# Engaging Community in Medicinal and Aromatic Plant Conservation

## *An Experience from Patana Forest of Kapilvastu District*

**SAGUN Kapilvastu**
**UNDP/GEF-Small Grants Programme**

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SAGUN

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**Photo credit**
Dhruba Gautam, Krishna Sharma, and Giri Raj Amatya

**Cover page**
Right: Bijay sal (Pterocarpus marsupium) seedling
Left (up): Amala (Pyllanthus emblica)
Left (down): Mentha (Mentha piperita)

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*Empowered lives.*
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## Foreword

The GEF-Small Grants Programme (SGP) in Nepal has been supporting implementation of several small community led innovative projects that addresses both global environmental issues and local livelihood needs of the community.

"Reaching the Unreached: Promotion of NTFPs/MAPs for Biodiversity Conservation and Livelihood Enhancement Project" implemented by SAGUN - a local NGO of Kapilvastu District - under financial support of SGP is one of such projects aimed to reduce biodiversity threats of the Patna Forest area of Kapilvastu by making wise use of its natural resources.

The unique forest ecosystem of Patna harbors several non-timber plant species, which are highly rich in medicinal and aromatic values and significantly important for the livelihoods of the most marginalized ethnic Magar and Tharu communities of the area. In order to conserve this important ecosystem, the project primarily engaged with these ethnic groups to build their capacities for making sustainable use of the resources that would help maintain their traditional health care systems and cultural practices, and yield additional cash incomes for them.

The project results are encouraging in producing twin benefits of biodiversity conservation and livelihood enhancements and have inspired the neighboring communities and nearby forest user groups to replicate this approach at a larger Patna forest landscape.

It gives me immense pleasure to see documentation of the achievements made by the project in the form of a publication. I would like to thank both: Mr. Vivek Dhar Sharma, National Programme Assistant of SGP and Dr. Dhruba Gautam, Advisor of SAGUN Kapilvastu for their great efforts to this end.

I remain hopeful that the practices and approaches adopted by the project, which are highlighted in this publication, can be easily replicated under similar contexts and success of the project will inspire the entire SGP family in the days to come.

Vijaya Prasad Singh
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# *Preface*

With funding support from the UNDP/GEF-Small Grants Programme, Reaching the Unreached "Promotion of NTFPs/MAPs for Biodiversity Conservation and Livelihood Enhancement Project" was implemented in wards numbers 7 and 8 of Patana VDC, Kapilbastu District during 2012-2013. Located in about 8 km south of East-West Highway, the project covered 814 households with a total population of 5,514, most of whom were Magar and Tharu. The project was designed to strengthen the promotion and sustainable harvesting of natural resources, including NTFPs/MAPs, in order to conserve the forest and promote livelihoods.

Because its strategies and approaches were effective, the project yielded very good results within a short period of time. The project generated the anticipated results because it provided education to *gothala* (shepherds), engaged eco-club students and traditional Tharu healers (*guruwa, baidhawa)* in the project, organised environmental rallies; and used the knowledge of traditional Tharu leaders like *badghar* (Tharu village heads) to conserve NTFPs/MAPs. The project contributed to biodiversity conservation in general and the conservation and sustainable use of biological diversity important to agriculture and sustainable land management, in particular.

The project benefited resource-poor, vulnerable and marginal sections of society, mostly the Magar (hill migrants) and the Tharu (the indigenous people). It employed participatory vulnerability analysis to ensure that these groups would get to participate in the decisions that affect their lives and that their needs would be carefully taken into account. Their special needs are reflected in the community-based livelihood improvement plans, NTFPs/MAPs promotional plans, and biodiversity conservational plans drafted by the project. This project was implemented through SAGUN, a Kapilvastu-based NGO, in coordination with two collaborative forest users' groups, Chandeshwori and Pipaldanda. SAGUN uses a community-centred approach to empower and mobilising social groups and youths in order to conserve local biodiversity and increase livelihood resilience.

This report carefully documents the project's approach and methods, key achievements, success stories, important lessons learnt and offers a few recommendations. We hope that this report helps project designers, implementers, civil societies, researchers, and academicians whose interest is in biodiversity conservation in general and conservation of NTFPs//MAPs for livelihood promotion in particular. On behalf of the UNDP/GEF-Small Grants Programme (SGP), I thank all the contributors to this report, in particular Mr. Vivek Dhar Sharma and Dr. Dhruba Gautam, for all their penetrating insights, thoughtful critiques, and sustained support. Building a livelihood-resilient community through biodiversity conservation will take time, but the journey will be a fruitful one as long as we ensure that the projects we carry out achieve the results.

Gopal R. Sherchan
National Coordinator
UNDP/GEF-Small Grants Programme

# *Acknowledgements*

We would like to acknowledge the support of the UNDP/GEF-Small Grants Programme, which helped us to carry out and publish this report on the 'Reaching the Unreached: Promotion of NTFPs/MAPs for Biodiversity Conservation and Livelihood Enhancement Project" (NEP/SGP/OP5/Y1/CORE/12/06), which ran for 18 months between July 2012 and December 2013 in Patana VDC of Kapilvastu District.

While collecting primary information, we interacted with local-, district- and national-level stakeholders, including the members of two collaborative forest users groups (Chandeshwori and Pipaldanda), four non-timber forest products (NTFPs)/medicinal and aromatic plants (MAPs) promotion groups, cooperatives, women's groups, and community-based organisations as well as with school teachers and students. Youth groups, local traditional healers (*guruwa, baidhawa*), shamans and Ayurved pharmacists, and local media were also very helpful. We are thankful to all of these individuals for providing us with a wealth of information and data.

We would also like to extend our sincere gratitude to the sundry other individuals who helped make this study a success by contributing their time, feedback, and suggestions. We are very thankful to everyone who supported us and helped us complete our report effectively and on time.

We wish to express our sincere appreciation for and thank to all project staff, including the project coordinator, social mobilisers, and project accountant for their valuable time, relevant information and inputs. We are also indebted for the support (cash, kind, labour and materials) provided by Patana VDC, Himalayan Socio-Economic Development Centre/Caritas Nepal for creating programmatic synergy. The collaborative forest user group's (FUG) support was particularly instrumental in providing the labour needed for fencing newly planted NTFPs, women's empowerment, livestock vaccination, organic vegetable farming, and plantation.

We express our deepest gratitude to all project stakeholders, including local beneficiaries, for providing us with the opportunity to learn from their experience and motivation. We hope that the report will be beneficial to relevant stakeholders, acamedician and policymakers.

Finally, we would like to thank Mr. Vivek Dhar Sharma, Dr. Dhruba Gautam and Ms. Maneesha Rajbhandari for all their hard work in finalising this report.

Thank you all.

Krishna Sharma
Chairperson

SAGUN Kapilvastu
2017

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# List of acronyms

| | |
|---|---|
| CBO | Community based organization |
| CFUG | Community forest user group |
| FUG | Forest user group |
| GEF | Global Environmental Facility |
| IEC | Information education communication |
| MAP | Medicinal and aromatic plant |
| NGO | Non-government organization |
| NTFP | Non-timber forest product |
| SGP | Small Grants Programme |
| UNDP | United Nations Development Programme |
| VDC | Village Development Committee |



# Engaging Community in Medicinal and Aromatic Plant Conservation

## An Experience from Patana Forest of Kapilvastu, Nepal

### 1. The Context

Patana Forest in Kapilvastu District forms a biological corridor connecting the Chure hills with the Terai. Spread over 2500 ha of land in Patana, Banganga and Patariya VDCs, the forest is rich in biodiversity and culture. Most of Patana Forest comprises *sal* (*Shorea robusta*) in different stages of growth. In many places, this species forms pure stands while in others it is associated with *bhalayo* (*Semecarpus anacardium*), *botdhayero* (*Lagerstromia parviflora*), *amala* (*Emblica officinalis*), *barro* (*Terminalia bellirica*), *harro* (*Terminalia chebula*), *Adina cordifolia*, *saaj* (*Terminalia alata*), *Cassia fistula*, *Callicarpa macrophylla*, and *Woodfordia fruticosa*. *Dalbergia-Acacia* trees are found in riverine areas. Quite a number of *bijay sal* (*Pterocarpus marsupium*) trees are also found in the forest. The forest is also home to a large number of climbers like *Acacia pinnata*, *Cuscuta reflexa*, and *Bauhinia vahlii*.

The forest provides a home for various wild mammals such as blue bulls, porcupines, bears, leopards, jackals, monkeys, wild cats, boars, rabbits, *gohar*, and gray mongooses. Tigers also inhabit the forest. A number of birds such as parrots, giant hornbills, magpies, egrets, doves, bulbuls, partridges, pheasants, crows, and eagles are also found in the forest.

The forest is rich in NTFPs/MAPs. A preliminary survey report (2012) revealed that there are over 102 medicinal plants used by locals (see Annex-1 for list of NTFPs/MAPs, scientific name, local use and part use).

Patana forest

These plants have both cultural and therapeutic value but seemingly no commercial value. Because no effort at conservation has been made, these valuable plants are disappearing. The main reasons for their rapid decline are lack of proper identification, improper harvesting, and over-exploitation.

### 1.1 Salient features of project area

Kapilvastu District lies in Lumbini Zone and the proposed Province No. 5. It is located between latitudes of 27.5° N and 27.83° N and longitudes 82.7° E and 83.23° E and covers an area of 1,738 sq. km.

Motipur village adjacent to Patana Forest

The district is situated between 93 masl and 1,491 masl. Geographically, the district can be divided into the lowland plains of the Terai and the low Chure hills. By climate, the district is divided into three zones: (i) lower tropical below 300 m (86.8%), (ii) upper tropical at 300–1,000 m (12%), and (iii) sub tropical at 1,000–2,000 m (1.2%). Summers, with average temperatures above 27 °C, are hot, but average winter temperatures are below 15 °C. The monsoon seasons lasts from June to September. The annual rainfall is between 750 mm and 1,650 mm.

Southern Patana Forest is situated in the Terai, but northern reaches lie in the Bhabar foothills and Churia Range. Most of the Bhabar belt is covered with rocks, gravels and sand. Some areas of Patana Forest are sandy and stony and some areas are covered in black soil.

This project was implemented in wards numbers 7 and 8, wards lying about 8 km south of East-West Highway and home to 5,514 people in 814 households (see annex-2). In Ward No. 7, the majority of people are Tharu whereas in Ward No. 8 Magar are dominant (see annex-3 for tole-wise major ethnic groups).

## 1.2 Socio-economic conditions

Large numbers of people engage in agricultural activities, including animal husbandry. In fact, every household is fully or partially dependent on agriculture. According to well-being raking (2012) of two collaborative forest user committees, most people in the project area belong to the lower middle class but some are very poor and landless.

## 1.3 Major rivers and streams

The Kothi, Sukalkotho and Ghagawa are the major streams that flow though Patana Forest whereas the Walapur Khola, Sugako Jharan and Mauwari Jharan are small streams. Stream water is channeled through irrigation canals in Sonpur, Motipur, Bankatti, Gogapur, Dharmapur, Ghagawa, Danapur, Mechkari, and Walapur Lakhanpur. Galai Wetland is a major wetland and Patana Pokhari and Sonpur Pokhari are small ponds. They are used for irrigation and a water spot for livestock and wildlife during winters.


Map showing the project district


Devi Than


Shiva temple adjacent to Patana Forest

### 1.4 Open spaces

Mobari Chaur, Galau Chaur, and Gogapur Chaur are open spaces in and around the forest. They are used for recreational activities, sports, community gatherings, and meetings of forest users groups.

### 1.5 Religious sites

The project area includes a number of temples, such as those of Sivalaya in Mechkari, Durga in Motipur, Narayan in Balapur, and Kalika in Dharmapur. A church called Vajan Asram is found in Birpur.

## 2. Rationale of Project

The design of this project kept in mind the following points:

### a. Poor conservation of NTFPs/MAPs

NTFPs/MAPs conservation was not prioritised in Patana; forest conservation was limited to managing firewood, fodder and timber. The status of NTFPs/MAPs was declining due to habitat destruction, deforestation, population growth, overgrazing, and lack of conservation. There was a dire need to develop local capacity regarding the proper management of NTFPs/MAPs. Sustainable management includes identifying NTFPs/MAPs, inventorying them and their regeneration status, and practicing sustainable harvesting and use.

### b. Over exploitation of Bijay sal

In the past, bijay sal (Pterocarpus marsupium) made ample use of its wood for making furniture, traditional ploughs, bullock carts, and utensils like glasses and water vessels and its leaves were used as fodder. People also preferred its ash to wash dishes. The fire wood of Bijay sal is considered very popular. As a result, there was over exploitation of Bijay sal and no conservational initiatives to safeguard this species.


Removal of outer bark for firewood leads to death of Bijay sal tree


Overharvesting of leaves of Bijay sal tree

### c. Traditional and indigenous knowledge documentation

Villagers in the project area who cannot afford modern health facilities often rely on traditional healing practices, but the traditional uses of many NTFPs/MAPs have been forgotten because they have not been properly documented. Knowledge documentation is a key step toward conservation.

### d. Religious and cultural values of NTFPs/MAPs

Hindu rituals require the use of many sacred plants, but deforestation has made it hard to find these plants (Karki, 2001). Rural people do use NTFPs/MAPs for food and farm inputs but also for social, cultural, and religious functions. Many communities maintain certain areas as sacred groves where harvesting is banned or carefully controlled (Arnold, 1995). Harvest is restricted to ensure that the need for religious and socio-cultural ceremonies can be met. Certain species

Group work during planning

play a crucial role in spiritual ceremonies, or have taboos associated with them that forbid their harvest.

### e. Significant medicinal and food value of NTFPs/MAPs

Locals use NTFPs/MAPs in different therapies, such as treating fevers and other ailments. NTFPs/MAPs also provide food, including fruits, vegetables, and rhizomes. Proper and sustainable management could significantly improve these benefits.

### f. Commercial potential of NTFPs/MAPs

Although, Patana forest is rich in NTFPs/MAPs, they have not been produced commercially. Building local capacity could jump start and enhance such production.

### g. Acknowledgement by development plans and programmes

The government's three-year development plan (2010-2013) emphasised researching and developing NTFPs/MAPs to create employment by promoting income-generating activities. It envisaged reducing poverty through the mobilisation of natural resources like forests, land and water.

Community consultation during data collection

## 3. Study objectives

Study objectives were to (i) strengthen and promote NTFPs/MAPs available in the Patana Forest with the aims of conservation and value addition, (ii) increase awareness about and knowledge management of NTFPs/MAPs through capacity-building initiatives, and (iii) enhance the livelihoods of local communities through the sustainable use of NTFPs/MAPs and the initiation of organic farming

## 4. Study methods

This study used both primary and secondary information. Secondary information was gathered through a review of relevant literature and published and unpublished reports whereas primary information was collected using participatory tools and techniques. Group interviews; focus group discussions with collaborative FUG members and NTFP/MAP promotion groups; key informant interviews with local traditional healers, traders, elder men and women and teachers; consultations with *guruwa*[1], *baidhawa*[2]; direct observation; and ethno-botanical transect walks and surveys are some of the participatory approaches used. Group interviews were carried out with 60 knowledgeable adults from each project village. They included shepherds, woodcutters, fodder collectors, medicinal plant collectors, and others. All the information collected through various tools and techniques was synthesized and analyzed before arriving at a conclusion.

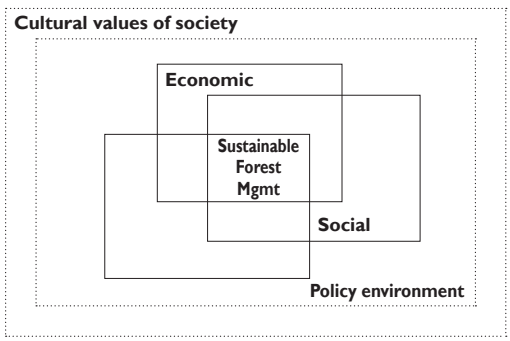
1 A Tharu senior regional *guruwa*, or "witch doctor," performs a shamanic ceremony to ritually purify a village during a disease outbreak, driving the disease spirits out of village. With the consent of the villagers the *Badghar* may appoint a "*Guruwa*" who is the medic and chief priest of the village. *Badghar* has an authority of punishing those who do not follow their orders or who go against the welfare of the village. Generally the *Badghar* has a *Chaukidar* to help him.

2 *Baidhawa* is traditional healers who prepare local medicine from available medicinal plants and cures and heals minor diseases like headache, stomachache, etc.

## 5. Conceptual framework for conserving Patana Forest and NTFPs/MAPs

As described by Becker (1997), the concept of sustainable forest management entails economic viability, environmental soundness, and social acceptance. It is a holistic approach that considers policy as well as the cultural values of a society. The framework shows very clearly that an assessment of sustainable forest management must consider both a society's ethical or cultural values and an enabling policy environment.

Conceptual framework for sustainable forest Management




### 5.1 NTFPs/MAPs are important economic sources

In Nepal, hundreds of plant species are used as NTFPs/MAPs (Rawal 1997; Shrestha et al. 2004) and have great conservation and economic value (Gauli & Hauser 2009). In rural areas, these resources are a key source of income for many of the poorest of people, helping them earn a livelihood. NTFPs/MAPs, which are often common property resources, have many potential benefits to people and to the environment. They provide fuel wood, fodder, charcoal, fencing, poles, medicinal plants, fiber, resins, and a variety of foodstuffs, such as fruit, nuts, and mushrooms (Arnold,1995).

Locals use NTFPs/MAPs for different purposes, like medicine, fodder, and food. They can be categorized broadly into four types by usage: medicinal plants, edible plants, plants for making domestic items, and plant use in rituals and religious ceremonies whether herbs, shrubs, climbers, or trees, are a main source of remedy for various diseases. One of the most important uses of NTFPs/MAPs is to prepare traditional medicines because their sale is a source of income.

Though NTFPs/MAPs can enhance livelihoods, alleviate poverty, and contribute to the national economy, at present the distribution of their benefits is not fair. Communities involved in conservation practices are not getting a reasonable share of the benefits from NTFPs/MAPs. Local people will not initiate the sustainable use and management of NTFPs/MAPs until they are assured of personal and societal benefits.

### 5.2 NTFPs/MAPs have medicinal value and basis for traditional healing practices:

More than 700 species of plants used in traditional medicinal practices were recorded in 1999; since then an additional 703 have been added. These 1,403 species represent about 20% of the total estimated flowering plants of Nepal (Tiwari, 1999). Most of the species are wild, a few are exotic, and some have been domesticated and cultivated for years. Records of early Hindu civilization reveal that a considerable number of drugs used in modern medicine were in use even in ancient times. Medicinal plants discovered by traditional societies are proving to be an important source of potentially therapeutic drugs (Cox & Ballick, 1994).

