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Medicinal plants, their conservation, use and production in southern India

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Publication date:
2008

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Singh, R. V., Singh, P., Hansen, L. A., & Graudal, L. O. V. (2008). *Medicinal plants, their conservation, use and production in southern India*. Forest & Landscape, University of Copenhagen. Development and Environment Vol. 11/2008

Download date: 17. Nov. 2026

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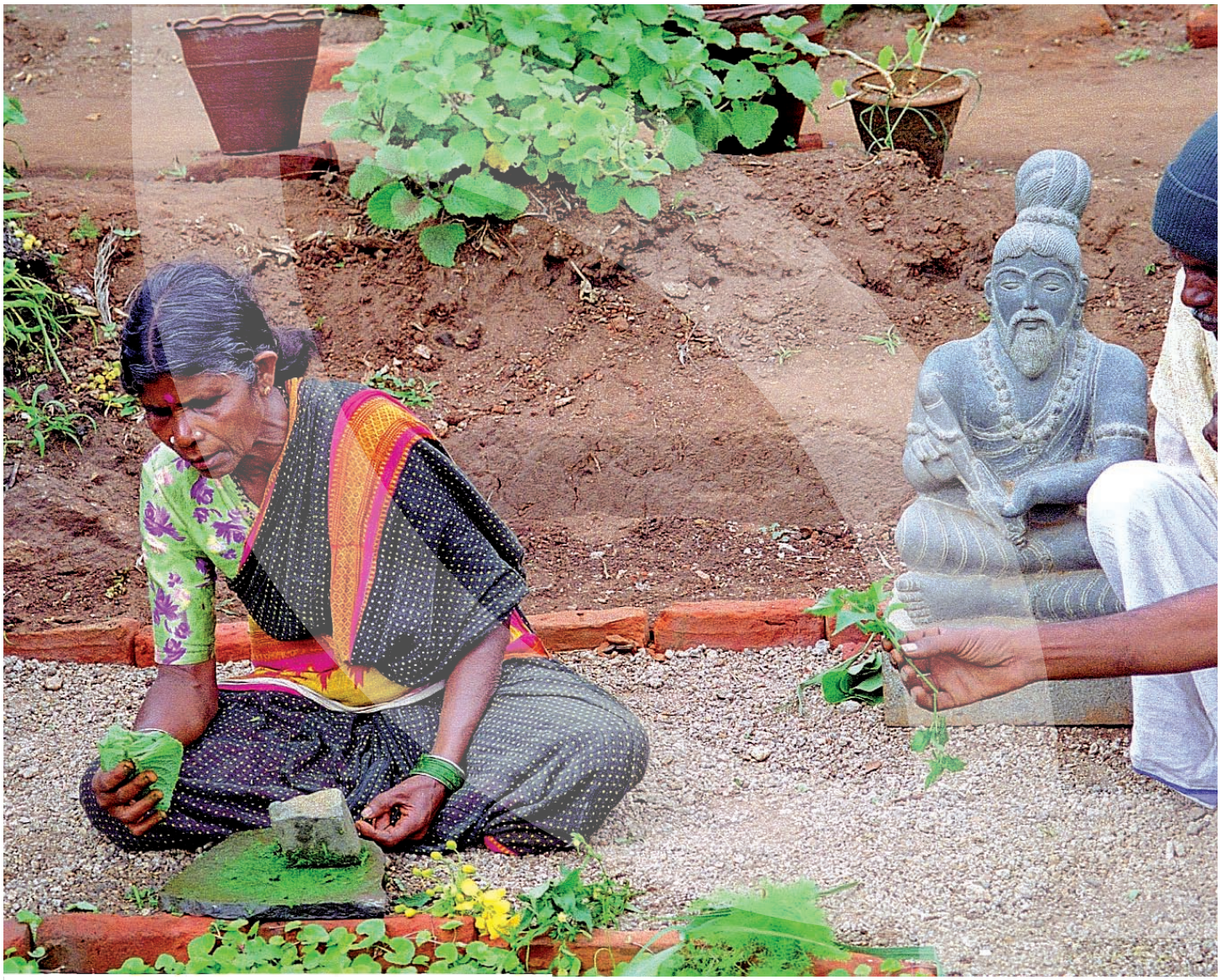
DEVELOPMENT AND ENVIRONMENT 11 / 2008



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Experiences and lessons learnt 1993-2007

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Title
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Authors
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Cover Photo
Women grinding leaves for medicine
Photo: Laurits Aalling Hansen
All other photoes: Lars Graudal

Publisher
Forest & Landscape Denmark
University of Copenhagen
Hørsholm Kongevej 11
DK-2970 Hørsholm

Press
Prinfo DK-9100 Aalborg

Series - title and no.
Development and Environment No. 11-2008

ISBN
ISBN 978-87-7903-359-7 (print)
ISBN 978-87-7903-360-3 (internet)

Number printed
500

DTP
Melita Jørgensen

Citation
Singh, R.V., Singh, P., Hansen, L.A. and Graudal, L. 2008. Medicinal Plants, their Conservation, Use and Production in Southern India.Development and Environment No. 11-2008. Forest & Landscape Denmark.

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Introduction

The introduction of modern medicine in India in the 20th century has been extremely important for the improved welfare of the Indian people.

However, the emphasis on modern medicine in the Indian health system also led to a neglect of the millennia old indigenous health systems in India and the prevailing use of medicinal plants from the wild in these systems. At the same time the growing pressure on nature and natural resources, which came with a rapidly increasing population and economic development, meant that many of the medicinal plants came in danger of extinction or genetic erosion.

Thus, towards the end of the 20th century, the indigenous knowledge as well as the resource base of the traditional health systems in India were endangered.

On this background, during the period 1993 to 2004 Danida provided support to a project called *Strengthening the Medicinal Plants Resource Base in Southern India in the Context of Primary Health Care* executed by the Foundation for Revitalisation of Local Health Traditions (FRLHT) – a Bangalore based Non Government Organisation (NGO). The Project area comprised the three southern states of India, Karnataka, Kerala and Tamil Nadu.

The achievements of the Project were remarkable, and the objectives and outputs of the Project were met for the main part (Danida 2004, see annex 1). The Project was in many aspects pioneering new ways of conserving medicinal plants *in situ* as well as *ex situ*, cultivation of medicinal plants for income generation by the local population, mainly low caste women, and cultivation of medicinal plants on a family basis in small herbal gardens. After a slow start this latter development took off rapidly, and by the end of the project period close to 147,000 Kitchen Herbal Gardens were established in the Project area.

Although the Project thus was very successful some mainly institutional matters were still to be sorted out or improved according to the completion report (Danida 2004):

1. The village institutions concerning the Kitchen Herbal Garden development meant to enhance the production of medicinal plants are not ideal. This is hampering further development and needs to be adjusted in order fully to be able to address the needs of the people.
2. The overall institutional arrangements regarding cultivation of medicinal plants for income generating activities are in place through the well developed Joint Forest Management Scheme of the Indian Government, but at local level adequate institutional arrangements have not been developed satisfactorily in order to tap into a huge development potential.

3. In the field of *in situ* conservation of medicinal plants the local people do not have a satisfactory stake in the development.

Furthermore, the Project approach towards the conservation of the medicinal plant species and their genetic variation was largely a pragmatic empirical one identifying areas to be protected in order to cover species and plant populations known to be under pressure. Since the early 1990'ies approaches towards the conservation of species and genes have developed a lot. A fourth point of improvement is therefore:

4. The need to introduce a more systematic conservation approach to adequately cover medicinal plant species and their genetic variation based on their genecology.

Some of the Project elements are now being replicated in other states of India through a 'National programme on Promoting conservation of Medicinal Plants and Traditional Knowledge for Enhancing Health and Livelihood Security' (the CCF II Project, cf. FRLHT, 2006b), see figure 1. To provide suggestions for improvements particularly to the execution of the four points mentioned above, a Mission visited the three states in August/ September 2007 in order to assess the issues above and other relevant issues regarding the conservation, use and production of medicinal plants in India.

This report presents:

- The background and objectives of the Project as it developed (chapter 1).

It further provides a brief introduction and status of the three major activity areas of the Project, which were:

- *In situ* conservation through the establishment of Medicinal Plants Conservation Areas (MPCAs) – chapter 2.
- Improving livelihood and enhanced use of medicinal plants through the establishment of Medicinal Plants Development Areas (MPDAs) – chapter 3.
- *Ex situ* conservation, improving livelihood and enhanced use through the establishment of Medicinal Plants Conservation Parks (MPCPs) and promotion of Kitchen Herbal Gardens/Home Herbal Gardens (KHGs/ HHGs) – chapter 4.

For each of these three major activity areas suggestions for possible future ways of achieving sustainability are given.

Finally, the report contains a proposal for:

- Development of a strategy for conservation of medicinal plants genetic resources in India (chapter 5).

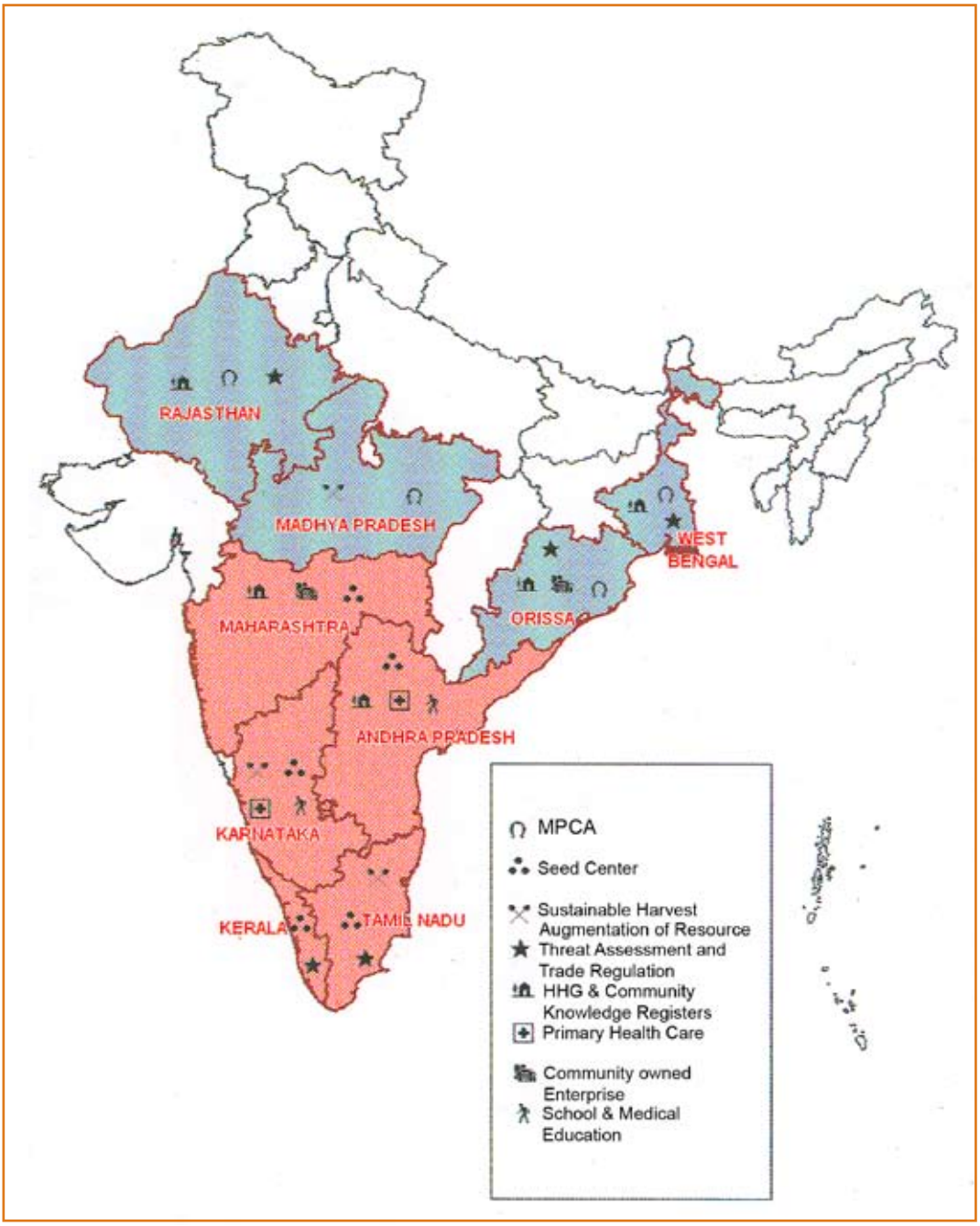

Figure 1. Geographical coverage of the National programme on Promoting Conservation of Medicnal Plants and Traditional Knowledge for Enhancing Health and Livelihood Security 2006-2007 (FRLHT 2006b). The conservation, use and production of medicinal plants in India is now being extended from the three southern states (1993-2004) to larger parts of India.The red coloured states have plans for state level medicinal plants seed centres, whereas the blue have plans for MPCAs.

Acknowledgements

The Mission comprised the following persons:

- Dr. R.V. Singh, Forestry Consultant (former Director General of ICFRE)
- Dr. Pratima Singh, Anthropologist
- Mr. L.A. Hansen, Forester, Natural Resource Management Specialist (former Technical Advisor to Danida)
- Mr. Lars Graudal, Head of the Division of Forest Genetic Resources, Centre for Forest, Landscape and Planning (Forest & Landscape Denmark – FLD), University of Copenhagen.

The Mission was financed by Danida through the current performance contract between Danida and FLD.

The Mission held meetings with FRLHT staff, senior forestry staff at State Forest Departments (SFD), NGO staff involved; and visited a number of communities implementing various activities related to medicinal plants (see itinerary in annex 2).

The Mission wants to extend its thanks to all officials and individuals met for the kind support and valuable information it received during the stay in India, which facilitated the work of the Mission.

The views contained in this report are those of the members of the Mission team and do not necessarily correspond with the views held by the stakeholders participating in meetings and discussions with the team.

List of Abbreviations and Acronyms

CAMP	Conservation Assessment and Management Prioritisation
CCD	Covenant Centre for Development
CCF	Country Co-operation Framework
DANIDA	Danish International Development Assistance
DFSC	Danida Forest Seed Centre
DKK	Danish Krone
EMF	Ethno-Medicinal Forests
FAO	Food and Agriculture Organisation of the United Nations
FCRI	Forest College & Research Institute
FD	Forest Department
FDA	Forest Development Agency
FLD	Forest & Landscape Denmark (The Danish Centre for Forest, Landscape and Planning, the Faculty of Life Sciences, University of Copenhagen
FRLHT	Foundation for Revitalisation of Local Health Traditions
GMCL	Gram Mooligai Company Ltd.
GoI	Government of India
HHG	Home Herbal Garden
HOPE	Health of People and Environment
IBPGR	International Board of Plant Genetic Resources
ICFRE	Indian Council of Forest Research and Education
IPGRI	International Plant Genetic Resources Institute
IRs	Indian Rupees
JFM	Joint Forest Management
JFMC	Joint Forest Management Committee
KHG	Kitchen Herbal Garden
LMC	Local Management Committee
MoEF	Ministry of Environment and Forests
MoU	Memorandum Of Understanding
MPCA	Medicinal Plants Conservation Area
MPCC	Medicinal Plants Conservation Centre
MPCN	Medicinal Plants Conservation Network
MPCP	Medicinal Plants Conservation Park
MPDA	Medicinal Plants Development Area
MPU	Model Production Unit
NGO	Non-Governmental Organisation
NMPCMG	National Medicinal Plants Conservation and Management Group
NMPCN	National Medicinal Plants Conservation Network
NTFP	Non-Timber Forest Product
NWFP	Non-Wood Forest Product
PA	Protected Area
RET	Rare, Endangered and Threatened
RL	Red Listed
SFD	State Forest Department
SHG	Self Help Group
TANTEA	Tamil Nadu Tea Corporation

TANU	Tamilnadu Agricultural University
TBGRI	Tropical Botanical Garden and Research Institute
TNFD	Tamil Nadu Forest Department
VFC	Village Forest Committee
VPC	Village Planning Committee
VRP	Village Resource Person

Summary

The present report presents experiences and lessons learnt in conservation and use of medicinal plants in the three Southern India states Kerala, Karnataka and Tamil Nadu over the period 1993-2007 based on a Danida supported programme 1993-2004.

