VFC area.

Since the year 2006 the harvesting of Cinnamon leaf is banned by state forest department in Uttara Kannada district due to over-harvesting and unscientific harvesting of the resources. Local villagers

were allowed to collect only the fruits of cinnamon species. However, earlier collection of leaf has resulted into death of several trees, and therefore quantity of fruits available has reduced drastically. Some participants opined that earlier almost twenty five years ago they used to collect 45 to 50 kilograms of dried fruit of Cinnamon per family every year, whereas now it has reduced to less than 5 kilograms per family per year. During those days each tree yielded approximately 10 to 12 kilograms of fruit, where as now it has reduced to just 2 to 3 kilograms. The contractors who obtained the tender to harvest the product had collected the leaves by chopping the branches and sometimes even the entire tree was cut down. The participants claimed, this method of persistent harvest for several years has resulted in the death of several trees in the forests surrounding the villages. Leaf from only a designated part of tree should be harvested, leaving at least some 40 % of the growing shoots untouched. Even for harvesting the fruit by individual collectors they said only small twigs should be cut with sharp sickles.

Establishing a women lead Village Forest Committees:

Currently, harvesters who are non-locals are engaged in harvesting, and have little concern over the resources they wish to harvest as much as possible, at the earliest. This is evident from the state of species such as *Garcinia gummigutta*, *Myristica malabarica*, black creeper, cane and cinnamon. Karoor hamlet with nearly 275 residents is located in a remote area and has less connection with the other part of the village (Sarguppa). The village panchayat has already petitioned the state government to designate Karoor as a separate revenue village, considering its geographic features. In this connection the participants of the workshop decided to form women Village Forest Committee to protect and manage the forest resources as well as to undertake value addition, marketing and enterprise development activities.

Possibility for green-labeling of the product especially that of fruits harvested adopting sustainable methods was discussed. This would be done through participatory guarantee scheme involving farmers, collectors, Village Forest Committees and local community organizations. Harvesting of fruits at right time, cutting of only the small twigs and allowing some part of fruits for regeneration and not to harvest the fruits from younger trees are recommended in the workshop as Best Harvesting Practice.

It was also decided to give training on value addition, packaging and marketing of Non Timber Forest Products especially fruits from which harvesting would cause minimum threat to the resources.

Ms. Triveni, (Scientist - College of Forestry), Gangadhar Bhat, (vice president of Devanalli gram panchayat, members of women groups, farmers and large number of NTFP gatherers were present in the workshop.

Summary of workshops/meetings held at other villages (Gonsar, Guruvalli, Benagaon, Dodmane, Savale Manjguni)

Workshops and discussion meetings were organized for Cinnamon harvesters, Village Forest Committee members, Forest Department officials, research institutions and women self help groups.

Leaves and fruits of cinnamon are harvested during the dry season, which typically lasts from January till May. The fruits ripen between March and May.

For harvesting of the leaf state Forest Department auctions tender in each Range Forest Division and the highest bidder becomes the contractor for harvesting the leaf. Contractors hire laborers to go into the forest and pluck/harvest the leaf from the cinnamon trees. Collectors usually come from outside the villages, normally a contract laborer.

Extractions of fruits are normally done by local communities. The stem bark, fruits and leaves of these species are harvested for medicinal and culinary purposes and, therefore, provide important economic and livelihood opportunities throughout the Western Ghats. Cinnamon is regarded as commercially important Non-Timber Forest Product (NTFP) that, if harvested properly, "can be used effectively as a key tool for conservation of remaining tropical forests". Unfortunately, the methods employed to harvest both cinnamon species have long been unsustainable in terms of the plants' ability to regenerate and also, as a viable livelihood option. It is used extensively in flavoring confectionaries, liquors, pharmaceuticals, soaps and dental preparations. It is also used in candies, gums, incenses, dentifrices, antiseptics and astringents. Cinnamon is always in demand by the bakery trade.

The industrial use of cinnamon species is mostly dependent upon the extraction of oil from the stem bark of cinnamon trees. The oil is often found in medicine as a carminative and antiseptic against cold and diarrhea.

Locally, the bark from cinnamon plants is commonly used as a flavoring agent in culinary preparations and in pickles. Likewise, the fruit, or bud, of the trees is harvested and used as a spice. Leaves are also used for flavoring and used in construction of traditional houses as pest repellant.

The high commercial value of cinnamon has most likely contributed to unsustainable harvesting methods that are equivalent to over-exploitation. Harvesting methods employed for the collection of cinnamon to determine how and the extent to which cinnamon is harvested. For harvesting the leaf entire branches or some times trees are cut. Harvesters mentioned that collection or plucking buds from the branches is very time consuming, so most collectors resort to cutting the branches and then plucking the small twigs from the branches to augment the amount of buds collected in the shortest time span. Harvesters then

carry the twigs to the house to remove the buds. In their homes, harvesters separate the fruits from the twigs and dry them to prepare them for marketing. To collect the bark, the stem of the tree is often left exposed which is, likewise, harmful to the survival of the tree.

Cinnamon has been harvested within Uttara Kannada for commercial purposes for centuries now. The quantity of cinnamon harvested in the region gradually increased between the mid-1980s and the early to mid-1990s (secondary data from forest department 2009, personal communication with harvesters and forest contractors). In 1994, the Principal Chief Conservator of Forests (PCCF) Bangalore banned the tender to collect the leaves, explaining the significant decrease of collection beginning in the mid-1990s (Letter number M.F.P: CR-96: 89-90 dated September 19, 1994). The ban was, however, imposed only in certain other forest divisions such as Sirsi, Honnavar, Haliyal, Yellapur and Karwar, but excluding Shimoga and Sagar forest divisions, therefore not entirely halting the unscientific and unsustainable harvesting of cinnamon in certain forest divisions. Due to this loophole, permission from one forest division is used to collect and stock cinnamon leaves and buds illegally from Sirsi division. It is clear on multiple levels that the ban on cinnamon collection proved to be ineffective. The economic incentive to collect cinnamon was not eradicated, and therefore, people continued to harvest irresponsibly in the face of ineffective and poorly implemented government policy. The need to find a balance between ecological and economic sustainability needs to be considered as well as reasonable enforcement of the law. In 2004, the ban on cinnamon collection was lifted. Now again since 2008 ban was imposed in certain forest divisions and it is open in several other forest divisions.

. Following issues were discussed in detail.

1. Cinnamon species available in the forest region around the villages.
2. Harvest practices and existing management plans.
3. Dependency of the local community on the Cinnamon resources.
4. Threats and Opportunities.

Possibility of establishing a community nursery and to propagate the species and cultivate in VFC area. Villagers and contract laborers said that a maximum of 200 kilograms of leaf could be harvested from a single tree (average around 30 kilograms).

Efforts are being made to establish a woman-led Village Forest Committees in Karoor village.

Possibility of eco – labeling for marketing of the products, responsible harvesting practices, nursery raising and introducing it in to the agro-forestry systems were also discussed during these meetings.

Photo 3: Photo of workshop held at Gonsar

Photo 4: Western Ghats task force chairman visiting the venue workshop held at Yedahalli