Cultural, social, and organizational issues are important in determining the direct and indirect benefits of commercializing NTFPs/MAPs. People are interested in the benefits of gainful employment and income generation that NTFPs/MAPs can provide.

Historically, Magar and Tharu people of the project area acquired much knowledge regarding


Bojho (*Acorus calamus*)


Amala (*Pylanthus imblica*)


Barro (*Terminalia belerica*)


Bel tree (*Aegle marmelos*)


Ritha (*Spandius mokurossa*)


Harro (*Terminalia chebula*)


Tejpat (*Cinnamomum tamala*)


Gurjo (*Tinospora cordifolia*)

the diverse uses of NTFPs/MAPs for food, medicine, clothing, construction, dyes, ritual performances, and energy from their ancestors. Most importantly, their traditional health care systems still make extensive use of various products from locally available plant species.

Tharu and Magar communities believe strongly in the efficacy of herbal medicine and traditional healing practices and wish to continue to use them. It is learnt that medicinal plants have diverse therapeutic functions, and relatively few side effects.

Traditional healing practices differ from one ethnic group to another since they are heavily determined by culture, myths, rituals, economic and social values, traditional beliefs, fame of specific treatments. The distance an ethnic group, as a whole, lives from NTFP resources and the convenience with which they can collect them also shape their healing system, as does the knowledge which is handed down regarding the utilization and availability of plant resources. Even within the same ethnic group, healing systems differ from one location to another due to geographical, educational as well as cultural and religious variations. Rural people like traditional medicine because it is easily accessible, low-cost and culturally acceptable. In addition, a close patient-healer relationship develops due to the friendliness of healers and long-term family associations. The type, preparation, and uses of traditional medicines are largely influenced by folklore, custom, and the cultural habits, social practices, religious beliefs and superstitions of the people who prescribe or use them.

Active ingredients are extracted from different plant parts such as roots, leaves, seeds, bark, rhizomes, stems, bulbs, flowers, young shoots, thalli, latex, and sporocarps. They are used either in their raw form or after processing. In some cases, the whole plant, including the root, is utilized. NTFPs/MAPs are used for four main classes of disease: (i) respiratory tract infections (fevers, headaches, sinusitis, cough and cold and the like), (ii) gastro-intestinal ailments (mouth ulcers, cholera, stomach pain, indigestion, constipation, diarrhea, dysentery, intestinal worms, and gastric disorders), (iii) skeleto-muscular problems (swelling, body pain, back pain, dislocated bones, fractures, rheumatism), and (iv) dermatological infections (scabies, skin diseases, boils, herpes). Plants are used in a variety of forms, like juice, decoction, infusion, paste, powder, diluted preparations, and smoke. Sometimes, fresh or dried plant parts are used just as they are. Techniques of medical administration are both internal (inhalation, oral ingestion) and external (application of poultices and rubbing or massage).

Traditional healing systems and traditional medicines are popular. Patients are examined in the morning or in the evening on particular days, often Tuesdays and Saturdays. Healers either visit a patient's house, even staying the night if necessary, or patients go to see healers. Food grains, locally brewed alcohol, vegetables, and chickens are some the items given in exchange for treatment instead of fees. Patients' ability to pay in kind makes the treatment affordable. Local healers' residence in communities makes their services easily available. Some local healers were reluctant to share their knowledge about medicinal plants and their properties. They strongly believe that if they share what they know, their *guru* will get angry with them, and they will lose their knowledge forever. In addition, they fear that if they disclose any information about medicinal plants and their properties at all, then they will lose their ability to heal. Even if they teach incantations and charms to other healers, those incantations and charms become invalid in their teaching.

Since both collaborative forests in Patana are rich in NTFP/MAP resources, grazing in them has largely been stopped. Occasionally, however, limited grazing is allowed as agreed upon by the forest users' groups. These groups periodically patrol the forests to prevent the illegal harvesting of medicinal plants. *Guruwa, baidhawa* people are the ones who most use medicinal plant species for folk remedies (see annex-4 for list of key


Tharu cultural dance during *badki ekadashi*

*Guruwas*). These groups have their own collection guidelines that, directly or indirectly, contribute to the sustainable use of plant species. For example, they collect medicinal plants only when needed and only on certain auspicious days like Sundays, Tuesdays, and full moon days. Some healers believe that the medicinal plants found in nearby villages do not work as they are made impure by domestic animals and people and have thereby lost their healing properties. As a result, they harvest from interior areas of the forests.

The community-agreed rules and regulations which govern the collection medicinal plants help promote the sustainable use of those species. For example, when the roots or rhizomes of plants are collected, only the required amount is removed and the plant is replanted so that it will hopefully regenerate. The fact that only the needed parts and amounts of medicinal plants are collected contributes to their sustainability and proper management. In the project area, *guruwa, baidhawa* are still highly respected. Many people go to them, rather than Western-trained doctors in government health posts, for the primary treatment of diseases and disorders or visit them after growing weary of visiting doctors.

## 5.3 Cultural value of Patana Forest

Patana Forest is considered a religious site for Hindus and hence has significant cultural value. Somai Than in Dharmapur and Maiko Than in Motipur are the two most common places within the forest where people conduct their annual *kul puja*, or clan worship, the most important ceremony in Magar and Tharu communities. They construct a temporary altar at one or the other of the *than*, or place, to celebrate their *kul puja*. Teej, a festival for Hindu women is performed at the edge of the forest in the Nepali month of August/September). Clearly, Patana Forest has considerable cultural value.


Decoration of scared plant during ritual is mandatory

## 5.4 Use of plants for religious and ritual purposes

People's religious usage of plants varies according to their cultural backgrounds. These differences are hardly surprising: as Milton (1996) said, culture and cultural variation are not just matters of different symbols with similar meanings but different ways of expressing the same things.

- People in the Magar and Tharu communities are, in general, very pious and take great satisfaction in carrying out elaborate rituals.
- Hindus perform ritual and religious activities to earn religious merit and thereby benefit in both this life and their next life. They perform rituals like *Satyanarayan puja* and *bratabanda,* recite the


Religious function/*bhajan*


Worshipping water god before canal desilting within the forest area


Dried Bel *(Aegle marmelos)* fruits

Puran, and celebrate the festivals of Teej, Swastani, and Buddha Jayanti, among others.

- The major festivals, the Magar celebrate are Dashain, Tihar, Holi, Teej, and Maghesankrati. They also perform *puja*, or ritual demonstrations of devotion through offerings, to deities such as Mai, Vager, Nag, and Devi, as well as to their own ancestors, or *kul.* Much of this worship is related to forests and water. Among the Tharu, the festivals of Maghi Mela, Nag Panchami, Badki Aaitabar, and Holi are widely celebrated. *Puja* devoted to Dhagawapuja, Dhureri, Hareri, Mudawa Bab, and Diharwa, all of which involve the worshipping of forests and water, is also common. Just as the religious and ritual practices of the Magar and the Tharu differ, so, too, does their use of plants.
- Some medicinal plants are used as pesticides to kill various harmful insects that affect their crops. People use leaf plates to offer foods to their gods and goddesses. These plates are particularly necessary for making offerings to their ancestors when they recite the Puran.
- Every Hindu *puja* requires some species of plant, whether it be *kush (Desmostachya bipinnata)*, *tulasi* (*Ocimum basilicum*) or *pipal* (*Ficus religiousa*) to serve as a symbol of the god Vishnu.
- Plants with white latex are considered to be pure enough for rituals; other plants are not. To Hindus, white latex symbolizes milk.
- Leaves and branches of *pipal*, *bar*, *jamun, bhalayo, ashok, bel* and *chiuri* are considered to be sacred. They are used by Hindus to perform rituals as associated with the recitation of the Puran, various *puja*, *bratabanda*, marriage, and death. *Pipal*, *bar*, *dumri*, and *pakhari* are also used for making the *toran* (sacred garlands) used in *Bastu puja*.
- The leaves of *pipal* and *bhalayo* are required during the *nwaran*, or naming ritual, that is performed for babies when they are 11 days old. Brahmins write the name of a newly born child on a *pipal* leaf after determined what it should be according to the date of birth and the Hindu calendar. It is believed that this name will not be destroyed for a long period. Similarly, a branch of a *bhalayo* plant is burnt and the ash is smeared on the forehead and other parts of a baby. This ritual is believed to protect the baby from itching.
- The leaves of the *bel* tree are used to worship the god Shiva during the recitations of the *Rudri Paath* and the month-long *Swasthani* festival. It is believed that someone who makes such an offering will be emancipated from the repercussions of a sinful deed.
- During the *puja* performed on *Rishi Panchami,* a festival celebrated by Hindu women, women gather on the banks of a river to perform a ritual washing with soil. They clean their teeth and vaginas with 65 twigs and leaves from a plant called *apamarga* (*Achyranthes aspera*).
- The Tharu use the leaves of the *mangath* as bed to prevent tetanus after a delivery, consume *jhtharigath* during pregnancy to increase energy, keep banana rhizomes near pregnant women in labor, use *kamalnath* to reduce fever during pregnancy, and drink *kharan pani*, a soup of ash, *sonth*, *bheli* and ginger, after delivering a child. *Pipal*, *jamun, bel* and *Kush* is used during *Hareri puja*[3], *Lawangi puja*[4], *Dhuriya puja*[5], *Renjiya puja*[6] *and Harot puja*[7].
- The Magar prepare a soup of *tulasi*, *bel blauti*, and *bhringaraj* for mothers and their newborns to prevent pneumonia and coughs. They also grind together *taprejhar*, *badalpat*, *ganigurjo*, and *bojho* and give it to new mothers to increase energy. During a marriage ceremony, the Magar use poles

3 *Hareri puja* (worship) means worshiping of crops. When crops start growing, the Tharu people gather at one particular place and worship these just growing crops since they believe that their worship leads to an increase in the produce. *Hareri* is derived from the word "*Hariyo*", meaning green. Thus, etymologically speaking, *Hareri puja* (hareri worship) means worshipping green crops.

4 *Lawangi puja* is used to refer to worshipping just harvested crops. Tharu people do not eat newly harvested crops before worshipping them or giving a small amount to their Gods. This worship is done collectively in Tharu community. Lawangi is derived from the word "lawa", meaning new. Therefore, lawangi refers to worshiping new crops before consuming them.

5 *Dhuriya puja* means worshipping dry land. Tharu people believe that if they worship dry or yet-to-cultivated land, its fertility will increase, thereby leading to an increase in an agricultural production. This *puja* is performed at community level.

6 *Renjiya puja* is worshipping Gods with the hope that one can get power from them that protects one from a fatal disease.

7 *Harot puja* refers to worshipping plough, yoke, iron instrument fixed to the plough. Tharu people perform *harot puja* by keeping plough, yoke, and iron instrument fixed to the plough in ready condition for ploughing the land. They also plough the land for a short time as part of *harot puja*.


Bojho *(Acorus calamus)*


Ritha *(Spandius mokurossa)*

of *sal* and bamboo and leaves of mango, *pipal*, and *bel* to prepare a sacred fireplace (*jagge*).

- During a funeral, the Magar use the wood of *sal* and *kusum* trees to cremate the body. They do not use the wood of either *jamun* or *phader* trees as these are not considered sacred woods.
- The leaves of wild banana trees are essential for various rituals and religious rites. They are used in particular to offer food and beverages to their ancestral deities.
- It is believed that stalk of the *nagbeli*, the entire *kurilo*, and the tendrils of *kukurdaino* can protect a house form evil spirits if they are placed on the lintel of the main door.

### 5.5. Enabling policy environment

Nepal has a strong enabling policy for forest conservation. Its policies include Vegetation Conservation Policy (1972), Forest Policy (1993) and Forest Regulations (1995), Environmental Conservation Policy (1996), Forest Sector Policy (2000) and Herbal and NTFP Development Policy (2004). Its proactive community forestry policy is help up as across the world as exemplary.


Consultations on NTFP/MAP policies

## 6. The Project

SAGUN, a Kapilvastu based NGO, with financial support from UNDP/Global Environment Facility/ Small Grants Programme (GEF-SGP), launched a demonstration project showing how to conserving these medicinal plants in two wards of Patana VDC, Kapilvastu District. Project's details are given below.

| | |
|---|---|
| **Project name** | Reaching the Unreached: Promotion of NTFPs/ MAPs for Biodiversity Conservation and Livelihood Enhancement Project |
| **Project number** | NEP/SGP/OP5/Y1/CORE/12/06 |
| **Project location** | Patana VDC, Ward-7 (Danapur) and Ward-8 (Motipur), Kapilvastu, Nepal |
| **Project duration** | July 2012- December 2013 (18 months) |
| **Project cost** | Total NPR 9234400 (US$ 92340)<br>GEF-SGP 3999900 (US$ 39999)<br>Other 5234500 (US$ 52345) |
| **GEF Focal area** | Biodiversity conservation and land degradation OP13 - Conservation and Sustainable Use of Biological Diversity Important to Agriculture and OP15 - Operational Program on Sustainable Land Management |
| **Beneficiaries** | 814 households, 5514 population (female -2819, male-2695), ethnic composition (Tharu-54%, Magar-42%, Madhesi-2%, Dalits-2%) |

## 7. Project's working approach

While implementing the project, the following approaches were implemented to empower local people and foster conservation effort.

### 7.1 Inception workshop

At the project inception workshop different stakeholders such as representatives of the government, forest users groups, media and local people were briefed about the project (objective, plans and programs including budget).


District level project consultation workshop

Community orientation on project initiatives

## 7.2 Demonstration in a small area

Since its resources were limited, the project was implemented in just two wards of Patana VDC so it would be able to demonstrate meaningful results. The project worked with two collaborative forest user groups, namely those managing Pipaldanda Collaborative Forest in Danapur and Chandeswori Collaborative Forest in Motipur (see annex-5 for list of collaborative and community forest in Patana VDC).

## 7.3 Formation of socially inclusive NTFP/MAP groups

The project facilitated the formation of socially inclusive NTFP/MAP sub-committees in the project area for NTFPs/MAPs conservation and development.

## 7.4 Orientation and sensitization

Orientation and sensitisation workshops were carried out to involve stakeholders such as *gothala* (shepherds), eco-club students and traditional Tharu healers (guruwa, *baidawa*). Environmental rallies were organised to orient the general public. The project also mobilized *badghar* (Tharu village heads) and *chaukidar* (forest guards) in the conservation initiatives.

## 7.5 Production of IEC material, NTFP/MAP policy brief, and media mobilization

In order to orient locals and school students, IEC materials on relevant NTFPs/MAPs were developed and distributed. A local FM channel was also mobilised to disseminate this information to a wider audience.

## 7.6 Capacity development

Capacity-building components included the sustainable harvesting of NTFPs/MAPs, marketing, post-harvesting techniques, and organic farming.

## 7.7 Seed support for conservation initiatives

Seed support was provided to cultivate NTFPs/MAPs in collaborative forests and on private land and to establish processing units for NTFPs/MAPs.

## 7.8 *Bijaya sal* conservation

Special efforts were made to conserve the *Bijaya sal*, a rare tree species. The project also interviewed elderly people and members of collaborative forest users' groups to estimate their number in Patana Forest. *Bijaya sal* demonstration plots were established by two collaborative forest users' groups.

Children participation during Bijay sal *(Pterocarpus marsupium)* conservation rallies

### 7.9 Partnership

The project built meaningful partnerships with the local government, line agencies, Ayurvedic companies, and collaborative forest users' groups as well as with Himalayan Socio-Economic Development Nepal, which implements community development projects with Caritas Nepal's funding.

## 8. Major project activities

The project's activities were categorised into three key components: (i) institution-building and awareness generation, (ii) capacity-building initiatives, and (iii) conservation and livelihood initiatives.

### 8.1 Institution-building and awareness generation

**a. Formation of socially inclusive NTFP/MAP committees**

The project facilitated the formation of four inclusive NTFP/MAP sub-committees in the project area for NTFP/MAP conservation and development. At least 80 people were involved in these committees, 41% of whom were males and 59% of whom were female. The inclusive NTFP/MAP groups accommodated all people interested in the cultivation of the NTFPs/MAPs. The provision of socially inclusive committees helped see the project's benefits reach previously unreached sections.

**b. Connecting NTFP/MAP conservation sub-committees with private Ayurvedic companies**

To facilitate the marketing of NTFPs/MAPs, NTFP/MAP conservation sub-committees were linked with six Ayurvedic companies: Ayurvedic Pharmacy, Kotihawa, Bhairahawa; Lumbini Ayurvedic Pharmacy, Butwal; Neem Ayurvedic Pharmacy, Butwal; Janta Ayurvedic Pharmacy, Butwal; Gnawali Pachak Ayurvedic Pharmacy, Butwal; and Family Ayurvedic Pharmacy, Butwal. Establishing these links helped the sub-committees access markets. A total of 48 people were actively involved in the interactions.

**c. Strengthening of local cooperatives**

The project facilitated the formation and strengthening of local cooperatives in order to systematize marketing channels. The members of four NTFP/MAP sub-committees were linked with cooperatives to initiate group-based cultivation, sustainable harvesting and proper marketing of NTFPs/MAPs. It was agreed that 10-15% of the income earned by a cooperative would be used to for the conservation and sustainable harvesting of NTFPs/ MAPs. More than 36 people were able to run NTFP/MAP-based small-scale enterprises due to the strengthening of cooperatives.

**d. Development of IEC materials and awareness-raising**

IEC materials related to mentha (*Mentha piperita*), citronella, lemon grass, nursery construction and management and policy review were produced. A thousand copies of each were published and disseminated to relevant stakeholders, including school students, collaborative forest users, *guruwa* and *baidhawa*, and shepherds. Rallies, radio programs, and documentary shows on NTFPs/MAPs conservation were also organised in order to reach a wide audience. More than 574 people benefitted from awareness-raising.

**e. Conservation education for school students**

The project helped to form two eco-clubs each engaging a total 50 students from grades 6 to 9. These students were mobilised to organise debate, essay, and art competitions related to the conservation of NTFPs/MAPs. Video documentary on wise use of NTFPs/MAPs were also shown periodically. These initiatives collectively helped to increase awareness about NTFPs/MAPs among 450 school students in two


Bojho (*Acorus calamus*)


Amala (*Pyllanthus imblica*)


Barro (*Terminalia belerica*)


Bel tree (*Aegle marmelos*)


Ritha (*Spandius mokurossa*)


Harro (*Terminalia chebula*)


Tejpat (*Cinnamomum tamala*)


Gurjo (*Tinospora cordifolia*)

schools. The commitment of students towards the conservation of NTFPs/ MAPs increased as did their knowledge and understanding.