The lessons learnt and recommendations for the future relates to the following four major activity areas:

- *In situ* conservation in Medicinal Plants Conservation Areas (MPCAs)
- Development of models for participatory conservation, development and sustainable use medicinal plants in Medicinal Plants Development Areas (MPDAs)
- *Ex situ* conservation and use of medicinal plants for primary health care in Home Herbal Gardens (HHGs) supported by extension service of Medicinal Plants Conservation Parks (MPCPs)
- Development of a strategy and an integrated national programme for conservation of medicinal plants genetic resources in India.

Medicinal Plants Conservation Areas (MPCAs)
A total of 34 MPCAs was established (see figure 2 page 11 and annex 3). The areas were established as so-called 'hand-off- areas'. However, the management of MPCAs as 'hands-off areas' remained debatable during the project period. Strict protection of MPCAs as envisaged was found to be difficult.

The major lessons learned with regard to the sustainability of the *in situ* conservation areas are:

- The interest of the State Forest Departments in the MPCAs needs to be sustained
- An appropriate village level organisation needs to be put in place to ensure active participation of local village communities for the protection and management of MPCAs
- Management of the conservation areas should be provided for
- The role, the conservation efficiency and the regulation of use of the MPCAs should be clarified as a basis for future plans and monitoring.

Medicinal Plants Development Areas (MPDAs)
A total of 12 MPDAs was established (see figure 3 page 18). Broadly 4 MPDA models were tried: 1) eco-restoration of natural vegetation, 2) establishment of new mixed cropping systems, 3) enrichment of existing farming systems, and 4) integration of medicinal plants with joint forest management.

The experience gained under MPDA programme has broadly been as follows:

- The MPDA component should form an important part of a programme

on conservation and sustainable use of medicinal plants because it ensures people's participation in conservation and development of medicinal plants and its contribution to the welfare of the participating community can be substantial;

- Instead of selecting new areas, the forests already brought under JFM and relatively rich in medicinal plants resource should be treated as MPDAs;
- It would be better to work with the existing village level organisation like VFC constituted under JFM programme instead of creating a new organisation like LMC which could not be integrated with institutional structure of SFDs and was, therefore, not found to be sustainable;
- The area of the MPDAs should be big enough to ensure sizeable benefits to the participating community;
- Planting of medicinal plants to supplement natural regeneration in MPDAs to augment medicinal plants resource and consequently the income of village community should be undertaken;
- Besides ensuring sustainable harvest of medicinal plants from MPDAs, arrangements for marketing of medicinal plants or of value added products are important.

Further action in the light of above experiences gained will help in developing a workable model for MPDAs. Making arrangements for marketing of medicinal plants collected from MPDAs by participating village communities is, however, the most crucial factor determining the success of MPDAs. Medicinal plants constitute an important resource in the JFM areas being protected by VFCs who are, however, not getting full advantage from this resource for income generation because of problems in marketing small quantities of medicinal plants collected from these areas. No steps were, however, taken in this direction during the project period.

The following measures might be helpful.

- Small scale units for manufacturing medicinal plants-based medicines may be established.
- The VFCs are considered to be in the domain of SFDs and NGOs have, therefore, not been working with them. NGOs should help individual VFCs in marketing or in establishing federations of VFCs which can undertake marketing of medicinal plants. In some cases, NGOs may undertake the role of VFC federations for purchase and processing of NTFPs and for sale of products. To provide money to VFCs to pay the members for collection of medicinal plants, funds may be provided through the forest development agency (FDA) to create revolving funds out of which VFC members may be paid and to which sale price realised later may be deposited.
- The SFDs may extend help in establishing links between VFCs/VFC federations and medicine manufacturing units/pharmaceutical companies for marketing of medicinal plants and provision for such facilitation may be included in a Memorandum of Understanding (MoU) to be signed between SFDs and VFCs.
- The State Forest Development Corporation may undertake marketing of

medicinal plants to be bought from VFCs/VFC federations.

- Some enterprising VFC federations may be encouraged to establish small enterprises based on medicinal plants to produce and market semi-processed and processed goods made out of medicinal plants.

The Home Herbal Gardens (HHGs)

About 147.000 HHGs were raised involving as many families of the rural poor. The establishment of the HHGs was supported by a network of MPCPs and NGOs (see figure 4 page 26). Although a success in terms of dissemination, the HHG programme as implemented under the project may not be sustainable. The factors adversely impacting sustainability include:

- poor survival of medicinal plant seedlings in HHGs;
- seedlings either free of cost or at subsidised rates not available after the closure of Danida supported project;
- some of the plants included in the package of seedlings supplied and consequently raised in HHGs being available in the wild near the villages,
- lack of conviction of house wives towards use of home remedies in preference to allopathic medicines believed to be giving quick relief (particularly in cases of illness of children and wage earning husbands);
- lack of sustained interest of households in the maintenance of HHGs as visible during visits of the team.
- Most of the MPCPs who promoted HHGs during implementation of the programme have lost interest in this programme.

It is therefore concluded that the present design of the HHG programme needs to be changed. The approach of using medicinal plants for primary health care of the rural poor requires careful examination. The necessity of making available medicinal plant-based medicines for common ailments in the villages needs no emphasis.

The approaches to achieve this objective need to be practical and cost effective. Such approaches could include the following:

- Raising medicinal plants by households for use in home remedies
- Making available medicinal plants-based medicines through *vaidyas* (folk healers) in the villages
- Making available at affordable price to rural households the medicinal plants-based medicines manufactured in small units to be set up for the purpose.

The objective of popularising the use of medicinal plants for primary health care can also be achieved through sale at affordable price to rural households of the medicinal plants-based medicines manufactured at small scale medicine manufacturing units. This approach may include the following:

- Setting up a modest, but modern facility, to manufacture medicines from medicinal plants
- Arrangements for supply of medicinal plants to such a unit

- Mechanism for making available at affordable price the medicines manufactured in medicine manufacturing unit
- Operationalisation of the concept

A strategy for conservation of medicinal plants genetic resources in India
The strategy adopted under the Danida supported project as well as in implementing other programmes currently in operation, provided establishment of MPCAs in only forest areas. The selection of the MPCA sites did not relate systematically to the eco-geographic or genecological variation in order to capture the variation in medicinal plants as represented e.g. by forest types.

Even though the forests are reported to be the main repository of medicinal plants resource in India, the areas outside forests are also an important source of medicinal plants traded in the country.

Furthermore a strategy will not be complete without dealing with cultivation of medicinal plants as demonstrated by the MPDAs and the HHGs. It is necessary to view and understand the whole value-chain of production (from conservation and cultivation over harvest to processing and market) in order to conceive a strategy for conservation and use. All participants, their linkages, and influential factors in the agribusiness system needs to be analysed in order to identify constraints and opportunities for growth; and to further explore opportunities for leveraged intervention (cf. e.g. Danida 2007).

The strategy needs, therefore, to be developed for
- *in situ* conservation in forest areas,
- *in situ* conservation in areas outside forests,
- *ex situ* conservation, and
- medicinal plants cultivation.

Networking of stakeholders is necessary to provide institutional sustainability for conservation and sustainable use of medicinal plants. Following mechanisms for networking are suggested.
- National Medicinal Plants Conservation and Management Group (NMPCMG) may be constituted at national level having SFDs of all states and union territories as members and to be coordinated and serviced by the Ministry of Environment and Forests, Government of India.
- National Medicinal Plants Conservation Network (NMPCN) needs to be established with a new mandate and membership to bring all those engaged in conservation of medicinal plants together such as SFDs, NGOs engaged on medicinal plants conservation, associations of medicinal plants cultivators, associations of medicinal plants gatherers, representatives of pharmaceutical industries using medicinal plants, National Medicinal Plants Board, State Medicinal Plants Boards etc. Interlinking of NMPCN with international networks on conservation of medicinal plants is necessary.
- A network for stakeholders in revival and popularisation of local health traditions is also necessary.

An integrated national programme

The work on the various aspects of medicinal plants in the country is fragmented and the whole picture is not readily available. Documentation of the work being done on different aspects of medicinal plants is necessary. For future work, a co-ordinated approach may be necessary to avoid duplication and wastage of scarce resources. It may, therefore, be helpful to develop the National Programme on Medicinal Plants Conservation and Sustainable Use so that no gaps may be detected later which may impede conservation and sustainable use efforts relating to medicinal plants in the country. Co-ordinated efforts at national and international level may be necessary to take full advantage of the experience and expertise available in this field.

A list of childcare plants (Exhibition in Chennai, Auroville MPCP)

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1. Background

1.1 The Health System in Rural Areas

India's State Governments administer a modern medical infrastructure for health delivery services in rural areas including district hospitals, block-level hospitals, primary health centres, primary health units (for every 5,000 people), and village health guides (for every 1,000 people). However, it is believed that a maximum of less than half of the rural population is actually covered by the health services - in certain areas the coverage is very low.

Due to the shortcomings of the modern health system, a number of World Health Organisation (WHO) resolutions (WHO 29.72, 32.42, 30.49, & 31.33) emphasise the need for wider use of traditional medicine, urging the member countries to promote traditional medicinal systems. Hereby attention is focused on the importance of medicinal plants in health care systems of the developing world.

In this context, indigenous Indian health systems, which are based on local resources such as medicinal plants and have cultural roots in the communities, could be a valuable supplement to the modern health care system.

1.2 Indigenous Health Systems in India

The indigenous health systems in India have two social streams:

One is folk medicine or Local Health Traditions (LHT), which are oral traditions found in the rural communities all across India. The carriers are millions of housewives with practical knowledge of simple home remedies, traditional birth attendants, local healers, bone-setters, practitioners skilled in acu-pressure, eye diseases, dental care, poisons or veterinary care and village- level herbal medicine healers. They constitute an autonomous, self-reliant and community-supported system of health delivery at the village level. The folk medicine is based on empirical knowledge and utilises a large proportion (25-60%) of local plant species in the various regions, as well as many animals and some minerals.

The second stream of the indigenous health system consists of traditional, organised and codified Indian Systems of Medicine (ISM) such as Ayurveda, Unani, Siddha and Amchi. Unlike the folk medicine, these systems have sophisticated theoretical foundations expressed in hundreds of manuscripts covering treatises on all branches of medicine and surgery. Some of the Ayurvedic texts are up to 3,000 years old. Herbal medicine is dispensed regularly and the recipes are usually quite complicated, comprising 20-30 different plant species each. The total number of plant species used in ISM is much lower than in folk medicine; in Ayurvedic texts, approximately 600 species are mentioned.

1.3 The Social Setting

The primary users and producers of medicinal plants are the tribal and non-tribal rural poor, who are outside the official primary health care system. Both of these groups possess much knowledge about traditional medicine. The people, living in the areas with a high density of medicinal plants, are mainly tribal people.

Mostly, elders and housewives possess the knowledge of medicinal plants. However, due to the past century of exploitation of tribals by outsiders, they often refrain from sharing their knowledge with others. They are afraid of witnessing even further exploitation. Each tribal group has its specialisation on medicinal plants and the knowledge is mostly kept exclusively within the group.

The impact of modern medicine is considerable and the usage of herbal medicine is steadily eroding. The status of local health traditions is often low in relation to modern medicine. People who can afford modern medicine and most young people are more attracted to urban (western) lifestyles and values. The elders have often given up trying to educate them about the uses of medicinal plants because of their lack of commitment and willingness to enter the long-term process of learning. If this problem is not addressed, the medicinal knowledge may die out due to the fact that the elders do not feel secure about sharing this valuable knowledge with others. The elders are afraid, that their learnings could be improperly handled or even misused.

Access to the official medical centres in rural areas, where western medicine is available, is often difficult for the rural poor. Although medicine and treatment is relatively cheap in absolute terms, it is often beyond the reach of poor people. In the opinion of some social workers, loans to cover medicinal expenses are considered to be a major debt burden for many people in the rural areas.

The traditional health sector in India may thus play a substantial role in providing health care to the Indian People, and has the potential of further contributing to the self-reliance of village communities, if a continuous effort is made to revitalise its folk stream.

1.4 The Wild Plant Resource Base of Medicinal Plants

The Indian sub-continent has a very rich diversity of plant species in a wide range of ecosystems. There are about 17.000 species of higher plants, of which approximately 8.000 species, are considered medicinal and used by village communities, particularly tribal communities, or in traditional medicinal systems, such as the Ayurveda. Many of the wild plants are endemic and are found only in specific ecological niches.

Due to the 250 per cent increase in human and livestock populations in the 20th century and the subsequent pressure on available land, which has lead to deforestation and land degradation, many species or populations of spe-

cies are now threatened with extinction, because their natural habitats are being destroyed. Almost all medicinal plant raw materials in India are collected from wild populations. This has led to the unsustainable exploitation of many of the plants. The growing interest in traditional herbal medicine will lead to a further increase in the demand for medicinal plants.

Local market outlet of medicinal plants products at Algarkovil

1.5 Sectoral and Regional Policies and Institutions

Legal Framework for Conservation in India

The legal framework for the conservation of nature and natural resources in India is mainly provided by two national laws:

- The Indian Forest Act (1927 with amendments), and
- The Wildlife Protection Act (1972).

The legal categories of forest land are:

- Reserved Forests and Protected Forests
- National Parks
- Wildlife Sanctuaries

The Forest Act primarily provides for the establishment of Reserved Forests and Protected Forests under the State, while the Wildlife Protection Act is concerned with Wildlife Sanctuaries and National Parks in addition to Game Reserves and trade in wildlife. These legal categories of land repre-

sent different levels of protection. However, there are presently no specific laws or regulations in India concerning the exploitation of any plants apart from certain species of trees. Outside a national park, any plant can be made extinct without breaking the law. In addition to the national legislation, there are also laws and regulations issued by the state Governments.

An act called 'The Biological Diversity Bill, 2000' (bill no 93 of 2000) was passed by the Indian Parliament in 2002 to provide for conservation and sustainable use of biological diversity, and for equitable sharing of the benefits arising out of biological resources. The outcome of this bill is expected to contribute positively to the regulation of conservation, collection and trade of medicinal plants.

The Indian Forest Service

At central level, the responsibility for the forests of India is vested in the Ministry of Environment and Forests (MoEF). Each of India's States has a Forestry Department (SFD), headed by a Principal Chief Conservator of Forests (PCCF) for administration and management of the Reserved and Protected Forests as well as the National Parks and Wildlife Sanctuaries. The middle and senior management cadre of the forest departments in each state are members of the Indian Forest Service, while the subordinate level including State Forest Officers and uniformed Range Forest Officers, Deputy Rangers, Foresters and Forest Guards constitute the State Forest Service. Within each of the forest departments of the three southern states, Karnataka, Kerala and Tamil Nadu, there are at least two administrative wings: wildlife and forest conservation.

National and Regional Forest Policy

The first National Forest Policy was adopted in 1894 and revised in 1952, a few years after India gained independence. Under this policy emphasis was put on timber production and the forests were looked upon mainly as a source of revenue, while the various needs of the local populations were neglected. This led to constant conflicts between the Forest Department and local people, whose traditional, although informal, right to utilise the forests has been reduced. The result is that people feel little responsibility for the forest, as it is not 'theirs'. The Forest Department, on the other hand, has had insufficient resources or political backup to protect the forests effectively against illicit over-exploitation, and therefore many areas of forest are today more or less degraded.

In the revised National Forest Policy of 1988, these imbalances were addressed. The principal aim of the new Policy is to ensure environmental stability, and derivation of direct economic benefits is subordinated to this aim. Commercial timber cutting in natural forests has been banned in some ecologically fragile areas. Furthermore, local people's involvement in the development and protection of forests is regarded as essential. The requirements for fuel-wood, fodder, minor forest produce and small timber of the tribals and other villagers living in and near the forests are to be treated as

first charge on forest produce, and the forest communities should be motivated to identify themselves with the development and protection of forests from which they derive benefits.