**f. Education for shepherds**

A total of 35 non-school going children benefitted from education for shepherds, which highlighted issues related to the conservation, development and wise harvesting of NTFPs/ MAPs. They learned about do's and don'ts regarding the conserving, harvesting and post-harvesting of NTFPs/MAPs.

**g. Interaction programmes with *guruwa, baidhawa* and other stakeholders**

The project held four interaction programs with *guruwa, baidhawa*, local herders, Ayurvedic shop owners and Ayurvedic technicians to discuss the conservation, protection, and sustainable harvest of NTFPs/MAPs. Contemporary issues related to sustainable harvest were discussed to promote the cross-fertilization of knowledge. A total of 15 people actively participated in these interaction programmes.

**h. Sharing policy provisions with forest users**

In order to share policy provisions, some simple pamphlets were prepared in Nepali language. They thoroughly reviewed the following policy provisions in chronological order:

- Plant Protection Act (1972)
- Forest Act (1993)
- Forest Regulations (1995)
- Environmental Conservation Policy (1996)
- Local Self-Governance Act (1998)
- Forest Sector Policy (2000)
- Herbal and NTFP Development Policy (2004)
- Nepal Biodiversity Strategy Implementation Plan (2006)
- Three-Year Interim Plan (2010-2013)
- Industrial Policy (2010)
- Nepal Business Integrated Strategy (2010)

To share the provisions regarding NTFPs/MAPs spelled in these plans, policies and strategies, a one-day orientation was organised for each of four NTFP/MAP groups. Altogether 1600 people were sensitised.

**i. Knowledge documentation of the types and use of NTFPs/MAPs**

Even though local people have thorough knowledge about locally available NTFPs/MAPs and their use for household purposes, income generation and medicine, that knowledge was neither properly documented nor transferred to the younger generation. To remedy this lacuna, the project mobilised NTFP/MAP promotional groups to identify NTFPs/MAPs and categorize them by uses for different purposes. A total of 102 types of NTFPs/MAPs were systematically documented.

**j. Mobilisation of FM radios to disseminate information related to major NTFPs/ MAPs**

The project mobilised FM radios to raise awareness on the following seven medicinal plants by developing simple radio programmes that were aired once a week. It was estimated that at least 15,000 people from five districts benefitted from hearing such radio programmes.

- *Asuro* (dry)—*Justicia adhatoda* L. (Acanthaceae)
- *Bayar*—*Ziziphus mauritiana* Lam. (Rhamnaceae)
- *Bel*—*Aegle marmelos* (L.) Corr. (Rutaceae)
- *Bojho*—*Acorus calamus* L. (Acoraceae)
- *Mauwako phul*—*Madhuca longifolia* Mac. (Sapotaceae)
- *Rudilo*—*Pogostemon bengalensis* Kuntz. (Labiatae)
- *Gurjo*—*Tinospora cordifolia (Menispermaceae)*


Ritha *(Spandius mokurossa)*


Tejpat *(Cinnamomum tamala)*

## 8.2 Capacity-building initiatives

### a. Training on NTFP/MAP nursery management

The project organised a three-days training on NTFP/MAP nursery management involving 30 farmers. The training focused on community-managed NTFPs/MAPs promotion and management, local biodiversity conservation, and forest resource management. The step-wise process was imparted and nursery establishment was demonstrated.


Participants practicing sustainable harvesting of NTFPs/MAPs

### b. Training on the sustainable harvesting and wise use of NTFPs/MAPs

A three-day training on the sustainable harvesting and wise use of NTFPs/MAPs was imparted to community based organization (CBO) members, collaborative FUG members, *guruwa, baidhawa*, shamans and Ayurved pharmacists. The training was attended by 44 participants.

### c. Organisation of study visits

The project organised a study visit to 18 key farmers in Gajada village of Kapilbastu District and Dhakeri and Samshergunj villages of Banke District to encourage people to take up the commercial farming of NTFPs/MAPs and practice sustainable harvesting. During the tour, they obtained first-hand information on nursery establishment, cultivation of medicinal and scented NTFPs in collaborative forests and on private lands, caring for cultivation areas, sustainable harvesting, and marketing. They were also taught about cost-benefit analysis and the short and long-term benefits of cultivating NTFPs/MAPs.


Orientation on NTFPs/MAPs conservation

### d. Training on organic vegetable farming and seed support

As the project area has access to partial winter irrigation and local markets are available, vegetable farming could be an impressive income sources. A total of 40 people were involved in organic vegetable training. The training largely focused on seed selection, seed bed preparation, seedling transplantation, use of inputs (timing, dosage, etc), harvesting, and marketing. A vegetable crop calendar of a number of vegetable varieties was also prepared to enable farmers to reap the maximum benefits.

### e. Training on NTFP/MAP marketing scopes

A three-day training on the scope of NTFPs/MAPs marketing was organised for 40 people for three days


Vegetable farm

to encourage locals to take up NTFPs/MAPs farming. The training helped impart information of marketing options, linkages, and routes as well as on timing in order to maximise benefits.

### f. Training on post-harvest technologies

The project organised training on NTFPs/MAPs harvesting and storage (post-harvest) technologies so that farmers can store and sell their commodities at appropriate times, i.e. when the price in the market is high. More than 40 people engaged in NTFPs/MAPs cultivation benefitted from this post-harvest training about proper storage and handling system to prevent wastage.

## 8.3 Conservation and livelihood initiatives

### a. Establishment of NTFP nursery and cultivation of NTFPs/MAPs

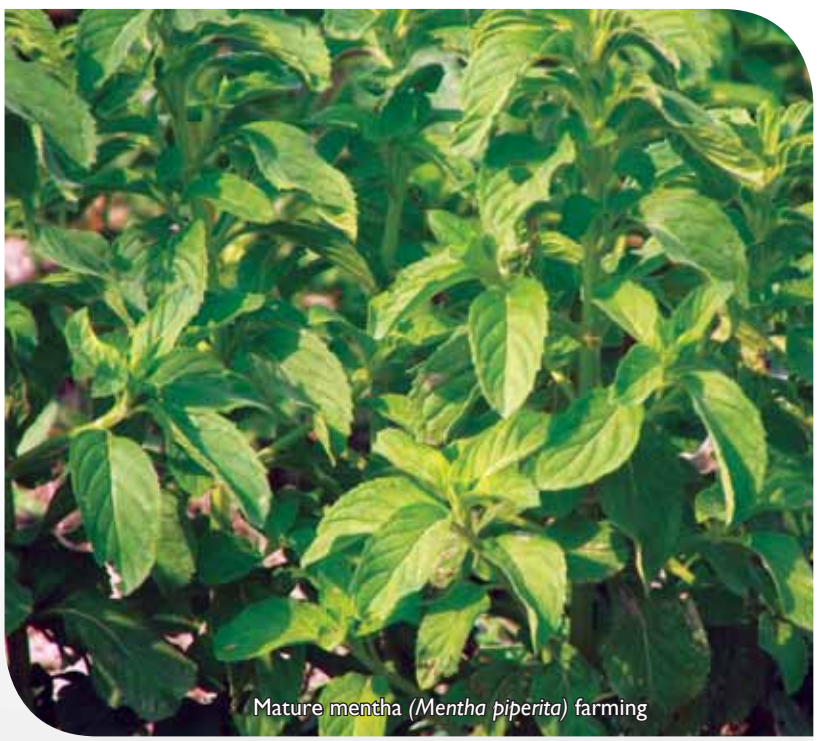
With the active involvement of NTFP/MAP promotion groups, two nurseries were established, one in each village. They produced more than 13,000 seedlings. About 9,000 seedlings were planted in two collaborative forests and 4,000 seedlings were planted in private forests or land. This initiative helped promote the establishment of nurseries and culture of plantation on collaborative and private forest land.

### b. Cultivation of *mentha*

The project initiated the cultivation of *mentha* on 8 ha of private land in Motipur and Danapur villages for demonstration purposes.

### c. Linkage with Shiva Mandir CFUG for the processing of *mentha*

The farmers of Patana cultivated *mentha*, a choice which is particularly beneficial its cultivation does not hamper the sowing of other crops and actually fills the gap from April to early July, when most of the land is fallow. *Mentha* is also a repellent crop so there is no need to protect it from livestock and wildlife. A memorandum of understanding was developed between four NTFP/MAP promotional groups with Shiva Mandir CFUG, Jeetpur-4, for using its modern equipment to process *mentha*.


Mature mentha *(Mentha piperita)* farming


Mentha *(Mentha piperita)* farm


Conservation Initiative for Bijay sal

### d. Initiation to conserve *bijay sal*

The project partnered with local collaborative forest user groups to practice in-situ *bijay sal* conservation. It carried out a census of *bijay sal* in northern parts of Kapilvastu District and found 1,100–1,200 *bijay sal* trees (see Annex-9 for census of *Bijay Sal*). Four NTFP/MAP promotional groups developed detailed plans of action for the conservation and wise use of *bijay sal*. They also established *bijay sal* demonstration plots (1 ha per group) by planting and safeguarding naturally germinated seedlings. Chandeshwori forest user group of Motipur lead the plantation of these seedlings. Each NTFP/MAP promotional group had dug a trench and brought compost manure to facilitate the proceedings. The project mobilised local media to spread awareness about *bijay sal* on a wide scale. An information board was prepared and erected in a strategic location in Motipur. It displays simple information about the *bijay sal* and its medicinal use.

#### Box-1: Salient features of *bijay sal*

*Pterocarpus marsupium*, also known as *bijay sal* or the Indian Kino Tree, is a medium to large deciduous tree that can grow up to 30 m. It is native to Nepal, India and Sri Lanka. It is also known by the names Malabar Kino, Benga, Piasal, Venkai, and many others. Its leaves are oblong, have conspicuous veins, and produce reddish latex. It is used for fodder, medicinal purposes, and furniture and house construction. The heartwood, leaves, fruits, and flowers of the *bijay sal* have long been used for their medicinal properties in the Ayurvedic science of medicine.

**Kingdom**: Plantae
**Order**: Fabales
**Family**: Fabaceae
**Genus**: Pterocarpus
**Species**: P. marsupium
**IUCN category**: Vulnerable

Studies of the tree have confirmed some of the medicinal properties of the *bijay sal*. The heartwood, which is used as an astringent and to treat inflammation and diabetes, is effective due to its high pterostilbene content. In-vitro studies of the plant's anti-diabetic properties have also been carried out. The gum resin of *P. marsupium* is the only herbal product ever found which has the ability to regenerate the beta cells that produce insulin in the pancreas, thus making it an effective treatment for Type 1 diabetes. The tree's flavonoid constituents marsupin, pterosupin and liquiritigen reduce serum triglycerides, total cholesterol and low-density lipoprotein in the blood. But pregnant women are not advised to consume it.

The uses of the *bijay sal* in traditional medicine are many. Similipalkol tribes in Odisha make a paste of the barks of *P. marsupium*, *Mangifera indica*, *Shorea robusta* and *Spondias pinnata* to treat dysentery and other diarrheal illnesses. The Kannada people of India make a wooden tumbler from the tree's heartwood, leave water in it overnight, and consume the solution in the morning as a treatment for diabetes. They believe that the water draws healing properties from the wood. Indeed, the Kannada also believe that a poultice made from the bark and leaves of the tree possesses astringent properties useful in treating skin conditions.

Some of the other diseases it is used to treat and beliefs about it are listed below:

- It cures elephantiasis, and coughs and blackens hair.
- The regular consumption of a powder made from various parts promotes good for health and helps heal heart diseases.
- If the trees powder is soaked overnight, the solution clears the skin; heals fractures; alleviates indigestion, asthma, and muscle pain; and cures reproductive and urinary problems.
- Its fruits cure the inflammation of internal organs, syphilis, stomachache, cholera, excess bleeding, and other conditions.
- It is useful in veterinary medicine, especially to treat stomachaches in animals.
- The powder of the bark of *bijay sal* should be mixed with water and swallowed to treat pneumonia.


Gurjo (*Tinospora cordifolia*)


Bojho (*Acorus calamus*)


Amala (*Pyllanthus imblica*) fruits


Dried *kurilo-satawori*

## 9. Results

The project's major results were largely categorised into three major sub-headings: (i) sustainable forest management, (ii) livelihood improvement, and (iii) organic vegetable farming.


Deweeding for sustainable forest management

### 9.1 Sustainable forest management

The action plans of two collaborative forests were reviewed and plans to conserve and promote more than 102 local medicinal plants were added. These new plans were implemented in coordination with collaborative forest users' groups, Patana VDC and Shree Himalaya Socio-Economic Development Centre/Caritas Nepal.

As provided in the plans, the collaborative forest users' groups established two nurseries with a total of 13,000 seedlings. Then the project facilitated the planting of those seedlings on 24 ha of collaborative forest land (4 ha in Motipur and 20 ha in Danapur) and 7 ha of private forest land. The seedlings planted included ritha (*Spandius mokurossa*), bakaino (*Melia azedarach*), Dumri (*Ficus racemosa*), amala (*Pyllanthus imblica*), jamun (*Syzygium cumini*), arjun (*Terminalia arjuna*), simal (Bombax ceiba), Koiralo (*Bauhinia variegata*), Ipil-Ipil (*Leucaena leucocephala*), siris (*Albizia lebbek*), khayar (Acacia catechu), bel (Aegle marmelos), neem (Azadirachta indica), bamboo, harro (*Terminalia chebula*), and barro (*Terminalia bellirica*). Fences of barbed wire and vegetation were strengthened around the newly planted area in coordination with two collaborative user groups and Patana VDC.

The forest users were involved in nursery establishment, plantation, and fencing with barbed wire. Regenerative growth is extremely good.

In order to control unsystematic free grazing, the forest was divided into blocks for use in rotational grazing and rules and regulations were formed. Violators of rules are fined: NRs 50 the first time, NRs 100 the second, and NRs 500 for any further violation.


Community members engaged during fencing

## Success Story 1: Community-Based *Bijay Sal* Conservation Initiatives

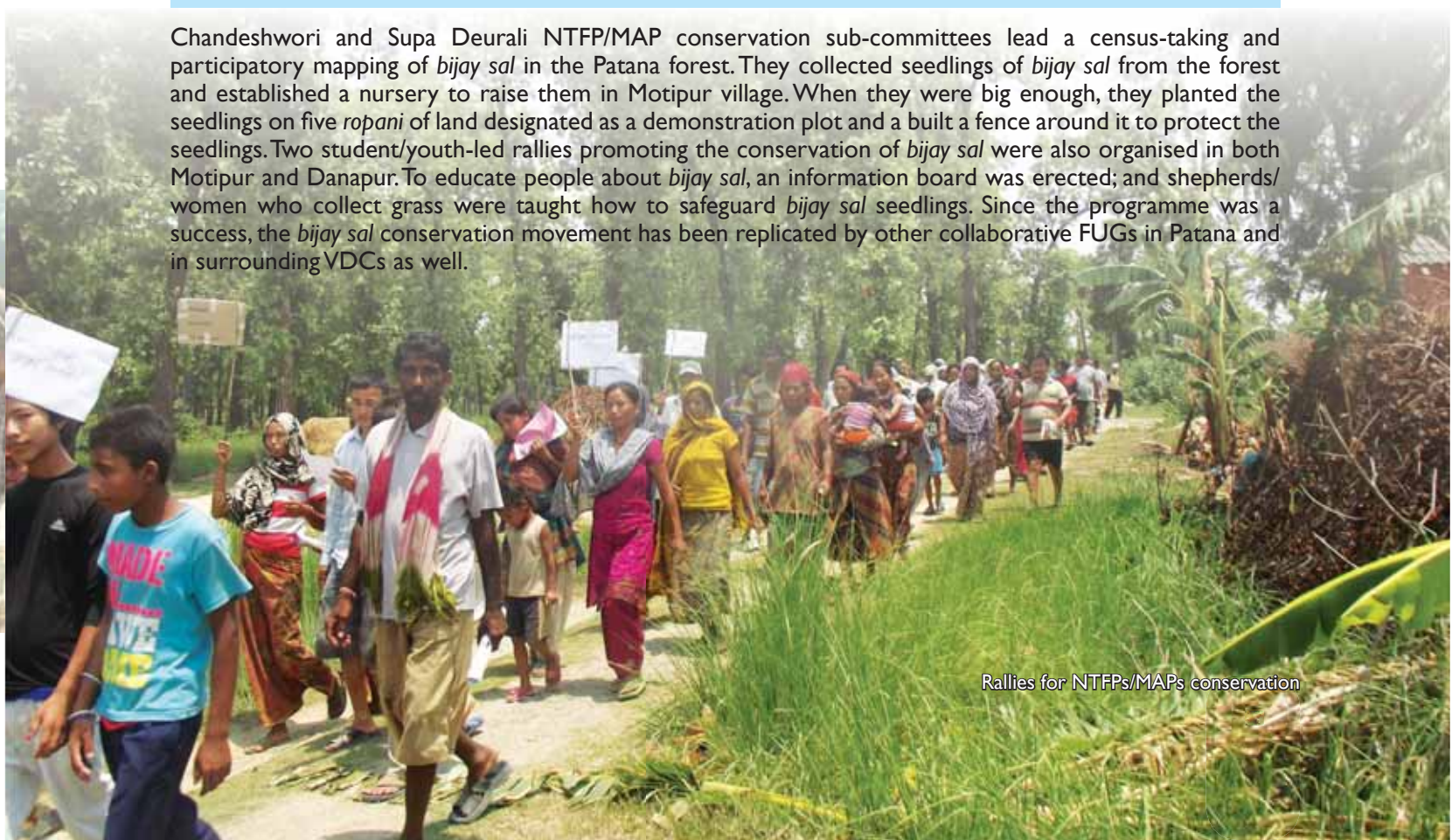
*Bijay sal* (*Pterocarpus Marsunpium Roxb*) is found widely in northern Kapilvastu. Its leaves are oblong, have conspicusous veins, and produce reddish latex. The tree is used for fodder, medicinal purposes, and furniture and house construction. Forest encroachment and excessive use has made its population decline dangerously.

Before the project's intervention, collaborative FUGs were not aware of the need to conserve the *bijay sal* and made ample use of its wood for making furniture, traditional ploughs, bullock carts, and utensils like glasses and water vessels and its leaves were used as fodder. People also prefer its ash to wash dishes. Since the majority of *bijay sal* seedlings are found along canals, they are damaged during annual canal maintenance work. They are also damaged when people harvest grass in collaborative forests. Deforestation, forest degradation, forest fires, and unsustainable harvesting are some major reasons for its decline.

*"We are now well aware of the benefits of bijay sal. In the past we used to use its timber to make bullock carts and traditional ploughs as it is strong and easily bent. We have learned that the bijay sal helps hold soil moisture in the forest and agriculture land along the forest, but it was only after our agricultural land started drying up that we realised how important this tree was. Our collaborative FUG has prepared some rules for the conservation of the bijay sal, including penalties for those who violate the rules."* Mr Bhim Thapa Magar, chair, Chandeshwori collaborative FUG.

*"In the village, collecting fodder and grass for livestock is a job for women. Since we didn't know about the causes and consequences of bijay sal conservation, we used to cut grass without paying attention to the damage we did to bijay sal seedlings. The bijay sal is a magical medicine useful for treating many diseases, so we are very interested in conserving it."* Ms. Jayanti Gaha Magar, local woman

Chandeshwori and Supa Deurali NTFP/MAP conservation sub-committees lead a census-taking and participatory mapping of *bijay sal* in the Patana forest. They collected seedlings of *bijay sal* from the forest and established a nursery to raise them in Motipur village. When they were big enough, they planted the seedlings on five *ropani* of land designated as a demonstration plot and a built a fence around it to protect the seedlings. Two student/youth-led rallies promoting the conservation of *bijay sal* were also organised in both Motipur and Danapur. To educate people about *bijay sal*, an information board was erected; and shepherds/women who collect grass were taught how to safeguard *bijay sal* seedlings. Since the programme was a success, the *bijay sal* conservation movement has been replicated by other collaborative FUGs in Patana and in surrounding VDCs as well.



Rallies for NTFPs/MAPs conservation

## 9.2 Livelihood improvement

By initiating the cultivation of NTFPs/MAPs and organic vegetable farming, the project helped people better earn a livelihood. *Mentha* was cultivated on a total of 9 ha of land in Motipur and Danapur villages and earned 28 households an average seasonal income of NRs 62,858. The practice of farming *mentha* is increasing because the plant has multiple benefits.

### Success Story 2: *Mentha*, an aromatic plant, is a good source of income

From April to July of every year, people in Patana leave their land fallow. Because they practiced open grazing system, they neither grow vegetables nor fruits during that period. Besides, crop damage by wild animals such as blue bull and wild boar was also a major problem.

In 2013, 28 farmers planted *mentha* on 9 ha. The project trained participating farmers in land preparation, manure and irrigation management, weeding and other forms of care and support, disease and pest management, crop harvesting, and post-harvesting. The 28 farmers also made a study-visit to Shamshergunj and Dhakeri villages in Banke District to learn first hand information about *mentha* farming. The project linked the *mentha* farmers with Shiva Mandir CFUG of Jeetpur to ensure that the essential oil produced by *mentha* would be distilled and marketed.

*Mentha* farmers earned an average of NRs 62,858 per season. In addition to the money, *mentha* farming has a number of other benefits. Its aroma repels pests and wildlife and thereby helps reduce crop damage. After *mentha* is harvested, the residual parts are used as green manure, which helps increase paddy production. When other farmers realized that *mentha* has multiple benefits, they, too, took it up.

Ram Krishna Chaudhary, lead farmer, Danapur

Many women are very happy with *mentha* farming. It's easy to do even for women because it is not very labour intensive. This is the reason that area under mentha cultivation is in increasing order.

Ms Jhila Thapa Magar, Chair, Supa Deurali NTFPs/MAPs Conservation Committee

*Mentha* is an annual plant that grows up to 90 cm tall and produces oil from all of its parts except the root. About 80% of its oil comprises menthol, a compound which is used for making antiseptic, cough syrup, tablets, and other products. It is also used to flavour sweet and savory dishes and make tea.

Mentha *(Mentha piperita)* cultivation

## 9.3 Increasing organic farming

The project helped 38 lead farmers convert 10 ha of land into organic farms by providing them with the knowledge, skills, and inputs they needed. On average, each participating farmer earned NRs 5,000–8,000 per month from off-seasonal organic vegetable farming. The support of Himalayan Socio-Economic Development Centre/Caritas Nepal has also been instrumental in organic vegetable farming.

In order to reap maximum benefits from vegetables, 12 lead farmers were trained to serve as local technicians who can carry out soil testing and treatment. They supported other families by visiting their farm plots, testing the soil, and offering and overseeing treatment if it is called for.

### Success story 3: Organic farming: promoting a green enterprise

Before the project came into effect, the village had not started to practice organic farming nor crop rotation and, with the recent increase in the use of chemical fertilizers, pesticides and hybrid varieties, farming in Patana VDC was becoming less sustainable.

The project helped 38 lead farmers to initiate organic farming on 10 ha of land. Agro-biodiversity has been restored by adopting crop rotation and inter-cropping and using organic fertilisers and bio-pesticides. Making this change was no easy job. It took persistent advocacy to get locals to even try non-chemical inputs. Eventually, the project trained locals to prepare organic manure and bio-pesticide by using cow dung, urine and various plant varieties available locally. The project also trained 12 local soil technicians. They were instrumental in helping farmers to test their soil and prescribe soil treatment accordingly.

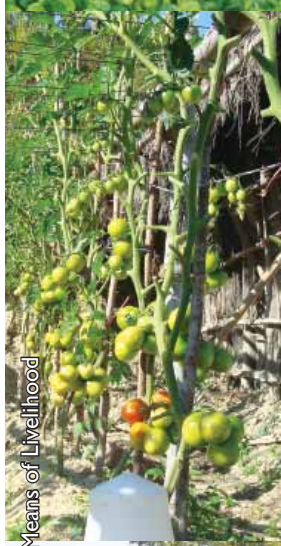
*"I am very proud to be a lead organic farmer. Many other farmers consult with me about organic farming. If we do not practice organic farming, sooner or later our agriculture land will lose its value. We need to take care of our soil. If it's unhealthy, it does not yield much. Since we started organic farming and using compost manure and bio-pesticides, the soil has regained its fertility. There is little chance of crop failure either now or in the future."*

*Mr.* Gau Prasad Lamichhne (Magar), Ex-chair, Chandeshwori collaborative FUG.

*"Along with organic vegetable farming, the project also encouraged local people to generate money through savings-and-credit cooperatives. The project provided training regarding the operation of savings-and-credit cooperatives, leadership development, income generation, and marketing. For the sustainability of organic farming, the project need to coordinate with agriculture service center and district agriculture development office in a regular manner."*

Mr Nava Raj Pantha, VDC Secretary, Patana VDC

Each family made NRs 5000–8000 per months from off-seasonal vegetable farming. Enthusiasm for adopting organic farming escalated after others discovered that the 28 lead farmers had earned a total of NRs 203,000 through organic farming. Today, organic farming is gradually being replicated in neighboring villages as well.



Vegitable Farming: Means of Livelihood

## 9.4 Institution-building and development of local resource person

A total of 14 groups having 102 men and 354 women members have been mobilized by the project. By the project's end, they had collected NRs 7,02,200. All 14 groups were successfully linked with two savings-and-credit cooperatives. The project has also collaborated with other agencies working in Patana VDC for synergy (see annex-10 for list of institutions working in Patana VDC).

The project also developed 24 local resource persons for NTFPs/MAPs conservation and development and identified 102 local medicinal plants to conserve. Four inclusive NTFP/MAP sub-committees were formed and 44 key leaders were readied for NTFPs/MAPs advocacy and campaigns. Local people's sense of ownership of NTFPs/MAPs conservation and development increased once they got involved through the four committees

*"Compared to before, the quality of community and private forest areas has improved. Because of forest conservation and systematic grazing practices, forests are replete with beautiful grasses. Wetlands and riverine forests have revived. Degraded land has been converting to greenland."*

*Ms Sharmila Lamichhane (Magar), Motipur village*

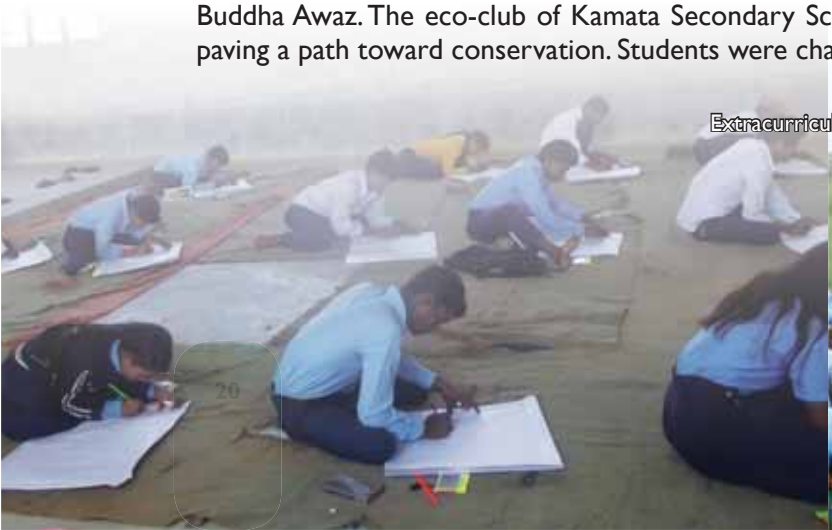
*"People have learned about the post-harvest treatment (cleaning, drying, grading, storage) of collected MAPs. The forest has become dense, so we are now able to harvest grass and fodder quickly. We used to have to walk long distances to harvest grass and fodder. All that is history now thanks to the forest conservation program. Along with CBO and collaborative FUG members, it is necessary to train guruwa, baidhawa, shamans and Ayurvedic pharmacists for the best usage of the MAPs available in Patana Forest. It also assures the wise use and sustainable harvesting of* MAPs." *Ms Durga Magar, Motipur*

### Success Story 4: Eco-club members serve as conservation ambassadors

Since environment was not seen as an important issue, no eco-clubs had been formed in the schools of Patana VDC before the arrival of the project. Students were unconcerned about the types and usage of NTFPs/MAPs and techniques for conserving them. Consequently, they would mindlessly uproot or trample on NTFPs/MAPs while tending livestock or gathering firewood and grass.

Students were provided with a simple orientation regarding the significance and roles and responsibilities of eco-clubs. Each team was given a list of interested students and a theme to prepare. Two eco-clubs were formed. Both work actively to conserve NTFPs/MAPs. Since students, youths and school teachers can play an important role in conservation, information on NTFPs/MAPs was integrated into school-based extracurricular activities like debate, essay, and art competitions.

Through extracurricular activities, as many as 450 students improved their understanding of NTFPs/MAPs conservation, and the roles they can play in this respect. They also learned about the conservation of NTFPs/MAPs and their sustainable harvesting through a video documentary. The voices of students speaking about the role of local people in NTFPs/MAPs conservation were recorded and aired from the local FM Radio Buddha Awaz. The eco-club of Kamata Secondary School has become a role model for other schools by paving a path toward conservation. Students were changed from nature destructors to nature conservers.



Extracurricular activities


Ritha *(Spandius mukorossi)*


Harro *(Terminalia chebula)*


Tejpat *(Cinnamomum tamala)*


Amala *(Pyllanthus imblica)*

*"Before the project, we were not taught about NTFPs/MAPs conservation at school or at home. But now, thanks to eco-club initiatives and extracurricular activities, we have realized that we were unknowingly destroying NTFPs/MAPs. Now we are very concerned about their conservation."*

Mr. Panchuram Chaudhary, student, grade 8

*"Whenever I went to collect fodder with my father and mother, we used to cut all the vegetation in the entire field rather than just cutting grass and avoiding small plants. In ignorance, we used to cut many important MAPs. That was very stupid of us. Now that we know the importance of MAPs, we have become very selective during fodder collection: we leave valuable MAPs to grow. If we don't act now, these precious plants will exist only in stories for future generations."*

Ms. Maya Tharu, student, grade 9

## 9.5 Co-funding and resource mobilization

The project was successful in developing meaningful partnership with Himalayan Socio-Economic Development/ Caritas Nepal to empower women, conservation and livelihood initiative such as wetland conservation, organic vegetable farming, mentha farming and livestock vaccination. Likewise, the project also partnered with Patana VDC, Chandeswori and Pipaldanda collaborative forest users group to undertake conservation activities. The project was successful in generating additional NPR 52,34,500. (Table 1 ). Co-funding not only increased the interest of locals but also fostered the accountability of local stakeholders.

Table 1: Co-funding status

| SN | Agencies | Key theme/task | Cash and kind equivalent to NPR |
|---|---|---|---|
| 1 | Patana VDC | Fencing of newly planted NTFPs in two CFUGs | 3,16,850.00 |
| 2 | Himalayan Socio-Economic Development Centre/Caritas Nepal | Women empowerment, livestock vaccination, organic vegetable farming, improvement of water hole, conservation of Gagai wetlands, promote metha farming through seed support | 37,82,650.00 |
| 3 | Chandeshwori Collaborative FUG | Labor contribution during nursery establishment, plantation, and fencing with barbed wire | 4,25,000.00 |
| 4 | Pipaldanda Collaborative FUG | Labor contribution during nursery establishment, plantation, and fencing with barbed wire, water hole conservation | 7,10,000.00 |
| | Total | | 52,34,500.00 |

Women participation during planning and decision making

### 9.6 Gender Result

Based on indicators and sub-indicators, the project was categorised as Direct Gender Responsive' (code of 1) as it scored 51, which is more than 50. The participation of women in groups and committees is 62% and 49% respectively (refer annex-6). Inclusion of women is more than 33% in staffing, management and coordination committees including decision making positions. Similarly, the provision of stakeholders/ women's participation in the executive committees and other committees including major posts was good because this participation is more than 33% in users committee and less than 33% in decision making positions. The project had a compulsory provision in presence of women staff/member in project management or implementation meetings. Similarly, the participation of women staff and member in orientations, seminars, workshops, skill development programs and training was excellent because their presence is more than 33%.The project also maintained sex disaggregated data on benefits in the program and reviewed the budget allocated for gender specific program. There was no discrimination in terms of job employment and equal wage to men and women (refer annex-7). Adequate budget (64% of the total budget) was allocated for programs promoting gender equality and equity (refer annex-8). Out of 5,514 beneficiaries, 2965 (54%) are women (project record, 2014). The Project helped to reduce gender inequality through involving women and men in every stage of project cycle.

## 10. Lesson learned and recommendation

The following lessons and recommendations were drawn based on the careful implementation of the project in and around Patana Forest:

### a. Diversity conservation verses commercial production of NTFPs/MAPs

The locals recorded 102 NTFPs/MAPs in the forest area managed by two collaborative forest users' groups. The project was successful in conserving these NTFPs/MAPs but was unable to cultivate them for commercial purposes. It is learnt that along with conservation of variety of NTFPs/MAPs, it is important to focus on commercial production of few NTFPs/ MAPs for economic empowerment.

### b. Engagement of a wide range of stakeholders

Aside from regular stakeholders such as VDC, DDC, the District Forest Office, school students, and two collaborative FUGs, the project also included important but often neglected stakeholders such as shepherds, shamans, *guruwa, baidhawa* and Ayurvedic pharmacists. Involving so many different people helped document the medicinal value of the NTFPs/MAPs as well as develop a market for NTFPs/MAPs and scale up related enterprises.

### c. Sharing of policy brief

The preparation and sharing of a policy brief with stakeholders was instrumental in generating local interest in conserving the forest.This sharing helped to develop community leaders as local resource persons. Their presence, in turn, facilitated the communication of technical conservation issues to a large mass of people. Awareness of policy provisions can also help to scale up NTFPs/MAPs- and agro-based enterprises. Developing *do*'s and *don't*'s and other IEC materials

on the basis of policy provisions can save time and resources among entrepreneurs.

### d. NTFP documentation

The documentation of local knowledge about the use of plants in rituals, daily life, and medicine and the cultivation of an appreciation of their value significantly increased the value of the forest as a whole for local people. This increase in valuation helped bind all stakeholders together in the conservation effort.

### e. Conservation of *bijay sal*

The fact that *bijay sal* trees are found in Patana Forest enhances its biodiversity value. The simple counting of *bijay sal* trees, the spreading of information about its medicinal value and the development of a *bijay sal* conservation block developed local interest in conserving this disappearing vulnerable flora.

### f. Livelihood versus conservation

Conservation efforts become easier when local livelihoods were addressed. Locals were engaged diverse income generation and livelihood activities such as cultivation of *mentha* and the development of a system for extracting its essential oil, promotion of animal husbandry, organic farming and water hole management. These income-generating opportunities had kept locals from turning to the illegal timber harvesting in the forest. Since *mentha* repels wildlife, wildlife-induced crop damage declined and, as a result, so did conflicts between humans and wildlife.

### g. Institutional building

The formation of socially inclusive NTFP/MAP conservation and development sub-committees not only ensured the proper distribution of roles and responsibilities but also fostered a healthy competition among them for embracing sustainable conservation initiatives. NTFPs/MAPs conservation plans create an enabling environment for the wise use, conservation, sustainable harvesting and marketing of available NTFPs/MAPs.

### h. Establishment of nurseries

The quality of seedlings is good and they are healthy if nurseries are established locally. Establishing a nursery also fosters the culture of plantation at the local level. That said, maintaining a community nursery was very challenging from conservation and protection point of view.

### i. Engaging youth

Youths are agents of change. Involving youth in conservation activities is important for sustainable forest management. The project's allocation of open fields next to forest areas for sports, recreation and community gatherings attracted youth to the conservation effort.

### j. Conservation of giant hornbill

Since giant hornbills are also found the in the Patana Forest, effort should also be concentrated in conserving the bird along with the conservation of Patana forest and Bijay sal.

### k. Scaling up

The concept of conserving forests by addressing their religious, medicinal, and daily use value making locals aware of policy issues, and improving local livelihoods should be up-scaled to ensure that of the entire Patana Forest is conserved.