However, the situation is different in areas where the Forest Service has been unable to protect the forest against serious depletion. In June 1990 Government of India issued guidelines for ' Involvement of village communities and voluntary agencies for regeneration of degraded forests (GoI, MoEF, No. 6-21/89-F. P. dated 1,6.1990). The guidelines provided that the programme was to be implemented under an arrangement between the village community (beneficiaries) and the state forest departments. The forest area selected for joint management was to be worked in accordance with a working scheme. The benefit of people's participation was to go to the village communities and not to commercial or other interests.

In pursuance to these guidelines, Karnataka Government issued guidelines for Joint Forest Planning and Management (JFPM) Scheme (SPWD 1998) in 1993 under Government Order (G.O). No. AHFF 232 FAP 86). These guidelines covered degraded forest land, non-forest government wastelands, roadsides, canal sides and tank foreshores. The Village Forest Committee (VFC) to be formed for any village or for a selected group of villages, undertakes jointly with SFD, Karnataka planning, protection, regeneration, development and management of forest areas and other government lands covered under JFPM. Members of VFC (the beneficiaries) are given usufruct like fuelwood, grasses, and lops free of cost. If they successfully protect the forest, the sale proceeds of the remaining forest products, after meeting the demand of villagers, are shared as follows: 50% to government, 25% to VFC members, 25% to be credited to a special fund called Village Forest Development Fund. The selected sites are managed in accordance with a Working Scheme prepared by the State Forest Department in consultation with the beneficiaries. The guidelines suggest that committed voluntary NGOs with proven track records may be associated as interface between State Forest Department and local village communities in order to motivate and organise the villagers, so that they participate in JFPM schemes. Along with trees for fuel, fodder and timber, the village community may be permitted to plant certain fruit trees as well as shrubs, legumes and grasses.

JFPM was applicable to only degraded forests. Karnataka government through their order G.O. No. FEE 94 FAP 93 dated December 16, 1996 extended JFPM programme to also the non-degraded forests which are predominantly inhabited by tribal population or where the forest dependent tribals living in and around such forests are traditionally dependent upon the forests for their livelihood and cultural identity.

Tamil Nadu government issued orders regarding JFM in degraded forests *vide* G.O. No. 342 dated August 8, 1997 (SPWD 1998). According to this order, all non-wood forest produce for domestic consumption is given free of cost to VFC members, subject to availability. Any surplus after meeting domestic requirements is sold by VFC and 75% of sale proceeds is distributed equitably among VFC members and the remaining 25% is credited to

Village Forest Development Fund.

Kerala government also issued orders adopting JFM in degraded forests *vide* G.O. Ms No. 84/97 F & WLD, dated January 16, 1998 (SPWD 1998). The Vana Samrakshana Samithi (VSS) is entitled to collect specified quantities and items of NTFPs as per prescriptions of microplan. The VSS is entitled to 100% of the net revenue from the NTFPs to be used on development activities other than forestry (50%), forest development (25%) and distribution among VSS members (25%) in accordance with the decision of VSS on the matter.

Joint forest management programme, which was earlier being implemented only in degraded forests was extended in February 2000 to non-degraded forests also, except the protected area network (GOI 2000). The new guidelines provided that in good forest areas, JFM activities will concentrate on Non-Timber Forest Products (NTFP) management and NTFPs will be given to village communities free or at concessional rates. These guidelines further provide that i) JFM committees may be registered under the Societies Registration Act, 1860 to provide them the legal backup, and ii) women participation in JFM should be improved by having at least 50% members of JFM general body and at least 33% of JFM executive committee from amongst women.

Government of India, Planning Commission constituted a Task Force on Conservation and Sustainable Use of Medicinal Plants in June, 1999 (Planning Commission 1999). The Task Force submitted its report in February 2000 (Planning Commission 2000) and recommended establishment of 200 Medicinal Plant Conservation Areas (MPCA) all over India, and 200 Vanaspati Vanas in degraded forests for intensive production of medicinal plants. Furthermore, the Task Force recommended establishment of Medicinal plant Board for an integrated development of the medicinal plants sector.

The National Medicinal Plants Board (NMPB) was established in November 2000. It is responsible for coordination of all matters relating to medicinal plants, including drawing up policies and strategies for conservation, proper harvesting, cost-effective collection, research and development, processing, marketing of raw material in order to protect, sustain and develop this sector. Its functions also include promoting of ex-situ cultivation and conservation of medicinal plants. State Medicinal Plants Boards have also been established in different states, including the three states covered under Danida supported project.

The Government of India enacted The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 which provides that the Scheduled Tribes and other traditional forest dwellers shall have the right of ownership, access to collect, use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries. They shall have the right of access to biodiversity and community right to intellectual property and traditional knowledge related to biodiversity and cultural diversity.

1.6 Intellectual Property Rights

The Convention on Biological Diversity (CBD), developed on the basis of the UN Conference on Global Environmental issues in Rio in 1992, acknowledges traditional knowledge of bio-diversity to be the intellectual property of local communities. In order to operationalise the protection of such local knowledge, the GoI has enacted The Biological Diversity Act, 2002 (GoI 2003). The National Biodiversity Authority has been established under this Act to advise the central government on matters relating to the conservation of biodiversity and sustainable use of its components and equitable sharing of benefits arising out of the utilisation of biological resources.

The Danida supported Medicinal Plants Project (see details below, section 1.7), executed by the Foundation for Revitalisation of Local Health Traditions (FRLHT) together with a range of other concerned networks and organisations, has contributed to the development of a community register of local bio-resources and local knowledge to be kept in people-oriented local institutions. With help from like-minded partners the Project has designed a common documentation format for community registration.

In consultations with the MoEF the Danida supported Project has also developed models of Material Transfer Agreement/Information Transfer Agreement based on the Convention of Biological Diversity (CBD) guidelines and the provisions of the draft Indian Bio-diversity Act.

1.7 The Danida Supported Medicinal Plants Project

In October 1989 a proposal for a Project for Strengthening the Medicinal Plants Resource Base in India (the Project) was presented to Danida by the GoI. The Proposal originated from a network of health NGOs and was supported by the office of the Adviser to the Prime Minister. In 1993 an agreement was signed between the Foundation of Revitalisation of Local Health Traditions (FRLHT) and Danida. The agreement covered the financing of the Project over a period of four years commencing in may 1993 with a pre-operational year followed by a pilot phase lasting for three years. In 1996 the Project was extended for a 7 year period ending 31 May 2004.

The Objectives of the Project were:

Development Objective: To contribute to the self-reliance and capacity of rural Communities in the three states of Karnataka, Tamil Nadu and Kerala, ultimately replicated on an all-India basis, to meet their own primary health care needs through the use of medicinal plants and within the context of 'Health for all by the year 2000'.

Immediate Objective: To establish a system of conservation for medicinal plants and their sustainable use in the three states of Karnataka, Tamil Nadu and Kerala.

The Project had four components:

- *In-situ* conservation
  - Medicinal Plants Conservation Areas (MPCA)
  - Medicinal Plants Development Areas (MPDA)
- *Ex-situ* conservation
  - Medicinal Plants Conservation Parks
  - Kitchen Herbal Gardens (KHG)
- Research and Information
- Communication and Training

The Project was implemented by the Foundation for Revitalisation of Local Health Traditions (FRLHT), a Bangalore based NGO.

The three key challenges to be addressed by the Project were

- the decline of medicinal plant resources;
- revival of the local health traditions;
- accessibility of medicinal plant resources.

2. Conservation of medicinal plants *in situ*

Medicinal plants conservation in India was initiated in 1993 under a Danida supported project in the three southern states, viz., Karnataka, Kerala and Tamil Nadu. The development of the *in situ* Medicinal Plants Conservation Areas (MPCAs) comprised

- identification and demarcation of the MPCAs
- peoples participation in the conservation activities, and
- plans for management of the conservation areas

This chapter contains a brief description of the development of these three points during the project period. Furthermore, the two following points are covered:

- Status of the MPCAs in 2007
- Some lessons learned concerning the future prospects for sustainability of the MPCAs

2.1 Establishment of the Medicinal Plants Conservation Areas (MPCAs) 1993-2004

The project document for phase I of the Danida supported project (1993-1996) stated in respect of *in situ* conservation that 'The protection of selected habitats where there is still plant diversity, as determined by species richness, will be done to ensure the survival of the medicinal plants for future use. …… *In situ* conservation will not be restricted to medicinal plants, other plant species and the fauna of the area will also be protected. This is to conserve medicinal plants within their ecosystems. The size of these areas, to be called Medicinal Plants Conservation Areas (MPCAs) will be such that the habitat and a viable biological community is represented according to the theory of island biogeography' (MacArthur and Wilson, 1967). The MPCAs were to be complemented with a matrix of semi-natural lands or areas under great pressure, last foothold species, ecological niches, and endemic centres, but such areas were eventually not selected for establishing MPCAs under the project.

During the first phase of the project, 30 MPCAs were established in forests traditionally valued as medicinal plants repositories, easily accessible, relatively less disturbed, forming compact micro-watersheds and not very much used by local people to meet their livelihood needs; 20 out of 30 were located in Western Ghats region. Seven MPCAs were located in protected areas (PAs) and the remaining in other reserved forests. For practical reasons, efforts were made to make MPCA boundaries to follow physical features such as ridges, water courses, roads etc. and a tentative upper limit of 300 ha was adopted. The distribution of these 30 MPCAs by forest types was unequal (Review Report 1994) and some of the forest types were not duly represented.

After the MPCAs had been established, an exercise on threat status of medicinal plants was undertaken in respect of states covered under the project through periodic Conservation Assessment and Management Prioritisation (CAMP) workshops. Based on threat assessment and floristic surveys conducted in MPCAs, it was found that populations of four critically endangered species of medicinal value found in these states were not covered under these MPCAs. Additional four MPCAs were, therefore, established during phase II of the project (1997-2004) to conserve viable populations of these four species: one MPCA for *Saraca asoca* in Karnataka, one MPCA for *Janakia arayalpathra* in Tamil Nadu and two MPCAs in Kerala, one each for *Coscinium fenestratum* and *Utleria salicifolia*. Thus, 34 MPCAs were established (13 in Karnataka, 9 in Kerala and 12 in Tamil Nadu (See map of project area giving location of MPCAs). The area of MPCAs varied from 80 to 350 ha (annex. 3). Size wise distribution of MPCAs was: up to 100 ha, 1; >100-150 ha, 9; >150-200 ha, 8; >200-250 ha, 7; >250-300 ha, 5; >300 ha 4.

The location of the MPCAs is shown in figure 2.

Botanical studies were conducted at two levels in all MPCAs to capture the floral diversity. First level included a comprehensive inventory of vegetation followed by repeated surveys during different seasons to record observations in different phenological stages and to record the existence of even ephemerals. Second level studies focused at preparing botanical profiles of the vegetation (herbs, shrubs and trees) with reference to prioritised species in randomly laid out transacts along contours to cover a minimum of 2% of the MPCA area. Record of such botanical surveys was kept in specially designed field formats, backed up with herbarium specimens. About 25,000 voucher herbarium specimens representing 2,743 species of 160 families were collected and kept in herbarium for future use. Table 2.1 gives details of medicinal plants captured in MPCA network (FRLHT 2006 a).

Table 2.1 Details of medicinal plants captured in the MPCA network

Particulars	Karnataka	Kerala	Tamil Nadu
i) Total number of medicinal plants listed in the state	1,698	1,864	1,551
ii) Medicinal plant species recorded in MPCA network	976	832	971
iii) Item ii) as percentage of item i)	57	44	63
iv) Number of threatened taxa of medicinal plants in the state	88	80	77
v) Number of threatened taxa of medicinal plants in MPCA network	53	48	33
vi) Item v) as percentage of item iv)	60	60	42

The percentage of medicinal plants captured in MPCAs to their total number found in the three states (Karnataka 57%, Kerala 44%, Tamil Nadu 63%) was not in accordance with the proportion of MPCA area to total forest area in these states (Karnataka 0.072%, Kerala, 0.196%, Tamil Nadu,

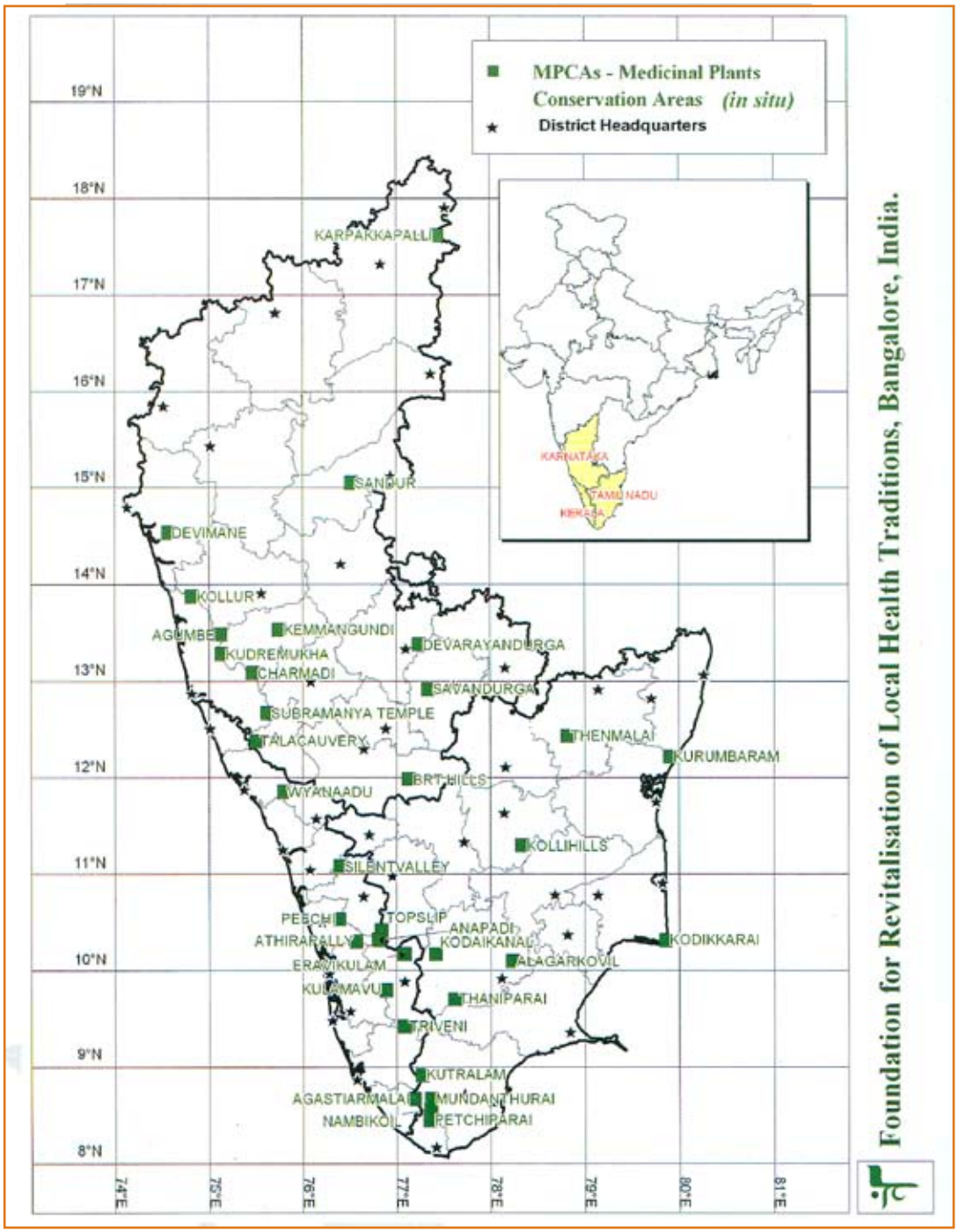

Figure 2. The location of the 34 Medicinal Plants Conservation Areas established (FRLHT 2006a).

0.1055); Kerala with the highest proportion of MPCA area to forest area had the lowest proportion of medicinal plants captured in MPCAs. The percentage of threatened taxa captured in the MPCA network was the lowest in Tamil Nadu. Unequal distribution of MPCAs with respect to area under different forest types could partly explain for this discrepancy. It was observed that distribution of MPCAs in proportion to the forest area under different forest types in the project area could have ensured capturing greater diversity of medicinal plants (FRLHT 2006 a).

An exercise was undertaken to determine if increasing the number of

MPCAs could have ensured capturing of greater percentage of medicinal plants reported from this region. The rate of addition of new species with every additional MPCA site was determined using species-area curves applied to data on number of species recorded in each MPCA. The rate was computed by a mean of 200 random simulations so that each MPCA got equal chance to get added as 1st, 2nd, 3rd and so on till the last MPCA to avoid any bias from unequal sampling across MPCAs (FRLHT 2006 a). On an average, 200 species got added with every additional MPCA for the first five MPCAs, while the last 5 MPCAs added less than 7% to the cumulative total. This analysis showed that increase in the number of MPCAs would not have helped and establishing about 8-12 MPCAs in each state was considered sufficient (FRLHT 2006 a). However, the distribution of MPCAs to forest types was not taken into consideration and some of the genecological variation may therefore not be covered by the current MPCAs.

Entrance of the MPCA established at Alagarkovil

2.2 People's Participation in Protection of MPCAs 1993-2004

The initial project strategy was to locate MPCAs away from habitations and in areas generally free from biotic interference (FRLHT 2006 a). Thus MPCAs were located in relatively remote areas away from habitations. It was thought that locating MPCAs at such places would ensure their protection from biotic interference. It was, however, soon realised that securing the participation of local communities in medicinal plants conservation programme was very essential and should have been provided for in the project design. Treating MPCAs as 'hands-off areas', inaccessible to local communities, and securing effective participation of local communities appeared to be self-contradictory (FRLHT 2006 a). The strategy for involving local communities in

the MPCA programme, therefore, aimed at providing some material benefits to participating local communities in lieu of their contribution towards protection of MPCAs. The local community in respect of an MPCA was organised into MPCA management committee called local management committee (LMC). LMCs were formed for 22 out of 34 MPCAs and for the remaining 12 MPCAs located far away from habitations, formation of LMCs was not considered necessary.

The main activity of LMCs was protection of MPCAs. The activities undertaken to benefit the LMCs included establishing community herbal gardens, home herbal gardens (HHGs), medicinal plants nurseries, simple processing of medicinal plants and sale of products of such processing. Appropriate communication materials were prepared and communication tools were used to sensitise and educate LMC members about the conservation of medicinal plant resources in MPCAs. As no forest produce was to be harvested from MPCAs, the approach of sharing forest produce from adjoining forest areas with local community was tried through treating such forest areas as buffer zones to MPCA, but this approach could not materialise because of resistance of state forest departments (SFDs) to this approach. Establishment of medicinal plants development areas (MPDAs) close to MPCAs to benefit the local community was also tried with little success.

The MPCAs have been fairly well protected, but measures taken to benefit the participating village communities yielded mixed results and in most cases the LMC members could not be benefited as planned. Further, the works undertaken to benefit the local village communities could not be sustained after the project period. The local communities needed to be ensured adequate economic returns to compensate them for the loss accruing as a result of denial of access to the resource to be strictly protected for long-term conservation. The LMCs were not registered with forest department (FD) and did not have any legal status under joint forest management (JFM) rules. They could, therefore, not fit into the institutional structure of SFDs at the close of the project. The LMCs have, therefore, not been recognised by SFDs and have consequently become redundant. The protection of MPCAs is now the responsibility of SFDs without the participation of local communities.

2.3 Management Plans for the MPCAs 1993-2004

The MPCAs established under the project were treated as 'hands-off areas' and no works were carried out except fire protection and soil and water conservation. A work plan for each MPCA was prepared and implemented to carry out such works during the project period; cost of establishment and management has been reported to be about Rs 0.5 million per MPCA (Review report 2003). No works have been carried out in MPCAs during the post-project period; planting of NTFP species was, however, reported in small parts of two MPCAs in Tamil Nadu.

The management of MPCAs as 'hands-off areas' remained debatable during the project period. Strict protection of MPCAs as envisaged was found to be difficult and there were reports of some indiscreet removals by some

stakeholder groups (FRLHT 2006 a). The SFDs argued for undertaking some works such as bush cutting to encourage the growth of medicinal plants, harvesting of bamboo which could be a source of fire hazard, and enrichment planting to improve the population of medicinal plants in MPCAs. The LMCs were, however, in favour of 'hands-off areas' approach because they felt that the protection of MPCAs would be difficult if some removals, for whatever purpose, were allowed. The Review Teams favoured 'hands-off areas' approach, but suggested utilising MPCAs for relevant research work such as studies of vegetation dynamics, sustainable collection rates, species-area curves and location of important species populations, as a tool for developing optimum size of MPCAs (Review Report 2001). The MPCAs were, however, not utilised for such research work, except for 7 MPCAs where species recovery research was undertaken during phase II to study conservation biology of selected medicinal plant species of high conservation concern which generated information useful for the management of these species (FRLHT 2006a). Species recovery programme under the project led to subsequent similar research work undertaken by several organisations under the National Species Recovery Programme.

2.4 Status of the MPCAs 2007

The following observations were made by the Team during the field visits in August/September 2007:

i) The MPCAs are satisfactorily protected. Signs of some grazing and cutting of a few bushes and climbers was, however, observed in the MPCAs visited.

ii) There is no separate staff in the form of watchers, watchers were appointed during the project period for protection of MPCAs. Protection of MPCAs is currently being done by regular SFD staff.

iii) The LMCs constituted for involvement of local communities in MPCA programme ceased functioning after the project period and there is no village level organisation entrusted with the responsibility of protecting the MPCAs.

iv) No works have been carried out in the MPCAs after the project period and no working plans or management plans have been prepared. The MPCAs are being maintained as 'hands-off areas' without any management interventions. However, bamboo growing in one MPCA (Sawan Durga) has been harvested by SFD while in another MPCA (Alagarkovil), 20 ha area has been planted with NTFP yielding tree species. During discussion, it was revealed by SFD, Tamil Nadu that such planting has been done in one more MPCA.

v) The working plan of the forest division in which the MPCA is located and was visited in Karnataka made no mention of the MPCA and made no prescriptions for its maintenance and management. In Tamil Nadu, it was reported that the working plan reports make mention of MPCAs and MPDAs in respect of forests where they occur.

vi) No separate budget line has been created for providing funds for the maintenance and management of MPCAs in Karnataka. In Kerala and Tamil Nadu, however, such a budget line has been created according to the SFD.

2.5 Some lessons learned concerning the future prospects for sustainability of the MPCAs

The major lessons learned with regard to the sustainability of the *in situ* conservation areas are:

i) The interest of the State Forest Departments in the MPCAs needs to be sustained

ii) An appropriate village level organisation needs to be put in place to ensure active participation of local village communities for the protection and management of MPCAs

iii) Management of the conservation areas should be provided for

iv) The role, the conservation efficiency and the regulation of use of the MPCAs should be clarified as a basis for future plans and monitoring.

The lessons learned are further described below.

Sustained interest of SFDs is essential for sustainability of MPCA and MPDA (see chapter 3) programmes. The SFDs should have been involved in the preparation of the project document and also in its further revision for a subsequent phase to ensure ownership of the project by them. The preparation of the project document for phase I and later for phase II by outside experts not involving the concerned SFDs resulted in the SFDs treating the project as Danida project being implemented by FRLHT and considered their role limited to facilitate project implementation. During implementation of the project, the field staff (Forest Guards, Foresters/Deputy Rangers, Forest Rangers) got involved and became aware of project details. Training sessions were also arranged under the project to improve the capacity of field staff. However, the senior officers in SFDs remained generally unaware of details of implementation and of the measures required to ensure sustainability of project works after the project period. Sustainability of project works cannot be ensured without active involvement of senior officers in SFDs who are responsible for planning, budget allocation and supervision of work of field staff. Financial support by Danida and implementation by FRLHT resulted in keeping the project implementation out of periodic monitoring procedure of SFDs to which all other works carried out are subjected to. It also resulted in low level of involvement of senior officers in implementation of this project. The Review Missions and Monitoring Missions usually interacted only with field staff to monitor the progress of implementation. The interest of SFDs in the MPCAs needs to be sustained.

An appropriate village level organisation needs to be put in place to ensure active participation of local village communities for the protection and management of MPCAs. As the JFM programme applies to non-degraded forests also, a joint forest management committee (JFMC) may be formed for each MPCA. Taking the MPCA as the core zone, the forest area surrounding/adjoining the MPCA may be declared as eco-development zone to be managed under JFM approach to benefit village community participating in protection and management of MPCA which is to be treated as hands-off-area for conservation of medicinal plants. The size of an eco-de-

velopment zone may be decided on the basis of the size of the participating village community and depending on the forest area available for the purpose. It needs, however, to be ensured that the area should be sufficient to provide some sizeable benefits to the participating village community. The SFDs may help JFMCs in processing and marketing of non-timber forest products (NTFPs), including medicinal plants, collected from eco-development zone areas. Those members of MPCA-JFMCs who may desire to undertake medicinal plants cultivation may be encouraged and provided with necessary technical guidance and planting material at market price.

Management of the conservation areas should be provided for. A separate budget line should be provided in Karnataka to ensure sufficient funds for the maintenance and management of MPCAs. In Tamil Nadu and Kerala where a separate budget line has been created and funds are available, there is no management plan providing for works that could be carried out with the funds available. Management plan for each MPCA should be prepared for undertaking necessary works. Research works to be undertaken in the MPCAs may form an important component in the management plans. Research work in MPCAs will ensure their proper utilisation and also their sustainability. The MPCAs may, along with eco-development zone forests, be used for seed collection by SFD seed centres.

In the absence of proper provision in working plans regarding MPCAs, there might be a risk of the MPCAs being neglected and even lost. Without waiting for working plan revision which might become due after several years, amendments in the existing working plans may be made to make appropriate provisions regarding MPCAs to bring them under departmental monitoring system applicable to working plan provisions.

The role, the efficiency and the regulation of use of the MPCAs should be clarified. The MPCAs may be brought within the ambit of a National Strategy for Conservation of Medicinal Plant Genetic Resources in India and a National Medicinal Plants Conservation Network (NMPCN) and may be further linked to an international network.

The strategy and network for conservation of medicinal plants is discussed further in chapter 5 on Development of a Strategy for Conservation of Medicinal Plant Genetic Resources in India.

3. Medicinal plants conservation and associated development for livelihood support

During implementation of the Danida supported project, it was realised that in addition to intangible benefits through implementation of the MPCA programme (soil and water conservation, climate amelioration and ethical values), people's participation in medicinal plants conservation efforts will be limited if direct material benefits were not adequately provided to participating village communities (FRLHT 2006 a). The approach of providing such benefits from buffer zone forests did not materialise as mentioned under the MPCA programme in the previous chapter. It was decided to take degraded forest patches near MPCAs under available Joint Forest Management (JFM) guidelines as medicinal plants development areas (MPDAs).

The current chapter provides

- a description of the development of the MPDAs 1994-2004
- status of the MPDAs observed in 2007, and
- lessons learned and possible future approaches for the MPDA programme

3.1 Establishment of the Medicinal Plants Development Areas 1994-2004

Establishment of MPDAs was thus not initially provided under the Danida supported project and was added subsequently consequent upon Review Team, 1994 recommendations. The MPDAs were to be established in degraded forest areas focussing on medicinal plants, managed and utilised for the benefit of local communities. The harvest of non-wood forest products (NWFPs) from MPDAs was to be made available to local village communities in accordance with JFM guidelines.

The objective of the MPDA programme was to develop a model for conservation, development and sustainable use of plant resource under participatory forest management. This programme thus aimed at creating an economic stake of communities in conservation and management of the medicinal plants resource in MPDAs.

Twelve (see map figure 3) MPDAs were established (4 in Karnataka, 8 in Tamil Nadu); the area of individual MPDAs varied from 10 to 50 ha. As degraded forest areas were not available near most of the MPCAs, the MPDAs had to be established in areas at some distance from the MPCAs (only one MPDA at Sawandurga was near MPCA) and in such cases the local communities participating in the MPDA programme were different from those participating in the MPCA programme. The idea behind undertaking the MPDA programme was that this approach will be useful for adoption under the JFM programme being implemented on a big scale throughout the country.

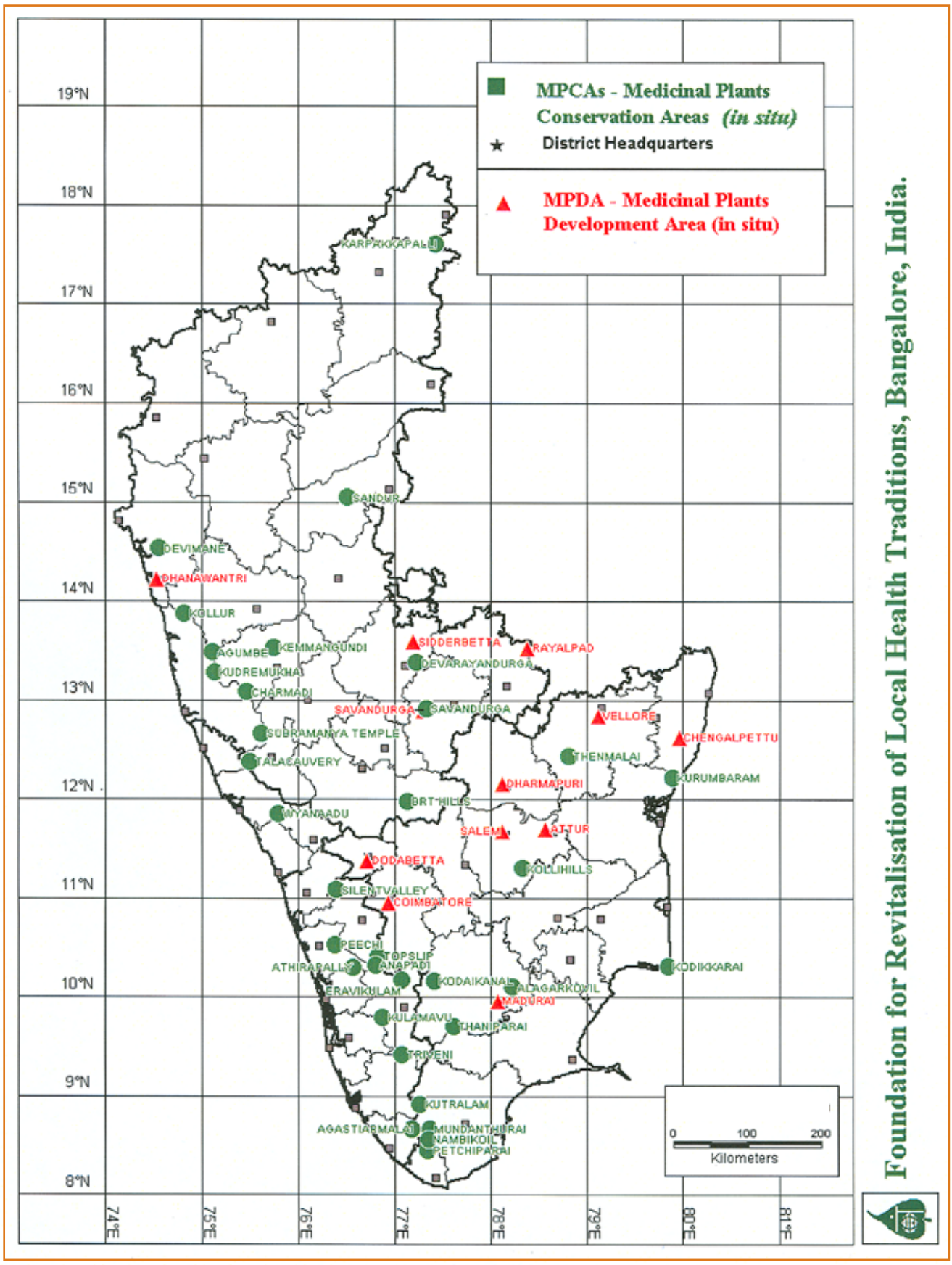

Figure 3. The location of the 12 Medicinal Plants Development Arreas (MPDAs) and the 34 MPCAs (FRLHT, unpublished).