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# Annex

## Annex-1: Name of NTFPs/MAPs, scientific name, local use and part use

| SN | Name | Scientific Name | Local use | Parts used |
|---|---|---|---|---|
| 1 | Aakeshbeli | *Cuscuta reflexa* Roxb. | • Cures jaundice | Seed, stem |
| 2 | Aank | *Calotropis procera* (Ait.) Ait.Fil. | • Strengthens liver and other internal organs<br>• Heals asthma | Leaf, Root |
| 3 | Ainsalu | *Rubus ellipticus* L. | • Cures cough and cold | Seed |
| 4 | Ajambari jhar | *Kalanchoe pinnata* Lam. | • Cures wounds and blisters | Leaf |
| 5 | Amala | *Pyllanthus emblica* L.Willd | • Increases appetite, strengthens teeth and blood vessels | Fruits, leaf |
| 6 | Amili jhar | *Oxalis latifolia* Kunth | • Cures dysentery, cholera and gastritis | Whole plant |
| 7 | Angeri | *Lyoniaova lifolia* (Wall.) Drude | • Cures scabies and skin burn | Young shoots |
| 8 | Arjun | *Terminalia arjuna* (Roxb.) Wight & Arn. | • Treats heart problems | Bark |
| 9 | Armale | *Anagallis arvensis* L. | • Cure stomach ache and gastritis | Whole plant |
| 10 | Asna | *Terminalia tomentosa* (Roxb.) Wight & Arn.) | • Cures fracture | Bark, leaf |
| 11 | Asuro | *Justicia adhatoda* L. | • Treats asthma, jaundice and heart problems | Whole plant |
| 12 | Babul | *Acacia nilotica* (L) | • Cures cuts and wounds | Bark, tender |
| 13 | Badahar | *Artocarpus lacucha* Buch.-Ham. | • Cure bleeding on cut wounds, scabies, gastritis and asthma | Leaf |
| 14 | Bakhrikane jhar | *Inula cappa* L. | • Cures stomach pain | Root |
| 15 | Balu jhar | *Sida cordata* L. | • Heals urinary inflammation problem | Leaf |
| 16 | Ban haledo | *Curcuma aromatic Salisb.* | • Heals abdominal problem | Root |
| 17 | Ban kapaas | *Hibiscus lampas* Cav | • Cures *garmidhatu* | Root, fruit |
| 18 | Ban maratti | *Sapilanthes calva* | • Cures cough and cold<br>• Heals toothache | Flower |
| 19 | Ban methi | *Melilotus indica* (L.) All. | • Treats scabies and other skin problems | Leaf |
| 20 | Ban pidalu | *Gonatanthus pumilus* (D. Don) Engl. & K. Karausi | • Cures wounds | Leaf, root |
| 21 | Banmara | *Ageratina adenophora* (Spreng.) King & H.Rob. | • Cures cuts and wounds | Leaf |

| SN | Name | Scientific Name | Local use | Parts used |
|---|---|---|---|---|
| 22 | Barro | *Terminalia bellirica* (Gaertn.) Roxb. | • Improves circulation and digestion<br>• Uses in Aayurvedic medicines "Triphala" and leaves used as a fodder | Bark, fruit |
| 23 | Bayar | *Zizyphus mauritiana* Lam, | • Cures dysentery<br>• Use root to make fermenting material<br>• Fruit juice used to overcome fish poisoning | Whole plant |
| 24 | Bel | *Aegle Marmelos* (L.) Correa | • Treats dysentery and leg ache, constipation, dysentery<br>• Leaves have religious value<br>• Fruit juice used to overcome fish poison | Leaf, fruit |
| 25 | Bethe | *Chenopodium album* L. | • Plant laxative and anti-helmentics | Tender shoot, and leaf |
| 26 | Bharamase phul | *Tropaeolaceae majus* L. | • Cures sneezing and sinusitis | Leaf, flower |
| 27 | Bhirangi jhar | *Alternatherea sessilis* L. | • Cure cut wounds | Leaf |
| 28 | Bhuin amala | *Nephrolepis cordifolia* (L.) Skeels | • Cures jaundice | Seed |
| 29 | Bhuinchampa | *Zephyranthes carinata* Herb | • Relives backbone pain, joint pain and bone fracture | Rhizome |
| 30 | Bhuin ainselu | *Fragaria nubicola* Lindl. ex Lacaita | • Cure tonsillitis<br>• Treat fungal infection. | Fruits, leaf |
| 31 | Bijaysal | *Pterocarpus marsupium* Roxb. | • Cures urinary inflammation problem and diabetes | Leaf, gum |
| 32 | Bojho | *Acorus calamus* L. | • Increases memory and purifies blood | Rhizome |
| 33 | Chariamilo | *Oxalis corniculata* L. | • Improves digestion<br>• Cures sinusitis | Whole plant |
| 34 | Dalchini | *Cinnamomum zeylanicum* Blume | • Cures mouth ulcer, and skin diseases<br>• Heals stomach pain | Seeds |
| 35 | Datiwan | *Achyranthes bidentata* Blume, Bijdr. | • Cures toothache | Herb |
| 36 | Dhaero | *Woodfordia fruticosa* (L.) Kurz | • Cures dysentery | Flower |
| 37 | Dhaturo | *Datura stramonium L.* | • Treats toothache, asthma and insomnia | Flower, seed and leaf |
| 38 | Dubo | *Cynodon dactylon* (L.) Pers. | • Cures analgesic, clots blood | Whole plant |
| 39 | Dudhe jhar | *Euphorbia hirta* L. | • Soothes throat problem, cures bruises | Whole plant |
| 40 | Gandhe jhar | *Ageratum conyzoides* L. | • Heals cut wounds to stop bleeding | Leaf |
| 41 | Ghodtapre topre jhar | *Centella asiatica* (L.) Urb. | • Increases memory and purifies blood; Lowers blood pressure and treats mental disorder | Leaf and steam |
| 42 | Giththa | *Discoria deltoidea* Wall. Ex Griseb | • Cures fracture and wound | Stem, tuber |
| 43 | Golkaankri | *Solena amplexicaulis* (Lam.) | • Cures gastritis | Root |

| SN | Name | Scientific Name | Local use | Parts used |
|---|---|---|---|---|
| 44 | Gopi bans | *Cephalostachyum capitatum* Munro | • Cures headache | Whole plant |
| 45 | Gujargano | *Cissampelos pareira* L. | • Cures cold, body pain and *ganogola* | Root |
| 46 | Gular | *Ficus recemosa* L. | • Heals inflammation | Fruit, leaf, gum |
| 47 | Gurjo | *Tinospora cordifolia* (Willd.) Miers | • Treats diabetes, anemia, fever and jaundice | Stem |
| 48 | Hade lasun | *Lilium wallichianum* Schult.f. | • Cures joint pain, backbone ache and kidney problem | Bulb |
| 49 | Halhale sag | *Rumex nepalensis*Spreng | • Cures swelling | Rhizome |
| 50 | Halhale ban palungo | *Rumex dentatus* L. | • Relieve tooth pain as well as cure the tooth gum swelling | Root |
| 51 | Hande kaphal | *Myrica esculenta* | • Cures fever, asthma, indigestion, toothache and measles<br>• Fruits are edible | Bark |
| 52 | Harro | *Terminalia chebula* Retz | • Improves circulation and digestion<br>• Uses in Aayurvedic medicines "Triphala" and leaves used as a fodder | Fruit |
| 53 | Hattibar | *Agave cantula* Roxb. | • Cure sprain<br>• Use leaf juice as fish polishing or fishing | Leaf |
| 54 | Jamun | *Syzygium cumini* L. Skeels | • Cures dysentery, diabetic | Leaf, fruit |
| 55 | Jire khursani | *Capsicum microcarpum* Cav. | • Cure rheumatic pain | Fruit, root |
| 56 | Kaalo haledo | *Curcuma caesia* Roxb | • Relief back pain | Rhizome |
| 57 | Kaloniuro | *Tectariacoadunate* Wall. ex Hook. et Grev. | • Cures dysentery | Rhizome |
| 58 | Kans | *Saccharum spontaneum* L. | • Cures urine burning | Whole plant |
| 59 | Kantakaari | *Solanum xanthocarpum* Schard & J.C.Wendl. | • Cures throat problems, teeth decay, common cold, headache, asthma and fever | Fruit |
| 60 | Kera | *Musa nepalensis* | • Cures diarrhea<br>• Use in fermenting "Marcha" | Fruit |
| 61 | Khair | *Acacia catechu* (L. f.) Wild) | • Cures dysentery | Bark, wood |
| 62 | Khanyo | *Ficus semicordata* Buch. ex J. E. Smith | • Cures gonorrhea, jaundice<br>• Use as fodder and fruits are edible | Root, leaf, fruit |
| 63 | Khar | *Themeda triandra* Forssk. | • Cures gastritis | Leaf |
| 64 | Kim kafal, Kimbu | *Morus alba* L. | • Kill intestinal worm | Root |
| 65 | Koiralo | *Bauhinia verigata* L. | • Cures headache | Leaf and flower |
| 66 | Kubindo | *Benincasa hispida* (Thunb.) Cogn. | • Cures jaundice | Fruit |

| SN | Name | Scientific Name | Local use | Parts used |
|---|---|---|---|---|
| 67 | Kurilo | *Asparagus recemosus* Willd | • Heals headache and provides energy | Stem |
| 68 | Kurkure | *Equisetum devile* | • Relief constipation<br>• Cures *garmidhatu* | Whole plant |
| 69 | Kush | *Desmostachya bipinnata* L. | • Cures toothache and stomachache | Root |
| 70 | Kushum | *Schleichera oleosa* (Lour.) Merr. | • Cures headache<br>• Seeds are edible | Leaf and fruit |
| 71 | Kyaamun | *Syzygium operculatum* (Roxb.) | • Cures sinusitis | Bark, leaf |
| 72 | Lajjawati | *Mimosa pudica* L. | • Controls bleeding | Root |
| 73 | Lemon grass | *Cymbopogon citratus*(DC). Stapf | • Treats flu | Leaf |
| 74 | Lunde | *Amaranthus spinosus* L. | • Cure overheat in the body | Root |
| 75 | Malu, Bhorla | *Bauhinia vahlii Wight & Arn.* | • Treats allergy | Leaf and bark |
| 76 | Mauwa | *Madhuca indica* (J.Konig) J.F.Macbr. | • Cure diabetes<br>• Use in wine making | Bark, fruit, flower |
| 77 | Mothe | *Sansevieria trifasciata* Prain | • Use as anti-helmetics and catheterization | Stem |
| 78 | Museli | *Curculingo orchioides* Gaertn | • Cures stomach ache | Root |
| 79 | Naagbeli | *Lycopodium clavatum* Linn | • Heals wound and skin burn | Root |
| 80 | Neem | *Azederacta indica* A Juss | • Prevents cancer<br>• Cures fever and stomach problems, typhoid, wound insecticide | Bark, leaf |
| 81 | Pankopat | *Piper betle* L. | • Treats gonorrhea, diabetes, cough<br>• Overcomes throat related problems | Leaf |
| 82 | Pipal | *Ficus bengalensis* L. | • Cures fracture<br>• Use as religious purpose | Bark, leaf |
| 83 | Pipla | *Piper longum* L. | • Cure cough and cold and spice | Fruit |
| 84 | Pirejhar | *Polygonum hydropiper* L. | • Eases in urination, improves digestion | Leaf |
| 85 | Pudina | *Mentha arvensis* L. | • Increases appetite | Leaf |
| 86 | Rajbriksha | *Cassia fistula* L. | • Cures dysentery, and allergy | Fruit, leaf |
| 87 | Ratigedi | *Abrus precatorius* L. | • Cures throat problems and soothes voice<br>• Seed paste used in sciatica and stiff | Seed |
| 88 | Ritha | *Sapandius mukorossi* Gaertn. | • Use for making soap and shampoo | Fruit |
| 89 | Rudilo | *Pogostemon benghalensis (Burm.f.) Kuntze* | • Cures cough and fever | Leaf juice |
| 90 | Safedmusli | *Chlorophytum arundinaceum* Baker | • Cure headache | Roots, tubers |
| 91 | Sarpagandha | *Rauvolfia serpentine* (L.) Benth. ex Kurz | • Cures blood pressure | Stem |
| 92 | Sarpako makai | *Arisaema tortuosum* (Wall.) Schott | • Cure wounds and blisters<br>• Overcome the problem of insecticides | Whole plant |
| 93 | Simal | *Bombex ceiba* L. | • Cures sexual diseases | Flower |

| SN | Name | Scientific Name | Local use | Parts used |
|---|---|---|---|---|
| 94 | Seudi | *Opuntia spp.* | • Cures ear-ache | Whole plant |
| 95 | Simali | *Vitex negundo* L. | • Treats scabies, fever, asthma and sinusitis | Root |
| 96 | Simlikaam | *Crataeva unilocularis* Buch, - Ham, | • Heals urinary inflammation problem, stone | Leaf |
| 97 | Sindurae | *Mallotus philippensis* (Lam.) Muell.Arg. | • Cures scabies<br>• Use as fodder | Root, fruit and leaf |
| 98 | Siru | *Imperata cylindrical* (L.) P.Beauv. | • Cures urine burning | Whole plant |
| 99 | Tanki | *Bauhinia purpurea* L. | • Cures diarrhea and dysentery<br>• Uses as good fodder | Bark, flower, leaf |
| 100 | Tejpatta | *Cinnamomum* tamala (Buch.-Ham.) Th. G. G. Nees | • Eases urination, increases appetite | Stem |
| 101 | Titepate | *Artemisia vulgaris* Wrightii (A. Gray) | • Treats scabies, diabetes | Leaf and steam |
| 102 | Unyu | *Adiantum capillusveneris* L. | • Cures migraine, snakebite and scorpion sting | Root |

## Annex-2: Demography of Patana VDC

| Ward | HHs | Total | Male | Female |
|---|---|---|---|---|
| 1 | 283 | 1568 | 738 | 830 |
| 2 | 101 | 667 | 327 | 340 |
| 3 | 82 | 538 | 280 | 258 |
| 4 | 252 | 1295 | 620 | 675 |
| 5 | 284 | 1307 | 636 | 671 |
| 6 | 169 | 943 | 435 | 508 |
| 7 | 134 | 796 | 395 | 401 |
| 8 | 204 | 1072 | 487 | 585 |
| 9 | 123 | 696 | 333 | 363 |

## Annex-3: Major toles/settlements and ethnic groups

| Ward | Major Toles | Main religion |
|---|---|---|
| 1 | Mechkuri and Patana Aairauli | Tharu, Magar, Muslim and Ahir |
| 2 | Galaha and Thulo Naugaiya | Tharu, Muslim, Chamar and Pasi |
| 3 | Sano Galaha and Ratanpur | Tharu and Kurmi |
| 4 | Dharmapur, Sonpur and Bangawa | Magar and Tharu |
| 5 | Vabpur, Bankatti, Birpur and Velroya | Magar and Tharu |
| 6 | Bahadiyur and Gogapur | Tharu |
| 7 | Kureli and Danapur | Tharu |
| 8 | Motipur, Balapur, Sano Thekai and Thulo Thekai | Magar and Tharu |
| 9 | Majhawa and Pipara | Tharu |

## Annex-4: Name of key *Guruwas* of Patana VDC

| Name | VDC | Ward |
|---|---|---|
| Deukhuram, Hare Ram Tharu | Patana | 5 |
| Birkhe Tharu | Patana | 2 |
| Dhaniram Tharu | Patana | 3 |
| Man Bahadur BK | Patana | 8 |
| Chandra Man BK | Patana | 8 |
| Phulmati Gaha | Patana | 4 |

## Annex-5: Collaborative/community forest in and around the Patana forest

| Ward | Name of collaborative/ community forest | Area (ha) |
|---|---|---|
| 1 | Siddhartha collaborative forest, Mechkari | 50 |
| 2 | Buddha Jyoti Community Forest, Galaha and Bahadurpur | 70 |
| 3 | Ananda Ban Community forest, Ratanpur | 40 |
| 4 | Kalika Community forest, Dharmapur | 85 |
| 4 | Navadurga Community Forest, Sonpur, Bangawa | 80 |
| 5 | Buddha Community Forest, Bankatti and Naugaiya | 100 |
| 6 | Modinadi Community Forest, Gogapur | 50 |
| 7 | Pipaldanda Collaborative Forest, Danapur | 55 |
| 7 | Gothalo Community Forest, Kareliya | 40 |
| 8 | Chandeshori Collaborative Forest, Motipur, Aairauli | 60 |
| 9 | Santiban Community forest, Majhawa | 6 |
| 1-9 | Rajapani Community forest, Gajhehada | 421 |
| 5 | Lalmatiya Community Forest, Kaptaiya, Lakhanpara | 80 |
| 4 | Muna Community Forest, Gandaiwa | 85 |
| 2 | Navajagriti Community Forest, Gobardibaha | 90 |
| 5 | Prativa Community Forest, Banga | 50 |

## Annex-6: Gender and Social Inclusion (GESI) Matrix

| Activities | Beneficiary type | # of infrastructure | Terai Dalit | | Terai Janajati | | Terai BC | | Other | | Muslim | | Hill Dalit | | Hill Janajati | | Hill BC | | Hill Other | | Total | | Youth (15-29 Yrs) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F |
| DDC level stakeholder workshop | Stakeholders | NA | 1 | 0 | 7 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 3 | 5 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| VDC level project's introductory workshop | Stakeholders | NA | 2 | 4 | 11 | 8 | 2 | 3 | 0 | 0 | 2 | | 3 | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Formation of socially inclusive NTFPs groups | CBOs | NA | 32 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 12 | 17 | 2 | 6 | 0 | 0 | 0 | 0 | 6 | 9 |
| Liaise NTFPs conservation sub-committees with Private Ayurvedic companies | CBOs | NA | 10 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 6 | 10 | 3 | 2 | 0 | 0 | 0 | 0 | 2 | 5 |
| Strengthening of local cooperatives | CBOs | NA | 7 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 7 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Development of IEC materials and awareness raising | CBOs | NA | 65 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 22 | 23 | 20 | 9 | 12 | 0 | 0 | 0 | 0 | 102 | 122 |
| Conservation education to School students | Students | NA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 190 | 260 |
| Running of *Gothala* (herder) education | CBOs | NA | 14 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 9 | 5 | 16 | 2 | 3 | 0 | 0 | 0 | 0 | 24 | 31 |
| Interaction programs among the *Baidawa* (Tharu Traditional healer) | CBOs | NA | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sharing the policy provisions among the forest users | CBOs | NA | 300 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 34 | 180 | 482 | 59 | 90 | 0 | 0 | 0 | 0 | 60 | 81 |
| Knowledge documentation about the types and use of NTFPs | CBOs | NA | 35 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 11 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 16 | 24 |
| Prepare conservation plan of most preferred NTFPs | CBOs | NA | 30 | 70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 8 | 20 | 15 | 4 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| Training on NTFPs Nursery management | CBOs | NA | 7 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 8 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

| Activities | Beneficiary type | # of infrastructure | Terai Dalit | | Terai Janajati | | Terai BC | | Other | | Muslim | | Hill Dalit | | Hill Janajati | | Hill BC | | Hill Other | | Total | | Youth (15-29 Yrs) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F |
| Training on sustainable harvesting and wise use of NTFPs | CBOs | NA | 8 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 10 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conduction of study visits | CBOs | NA | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Training on organic vegetable farming and seed support | CBOs | NA | 8 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 4 | 9 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Training on NTFPs/MAPs marketing scopes | CBOs | NA | 5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 3 | 8 | 1 | 3 | 0 | 0 | 0 | 0 | 3 | 2 |
| Training on post harvest technologies | CBOs | NA | 7 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 4 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 2 |
| Run Bijaysal sensitization workshops | CBOs | NA | 60 | 89 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 8 | 13 | 10 | 14 | 20 | 0 | 0 | 0 | 0 | 9 | 12 |
| Establishment of NTFP nursery and cultivation of NTFP | CBOs | 2 | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 4 | 10 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 3 |
| Cultivation of NTFPs within community forest and private forest | CBOs | NA | 1540 | 1500 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 34 | 700 | 998 | 127 | 250 | 0 | 0 | 0 | 0 | 112 | 134 |
| Cultivation of *mentha* | CBOs | NA | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 6 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vegetable farming | CBOs | NA | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 6 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Preparation of Bijaysal demonstration plots | CBOs | 2 | 1540 | 1800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 34 | 700 | 698 | 127 | 250 | 0 | 0 | 0 | 0 | 112 | 134 |
| Linked with Shiva Mandir CFUG for processing of menthe | CBOs | NA | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 4 | 10 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 3 |
| Plantation of Bijay Sal | CBOs | NA | 1540 | 1800 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 34 | 700 | 698 | 127 | 250 | 0 | 0 | 0 | 0 | 112 | 134 |

## Annex-7: Calculation of gender responsive budget based on indicators and sub indicators

| S.N | Major indicators and sub indicators | Checklist for assessing the indicators and sub indicators | Given Score | Score* |
|---|---|---|---|---|
| ***1.0*** | ***Women's participation in planning and implementation*** | | ***20*** | ***16*** |
| 1.1 | Provision of women's participation in program planning and budget formulation | If following is provisioned in planning and budgeting from ministerial to district levels | ***4*** | ***3*** |
| | | • *Excellent (Participation of women and gender focal person in decision making level at the ministry level and participation of 33% or above women representatives from stakeholders' group)*<br>• *Good (Participation of women officer or gender focal person in decision making level at the ministry level or participation of 20-33% women representatives from stakeholders' group)*<br>• *Fair (Participation of women staff from non decision making level at the ministry level or participation of 5 to less than 20% women representatives from stakeholders' group)* | *4*<br>***3***<br>*2* | ***3*** |
| 1.2 | Ensuring women's participation in implementation | | ***12*** | ***9*** |
| *1.2.1* | *Provision of women's participation in the implementation (at the project or district level)* | *Inclusion of women in staffing, management and coordination committees including decision making positions*<br>• *Excellent (> 33 %)*<br>• *Good (20-<33 %)*<br>• *Fair (5-<20 %)* | *5*<br>***4***<br>*3* | ***4*** |
| *1.2.2* | *Provision of stakeholders and women's participation in the implementation (users' committee and other committees).* | *Provision of stakeholders/women's participation in 0the executive committees and other committees including major posts (president, general secretary, treasurer)*<br>• *Excellent (> 33 including decision making posts and users committee)*<br>• *Good (<33% in decision making positions but >33% in users committee)*<br>• *Fair (10-<33 % in decision making positions and users committee)* | *4*<br>*3*<br>***2*** | ***2*** |
| *1.2.3* | *Provision of compulsory presence of women* | *Provision of compulsory presence of women staff/member in project management or implementation meetings* | ***3*** | ***3*** |
| 1.3 | Provision of women's participation in monitoring | Provision of women stakeholders or gender expert's participation in project monitoring | **4** | **4** |
| ***2.0*** | ***Capacity enhancement of women*** | | ***20*** | ***10*** |
| | | | | |
| 2.1 | Provision of capacity enhancement of women at the decision making and implementation levels | Provision of capacity enhancement of women staff and members who are at the decision making levels | **6** | |
| | | • *At least one training on decision making skills* | 2 | |
| | | • *Provision of refresher training* | **2** | **2** |
| | | • *Targeting women from special groups in such training* | 2 | |
| 2.2 | Provision of participation of women staff and members in capacity enhancement programs | If participation of women staff and member is provisioned in orientations, seminars, workshops, skill development programs and training in following manner | **7** | |
| | | • *Excellent (> 33 %)*<br>• *Good (20-<33 %)*<br>• *Fair (05-<20 %)* | 7<br>5<br>3 | **5** |

| S.N | Major indicators and sub indicators | Checklist for assessing the indicators and sub indicators | Given Score | Score* |
|---|---|---|---|---|
| 2.3 | Gender sensitive and context specific contents | Ensure gender sensitive in the contents of the training, workshops, orientations and skill development programs | **7** | |
| | | • *Gender sensitive contexts* | 4 | |
| | | • *Context specific gender sensitive delivery provision* | 3 | **3** |
| ***3*** | ***Ensure benefits and control of women over the program (including targeted programs)*** | | **30** | **12** |
| 3.1 | Ensuring benefits to women (target groups) | Provision of direct benefits to women from project/ program as per the following: | **8** | |
| | | • Excellent (> 50 %)<br>• Good (30-<50 %)<br>• Fair *(05-<30 %)* | 8<br>6<br>4 | **6** |
| 3.2 | Identification of gender gaps, women's special needs, and barriers and programs to address these gaps, barriers and needs. | Provision to identify gender gaps (lack of access to economic resources, e.g. lack of resources for health checkups; lower educational levels. e.g. lack of awareness on health services; and barriers in mobility, e.g., travel to the health facilities for health checkups) and to address them | **6** | |
| | | • Excellent (if the programs address all the three barriers mentioned above)<br>• Good (if the programs address only two barriers mentioned above)<br>• Fair ( if the *programs address only one barrier mentioned above)* | 6<br>4<br>2 | **2** |
| 3.3 | Provision of gender friendly implementation mechanisms and work place environment to ensure benefits to women | Besides women's participation as provisioned above in criteria (i) if following are provisioned | **7** | |
| | | • Provision to review and make acts and regulations gender responsive (promoting gender equity and removing discriminatory laws) and to address gender based violence at work place (code of conduct, complaints hearing , women friendly office layout) | 3 | |
| | | • Provision of the physical facilities to address the needs of women (separate toilet, breast feeding room, workplace layout to address the women's special needs). | 2 | |
| | | • Provision of activities to increase gender responsive service delivery (exposure visits, citizen charter, sensitization trainings, etc) | 2 | **2** |
| 3.4 | Ensuring budget for programs to benefit women | Ensure the following: | **2** | |
| | | • Adequate budget allocated for programs promoting gender equality and equity | 1 | |
| | | • Provision of non-transferability of the amount allocated for gender equality and equity related activities | 1 | **1** |

| S.N | Major indicators and sub indicators | Checklist for assessing the indicators and sub indicators | Given Score | Score* |
|---|---|---|---|---|
| 3.5 | Provision of the gender monitoring and impact evaluation systems to ensure benefits to women | Provision of gender disaggregated information/data collection and recording system at all levels of project / programs and in the impact evaluation | **7** | |
| | | • *Maintain sex disaggregated data on benefits in the program* | 2 | |
| | | • Provision for incorporating gender disaggregated information in (the Ministry and projects/programs)in the annual progress report by<br>✓ *Critical review of the provisions made under 1 to 3.2 points above addressed or not*<br>✓ *Review of the budget allocated for gender specific program* | <br><br><br>1<br><br>1 | |
| | | • *Provision of next year's planning based on the review findings of this year's program and budget.* | 1 | 1 |
| | | • *Provision of gender audit and impact evaluation of implemented program/projects* | 2 | |
| ***4.0*** | ***Promoting employment and income generation for women*** | | **20** | **11** |
| 4.1 | Provision of employment opportunities for women | Provision to guarantee employment for women in the jobs created by the current projects and program (reservation, employment priority, specifically for women in construction works, etc) | **8** | |
| | | ○ *Excellent* *(≥ 33 %)*<br>○ *Good* *(20-<33 %)*<br>○ *Fair* *(05-<20 %)* | 8<br>6<br>4 | **6** |
| 4.2 | Create alternative opportunities for income generation or career development | Provisions to create alternative opportunities for women's employment and higher income or career development | **7** | |
| 4.3 | Equal wage | Provision to ensure equal wage to men and women in the created job, e.g., construction works | **5** | **5** |
| ***5.0*** | ***Qualitative improvement of women's time use or reduce workload*** | | **10** | **4** |
| 5.1 | Improvement in the working process and save time | Provision of new time saving technology and working procedure in women's work with direct benefits to women (e..g, mobile bank, road, irrigation, out of school programs, mobile clinics, new women friendly technology, etc.) | 4 | **4** |
| 5.2 | Long term result oriented efforts to change the traditional roles of women | • *Discussions of the importance of the non-paying jobs of women and their household role in text books/ training material/communication material etc* | 2 | |
| | | • *Positive examples of work sharing by men/boys.* | 2 | |
| | | • *Provision for transformation in women's traditional labor role by the program/project* | 2 | |
| | Total | | 100 | 53 |

| S.N | Major indicators and sub indicators | Checklist for assessing the indicators and sub indicators | Given Score | Score* |
|---|---|---|---|---|
| | **GRB Rank**<br>***Direct Gender Responsive***<br>• *If score is = > 50, i.e. rated as direct gender responsive and give code of 1.*<br><br>***Indirect Gender Responsive***<br>• *If score is > 20 to < 50, i.e. rated as indirect gender responsive and give code of 2.*<br><br>***Gender Neutral***<br>• *If score is < 20, i.e. rated as direct gender responsive and give code of 3.* | | | CODE of 1 |

## Annex-8: Distribution of budget by gender

| General category of expenditures | 2012 | | 2013 | | Total | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| Manpower/labor | 1800 | 1800 | 1800 | 1813 | 3600 | 3613 |
| Training/Seminar/ Workshops etc.. | 1150 | 2500 | 1000 | 2860 | 2150 | 5360 |
| Biodiversity Conservation, Livelihood/Contracts | 344 | 344 | 249 | 450 | 593 | 794 |
| Equipment/Furniture | 2560 | 7640 | 5649 | 8040 | 8209 | 15680 |
| Total | 5854 | 12284 | 8698 | 13163 | 14552 | 25447 |
| **Percent** | 32 | 68 | 40 | 60 | 36 | 64 |

Source: Project's record, 2014

## Annex-9: Number of Bijaya sal tress in northern Kapilvastu

| VDC | Number of trees | No of trees before 20 yrs |
|---|---|---|
| Patana | 72 | 345-360 |
| Gajahada | 7 | 50-40 |
| Niglihawa | 4 | 40-45 |
| Motipur | 21 | 40-50 |
| Valwad | 22 | 100-200 |
| Mahendrakot | 21 | 30-35 |
| Buddi | 15 | 40-50 |
| Barkalpur | 6 | 20-25 |
| Dubiya | 22 | 100-200 |
| Chanai | 5 | 20-50 |
| Shivapur | 9 | 20-50 |
| Shivagadi | 45 | 50-80 |

Source: Consultation with elderly people and CFUG members (2013-2015)

## Annex-10: Institutions working in the Patana VDC

| SN | Organization | Ward | Main program |
|---|---|---|---|
| 1 | Poverty Alleviation Fund | 1-9 | Training and revolving fund |
| 2 | Micro-finance Program | 1,7,8,5 | Training |
| 3 | Sagun Kapilvastu | 7 and 8 | Conservation on biodiversity |
| 4 | Siddhartha social Development Center | 3-5 | Improve educational |
| 5 | Livelihood and Forestry Program | 1-8 | Biogas promotion |
| 6 | Shree Himalayan Socio-economic Development Center | 1-9 | Women empowerment and agriculture/IG |

## Annex-11: Project information board


# समुदायमा आधारित सुगन्धित जडिबुटी प्रवर्द्धनका पहलहरू

## सिट्रोनेला खेती/एक परिचय

सिट्रोनेलाको बोट भुईंबाट झांगिएर आउने र पातहरु लामा लामा भाला आकारका हुन्छन । पातहरु १.५ सेमी चाक्ला, माथिल्लो भाग हरियो, केही चम्किला र टुप्पा भूईंतिर लत्रिएका हुन्छन । सिट्रोनेला घाँसबाट निकालिने सुगन्धित तेल विभिन्न सुगन्धित वस्तुहरु जस्तै साबुन, किटनाशक औषधी, डिटरजेन्ट पाउडर, लामखुट्टे भगाउने धुप, भुई पुछ्ने साबुन आदिमा प्रयोग गरिन्छ । यसको उद्गम स्थल श्रीलंकालाई मानिन्छ । गर्मी हावापानी भएका उष्ण प्रदेशीय क्षेत्रहरुमा यसको खेती गर्न सकिन्छ । हाल तराईका जिल्लाहरुमा यसको खेतीले विस्तारै व्यापकता लिंदै गएको पाइन्छ । सिट्रोनेला वालीको लागि जमिनमा प्रशस्त चिस्यानको आवश्यकता पर्छ तर विरुवा लगाएको जग्गामा पानी जम्न भने दिनु हुँदैन । सिट्रोनेला गर्मी र पारिलो ठाँउमा राम्रोसंग फस्टाउने विरुवा हो । यसको खेती ५.६ देखि ६.५ अम्लीय भएको माटो, बलौटे मालिलो र पानी नजम्ने ठाँउमा उपयुक्त हुन्छ ।

### क) जग्गा तयारी :

जेष्ठ, असार महिनामा सिट्रोनेलाको खेती गर्न जमिनलाई राम्ररी जोती माटोका डल्लाहरुलाई मसिनो पारी फोड्नु पर्दछ । जग्गा तयारीको बेला २०-३० टन कम्पोष्ट मल प्रति हेक्टर जमीनमा एकनासले छर्नु पर्छ ।

### ख) मलको प्रयोग :

मलको आवश्यकता जमिन र माटोको गुणस्तरमा भर पर्छ । प्रति हेक्टर माटोको अवस्था हेरि १०० केजी नाइट्रोजन, ५० केजी फस्फोरस र ४० केजी पोटासियम राख्नाले वालीको उत्पादन राम्रो हुन्छ । ५० केजी फस्फोरस र ४० केजी पोटासियम र तीन भागको १ भाग नाईट्रोजन जग्गा तयारीको बेला राख्नु पर्दछ । बाँकी नाइट्रोजन पछि हरेक सिंचाई गर्दा छर्नु पर्दछ । प्राङ्गारिक मल र कीटनाषक औषधीबाट उत्पादित तेल भन्दा प्राङ्गारिक र जैविक मल प्रयोग गरेर उत्पादन गरिएको तेलको बजार मूल्य राम्रो हुन्छ । यसको खेती सामुदायिक वनमा प्राङ्गारिक खेती प्रणाली अनुसार व्यवसायिक रुपमा उत्पादन गर्न थालिएको छ ।

### ग) रोपाई :

यसको खेती स्लिप रोपी गरिन्छ । पुरानो सिट्रोनेलाको झयाङबाट स्लिप झिकी तयार गरिन्छ । स्लिप तयार गर्दा यसमा भएको पुरानो लामो जरा र पातहरु काट्नु पर्दछ । पातहरु काट्दा स्लिपको डाँठसम्म काटनु हुँदैन । पातको केही भाग स्लिपमा छोड्नु पर्दछ । यसरी तयार गरेको स्लिप वर्षात महिनामा रोप्नु पर्दछ । स्लिपलाई रोप्दा १० सेमी गहिरोमा एक बोटबाट अर्को बोटको दुरी ५०-६० सेमी र एक लाईन देखि अर्को लाईनको दुरी ६० सेमी को फरकमा रोप्नु पर्दछ । स्लिप रोप्दा माटोलाई खुट्टाले बेस्सरी थिच्नु पर्दछ । स्लिप रोपीसकेपछि २४ घण्टा भित्र पानी परेन् भने सिंचाई गर्नु पर्दछ ।

### घ) सिंचाई :

सिट्रोनेला वालीको लागि जमिनमा चिस्यानको आवश्यकता पर्छ तर विरुवा लगाईएको जग्गामा पानी जम्न दिनु हुँदैन । यदि पानी जम्न गएमा विरुवा मर्न सक्ने हुँदा बढी भएको पानीलाई कुलेसो बनाई निकास दिनु पर्छ । सामान्यतया सुख्खा मौसममा आवश्यकता अनुसार सिंचाईको व्यवस्था गर्नु पर्छ । अन्यथा विरुवाको अधिकतम वृद्धि हुन सक्दैन र वाली उत्पादनमा ह्रास आँउछ ।

### ङ) गोडमेल तथा स्याहार संभार :

सिट्रोनेला लगाएको खेतमा अरु घाँस र झारपात उम्रन दिनु हुँदैन । विरुवा रोपेको ३-४ हप्ता भित्रमा पहिलो गोडमेल गर्नु पर्छ । दोश्रो वर्षदेखि प्रत्येक वर्ष २-३ पटकसम्म गोडमेल गरीदिनु राम्रो हुन्छ ।

### च) रोग र कीरा :

सिट्रोनेला खेतीमा रोग र किराको आक्रमण धेरै हुँदैन तर कहिले काँही पात सडाउने रोगले हानी गर्न सक्छ । यसको नियन्त्रणको लागि प्रत्येक १५ दिनमा डाएथेन एम ४५-०.३ प्रतिशत छर्कनु राम्रो हुन्छ ।

### छ) वाली संकलन :

पहिलो वर्ष घाँसको उत्पादनको साथै तेलको उत्पादन कम हुन्छ तर दोश्रो, तेश्रो र चौथो वर्षमा क्रमशः वृद्धि हुँदै जान्छ । घाँसको वृद्धि अनुसार वर्षको ४-६ पटकसम्म वाली काट्न सकिन्छ । एक पटक वाली लगाईसकेपछि ४ वर्षसम्म लगातार उत्पादन लिन सकिन्छ । वाली संकलन भन्नु नै यसको सम्पुर्ण घाँस काट्नु हो र रोपे पछि कार्तिक, मंसिर महिनामा पहिलो वाली संकलन गर्न सकिन्छ र त्यसपछि २-३ महिनाको अन्तरमा दोश्रो वाली संकलन गर्न सकिन्छ । घाम लागेको बेला वाली काट्नु पर्दछ ।