Broadly, four MPDA models were tried. In one, degraded forest areas were taken up for eco-restoration through planting of trees and herbs of medicinal value. In the second, natural bushy vegetation was cleared and the cleared area was planted at wide spacing with a mixture of medicinal plants. In third, essential oil-yielding plants already occurring in the area were encouraged to grow and enrichment planting was done and the material was harvested to distil oil for sale. The fourth model was tried in Tamil Nadu towards the end of project period under which areas already under JFM were taken for augmentation and simultaneous harvesting of medicinal plants to benefit the participating village communities.

The first model was found to be emphasizing on eco-restoration rather than on medicinal plants development. It was too expensive to be replicable and the gestation period for making any benefits available to the village community was too long. The expected benefits to village community were not commensurate to the expenditure incurred. The participating village community could thus benefit only from employment generated in undertaking eco-restoration and planting works.

The second model under which planting of medicinal plants (mostly shrubs and trees) was done at a wide spacing of about 5 x 5 m after clearing the existing natural growth (including those of medicinal value) suffered from the following drawbacks as reported by Review Mission 2001:

i) clearing of natural vegetation removed the medicinal plants already growing in the area which were better adapted to site conditions,
ii) clearing reduced biodiversity,
iii) clearing increased soil erosion on slopes,
iv) clearing and planting increased cost and reduced net benefits for the local community,
v) the gestation period for harvest of medicinal plants planted was lengthened,
vi) expected yield from planting done at wide spacing of 5 x 5 m was to be low, and
vii) compatibility of species being planted with the site was not known. The visit to one of such areas by the Team showed that the cleared area has been invaded by unwanted weed growth and the survival and growth of medicinal plants planted was poor.

The third model tried at Dodabetta (Tamil Nadu) involved enrichment planting of aromatic plants already growing in the area and harvesting of such plants for distillation of essential oils to generate income for participating village community. This model was the most successful of all the four models tried and details of the same are summarised in Box 3.1.

Box 3.1 Dodabetta MPDA

Dodabetta MPDA is situated about 8 km north of Ootacamund town. The forest area taken up for this MPDA was formerly a part of cinchona plantations raised in Nilgiris by Cinchona Department established during 1860s to raise such plantations for the production of quinine to treat malaria. Cultivation of some aromatic plants was also introduced in these plantations to improve income. When the demand for quinine declined because of introduction of synthetic drugs, cinchona plantations were abandoned and Cinchona Department was abolished in 1990. Cinchona plantation area at Dodabetta (about 195 ha) was transferred to Tamil Nadu Forest Department (TNFD).

In 1994, TNFD along with an NGO called HOPE (Health of People and Environment) undertook involving of labourers of erstwhile cinchona plantations in the development of alternate livelihood opportunities through establishment of MPDA under Danida supported project in the abandoned and degraded cinchona plantation area. A tripartite memorandum of understanding (MoU) was signed in 1994 between TNFD, HOPE and FRLHT to establish the MPDA having an area of 195 ha. The land belongs to TNFD and village community will, under no circumstances, stake any claim on ownership or legal right to it. The MPDA is managed under JFM principles applicable in Tamil Nadu (SPWD 1998) to ensure sustainable production and use of medicinal plants by participating village community and the income generated from MPDA is shared with participating village community (80% to village community and 20% to TNFD).

The planning and execution of MPDA works was done by village community. For the purpose, the villagers formed general body enrolling one male and one female member from each household and constituted a Village Planning Committee (VPC) having four women, four men, two TNFD representatives and two members of HOPE. This initial set up was changed in June 1999 when a management committee was elected having a President (from among villagers), two members from NGO HOPE, 3 men and 6 women elected from general body and Forest Ranger as ex-officio secretary.

After Danida supported project was over, sustainability aspect of Dodabetta MPDA attracted attention. Medicinal Plants Development Agency was formed in place of MPDA management committee and a new MoU was signed between this agency and TNFD in August, 2007 to jointly manage and sustain the MPDA. The terms and conditions of this MoU are broadly the same as those of the MoU signed earlier in 1994.

The main activities of Dodabetta Medicinal Plants Development Agency include raising of medicinal plants nursery, planting medicinal and aromatic plants (rosemary, thyme, parsley, oregano, sage, citronella, *Acorus calamus*, *Elaeocarpus oblongus*, *Rhodomyrtus tomentosa*, *Laurus nobilis* etc) in forest area allotted to it, distillation of essential oils, simple processing of medicinal plants and marketing of essential oils and medicinal plants products. Distillation of essential oils has become the main activity. The income generated from different activities from 1994 to March, 2000 was as follows: sale of distilled oil, Rs 2.22 million; sale of herbs, Rs 0.138 million; sale of seedlings, 0.154 million; miscellaneous, 0.062 million; total Rs 2.574 million.

Besides distillation of oil from aromatic herbs, Eucalyptus oil distilled from dry leaves collected from adjoining forests became an important source of revenue. To handle distillation and marketing of oils, the village community established a separate enterprise called Dodabetta Essential Oils and Herbs. Out of total sales of this enterprise amounting to Rs 19.24 million, gross profit was Rs 0.53 million which was distributed among members. In addition to the distribution of this profit, sizeable benefit to the village community was through employment provided; the enterprise expenditure on works providing employment was Rs 12.4 million. The level of employment generated during the project is being maintained during post-project period through funding by TNFD.

The factors contributing to the success of Dodabetta MPDA include the following: i) The village community participating in MPDA had necessary skills of raising aromatic plants and their distillation; ii) The members having been rendered jobless after the closure of Cinchona Department were in dire need of employment which was provided with the establishment of MPDA; iii) A coherent village community which facilitated formation of village level institutions for MPDA and subsequent works; iv) The approach of converting MPDA produce into high value product (essential oils and processed herbs) for marketing; v) Abundance of dry Eucalyptus leaves available from nearby Eucalyptus plantations free of cost for extraction of Eucalypt oil; vi) Support and guidance provided by TNFD and HOPE NGO.

The success of Dodabetta MPDA was visible in the confidence of women members who turned up in large number to meet the Team and narrated their approaches to make it successful. The Team was greatly impressed by their confidence and determination when some of them said that they aim at having their own houses by 2010 costing about Rs 0.4-0.5 million each out of the income from Dodabetta MPDA.

Source: MPDA Dodabetta, TNFD, 2007

The approach adopted under the fourth model demonstrated that by utilising the strengths of JFM, there was good scope for medicinal plant resource augmentation. This approach also effectively involved women self-help-groups (SHGs), micro credit groups, local healers, NGOs, and educational institutions. This approach showed great potential, but as trial of this model was undertaken towards the end of project period, no definite conclusions became available before the end of project.

3.2 Status of MPDAs in 2007

The Team made the following observations during the field visits in September 2007.

i) The MPDAs established during the project period are being maintained with variable success.
ii) The models of MPDAs tried under the project could not demonstrate that sizeable benefits could accrue to the participating village community from the medicinal plants growing in these areas, except for Dodabetta MPDA where the income accrued mainly from distillation of essential oils.
iii) The LMCs constituted for securing people's participation in MPDA programme have ceased to function and village forest committees (VFCs) already existing under JFM for adjoining areas have been given the responsibility of MPDAs. The arrangements for people's participation in case of Dodabetta were more formalised and proved effective in involving the local communities.

3.3 Lessons learned and possible future approaches for the MPDA programme

As stated above, the MPDA programme aimed at

i) compensating village communities participating in protection and management of MPCAs through some income generation from nearby forest areas to be taken up for development and harvesting of medicinal plants, and
ii) developing a workable model of MPDA for JFM areas being protected and managed by involving local communities to be applied throughout the country.

The implementation of this component of the programme could, however, not be done properly.

The MPDAs could not be selected near the MPCAs where local communities were to be compensated.

The areas selected for MPDA under the first model were not suitable where mainly eco-restoration works were carried out through intensive soil and water conservation works rather than developing medicinal plants to generate income for the local communities participating in MPDA work. The plantations done in these areas were mostly of tree species which would have taken long periods to produce marketable material to generate income.

The cost of eco-restoration works in these areas was very high making replication of this model difficult.

The second model of MPDA involving clearing the natural vegetation and planting the area with medicinal plants (trees and shrubs) at wide spacing also did not meet the desired objectives. Clearing of vegetation removed some bushes and herbs of medicinal value. Clearing the site of existing vegetation and wide spacing adopted for planting resulted in the areas invaded by unwanted weeds and bushes resulting in high mortality of trees and shrubs of medicinal value planted in the area. The result was that these areas could not produce any harvestable medicinal plants.

The third model tried at Dodabetta was the only successful model. The factors contributing to its success have already been discussed.

The fourth model was tried quite late even in phase II in areas already under JFM in Tamil Nadu and was reported to have shown some potential, but its contribution to the income of village communities could not be demonstrated before the end of project period.
The problem with the MPDA component mainly lay in faulty implementation and not in faulty design. The shortcomings in implementation of this component need, therefore, be taken care of.

The experience gained under MPDA programme has broadly been as follows:

i) MPDA component should form an important part of a programme on conservation and sustainable use of medicinal plants because it ensures people's participation in conservation and development of medicinal plants and its contribution to the welfare of the participating community can be substantial;
ii) Instead of selecting new areas, the forests already brought under JFM and relatively rich in medicinal plants resource should be treated as MPDAs;
iii) It would be better to work with the existing village level organisation like VFC constituted under JFM programme instead of creating a new organisation like LMC which could not be integrated with institutional structure of SFDs and was, therefore, not found to be sustainable;
iv) The area of the MPDAs should be big enough to ensure sizeable benefits to the participating community;
v) Planting of medicinal plants to supplement natural regeneration in MPDAs to augment medicinal plants resource and consequently the income of village community should be undertaken;
vi) Besides ensuring sustainable harvest of medicinal plants from MPDAs, arrangements for marketing of medicinal plants or of value added products are important.

Further action in the light of above experiences gained will help in developing a workable model for MPDAs. Making arrangements for marketing of medicinal plants collected from MPDAs by participating village communities is, however, the most crucial factor determining the success of MPDAs. Medicinal plants constitute an important resource in the JFM areas being

protected by VFCs who are, however, not getting full advantage from this resource for income generation because of problems in marketing small quantities of medicinal plants collected from these areas. No steps were, however, taken in this direction during the project period.

The following measures might be helpful.

i) Small scale units for manufacturing medicinal plants-based medicines may be established as suggested under 'Making Available Medicines Manufactured in Small Units' in chapter 4. The VFCs participating in the MPDA programme may sell medicinal plants collected by them to such units.

ii) The VFCs are considered to be in the domain of SFDs and NGOs have, therefore, not been working with them. NGOs should help individual VFCs in marketing or in establishing federations of VFCs which can undertake marketing of medicinal plants. In some cases, NGOs may undertake the role of VFC federations for purchase and processing of NTFPs and for sale of products. To provide money to VFCs to pay the members for collection of medicinal plants, funds may be provided through the forest development agency (FDA) to create revolving funds out of which VFC members may be paid and to which sale price realised later may be deposited.

iii) The SFDs may extend help in establishing links between VFCs/VFC federations and medicine manufacturing units/pharmaceutical companies for marketing of medicinal plants and provision for such facilitation may be included in a Memorandum of Understanding (MoU) to be signed between SFDs and VFCs.

iv) The State Forest Development Corporation may undertake marketing of medicinal plants to be bought from VFCs/VFC federations.

v) Some enterprising VFC federations may be encouraged to establish small enterprises based on medicinal plants to produce and market semi-processed and processed goods made out of medicinal plants.

Inside the "Godown" (storage) for medicinal plants near Sevaiyoor

Local storage of medicinal plants near CCD, MPCP Sevaiyoor

4. *Ex situ* conservation and use of medicinal plants for primary health care

Medicinal plants conservation parks (MPCPs) were established by NGOs on their land to undertake *ex situ* conservation of medicinal plants and outreach activities to promote conservation and use of medicinal plants in nearby villages, see figure 4. Among outreach activities, promotion of raising kitchen herbal gardens (KHGs) was an important activity to popularise the use of medicinal plants in home remedies of common ailments. A large number of KHGs were established. The name KHG was, towards the end of project period, changed to home herbal garden (HHG), a term used in this report.

In general the MPCPs did not implement *ex situ* conservation of the genetic resources of medicinal plant species, nor did they provide for mass production of source identified reproductive material of the medicinal plant species. The *ex situ* conservation effort consisted of the establishment of living collections of a limited number of specimens of the medicinal plants collected (so-called Arboreta). The distribution of seedlings was in general of non-identified source, and thus not sufficient to initiate a gene conservation, domestication or breeding programme. The issue of integrating conservation, breeding and dissemination of planting material in an appropriate manner is dealt with in chapter 5.

The current chapter is dedicated to an assessment of the HHG Programme and how this programme can be developed to serve in a livelihood context from subsistence to market and business. The first part of the chapter deals with the development, experiences and future of the HHG Programme, *sensu stricto*. The second part of the chapter looks at the possibilities of redesigning the programme using a value-chain or market approach.

4.1 Home Herbal Garden (HHG) Programme

The HHG programme became an important programme of the MPCP component of the Danida supported project and is reported to have proved effective in popularising the use of HHG-grown medicinal plants in home remedies. The programme envisaged growing of medicinal plants in HHGs by as many households as possible in the villages covered under the various outreach programmes of MPCP-NGOs. The women beneficiaries of HHG programme were identified in each village through self-help groups (SHGs) and training for them in raising and maintaining HHGs and in use of medicinal plants for home remedies was arranged through MPCP NGOs or village resource persons (VRPs). A package of 18 - 20 medicinal plants, including a few that could be used as vegetables, was prescribed for each HHG depending on common ailments in the locality and the agro-climatic conditions of the village where HHG was to be established. Such uniform package of medicinal plants for each HHG was prescribed to make each

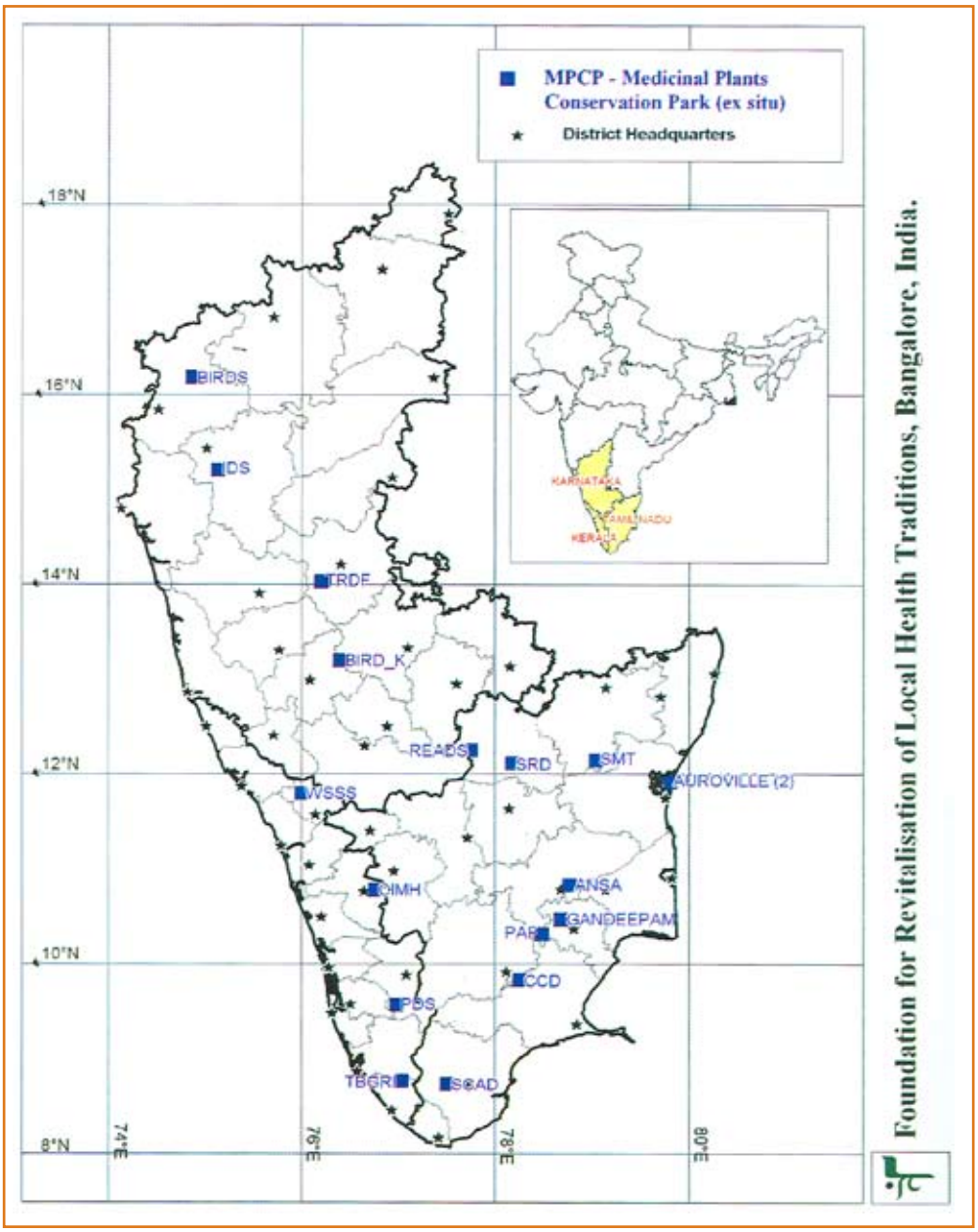

Figure 4. The location of the Medicinal Plants Conservation Parks (MPCPs) established (FRLHT 2006c)

household self-sufficient in respect of medicinal plants required for home remedies.