### ज) प्रशोधन उत्पादन :

गुणस्तर तथा बढी तेल उत्पादनको लागि घाँस काटिसकेपछि २४-४८ घण्टा सम्म ओईलाउन दिनु पर्दछ र त्यसछि मात्रै प्रशोधन गर्नु पर्छ । यसरी ओयलाएको घाँस प्रशोधन संयन्त्रमा राखी तेल उत्पादन गरिन्छ । वार्षिक सरदर प्रति हेक्टर १५०-२५० केजी सम्म तेल उत्पादन हुन्छ । पात प्रशोधनबाट सरदर १ प्रतिशत तेल उत्पादन हुन्छ । सिट्रोनेला खेती, प्रसोधन खर्च र आम्दानी प्रति हेक्टर प्रति वर्ष यस तालिकामा दिइएको छ ।

| विवरण | पहिलो वर्ष | | | दोस्रो वर्ष | | | तेस्रो वर्ष | | |
|---|---|---|---|---|---|---|---|---|---|
| | संख्या | दर रु. | जम्मा | संख्या | दर रु. | जम्मा | संख्या | दर रु. | जम्मा |
| जोताई (घण्टा) | ८ | ७०० | ५६०० | | | | | | |
| ज्यामी संख्या विभिन्न कार्यको लागि (प्लट बनाउने,मल छर्ने, गोडमेल गर्ने वाली संकलन) | १२६ | २२० | २७७२० | १४८ | २२० | ३२५६० | १४८ | २२० | ३२५६० |
| बीउ र स्लिप | ४०००० | ०.८ | ३२०० | ० | १ | | ० | १ | |
| कम्पोष्ट मल (ट्रलि संख्या) | ५ | ८०० | ४००० | ० | ८०० | | ० | ८०० | |
| ढुवानी र प्रसोधन तेल (केजी) | ८० | १०० | ८००० | १२५ | १०० | १२५०० | १२५ | १०० | १२५०० |
| कुल उत्पादन खर्च | | | ४८५२० | | | ४५०६० | | | ४५०६० |
| सुगन्धित तेल विक्रिबाट आम्दानी | ८० | ८०० | ६४००० | १२५ | ८०० | १००००० | १२५ | ८०० | १००००० |
| शुद्ध नाफा | | | १५४८० | | | ५४८४० | | | ५४८४० |

## थप जानकारीको लागि सर्म्पक:


**जैविक विविधता तथा जीविकोर्पाजनको लागी जडीबुटी प्रवर्द्धन कार्यक्रम**

**सगुन कपिलबस्तु**

मोतीपुर-५, चप्परगाउँ

फोन नं. ०७६ ६९००५०, ९८५७०३२५०४, इमेल: sagun.kapilvastu@gmail.com, वेबसाइट: www.sagunkapilvastu.org.np



*सन्दर्भ सामग्री : विजयमान स्थापित. समन्वित जडीबटीको खेती र प्रशोधन विधि परिचय. आई.डि.ई. नेपाल. (२०११) पश्चिमी तराई भ-परिधि विकास आयोजना (२०१२). सगन कपिलबस्त (२०११)*

# समुदायमा आधारित सुगन्धित जडिबुटी प्रवर्द्धनका पहलहरू

## लेमनग्रास खेती/एक परिचय

लेमनग्रास कागतीको जस्तो सुगन्धयुक्त बाहैं महिना हरियो रहिरहने बहुवर्षीय घाँस प्रजातिको विरुवा हो । यसको उचाई अन्दाजी एक मिटरसम्म हुन्छ भने पात खरका जस्ता हुन्छन । यसका साना मसिना जरा माटो मुनि चारैतिर फैलिएर रहेका हुन्छन । यसबाट निकालिने तेलमा ७५-८५ प्रतिशत सिट्राल नामको रासायनिक तत्व पाइन्छ । लेमनग्रास घाँसबाट झिकिने सुगन्धित तेलको प्रयोग विभिन्न प्रशोधनका सुगन्धित वस्तुहरु जस्तैः साबुन, क्रिम, लोसन, अत्तर आदिमा गरिन्छ । यसको पात कागती चियाको रुपमा पनि प्रयोग गरिन्छ । चकलेट र अत्तर बनाउने उद्योगहरुमा यसको तेल प्रयोग गरिन्छ । यो घाँसको राम्रो उत्पादनको लागि खेती गर्ने जग्गामा पर्याप्त मात्रमा चिसोपना हुनुपर्छ । सुगन्धित तेल उत्पादन गर्न गर्मी र पारिलो घाम भएको जग्गामा यसको खेती गर्नु राम्रो हुन्छ । यसको खेती बलौटे मलिलो माटो (५.८ देखि ६.५ पिएच) मा र पानी नजम्ने ठाँउमा उपयुक्त हुन्छ ।

### क) जग्गा तयारी :

जेष्ठ, असार महिनामा लेमनग्रास खेती गर्न राम्रोसंग जोतेर माटोका डल्लाहरुलाई मसिनो गरी फुटाउनु पर्छ । जग्गा तयारीका बेला खाल्डाहरु पुरी पानी नजम्ने गरी सम्याउनु पर्दछ ।

### ख) मलको प्रयोग :

मलको आवश्यकता जमिन र माटोको गुणस्तरमा भर पर्छ । साधारणतया १०० केजी नाइट्रोजन, ५० केजी फस्फोरस र ४० केजी पोटासियम प्रति हेक्टर राख्नाले वालीको उत्पादन राम्रो हुन्छ । ५० केजी फस्फोरस र ४० केजी पोटासियम र तीन भागको १ भाग नाईट्रोजन जग्गा तयारीको बेला राख्नु पर्दछ । बाँकी नाइट्रोजन पछि सिंचाईको बेला छर्नु पर्दछ । प्राङ्गारिक खेतीमा रसायनिक मलको प्रयोग गर्नु हुँदैन । अहिले बजारमा रासायनिक मल र कीटनाषक औषधीबाट उत्पादित तेल भन्दा प्रङ्गारिक र जैविक मल प्रयोग गरेर उत्पादन गरीएको तेलको बजार मूल्य राम्रो छ । यसको खेती सामुदायिक वनमा प्राङ्गारिक खेती प्रणाली अनुसार व्यवसायिक उत्पादन गर्न थालिएको छ ।

### ग) रोपाँई :

यसको खेती स्लिप रोपेर गरिन्छ । पुरानो लेमनग्रासको झयाङ्बाट स्लिपहरु झिकी यसमा भएको लामो जरा र पातहरु काटेर स्लिप तयार गर्नु पर्दछ । पातहरु काट्दा स्लिपको डाँठसम्म काट्नु हुँदैन । पातको केही भाग स्लिपमा छोड्नु पर्दछ । यसरी तयार गरेको स्लिप असार, साउन महिनामा रोप्नु पर्दछ । स्लिपलाई रोप्दा करिब १० सेमी गहिरोमा रोप्नु पर्दछ । एक बोटबाट अर्को लाईनको दुरी ६० सेमी को फरकमा रोप्नु पर्दछ । स्लिप रोप्दा माटोलाई खुट्टाले बेसरी थिच्नु पर्दछ । स्लिप रोपिसकेपछि २४ घण्टा भित्र पानी परेन भने सिंचाई गर्नु पर्दछ । प्रत्येक ४-५ बर्षमा नयाँ विरुवा रोप्नु पर्दछ ।

### घ) सिंचाई :

लेमनग्रास वालीको लागि जमिनमा चिस्यानको आवश्यकता पर्छ तर विरुवा लगाईएको जग्गामा पानी जम्न दिनु भने हुँदैन । यदि पानी जम्न गएमा विरुवा मर्न सक्ने हुँदा बढी भएको पानीलाई कुलेसो बनाई निकास गरी दिनु पर्छ । बेर्ना रोपेको २४ घण्टाभित्र पानी नपरेमा, विरुवाको वृद्दि हुने बेलामा सुख्खा पर्न गएमा आवश्यकता अनुसार सिंचाइको व्यवस्था गर्नुपर्छ । साधारणतया वर्षको ४-६ पटकसम्म सिंचाई गर्नु उत्पादनका लागि राम्रो मानिन्छ ।

### ङ) गोडमेल तथा स्याहार संभार :

लेमनग्रास लगाएको खेतमा अरु घाँस र झारपात उम्रन दिनु हुँदैन । विरुवा रोपेको ३-४ हप्ता भित्रमा पहिलो गोडमेल गर्नु पर्छ । दोश्रो वर्ष देखि प्रत्येक वर्ष २-३ पटकसम्म गोडमेल गरिदिनु राम्रो हुन्छ ।

### च) वाली संकलन :

पहिलो वर्ष घाँसको उत्पादनको साथै तेलको उत्पादन कम हुन्छ तर दोश्रो, तेश्रो र चौथो वर्षमा क्रमशः वृद्धि हुँदै जान्छ । घाँसको वृद्धि अनुसार ४-६ वर्षसम्म लगातार वाली लिन सकिन्छ । वाली संकलन भन्नु नै यसको सम्पूर्ण घाँस काट्नु हो । कार्तिक, मंसिर महिनामा पहिलो वाली संकलन गर्न सकिन्छ र त्यसपछि २-३ महिनाको अन्तरमा अरु वाली संकलन गर्न सकिन्छ । घाम लागेको बेला वाली काट्नु पर्दछ । संकलित वालीलाई पानीले भिजाउनु हुँदैन ।

### छ) प्रशोधन/उत्पादन :

गुणस्तरको तेल उत्पादनको लागि घाँस काटिसके पछि २४-४८ घण्टा ओईलाउनु दिनु पर्दछ र त्यसपछि मात्रै प्रशोधन गर्नु पर्छ । यसरी ओइलाएको घाँस प्रशोधन संयन्त्रमा राखी प्रशोधन गरी तेल उत्पादन गरिन्छ । वार्षिक सरदर प्रति हेक्टर वालीबाट ७०-८० केजी तेल उत्पादन हुन्छ । पातमा सरदर ०.४ प्रतिशत तेल हुन्छ । लेमनग्रास खेती, प्रसोधन खर्च र आम्दानी प्रति हेक्टर प्रति वर्ष यस तालीकामा दिइएको छ ।

| विवरण | पहिलो वर्ष | | | दोस्रो वर्ष | | | तेस्रो वर्ष | | |
|---|---|---|---|---|---|---|---|---|---|
| | संख्या | दर रु. | जम्मा | संख्या | दर रु. | जम्मा | संख्या | दर रु. | जम्मा |
| जोताई (घण्टा) | ८ | ७०० | ५६०० | | | | | | |
| ज्यामी संख्या विभिन्न कार्यको लागि (प्लट बनाउने, मल छर्ने, गोडमेल गर्ने बाली संकलन) | १२६ | २२० | २७७२० | १४८ | २२० | ३२५६० | १४८ | २२० | ३२५६० |
| बीउ र स्लिप | ४०००० | ०.८ | ३२०० | ० | १ | | ० | १ | |
| कम्पोष्ट मल (ट्रलि संख्या) | ५ | ८०० | ४००० | ० | ८०० | | ० | ८०० | |
| डुवानी र प्रसोधन तेल (केजी) | ५० | १५० | ७५०० | ८० | १५० | १२०० | ८० | १५० | १२००० |
| कुल उत्पादन खर्च | | | ४८०२० | | | ४४५६० | | | ४४५६० |
| सुगन्धित तेल विक्रिबाट आम्दानी | ५० | १२०० | ६०००० | ८० | १२०० | ९६००० | ८० | १२०० | ९६००० |
| शुद्ध नाफा | | | ११९८० | | | ५१४४० | | | ५१४४० |

## थप जानकारीको लागि सम्पर्क:


**जैविक विविधता तथा जीविकोपार्जनको लागी जडीबुटी प्रवर्द्धन कार्यक्रम**

**सगुन कपिलबस्तु**

मोतीपुर-५, चप्परगाउँ

फोन नं. ०७६ ६९००५०, ९८५७०३२५०४, इमेल: sagun.kapilvastu@gmail.com, वेबसाइट: www.sagunkapilvastu.org.np



*सन्दर्भ सामग्री : विजयमान स्थापित, सुगन्धित जडीबुटीको खेती र प्रशोधन विधि परिचय, आई.डि.ई. नेपाल, (२०११) पश्चिमी तराई भु-परिधि विकास आयोजना (२०१२), सगुन कपिलबस्तु (२०११)*

# समुदायमा आधारित सुगन्धित जडिबुटी प्रवर्द्धनका पहलहरू

## मेन्था खेती/एक परिचय

मेन्था करिब ८०-९० से.मी. अग्लो हुने बहुवर्षिय सुगन्धित विरुवा हो । मेन्थाको तेलमा ८० प्रतिसत मेन्थोल सारतत्व हुन्छ । मेन्थोलको प्रयोग विभिन्न औषधिहरु जस्तै मलम, दुख्दाखेरी लगाउने बाम, खोकिको सिरप, ट्याब्लेट आदिमा प्रयोग गरिन्छ । यो मिठाई, तेल आदि सामाग्रीहरु सुगन्धित पार्न पनि उपयोग गरिन्छ । मेन्थाको पात र कोमलो हाँगा पाचक, दमको औषधी, वायुसमन गर्ने औषधिको रुपमा प्रयोग गरिन्छ । यसको जरा बाहेक सम्पूर्ण भागबाट सुगन्धित तेल उत्पादन गरिन्छ ।

**क) जग्गा तयारी:**

पुष महिनामा यसको खेतीको लागि जग्गा तयारी गरिन्छ । खेतलाई राम्ररी खनजोत गरि झारपातहरु राम्रोसँग केलाई तयारी गरिन्छ । जग्गा तयारी गर्ने वेलामा पाकेको कम्पोष्ट मल (२०-३०) टन प्रति हेक्टर राख्नु पर्दछ । यस वालीलाई सिचाईको आवश्यकता पर्ने भएकोले सिंचाई गर्दा पानी नजम्ने गरी आलीहरु बनाई प्लटहरु बनाउने र पानी जमिरहेको अवस्थामा पानी कटाउन सक्ने व्यवस्था गरी राख्नुपर्दछ ।

**यसको खेती मुख्य तया दुइ किसिमले गर्न सकिन्छ ।**

१. **सक्कर रोपेर** : जमिन मुनि रहने यस विरुवाको सक्करलाई टुक्रा पारेर लाईनमा रोपेर खेती गरिन्छ । पुषको अन्तिम हप्ता देखि माघको तेश्रो हप्तासम्म ताजा र रोगरहित ५-६ सेमी लामो सक्करका टुक्राहरु खेतमा रोपिन्छ । सक्करहरु करिव २-३ से.मी. गहिरो लाईनमा सुताएर लगाउनु पर्दछ । एक लाईन देखि अर्को लाईनको दुरी ४५-६० सेमी हुनु पर्दछ । सक्कर राखी सकेपछि माटोले छोप्नु पर्दछ । यसरी खेती गर्दा करिव ३०० के.जी. सक्कर प्रति हेक्टर आवश्यक पर्दछ ।

२. **विरुवा रोपेर** : विरुवा रोपेर खेती गर्न पुषको अन्तिम हप्ता देखि माघ भित्र सक्करलाई टुक्रा गरी नर्सरी राख्नु पर्दछ । नर्सरीमा उमारेको मेन्थाको वेर्ना फागुनको अन्तिम हप्ता देखि चैत्रको पहिलो हप्ता भित्र रोप्नु पर्दछ । यसरी रोप्दा एक वेर्नाबाट अर्को वेर्नाको दुरी १०-१५ सेमी र एक लाइनबाट अर्को लाइन ४५-६० सेमी हुनु पर्दछ।

**ख) मलको व्यवस्थापन :**

मेन्था तेल उत्पादनमा मुख्य यसको घाँस उत्पादनमा भरपर्ने हुँदा राम्रो घाँस उत्पादन गर्न प्रयाप्त मात्रामा प्राङ्गारिक तत्वहरु माटोमा हुनु पर्दछ । माटोको गुणस्तर हेरी साधारणतया नाइट्रोजन १०० केजी. फोस्फरस ५० केजी प्रयोग गर्नु उपयुक्त हुन्छ । फोस्फरस र पोटास रोप्नु अगाडि माटोमा राख्नु पर्दछ र २० केजी नाइट्रोजन रोप्ने वेला सिंचाई गरिसकेपछि दिनुपर्दछ । बाँकी नाइट्रोजन २५-३० दिनको फरकमा तीन भागमा विभाजन गरी छर्नु पर्दछ।

**ग) सिंचाई :**

राम्रो उत्पादनको लागि सिंचाई पनि समय समयमा आवश्यकता अनुसार दिनु पर्दछ । प्रायः जसो जाडो मौसममा माघ देखि चैत्र सम्म माटोको अवस्था हेरि १०-१५ दिनको फरकमा सिंचाईको आवश्यकता पर्दछ भने गर्मी मौसममा वैशाख देखि जेष्ठ महिनामा ७-१० दिनको फरकमा सिंचाइको आवश्यकता पर्दछ । सिंचाई गर्दा पानी जम्न नदिन विशेष ध्यान पुऱ्याउनु पर्दछ । मौसम अनुसार सिंचाईको आवश्यकता पनि फरक हुन सक्छ ।

**घ) गोडमेल तथा स्याहार संभार :**

मेन्थाको खेतीमा समयमा गोडमेल गरी झारपातहरु हटाएमा यसको उत्पादन वढ्ने हुन्छ । विरुवा रोपेको ३०-३५ दिनमा र यसको खेतीमा झारपात नियन्त्रण गर्न २-३ पटक गोडमेल गर्नुपर्ने हुन्छ । धान लगाएको खेतमा झारपातको प्रकोप अलि कम हुने हुन्छ ।

## ङ) रोग तथा कीराको व्यवस्थापन तथा रोकथाम :

१) धमिराको प्रकोप प्राय सुख्खा मौसममा देखा पर्दछ । धमिराको प्रकोप भएमा मेन्था बोट र पातहरु कालो तथा पहेलो भई सुकेर जान्छ र विरुवा मर्दछ । यसको रोकथामको लागि प्रशस्त मात्रामा सिंचाई गर्ने हेप्टाफेन ३५ ओषधी प्रति हेक्टर ५० किलोको दरले माटोमा विरुवा रोप्नु भन्दा पहिले छर्नु पर्दछ ।

२) भुसिल कीराले पातको माथिल्लो र तल्लो भाग खाई पातलाई जाली जस्तो बनाउछ । यसको रोकथामको लागि नुभान, इन्डोसल्पान २ मिली प्रति लिटर पानीमा मिसाई छर्नु पर्दछ।

३) लाभ्रे किराले मेन्थाको फूल फुल्ने बेलामा (जेष्ठ महिना तिर) यसलाई आक्रमण गर्दछ । यसले विरुवाको पातलाई नाङ्गो पारी डाँठ मात्र बाँकी राख्दछ । नुभान २ मिली प्रति लिटर पानीमा मिसाई छर्नु पर्दछ ।

४) पात वेर्ने कीरा को प्रकोप भाद्र महिनामा हुने गर्दछ । यो कीरा हरियो रंगको हुन्छ र यसमा रातो पहेंलो रंगको धब्बाहरु हुन्छन । यसले मेन्थाको पात वेर्दछ र यसलाइ काटेर नोक्सान पार्दछ । यसको रोकथामको लागि नुभान, इन्डोसल्फान डेनिस आदि औषधीहरु २ मिली प्रति लिटर पानीमा मिसाइ छर्नुपर्दछ ।

५) लिफ ब्लाइट रोग वर्षात सुरु भएपछि लाग्ने गर्दछ । पातमा कालो, खैरो गोलो वा छिरविरे दाग हुने गर्दछ र पछि पात झर्ने हुन्छ । यसको रोकथामको लागि मानकोजेव (०.२ प्रतिशत) १५ दिनको फरकमा छर्नु पर्दछ ।