The beneficiary woman was required to select and fence a small area for planting the prescribed number of medicinal plants; the piece of land was preferably to be near the kitchen to utilise waste water for irrigation. The medicinal plant seedlings were raised in MPCP nurseries and were supplied to beneficiary women either free or at subsidised rates (Review Report 2003).

The beneficiary woman was responsible for planting and after care of the medicinal plants. About 147.000 HHGs were raised, involving as may families of the rural poor (Project Completion Report).

4.1.1 Impact evaluation of the HHG programme up till 2004

The evaluation of direct and indirect impact of HHGs on health of women and their families and on their economic welfare was undertaken in pursuance of Review Team recommendations (Review Report 2003). Some of the important findings of this evaluation (FHDSF 2004) are the following:

i) In the villages covered under HHG programme, about two-third of households established HHGs and the remaining one-third did not. The percentage of persons having belief in home remedies among both adopters and non-adopters of HHG programme being equal (about 91%), the reasons for not establishing HHGs related to non-availability of suitable piece of land, non-availability of water for irrigation etc.

ii) Age wise break up of HHGs at the time of study (2003) was: 1 year 8%; 2 years 45%; 3 years 14%; 4 years 14%; 5 years 7%; > 5 years 10%; age not known 2%.

iii) About 39% of HHGs were near houses and 55% in agricultural fields.

iv) The households raising HHGs reported in majority of the cases that waste water available from kitchen or bath rooms was inadequate to irrigate HHGs in view of the fact that 82% of households carried water for domestic consumption from public taps and, therefore, separate arrangement for watering the plants was necessary. As a result, about 43% HHGs were watered from bath and/or kitchen waste water and 50% from water from other sources; for the remaining, source was not known.

v) Reasons for not raising HHGs included non-availability of space (22%), water scarcity (33%), browsing by livestock (22%), disinterred in raising HHG (11%), reasons not known (11%).

vi) Target approach for establishing a certain number of HHGs every year resulted in some of them having been raised without adequate arrangements for protection and watering. The survival of medicinal plants in such HHGs was reported to be as low as 0-10%. Water scarcity and browsing by livestock were reported to be the main causes for mortality of plants.

vii) About 48% of households owning HHGs used medicinal plants for home remedies during three months period covered by the study.

viii) Use of HHG- grown medicinal plants for home remedies resulted in reduced medical expenses because of reduced frequency of travelling to nearby towns for treatment. The households using HHG-grown medicinal plants for home remedies saved about Rs 30 per month to treat common ailments such as cold, cough, fever; using medicinal plants for home remedies for common ailments is a wise and economic proposition as a first step, instead of seeking outside treatment for such ailments.

ix) The survival rate of medicinal plants and care of HHGs was better in villages where arrangement for buying surplus medicinal plant material by the MPCP NGO existed and in such cases, a household owning HHG could earn about Rs 30-40 per month.

x) The persons who paid for medicinal plants cared more and had used HHG more often to meet their primary health care (PHC) needs than those who got the medicinal plants free of cost (Project Completion Report).

4.1.2 Status of the HHG programme 2007

The observations made by the Team in the field September 2007 were the following:

i) Main causes for mortality of medicinal plants planted in HHGs included scarcity of water, difficulty in protecting the plants from livestock, strong competition between plants as a result of very close spacing adopted, shading of light demanding herbs by tree species planted in HHGs, inadequate or unsuitable space available in house compounds for HHGs, neglect of HHGs by households in some cases, etc.

ii) Only those species which were used for home remedies by the households were paid attention and consequently survived and the remaining did not survive. Out of about 18-20 species of medicinal plants planted in each HHG as a package, only about half of them were reported by the households to have been used by them for home remedies.

iii) No system is in place for the replacement of casualties of medicinal plants seedlings in HHGs. The annual plants need to be raised each year and efficient system of seed supply of these species is lacking.

iv) A package of 18-20 medicinal plants for each HHG resulted in problems such as providing sufficient space for planting, very close spacing resulting in competition and mortality, silviculture incompatibility between tree species and herbs and shrubs, difficulties in watering in view of shortage of water in some villages, planting of species already existing in the villages, inadequate utilisation of medicinal plants as only about half of them were reportedly used for home remedies by households, increased cost in raising and maintenance of HHGs.

v) Target approach for establishing a certain number of HHGs in a year resulted in dilution of extension support.

vi) HHG owning households had insufficient awareness and knowledge about use of all medicinal plants required to be raised in HHG.

vii) Wherever opportunity to sell surplus material from HHGs was available, it improved the success of HHGs.

4.1.3 Some lessons learned from implementation of the HHG programme

The lessons learned from HHG programme included:

i) A village may be treated as a unit to achieve self-sufficiency in terms of availability of medicinal plants for home remedies, instead of attempting to make individual households self-sufficient in this respect; households not having HHGs may get medicinal plants from HHG owners in the village;

ii) The medicinal plants growing wild in and around the village need not be grown in HHGs;

iii) A package of medicinal plants need not be recommended for each HHG and the participating members should be free to decide about the species to be grown in one's HHG; number of medicinal plant species may vary from one to another HHG;

iv) The utilisation of waste water from the kitchen should not be the deciding factor in locating the HHG because of the experience that such water was not sufficient to sustain the HHG, particularly in dry areas where

water was very economically used in the kitchen; HHG should be located where water will be available to irrigate it;

v) The HHG may also be located in the fields where irrigation may be available or the medicinal plants can be grown on field bunds where protection against grazing animals may be ensured;

vi) In order to reduce the cost of planting stock for HHG, direct sowing of seed or planting of cuttings of easy-to-root species may be tried;

vii) Low-cost models for raising HHGs need to be developed ;

viii) Best implementers in terms of medicinal plants based community outreach activities, involving in particular the women, are the SHGs;

ix) Decentralised nurseries at SHG level may reduce cost of transportation and may be more cost-effective; demand for seedlings should be assessed in advance to avoid over-production that may later on pose problems;

x) Federations of women SHGs may be given the responsibility of training HHG participants to ensure sustainability of HHG programme after closure of the project.

xi) Decentralised nurseries at SHG level may reduce cost of transportation and may be more cost-effective; demand for seedlings should be assessed in advance to avoid over-production that may later on pose problems;

xii) Federations of women SHGs may be given the responsibility of training HHG participants to ensure sustainability of HHG programme after closure of the project.

4.1.4 Sustainability of the HHG Programme

The HHG programme as implemented under the project may not be sustainable. The factors adversely impacting sustainability include:

i) poor survival of medicinal plant seedlings in HHGs as a result of factors enumerated in the previous paragraph;

ii) seedlings either free of cost or at subsidised rates not available after the closure of Danida supported project;

iii) some of the plants included in the package of seedlings supplied and consequently raised in HHGs being available in the wild near the villages,

iv) lack of conviction of house wives towards use of home remedies in preference to allopathic medicines believed to be giving quick relief (particularly in cases of illness of children and wage earning husbands);

v) lack of sustained interest of households in the maintenance of HHGs as visible during visits of the team.

vi) Most of the MPCPs who promoted HHGs during implementation of the programme have lost interest in this programme.

The Review Team, 2003 also expressed concerns about the sustainability of HHG programme (See Box 4.1).

Box 4.1 Sustainability of HHG Programme

The price of seedlings paid by HHG beneficiaries varied among MPCP NGOs. FRLHT paid uniformly to MPCP NGOs at the rate of Rs 1.50 per seedling under HHG programme while the cost of production was about Rs 1.00 per seedling. HHG beneficiaries got seedlings at subsidised rates or free. Thus both the MPCP NGOs and HHG beneficiaries gained under this system of seedling supply. It had been a strong incentive for NGOs to introduce HHGs as FRLHT subsidised the supply of package of seedlings. The SHGs depending on support from NGOs were not in a position to reject the programme. Over-commitment from the NGOs or VRPs at times resulted in HHGs being implemented in places where there was no fencing, and where there was lack of access to water. This incentive was to disappear when FRLHT funding was to cease, but for future replication of HHG programme, FRLHT needed to address the dilemma between need for incentives and risk of over-commitment.

Source: Review Report 2003

4.1.5 The HHG programme design needs changes

The present design of the HHG programme is not sustainable and needs to be changed. The design was evolved without discussion with beneficiaries, but was mainly decided by project implementing agencies and was handed over to the beneficiaries as a package supported by the project. As observed by Review Team 2003, the MPCP NGOs gained through sale of medicinal plant seedlings at a price fixed by FRLHT which was higher than the cost of production. The argument for such a decision was to generate some income for MPCP NGOs to ensure their sustainability and their continued interest in medicinal plants after the project period. This approach does not appear to have achieved the desired objective as most of the MPCP NGOs are reported to have shifted to programmes where finance was made available. The SHGs dependent on MPCP NGOs were not in a position to reject the programme strongly promoted by an NGO they depend on (Review Report 2003). After expiry of the project, seedlings cannot be supplied free or at subsidised rates. The poor women are unable to spend money on purchase of seedlings and on establishment and maintenance of HHGs.

Woman in front of her HHG in village near Sevaiyoor

There need not be any pre-determined design for HHGs. Instead, awareness needs to be created among potential HHG beneficiaries about the use of medicinal plants in home remedies to the extent that they should themselves decide about the medicinal plant species to be raised by them to treat common ailments which they consider important. They will of course be guided in taking such a decision by the knowledge of home remedies which they might already possess or may acquire through simple training. Supply of seedlings, seed or cuttings of medicinal plants to be raised by them should be available at reasonable price. It would be helpful if arrangements for sale of surplus medicinal plants material could be made to generate some additional income for persons undertaking establishment of HHGs. The performance of HHGs was better in villages where arrangements to sell such surplus material were made (FHDSF 2004). Women having HHGs expressed interest in generating some income from growing of medici-

nal plants (See Box 4.2). Suggestions for improving the design of HHG programme are given later under the heading 'Raising Medicinal Plants by Households for Use in Home Remedies'.

Box 4.2 Poor women interested in medicinal plants for income generation and home remedies

During discussions with the Monitoring Mission in August, 1998 (Monitoring Mission Report, August 1998) the women members of SHGs participating in KHG programme expressed the view that 'outreach efforts in making available medicinal plant seedlings for planting need not be limited to growing them to only meet home remedy requirements, but should also help generate some income for these poor families. The women, therefore, suggested growing of medicinal plants on vacant lands available to them. They were of the view that species, which are not browsed, can be grown on such land. They demanded planting stock of such species to be made available to them through the MPCP outreach programme and an assurance from MPCP NGO to buy back the medicinal plants grown by them.'

4.2 Possible Approaches for Growing Medicinal Plants for Home Remedies

Based on the experience gained in implementation of HHG programme, the approach of using medicinal plants for primary health care of the rural poor requires careful examination. The necessity of making available medicinal plant-based medicines for common ailments in the villages needs no emphasis. The approaches to achieve this objective need to be practical and cost effective. Such approaches could include the following:

- Raising medicinal plants by households for use in home remedies (4.2.1);
- Making available medicinal plants-based medicines through vaidyas (folk healers) in the villages (4.2.2);
- Making available at affordable price to rural households the medicinal plants-based medicines manufactured in small units to be set up for the purpose (4.2.3).

4.2.1 Raising medicinal plants by households for use in home remedies

Suggested design for the HHG programme to raise medicinal plants by rural households for home remedies may include the following elements.

i) Greater emphasis needs be placed on creating awareness about the advantages of using medicinal plants for home remedies. It should lead to creating a strong urge among the target groups for raising medicinal plants and should result in medicinal plants seedlings being demanded by households rather than being pushed by an outside agency.

ii) Growing of vegetables and medicinal plants for home use may be combined and may be called 'Growing of Nutritional and Medicinal Plants for Home Use'. Introducing the concept of growing medicinal plants with households having vegetable gardens may provide a good entry

point for successfully growing of medicinal plants in the villages and may ensure better survival and growth of medicinal plants.

iii) As majority of the households interviewed during HHG programme impact study gave lack of space near houses and lack of water for irrigating the plants as the main reasons for not raising HHGs, medicinal plants along with vegetables may be grown wherever convenient from the point of view of protection and watering, such as house compound, in hedge rows near houses, in a corner of or on bunds of agricultural fields, near the bore well or other sources of irrigation water etc.

iv) No package of fixed number of medicinal plants needs be advocated and the number of species to be planted and the number of seedlings to be planted of each of them may be left to the household. The operational guidelines for country co-operation framework (CCF II) provide the species to be planted in HHGs will be decided by the households and arrangements for raising the same in nurseries will be made (FRLHT 2006b).

v) The facts that only about half of the medicinal plants grown in HHGs were used by households and that only about half of the households made use of HHG-grown medicinal plants for home remedies during three months period of impact study and that about 87% of non-adopters of KHG programme took medicinal plants from those who raised HHGs for use in home remedies (FHDSF 2004) suggest that every household in the village needs not have an HHG. Self-sufficiency in the availability of medicinal plants for home remedies may be aimed at village level and not at individual household level.

vi) The medicinal plants growing wild in and around the village should not be planted.

vii) Some of the medicinal plants can be raised from seed or from cuttings and for such species, raising of seedlings in the nursery may not be necessary; arrangements for supply of seed and cuttings of such species may be made through SHGs. Short and simple training to raise these species from seed or cuttings may be arranged.

viii) The seedlings of medicinal plants may be raised in the village by SHGs or individuals to make them available to the households; it will save the cost on transportation of seedlings and will interlink demand and supply which creates problem in case of a centralised nursery. Medicinal plants seedling production has been decentralised under CCF II and a nursery will be maintained by each VRP (FRLHT II 2006b).

ix) No inputs for HHGs should be supplied free, but at a reasonable price. No financial support may be provided for raising and maintaining HHGs.

x) Training required for raising medicinal plants and vegetables and for using medicinal plants in home remedies may be decentralised and imparted in the village.

xi) Local healers may be involved in creating awareness and in imparting training on use of medicinal plants for home remedies. Survey of common diseases occurring in a locality may be helpful in deciding about the species of medicinal plants to be included in HHGs to be raised in a particular locality.

xii) Providing the households with a 'Do it Yourself' manual in local language containing all details regarding raising of HHGs, including seed treatment that can be handled at household level, and use of medicinal plants in home remedies may be useful. It may be desirable to organise a short training about the use of such a manual which may be distributed along with the seed and planting material for HHGs.

Medicinal plants in the nursery at CCD Sedana Sevaiyur (MPCP)

4.2.2 Making medicinal-plants based medicines available through Vaidyas

There had been an age old and well established tradition of vaidyas (folk healers) in Indian villages making medicines from locally available medicinal plants and administering the same for common ailments. The villagers had great faith in vaidyas for treatment of common ailments. However, this tradition got eroded under the influence of allopathic treatment (modern drugs). The institution of vaidyas in the villages making and providing me-

dicinal plants-based medicines for common ailments needs to be revived. It has to be ensured that formulations used as home remedies should be readily available in the village and should conform to the concerned provisions of Acts and Rules.

Treatment of common ailments does not necessitate at-hand availability of the medicinal plants as is advocated for having HHG in each house. The study on impact evaluation of HHG programme reported that in most cases, women seemed reluctant to practice a new home remedy solely on the basis of training imparted to them as a part of HHG programme and they preferred consultation with elderly knowledgeable women in the village or *nattu vaidyas* (folk healers) (FHDSF 2004). To meet the demand of medicinal plants of a village, either the vaidya may make arrangements for growing them or may buy from others in the village or nearby. This approach will take care of the landless also who may not have land to raise HHGs near houses or at other convenient places.

Traditionally, the prices charged by vaidyas for medicines remained affordable by the village poor. The SHGs and other village groups can through social pressure ensure that prices charged by vaidyas are reasonable. The cost effectiveness of the HHG programme is not known. The cost of raising and maintaining HHGs has not been calculated to study the economics of this programme. The review team (Review Report 2003) also observed that an assessment on cost effectiveness of the HHG programme had not been made. Accounting for all investments (land for HHG, cost of seedlings, fencing, time invested in watering and maintenance operations etc.) and taking into account poor survival rates of medicinal plants, use of only about 50% of plants for home remedies and only occasional use of medicinal plants for treating common ailments, the use of HHG-grown medicinal plants for home remedies may not be so cheap as generally advocated.

4.2.3 Making available medicines manufactured in small units

The objective of popularising the use of medicinal plants for primary health care can also be achieved through sale at affordable price to rural households of the medicinal plants-based medicines manufactured at small scale medicine manufacturing units. This approach may include the following:

i) Setting up a modest, but modern facility, to manufacture medicines from medicinal plants (4.2.3.1)
ii) Arrangements for supply of medicinal plants to such a unit (4.2.3.2)
iii) Mechanism for making available at affordable price the medicines manufactured in medicine manufacturing unit (4.2.3.3)
iv) Operationalisation of the concept (4.2.3.4)

4.2.3.1 Medicines manufacturing unit

i) The aim of the unit may be to promote the use of medicines made out of medicinal plants among rural people rather than meeting national demands for such medicines.
ii) The unit may have a geographical area of operation from which raw materials (medicinal plans) will be purchased so that those supplying me-

dicinal plants may be the share holders in the unit and may be the target beneficiary group for supply of manufactured medicines.

iii) Within geographical area identified for the unit, the main suppliers of medicinal plants to the unit (medicinal plants gatherers from the wild, cultivators of medicinal plants, JFMCs selling medicinal plants harvested from JFM areas or from eco-development areas of MPCAs) should be shareholders in the unit and should be entitled to the profit to be declared by the unit.

iv) The unit needs to be established and run on sound business principles after proper feasibility studies.

v) The mechanism for establishing the medicine manufacturing unit will have to be worked out through thorough consultations with stakeholders and experts.

4.2.3.2 Raw material supply to medicines manufacturing unit

Raw material supply to the unit manufacturing medicines can be from four sources: i) medicinal plants collected from the wild by groups (sanghas) of medicinal plants gatherers; ii) medicinal plants grown by cultivators; iii) medicinal plants collected from joint forest management (JFM) areas by JFMCs; iv) medicinal plants collected from eco-development forests adjoining MPCAs by JFMCs to be formed for MPCAs. Payment for the medicinal plants supplied may be made to the groups or to individuals in accordance with the modalities to be worked out for the purpose.

To ensure that the collection of medicinal plants from the wild or from JFM/eco-development areas is sustainable, the following steps should be considered:

i) Inventory of the medicinal plants resource from which collection is to be made.

ii) Determination and standardisation of non-destructive methods of collection for different important species to be collected.

iii) Awareness among the collectors about conservation of medicinal plants resource and creating their stake in that resource.

iv) Training in non-destructive methods of collection for those undertaking collection/harvest of medicinal plants.

v) Standardisation of cleaning, drying and packing of medicinal plants collected.

vi) Value chain analysis carried out for individual species to identify break-even points, volumes, number of growers and costs in the chain. This will help to identify possibilities for leverage interventions.

vii) Finalisation and signing of MoU between the suppliers of medicinal plants and the medicines manufacturing unit regarding price, mode of payment etc.

4.2.3.3 Mechanism for distribution of medicines manufactured

The channels for supply of raw material to the medicines manufacturing unit may be used for distribution of medicines manufactured. The associations of the medicinal plants collectors, associations of farmers cultivating

medicinal plants, JFMCs for JFM/eco-development areas, SHGs and their federations associated with HHG programme may undertake sale of medicines manufactured. Instead of paying the profits in cash to individual share holders supplying medicinal plants (medicinal plants collectors, cultivators of medicinal plants, JFMC members), coupons equal in value to the amount of dividend to be paid may be issued to individuals or groups supplying medicinal plants to medicines manufacturing unit with the condition that medicines for the amount of the coupon may be purchased at one time or instalments from medicine distributing agencies given above.

4.2.3.4 Operationalisation of concept of making available medicines manufactured in small units

The details of this approach need to be discussed thoroughly with various stakeholders to prepare an outline of the agreed approach. Proper feasibility studies need to be undertaken to work out details of different operations involved. A project plan may be prepared with the assistance of experts in different areas concerning establishment of medicine manufacturing unit and distribution of medicines. Experiences in running the units established during Danida supported project (GMCL and medicine manufacturing unit near BRT hills) and other similar units may be pooled and utilised.

Weeding in a herbal garden at Nadukuppam

5. Development of a strategy for conservation of medicinal plants genetic resources in India

Development of an appropriate strategy for conservation of medicinal plants genetic resources in India is urgently needed in view of continuing degradation of forest resources and of several programmes being initiated in the country with internal and external funding for medicinal plants conservation, which should make use of such strategy.

The Review Missions undertaken for the Danida supported project in the years 1994, 1995, 2000, 2002 also recommended that before using the MPCA approach for conservation elsewhere in the country, an analysis needs to be made to consolidate the MPCA concept in relation to location and size of MPCAs, management of MPCAs and community participation.

The strategy adopted under the Danida supported project as well as in implementing other programmes currently in operation, provided establishment of MPCAs in only forest areas. As mentioned in the Introduction, the selection of the MPCA sites did not relate systematically to the ecogeographic or genecological variation (Maxted *et al.* 1995; Graudal *et al.* 1997) in order to capture the variation in medicinal plants as represented e.g. by forest types.

Even though the forests are reported to be the main repository of medicinal plants resource in India, the areas outside forests are also an important source of medicinal plants traded in the country. The study on traded Indian medicinal plants (personal communication, Mr. Ved, FRLHT) showed that 26% of medicinal plant species, recorded in high volume trade (> 100 tonnes/annum), are being mainly sourced from areas outside forests (roadsides, wastelands etc), 52% species are obtained from forests, 19% from cultivation and 3% are imported. Medicinal plants conservation efforts are, therefore, necessary in areas outside forests also such as alpine areas above tree limit, deserts (cold as well as hot), wastelands of all descriptions found in all ecological zones of the country, wetlands etc.

Furthermore a strategy will not be complete without dealing with cultivation of medicinal plants. As highlighted in chapter 4, it is necessary to view and understand the whole value-chain of production (from conservation and cultivation over harvest to processing and market) in order to conceive a strategy for conservation and use. All participants, their linkages, and influential factors in the agribusiness system needs to be analysed in order to identify constraints and opportunities for growth; and to further explore opportunities for leveraged intervention (cf. e.g. Danida 2007).

The strategy needs, therefore, to be developed for

i) *in situ* conservation in forest areas,

ii) *in situ* conservation in areas outside forests,

iii) *ex situ* conservation, and

iv) medicinal plants cultivation.

Some general guidelines that may be useful for the preparation of a strategy have e.g. been published by IPGRI (FAO/DFSC/IPGRI 2001/FAO/FLD/IPGRI 2004a and b, and Heywood & Duuloo 2005)

5.1 Strategy for *in situ* Conservation of Medicinal Plants Genetic Resources in Forest Areas

The strategy needs to provide for

i) conservation in MPCAs in forests, and

ii) conservation in forest areas outside MPCAs.

5.1.1 Strategy for *in situ* conservation in MPCAs in forests

The MPCA network in three states covered under the project captured from 44 to 63% of medicinal plant species found in these states. The percentage of medicinal plant species captured in a state has no relation to forest area of MPCAs to total forest area in a state. The studies on species accumulation with addition in the number of MPCAs showed that on an average, 200 species got added with every additional MPCA for the first five MPCAs, while the last 5 MPCAs added less than 7% to the cumulative total. An increase in the number of MPCAs, without regard to their distribution to cover different forest types, would thus not have helped in capturing the medicinal plant species not captured in MPCA network established under the project.

Locating MPCAs only in forest areas known for their richness in medicinal plants without regard to their distribution to cover different forest types could capture only a part of the medicinal plant species found in this region. The forests in different stages of degradation were also not covered under MPCA network. Better distribution of MPCAs to cover all forest types in the region would have perhaps helped in capturing the remaining medicinal plant species.

While deciding about location of MPCAs across different forest types, special care needs be taken to cover vegetation types like scrub growth, alpine meadows, coastal and marshy vegetation etc. Besides distribution of MPCAs to cover different forest types, the desirability or otherwise of locating MPCAs in protected areas or outside needs consideration.

The initial strategy of the project aimed at total biodiversity conservation and not only on medicinal plants conservation. *In situ* conservation under the project was, therefore, not to be restricted to medicinal plants, but other plant species and the fauna of the area were also to be protected to conserve medicinal plants within their ecosystems. MPCAs were, therefore, preferably located in remote areas known for medicinal plants richness. MPCAs for medicinal plant species of particular conservation concern were

not established during first phase of the project; only 4 MPCAs were established during phase II for critically endangered medicinal plants.

Under the CCF II project (cf. the Introduction) being now implemented by FRLHT in nine states, priority is given to establishing MPCAs for medicinal plant species of conservation concern identified on the basis of CAMP exercise carried out for each state. But as the project can support establishing only 5 MPCAs in each state, MPCAs for conservation of species other than of conservation concern are not being presently established and genetic resources of such species may get depleted by the time MPCAs for them are established. The strategy to be developed may provide for both types of MPCAs to ensure conservation of genetic resources of medicinal plants. Methodology for CAMP exercise needs to be refined in light of the experience gained and may be included in the strategy to be developed.

Even though some of the rare, endangered and threatened (RET) species found in these states were captured in the MPCAs (see annex 3), their viable populations could not be included in the MPCAs. The Review Teams recommended adjustment of MPCA boundaries to capture viable populations of such species, but this exercise could not be undertaken. Inclusion of viable populations of medicinal plants of conservation concern needs to be ensured.

The methodology adopted for carrying out floristic surveys in MPCAs needs examination to provide for such surveys to meet specific objectives to be achieved. The analysis and use of data collected through floristic surveys in MPCAs presented some problems. The experience gained needs proper assessment. It needs to be examined if floristic data collected can be used to determine optimum size of MPCAs using species-area curves for different MPCAs. Transects for floristic surveys were marked on the ground to facilitate monitoring in the change of vegetation over time, but this objective could not be achieved because transects could not be located on the ground. The strategy may provide use of modern designs and tools for conducting floristic surveys in MPCAs.

The strategy may deal with preparation of management plans for MPCAs. The approach of treating them as 'hands-off areas' might result in their neglect and even disappearance in due course of time. Local communities participating in the protection of MPCAs need to be involved in preparation of management plans. The management plans may specifically provide for research work to be undertaken in MPCAs. Besides a number of research topics that may be identified by medicinal plants conservation network (MPCN) stakeholders, studies on genetic variability in important species of importance for cultivation and trade may be useful for breeding of improved varieties for cultivation by farmers. Research on social aspects, such as factors determining people's participation, should receive as much attention as the technical aspects.

5.1.2 Strategy for *in situ* conservation in forests outside MPCAs

The area of MPCAs constitute about 0.1% of the total forest area in the three states covered under Danida supported project (FRLHT 2006 a). In the remaining forest areas, indiscriminate and unregulated collection of medicinal plants goes on to meet demands of the market. The Team learnt during discussion with gatherers of medicinal plants that the quantum of their collection is decreasing and medicinal plants resource is getting depleted. The working plans for the management of forest areas are generally silent with regard to assessment and sustainable management of medicinal plant resources. The existing management system is likely to result in the loss of valuable medicinal plants genetic resources. The assessment of red listed (RL) species undertaken through CAMP exercises by FRLHT resulted in identification of 100 such species out of which 50 are endemic to South India (Ravikumar and Ved 2000). Many of these red listed species have been captured in MPCA network, but several others occurring in vegetation types not covered under MPCA network need to be conserved. Even if the number of MPCAs is increased, all red listed species may not be captured and conserved in MPCAs only. A strategy including some broad guidelines for forest managers to conserve genetic resources of medicinal plants in forests outside MPCAs is urgently called for to save these species, broadly on lines recommended for managed natural forests (FAO/DFSC/IPGRI. 2001).

Pelleting medicinal plants products at Gandepam MPCP

5.2 Strategy for *In situ* Conservation of Medicinal Plants Genetic Resources in Areas outside Forests

The areas outside forests also constitute an important source of medicinal plants because about 26% of medicinal plant species, recorded in high volume trade (> 100 tonnes/annum), are being mainly sourced from such areas (roadsides, wastelands etc (Ved, pers. comm., cf. above)). The wastelands include areas under the control of government (revenue department), panchayats, communities or even private. Such areas are found in all the ecological zones of the country.

Special features of such areas include:

i) location in small fragmented areas,

ii) used as common property resources to meet rural communities' requirements of fuelwood and grazing, and

iii) generally degraded sites of low productivity. In many cases, the degraded forests (scrub or blank areas) may offer conditions similar to wastelands for conservation of genetic resources of medicinal plants growing in such areas. Some special categories of areas outside forests include alpine areas, cold deserts and wetlands. In view of complex ownership and usufructory rights and of small and fragmented locations, special approaches may be necessary for conservation of genetic resources in areas outside forests.

5.3 *Ex situ* Conservation of Medicinal Plants Genetic Resources

The strategy for *ex situ* conservation of medicinal plants could not be developed under Danida supported project. The project document provided for establishment of *ex situ* conservation parks, referred to as medicinal plants conservation parks (MPCPs) in different ecological zones. The MPCPs were to share similar climatic, soil and other growing conditions as obtainable in natural habitats of the species to be conserved *ex situ*, but none of them provided agro-climatic conditions similar to natural habitats of medicinal plants required to be conserved *ex situ*. As establishment of gene banks for ex-situ conservation was not possible at MPCPs, it was decided that the work of gene banks should be entrusted to research institutes /universities (one in each state) having necessary technical competence and commitment. On further examination it was found that research institutes / universities did not have suitable areas for undertaking *ex situ* conservation. It was, therefore, decided towards the end of project period that *ex situ* conservation work may be undertaken in suitable forest areas adjoining MPCAs. It could, however, not go beyond raising seedlings in the nursery of some species to be conserved *ex situ*.

A strategy for *ex situ* conservation of medicinal plants genetic resources needs to be developed keeping in view general principles for *ex situ* conservation of forest genetic resources (FAO/FLD/IPGRI 2004b).

An approach for *ex situ* conservation of medicinal plants growing in areas outside forests will also have to be decided. One approach could be to select suitable areas under the control of forest department for such *ex situ* conservation. Areas under forest department (FD) control may be available in alpine areas, cold deserts, wetlands and even for wastelands occurring in different regions. Another approach could be of establishing ethno-medicinal forests (EMF) by NGOs of the type established under the Danida supported project.

Ex situ conservation through selection and breeding may be of particular importance (Kjær *et al.* 2001) and the concept of 'breeding seedling orchards' (BSOs) (Barnes 1995) is particularly useful because it represents low-input and fast-track options at the same time; and provides a direct link between conservation and cultivation of improved plants (Kjær *et al.* 2006)

5.4 Cultivation of Medicinal Plants

Meeting increasing demand from shrinking resources of medicinal plants in forest areas is a major challenge. Unregulated and continuous collection of medicinal plants from forests is resulting in depletion of this resource. Consequently, many species are getting gradually added to rare and threatened category. Cultivation of medicinal plants should, therefore, be regarded also as a measure to take off increasing pressure from forests for medicinal plants collection and thus a step towards conservation of medicinal plants in the forests. Cultivation of medicinal plants is picking up to meet the increasing demand, but necessary technical support is lacking. To support cultivation of medicinal plants, the following measures may be necessary.

i) The cultivators of medicinal plants who met the Team during its visit favoured regulated marketing of medicinal plants on lines similar to the marketing of agricultural produce. Steps in this direction are necessary.
ii) An assured market needs to be ensured providing fair prices for the medicinal plants to be cultivated. The SFDs and NGOs may help the farmers in this regard through establishing farmers' contacts with pharmaceutical industries and to develop value chains that are inclusive of small-scale farmers (Vermeulen et al. 2008).
iii) The medicines manufacturing unit for manufacturing medicines suggested under 'Making Available Medicines Manufactured in Small Units' (Chapter 4) may enter into an agreement with the cultivators on the broad pattern of contract farming to provide inputs requested for by the farmers on payment and to provide a guarantee to buy the medicinal plants at a minimum price agreed and mentioned in the agreement. The farmers should, however, be free to sell the medicinal plants at higher price to any buyer other than the medicine manufacturing unit. To ensure an equitable relationship between buyers and sellers in the value chains, economic and social analysis of the value chains for the individual species and identification of leveraged interventions should be carried out by public authorities.
iv) Arrangements are necessary for the cultivators to have an access to in-

formation about the potential buyers and the prevailing market rates. National Medicinal Plants Board (NMPB) and State Medicinal Plants Boards (SMPBs) may help in getting a short programme on cultivation and sale of medicinal plants included in agriculture programmes being broadcast by Door Darshan and All India Radio and their regional channels.

Supply of quality seed to medicinal plants cultivators is essential. A large group of farmers, at a meeting at the Covenant Centre for Development (CCD), Madurai, in September 2007, demanded supply of seed of improved varieties of medicinal plants to ensure higher productivity and to improve their income from medicinal plants cultivation. The following approach is suggested for supply of quality seed of medicinal plants.

i) Institutes having technical competence, necessary facilities and interest in undertaking breeding work on medicinal plants may be identified and collaborative arrangements between such institutes at national and international levels may be made for undertaking relevant research.

ii) Medicinal plants species for undertaking breeding work may be identified through discussion in a small group having representatives of pharmaceutical industries, progressive farmers engaged in medicinal plants cultivation, identified NGOs engaged in supporting medicinal plants cultivation, scientists from research institute(s), representative of National Medicinal Plants Board, representatives of identified SFDs, etc.

iii) An outline of a research programme may be prepared outlining the responsibilities of each collaborating partner in the work (research institute(s), NGOs, farmers).

iv) Based on available knowledge, a fast track approach may also be taken to make available seed of higher yielding varieties quickly.

v) The research institute(s), NGOs and farmers may undertake survey and collection of material from locations/provenances identified in the research proposal. Genetic material of medicinal plants already collected may be screened and used for breeding purposes. The Division of Plant Genetic Resources, Tropical Botanical Garden and Research Institute, in Palode, Thiruvananthapuram in the state of Kerala maintains core collections of tropical flora in South Indian states including medicinal plants. Similar collections are reported to have been made by other organisations also in the country. Stock taking is necessary of the core collections already made in the country.

vi) A project proposal may be prepared by the research institute(s) to be submitted to potential funding agencies for getting financial support; possibility of getting funding from pharmaceutical industries may also be explored.

vii) Responsibility for breeding and testing of varieties up to the stage of releasing the tested varieties for cultivation will be that of research institute(s).

viii) The NGOs and SFD seed centres may undertake the work of multiplication of seed of the released varieties and also of distribution of seed to the farmers.

ix) The NGOs and research institutes may undertake pilot trials to demonstrate the performance of new varieties and to convince the cultivators

about superiority of the new varieties.

x) The performance of released varieties on farmers' fields may be monitored by farmers, NGOs and research institutes.

The above suggested approach is together with networking of stakeholders (described in the following section) in line with current thinking of sector programme development.: Assessing the production – procurement – distribution chains within the context of the market (e.g. Danida 2007), where a part of the market (or value chain) approach is described in chapter 4 (section 2) with a focus on home remedies and small production units.

5.5 Networking of Stakeholders to Provide Institutional Sustainability for Conservation of Medicinal Plants

Networking of stakeholders is necessary to provide institutional sustainability for conservation and sustainable use of medicinal plants. Following mechanisms for networking are suggested.

i) Establishment of a network involving SFDs of the three project states, relevant research institutes in these states and the Ministry of Environment and Forests, Government of India (MoEF, GoI) was suggested to ensure sustainability of project works, but the same could not materialise within the project period (Monitoring Report November 2003). The work of medicinal plants conservation has now been taken up in some more states under donor funded projects. Some states are likely to initiate such work out of their own resources. It is necessary to have a forum at national level to discuss issues concerning conservation of medicinal plants.

   National Medicinal Plants Conservation and Management Group (NMPCMG) may be constituted at national level having SFDs of all states and union territories as members and to be coordinated and serviced by the Ministry of Environment and Forests, Government of India. Modalities concerning constitution, responsibilities and functioning may be worked out through discussions between SFDs and MoEF, GoI.

ii) Medicinal Plants Conservation Network (MPCN) was established during implementation of the Danida supported project, but is reported to have become non-functional. National Medicinal Plants Conservation Network (NMPCN) needs to be established with a new mandate and membership to bring all those engaged in conservation of medicinal plants together such as SFDs, NGOs engaged on medicinal plants conservation, associations of medicinal plants cultivators, associations of medicinal plants gatherers, representatives of pharmaceutical industries using medicinal plants, National Medicinal Plants Board, State Medicinal Plants Boards etc. Interlinking of NMPCN with international networks on conservation of medicinal plants is necessary. State units of NMPCN should be established to ensure its effective functioning as the national

unit will not be able to handle issues at state level. Modalities to establish NMPCN will have to be worked out through dialogue between different stakeholders and ways will have to be found to make NMPCN and its state units financially self sustaining.

iii) A network for stakeholders in revival and popularisation of local health traditions is also necessary. It may be called Lok Parampara Swasthya Sangathan (LPSS) and include NGOs, *Nattu Vaidyas*, HHG owners, SHGs, *Ayurveda* colleges, *Ayurveda* practitioners and others interested in the subject.

5.6 An Integrated National Programme on Medicinal plants Conservation and Sustainable Use – concluding remarks

The work on the various aspects of medicinal plants in the country is fragmented and the whole picture is not readily available. Documentation of the work being done on different aspects of medicinal plants is necessary. For future work, a co-ordinated approach may be necessary to avoid duplication and wastage of scarce resources. It may, therefore, be helpful to develop the National Programme on Medicinal Plants Conservation and Sustainable Use so that no gaps may be detected later which may impede conservation and sustainable use efforts relating to medicinal plants in the country. Co-ordinated efforts at national and international level may be necessary to take full advantage of the experience and expertise available in this field.

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Annex 1. Strengthening the Medicinal Plants Resource Base in India in the Context of Primary Health Care

Achievement of Objectives

Source : Project Completion Report (Danida 2004)

Objectives	Achievement of objectives			
	Very satisfactory	Satisfactory	Less satisfactory	Quite satisfactory
Development objective: To contribute to self-reliance and capacity of rural communities in the three states, namely Karnataka, Tamil Nadu and Kerala, ultimately replicated on an all India basis, to meet their own primary health care needs through the use of medicinal plants and within the context of'Health for all by the year 2000'		**Satisfactory:** The rural communities were targeted and trained both under in-situ and ex-siu conservation components to grow medicinal plants and use them for common ailments. About 0.15 million kitchen herbal gardens (KHGs) were raised by as many poor households to secure availability of medicinal plants for home remedies. Seedlings of medicinal plants for raising KHGs by rural communities were supplied by Medicinal Plants Conservation Parks (MPCP) NGOs to rural communities through nurseries established under the project. The outreach programme launched under MPCP generated high degree of awareness among the rural comminities with regard to growing and usese of medicinal plants for meeting primary health care need.		

Objectives	Achievement of objectives			
	Very satisfactory	**Satisfactory**	**Less satisfactory**	**Quite satisfactory**
Immediate Objective: To establish a system of conservation for medicinal plants and their sustainable use in the three states of Karnataka, Tamil Nadu and Kerala.	i) A network of 34 Medicinal Plants Conservation Areas (MPCAs) has been established and consolidated. ii) A network of 12 Medicinal Plants Development Areas (MPDAs) was established. iii) A network of 18 MPCPs was consolidated with active programmes of conservation education, documentation and assessment of local health traditions, KHGs and income generation activities involving local communities. iv) A Medicinal Plants Conservation Centre (MPCC) has been established in the outskirts of Bangalore. v) Training was conducted for forest department (FD) staff and eleven training modules were prepared on medicinal plants vi) As part of research, a total of 429 species were prioritised, 110 species were assessed for their Red List status through Conservation Assessment and Management Plan (CAMP) workshops. Compilations have been prepared on seed storage, propagation methods and agronomical practices of important medicinal plants. Trade studies cataloguing more than 800 botanical entities were completed and eco-distribution mapping for 150 prioritised species has been accomplished. Botanical surveys carried out resulted in setting up of a herbarium with more than 24,000 specimen belonging to more than 2,400 species. vii) A computerised database of medicinal plants has been developed incorporating; a) nomenclature correlation of 7,553 botanical names with more than 77,000 vernacular names; b) distribution of 5,200 species (nearly 43,000 records); c) trade database for more than 800 medicinal plant species; d) digital images of more than 10,000 images of medicinal plant species have been scanned and incorporated in the database.			

Annex 2. Itinerary of the Mission 2007

Date	Programme
August 26 (Sunday)	Arrival at Bangalore
August 27 (Monday)	Visited FRLHT and held discussion with FRLHT staff regarding issues arising out of Danida supported project and application of experiences in implementation of CCFII project.
August 28 (Tuesday)	Visited Savan Durga and met village community members associated with MPCA and MPDA protection and management, visited MPCA, MPDA and Kitchen Herbal Gardens (KHGs)
August 29 (Wednesday)	Discussion with officers of Karnataka Forest Department at Aranya Bhawan
August 30 (Thursday)	Visited KHGs and BAIF MPCC at Tiptur
August 31 (Friday)	Journey by air to Chennai and Meeting with Forest Department staff in the afternoon
September 1 (Saturday)	Chennai to Pondicherry. Visited KHGs on way and held meeting with NGOs at Auroville in the afternoon
September 2 (Sunday)	Pondicherry to Madurai. Pondicherry to Chennai by road and Chennai to Madurai by air
September 3 (Monday)	Visited CCD, MPCP Sevaiyoor and visited villages to study KHGs
September 4 (Tuesday)	Visited medicinal plants conservation centre at Natham and discussions with medicinal plants cultivators and gatherers
September 5 (Wednesday)	Visited Algarkovil MPCA and Van Burli MPDA and held discussions with LMC members and CCD staff
September 6 (Thursday)	Visited Gandeepam MPCC and kitchen herbal gardens and discussions with village communities
September 7 (Friday)	Madurai to Coimbatore. Discussions at Tamil Nadu Agricultural University, Coimbatore about breeding of medicinal plants.
September 8 (Saturday)	Visited Tamil Nadu Forest Department Seed Centre at Coimbatore and held discussions with staff of IFGTB, Coimbatore
September 9 (Sunday)	At Coimbatore, discussions among Team members regarding the outline of report. Dr. Graudal left for Denmark
September 10 (Monday)	Coimbatore to Ooty and on way visited Forest College and Research Institute, Mettupalayam
September 11 (Tuesday)	At Ooty, visited Dodabetta MPDA and held discussion with village communities involved in MPDA work
September 12 (Wednesday)	Ooty to Thrisur by road
September 13 (Thursday)	Thrisur to Thiruananthapuram by road
September 14 (Friday)	Visited TBGRI and held discussions with staff about medicinal plants conservation. Meeting with Kerala State Forest Department
September 15 (Saturday)	Visited Petchparai MPCA and herbal garden
September 16 (Sunday)	Return to respective places of residence of team members

Annex 3. Details of Medicinal Plants Conservation Areas (1993-2004)

State	MPCA	Area (ha)	Forest type	Number of medicinal plant species recorded	
				Total species	RETs
Tamil Nadu	Petchparai	210	Southern moist mixed deciduous	244	14
	Mundanthurai	200	Southern dry mixed deciduous	267	6
	Kutrallum	200	Southern moist mixed deciduous	317	2
	Thaniparai	100	Southern dry mixed deciduous	259	5
	Algarkovil	250	Southern dry mixed deciduous	227	4
	Kodaikanal	115	Southern montane wet temperate	85	11
	Kodikarai	252	Tropical dry evergreen	288	5
	Topslip	229	Southern hill top tropical evergreen	189	4
	Kollihills	200	Southern dry mixed deciduous	231	9
	Kurumbaram	108	Tropical dry evergreen n scrub	317	9
	Thenmalai	150	Southern dry mixed deciduous	320	7
Kerala	Agasthiarmalai	174	West coast semi-evergreen	217	16
	Triveni	308	West coast semi-evergreen	208	9
	Eravikulam	200	Southern montane wet temperate	83	15
	Peechi	156	Southern moist mixed deciduous	275	17
	Athirapally	112	Southern moist mixed deciduous	234	14
	Silent Valley	206	Southern hill top tropical evergreen	205	35
	Waynad	148	West coast tropical evergreen	163	29

State	MPCA	Area (ha)	Forest type	Number of medicinal plant species recorded	
				Total species	RETs
Karnataka	BRT Hills	150	Southern dry mixed deciduous	259	10
	Talacauvery	80	West coast semi-evergreen	255	17
	Savandurga	280	Dry deciduous scrub	314	8
	Subramanya	200	West coast semi-evergreen	220	25
	Charmadi	283	West coast semi-evergreen	310	26
	Devrayandurga	178	Southern thorn	140	26
	Kudermukh	110	Southern hill top tropical evergreen	238	19
	Kemmangundi	310	Southern hill top tropical evergreen	184	13
	Agumbe	210	West coast tropical evergreen	270	28
	Devimane	210	West coast semi-evergreen	259	26
	Sandur	350	Southern dry mixed deciduous	238	9
	Karpakapalli	150	Dry deciduous scrub	150	5

Source: FRLHT, Bangalore

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Medicinal Plants, their Conservation, Use and Production in Southern India

Towards the end of the 20th century, the millennia old indigenous knowledge of traditional health care as well as the natural resource base of the traditional health systems in India had become endangered.

To initiate a reverse of this situation, a project called Strengthening the Medicinal Plants Resource Base in Southern India in the Context of Primary Health Care was executed by the Foundation for Revitalisation of Local Health Traditions (FRLHT) from 1993-2004 with the support of Danida; and a larger National programme on promoting conservation of medicinal plants and traditional knowledge for enhancing health and livelihood security was initiated in 2006 with the support of UNDP.

The current report summarise status in 2007 of experiences and lessons learnt from the Danida-supported activities and provide recommendations for improvements of the different models for conservation and development used in India so far. The development of a strategy and an integrated national programme for conservation of medicinal plants genetic resources in India is considered an urgent need and the elements of such a strategy and programme are described in the report.

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