## ङ) वाली संकलन :

मेन्थाको वाली संकलन घाम लागेको दिनमा गर्नु पर्दछ । माघ महिनामा लगाएको वाली वैशाखको अन्तिम हप्ता सम्म पहिलो वाली तयार हुन्छ । दोश्रो वाली श्रावणको पहिलो हप्तासम्म तयार हुन्छ । समयमा राम्रोसँग खेती गरेर वर्षात शुरु हुनु भन्दा अगाडि अर्थात धान लगाउनु अगाडि मेन्थाको दुई वाली लिन सकिन्छ । यसको लागि पुषको अन्तिम हप्ता देखि माघको दोश्रो हप्ता सम्म मेन्थाको सकर रोप्नु पर्दछ । मेन्थाको सकर लाई रोप्नु अगाडि १२ प्रतिशत गाई वा भैसीको पिसावमा करिव ४० मिनेट भिजाएर रोप्दा ७० प्रतिशत मेन्थामा फूलफुल्ने र मेन्थाको तेल उत्पादनमा करिव ३० प्रतिशत सम्म वृद्धि गर्न सहयोग हुन्छ ।

## च) प्रशोधन/उत्पादन:

संकलित वालीलाई पातलो गरी फिजाएर २४ घण्टा ओइलाउनु राम्रो हुन्छ । प्रशोधन संयन्त्रको भाँडामा ओइलाएको वाली प्रशोधन गरी तेल निकालिन्छ । तेलमा भएको पानी र वाह्य पदार्थ हटाइसकेपछि सुगन्धित तेललाई सिसा, ग्यालभनाईज भाँडो वा स्टिलको भाँडोमा सुरक्षित भण्डार गर्नु पर्दछ । तेल उत्पादन करिव १००-१२५ केजी प्रति हेक्टर प्रति वर्ष उत्पादन हुन्छ । मेन्था खेती, प्रसोधन खर्च र आम्दानी प्रति हेक्टर प्रति वर्ष यस तालीकामा दिइएको छ ।

| विवरण | पहिलो वर्ष | | | दोस्रो वर्ष | | | तेस्रो वर्ष | | |
|---|---|---|---|---|---|---|---|---|---|
| | संख्या | दर रु. | जम्मा | संख्या | दर रु. | जम्मा | संख्या | दर रु. | जम्मा |
| जोताई (घण्टा) | ८ | ७०० | ५६०० | ८ | ७०० | ५६०० | ८ | ७०० | ५६०० |
| ज्यामी संख्या (प्लट बनाउने) | १२ | २२० | २६४० | १२ | २२० | २६४० | १२ | २२० | २६४० |
| वीउ र सकर | १ | ६०० | ६०० | ३०० | १ | ३०० | १ | ८०० | ८०० |
| कम्पोष्ट मल (ट्रली संख्या) | ५ | ८०० | ४००० | ५ | ८०० | ४००० | ५ | ८०० | ४००० |
| कम्पोष्ट मल छर्ने ज्यामि संख्या | १२ | २२० | २६४० | १२ | २२० | २६४० | १२ | २२० | २६४० |
| सिंचाई (संख्या) | ६ | ३४० | २०४० | १० | ३४० | ४३०० | ६ | ३४० | २०४० |
| गोडमेल तथा स्यार संभार | ४८ | २२० | १०५६० | ४८ | २२० | १०५६० | ४० | २२० | ८८०० |
| वाली संकलन (ज्यामि संख्या) | ६० | २२० | १३२०० | ३० | २२० | ६६०० | ४० | २२० | ८८०० |
| ढुवानी ट्रली संख्या | ४ | ५०० | २००० | ४ | ५०० | २००० | ४ | ५०० | २००० |
| प्रसोधन तेल (प्रति केजी ) | ६ | २००० | १२००० | ९० | २५० | २२५०० | २५ | ३०० | ७५०० |
| अन्य | | | १००० | | | १००० | | | १००० |
| कुल उत्पादन खर्च | | | ५६२८० | | | ६२१४० | | | ४५८२० |
| सुगन्धित तेल विक्रिबाट आम्दानी | ६ | १७००० | १०२००० | ९० | १२०० | १०८००० | २५ | ३५०० | ८७५०० |
| शुद्ध नाफा | | | ४५७२० | | | ४५८६० | | | ४१६८० |

## थप जानकारीको लागि सम्पर्क:


**जैविक विविधता तथा जीविकोपार्जनको लागी जडीबुटी प्रवर्द्धन कार्यक्रम**

**सगुन कपिलबस्तु**

मोतीपुर-५, चप्परगाउँ

फोन नं. ०७६ ६९००५०, ९८५७०३२५०४, इमेल: sagun.kapilvastu@gmail.com, वेबसाइट: www.sagunkapilvastu.org.np



*सन्दर्भ सामग्री : विजयमान स्थापित, सुगन्धित जडीबुटीको खेती र प्रशोधन विधि परिचय, आई.डि.ई. नेपाल, (२०११) पश्चिमी तराई भु-परिधि विकास आयोजना (२०१२), सगुन कपिलबस्तु (२०११)*

# समुदायमा आधारित सुगन्धित जडिबुटी प्रवर्द्धनका पहलहरू

## जडिबुटी नर्सरी/एक परिचय

जडिबुटीको खेती गर्नका लागि जडिबुटीका वेर्नाहरुको आवश्यकता पर्दछ । राम्रा वेर्ना नभएसम्म राम्रो खेती हुदैन । वेर्ना उमार्नको लागि निश्चित ठाँउको आवश्यकता पर्दछ । नर्सरी निर्माण गर्नको लागि उपयुक्त ठाउँको छनोट हुनुपर्दछ । ठाउँको छनोट नै नर्सरी निर्माणको महत्वपूर्ण भाग हो । ठाउँ छनोट गर्दा निम्न कुरामा विशेष ध्यान दिनुपर्दछ ।

**क) जग्गाको अवस्था :**

भावर तथा तराई क्षेत्रमा ठाउँ छनोट गर्दा सकभर पूर्व फर्केको समथर जग्गा उपयुक्त हुन्छ । भिरालो जग्गा नर्सरीको लागि उपयुक्त हुदैन । भिरालो जग्गाको माटो वगेर जाने संभावना वढी हुन्छ ।

**ख) पानीको स्रोत :**

पानीको स्रोत भरपर्दो हुनुपर्दछ । पानीको मुहान तथा स्रोत नजिकमा नभए वोरिङ तथा चापाकलको व्यवस्था गरेको हुनुपर्दछ ।

**ग) वाटोको सुविधा :**

नर्सरीमा पुग्नको लागि वाटो सुविधा भएको हुनुपर्दछ । जस्तै निर्माण सामाग्री पुराउन र नर्सरीवाट विरुवाहरु रोप्ने ठाउँसम्म पुराउन पर्दछ ।

**घ) माटो र वालुवाको स्थिति :**

वर्षेनी निकै धेरै माटोको आवश्यकता पर्दछ । २० हजार विरुवा उत्पादन गर्नको लागि सरदर १० घनमिटर माटोको मिश्रण चाहिन्छ । दुई भाग माटो र एक एक भाग वालुवा र कम्पोष्ट मलको आवश्यकता पर्दछ ।

**ङ) नर्सरी क्षेत्र :**

नर्सरीको स्थापना गर्ने ठाउँ छनोट गर्दा नर्सरीमा कति विरुवा उत्पादन गर्ने हो निश्चित भएको हुनुपर्दछ । विरुवा संख्या, विरुवा नर्सरीमा रहने समय, जमिनको स्तर आदिमा नर्सरी क्षेत्र निर्भर गर्दछ । नर्सरीको क्षेत्र सकभर चौकस र वारवेरा गर्न सजिलो हुनुपर्दछ ।

**च) सामाग्रीको उपलब्धता:**

नर्सरीको निर्माणको लागि आवश्यक पर्ने सामाग्रीहरु सकभर स्थानीय रुपमा नै उपलव्ध हुन सक्ने हुनुपर्दछ । नर्सरी निर्माणमा चाहिने वांस, काठ, काटी, किला, खर, माटो, वालुवा ,डोरी, मल, विउ, जैविक औषधि, आदि सामानहरु समयमा हुनु आवश्यक छ ।

**छ) पर्खाल वा वारवेरा:**

नर्सरीको सुरक्षा गर्नको लागि चारैतिरवाट वारवेरा वा पर्खाल लगाएर घेरेको हुनुपर्दछ ।

### ज) नर्सरी निर्माण:

नर्सरी निर्माण गर्ने स्थलमा ढुंगा, ढिस्का, रुख विरुवाहरु भएमा त्यसलाई हटाई राम्रो र सफा वनाउनु पर्दछ । नर्सरी व्याडहरु धेरै फराकिलो भएमा व्याडको वीचभाग सम्म पुग्न कठिन हुने भएकोले व्याडको चौडाई सकभर १.२ मिटर भन्दा वढी हुनुहुदैन । व्याडको लम्वाई नर्सरीको ठाउँ कति छ त्यसमा निर्भर गर्दछ । ८ मि. देखि १२ मि. लामो भएमा सुविधाजनक हुन्छ । व्याड पूर्व पश्चिम लम्वाई भएको वनाउन सकेमा छहारीको प्रयोग वढी प्रभावकारी हुन्छ ।

### झ) नर्सरीमा विरुवा उमार्ने:

प्लाष्टिकका थैलीहरुमा वेर्ना उमारेर : प्लाष्टिकका थैलीहरुमा विउ छर्नुभन्दा पहिले जंगलवाट ल्याएको माटो २ भाग वालुवा र कम्पोष्ट मल एक एक भाग गरी राम्रोसँग मिसाएर त्यसलाई मसिनो धुलो वनाउनु पर्दछ । यसरी मिलाएर मसिनो वनाएको माटोलाई मसिनो तारको जालीले छान्नु पर्दछ । छानेको माटोलाई प्लाष्टिकका थैलीहरुमा भरी नर्सरी व्याडमा राखिन्छ । विउ सधै प्लाष्टिकका थैलीमा रोपी विरुवा उमारे पछि विरुवा अर्को ठाउँमा सार्दा नोक्सान हुन पाउदैन र सजिलो सँग सर्न सक्छ ।

### सिधै व्याडमा विउ उमारेर:

व्याडमा उमारेका विरुवाहरुलाई जरा सहित उखेलेर रोपण क्षेत्रमा लगी रोप्न सकिन्छ । जरा सहित उखेलेका विरुवाहरु एक ठाउँवाट अर्को ठाउमा लग्न सजिलो हुन्छ ।

### रुट शुट कटिङ गरेर:

नर्सरीमा उमारेका विरुवाहरु पेन्सील साईजका भए पछि कटिङ वनाउन उपयुक्त हुन्छ । कटिङ वनाउँदा जमिनको सतहवाट भन्दा माथिको काण्डको एक भाग र जमिनमुनिको जराको दुई भाग गरी करिव एक वित्ता वरावरको कटिङ वनाईन्छ । यसरी वनाएका कटिङलाई वोरामा राखी पानीले चिसो पारी रोपण क्षेत्रमा लगी रोप्ने काम गरिन्छ । यसरी रोपेका विरुवाहरु अधिक राम्रा र सप्रेका हुन्छन । यो सवैभन्दा सजिलो प्रक्रिया हो ।

### हागाहरु वा झ्याङ्हरु (स्लिप) बाट:

जडिवुटीका विरुवाहरु हागा काटेर वा झ्याङ्हरु (स्लिप) वाट वा सकरहरु रोपण गरी जडिवुटी उत्पादन गर्न सकिन्छ । सिधै जमिनमा विउ छरेर पनि जडिवुटी उत्पादन गर्न सकिन्छ ।

### नर्सरी निर्माण गर्दा चाहिने मुख्य सामाग्रीहरु तथा औजारहरु

- विउ, माटो, वालुवा, कम्पोष्ट मल, प्लाष्टिकका थैली, वाक्लो पोलिथिनको सीट, डोरी
- विउ उमार्ने व्याडमा राखिने एल्युमिनियम तार
- तारको जाली, कांटी, मल, कलम, सिसाकलम, रजिष्टर खाताहरु
- औजार तथा मालसामानहरु
- कोदालो, हसिया, कोदाली, वन्चरो, डोको, टीनका वक्सा, माटो तथा वालुवा चाल्ने जाली, हथौडा, चुच्चे कुटो, वेल्चा, दांते, टुटी भएको पानी हाल्ने भाडो, स्प्रेयर, विरुवा उमार्ने किस्तिहरु, छहारी वनाउने सामाग्रीहरु, वाँस, वोरा, आदि ।


थप जानकारीको लागि सम्पर्क:

**जैविक विविधता तथा जीविकोपार्जनको लागी जडीबुटी प्रवर्द्धन कार्यक्रम**

**सगुन कपिलबस्तु**

मोतीपुर-५, चप्परगाउँ

फोन नं. ०७६ ६९००५०, ९८५७०३२५०४, इमेल: sagun.kapilvastu@gmail.com, वेबसाइट: www.sagunkapilvastu.org.np



सन्दर्भ सामग्री : ध्रुवराज भट्टराई २०५८, जडीबुटी मञ्जरी

# नेपाल सरकारको ऐन नियममा जडिबुटी सम्बन्धि भएको व्यवस्था

**परिचय:**

सन् २००४ सम्म जडिबुटी व्यवस्थापनको लागि भनेर खास ऐन र नियमको तर्जुमा गरेको पाईदैन । सन् २००४ मा नेपाल सरकारले पहिलो पल्ट हर्बल तथा जडिबुटी विकास नीति तर्जुमा गरेको पाईन्छ । तर पनि वन ऐन र वन नियमावलीले जडिबुटी सम्बन्धमा जे जति व्यवस्था गरेको छ त्यस अनुरूप नै हालसम्म जडीबुटीको संरक्षण, विकास र विस्तार हुदै आएको पाईन्छ । महत्वपूर्ण नीति, ऐन, रणनीती, नियमावली र योजनामा जडिबुटी सम्बन्धि गरिएको व्यवस्था तल संक्षेपमा दिइएको छ ।

**(क). वनस्पति संरक्षण ऐन (सन् १९७२):**

वन क्षेत्रबाट वन पैदावार संकलन गर्दा दीगो र बुद्धिमतापूर्णरूपमा वनस्पति संरक्षण गर्ने खालका कार्यक्रमहरू संचालन गर्ने

१. भू-तथा जलाधार संरक्षण ऐन (सन् १९८२): जडिबुटी तथा महत्वपूर्ण वनसम्पदाको विकास, विस्तार, संरक्षण तथा प्रवर्धन गर्दा भू(तथा जलाधार संरक्षण हुने प्रजातिलाई विशेष महत्व दिने
२. वन क्षेत्रको गुरू योजना (सन् १९८९): नेपालको ग्रामीण क्षेत्रमा वस्ने निम्न आय भएका समुदायको आधारभूत आवश्यकता हल गर्न वन सम्पदा र जडिबुटीको संरक्षण र प्रवर्धन गर्ने
३. नेपाल वातावरणीय नीति तथा कार्ययोजना (१९९३): लोपउन्मूख वनस्पति तथा जडिबुटीहरूको संरक्षण र प्रवर्धन गर्दै यसलाई आम्दानिको एउटा प्रमुख स्रोतको रूपमा विकसीत गर्दै लैजाने र सामुदायिक वन तथा समुदायको स्वामित्वमा रहेको खेर गएको जग्गामा जडिबुटी खेती गर्न प्रोत्साहित गर्ने

**वन ऐन (सन् १९९३):**

वन पैदावार भन्नाले वनमा रहेको वा पाइएको वा वनबाट ल्याएको पैदाबार जस्तै (१) काठ, दाउरा, गोल, खर, खोटो, काठको तेल, वोक्रा, लाहा, पिपला र पिली वा (२) रूख, पात, फल, फूल, मौवा, चिराइतो, कट्की र सबै प्रकारका जंगली जडिबुटी, वनस्पति तथा तिनका विभिन्न भाग वा अंगलाई जनाउँछ भनिएको छ । सरकारद्वारा व्यवस्थित वनको वन पैदावारमा नेपाल सरकारको स्वामित्व रहने छ । वन पैदावार उपयोग गर्न, हटाउन वा विक्रिवितरण गर्न, निकासी गर्न वा ओसारपसार गर्न तोकिएको अधिकारीले तोकिएबमोजिम ईजाजत दिन सक्नेछ । ईजाजत दिईने वन पैदावारको मूल्य वा दस्तुर तोकिए वमोजिम हुनेछ।

**वन नियमावली (सन् १९९५):**

जडिबुटी संकलन गर्न चाहानेले जडिबुटीको किसिम, संकलन क्षेत्र, परिमाण र संकलन गर्ने उदेश्य समेत खोली अधिकार प्राप्त अधिकारी समक्ष निवेदन दिनुपर्ने छ । जडिबुटी संकलन गर्ने इजाजत पत्र बमोजिम संकलन गरिएको जडिबुटीको दस्तुर लिई छोडपूर्जी दिईनसक्नेछ । कुनै व्यक्तिले लगाएको वन पैदावार बाहेक अन्य वन पैदावार विदेश निकासी गर्न अनुमतिका लागि सम्बन्धित भन्सार कार्यालयले सिफारिस दिन सक्नेछ ।

कुनै व्यक्ति, संघ संस्था वा उद्योगले संकलन, उपयोग, विक्रि वितरण, ओसारपसार निकासीमा प्रतिबन्ध लगाएदेखि वाहेकका अन्य वनपैदावर भन्सारको प्रज्ञापन पत्र र सम्बन्धित मुलुकको आधिकारिक प्रमाणको आधारमा दिन सक्नेछ । सामुदायिक र कबुलियत वनको कार्ययोजनामा व्यवस्था गरिएअनुसार वन उपभोक्ता समुहले वनमा पाईने जडिबुटीको संकलन गरि वेचविखन गर्न सक्छन तर ओसारपसार गर्दा सम्बन्धित जिल्ला वन कार्यालयमा अग्रिम जानकारी गराउनु पर्दछ । जडिबुटी जस्तै कुट्की, पाँचऔले, ओखरबोक्रा संकलन उपयोग, विक्री वितरण, ओसारपसार र विदेश निकासीमा प्रतिबन्ध र जटामसी, सर्पगन्धा, सुगन्धा कोकिला, सुगन्धवाल, भ्याउ, शिलाजित, तालिस पत्र, लौठ सल्ला, यार्सागुम्बा प्रशोधन विना विदेश निकासीमा प्रतिबन्ध गरिएको छ।

**वातावरण संरक्षण ऐन (सन् १९९६):**

५ टन भन्दा बढी जडिबुटी संकलन गर्नु परेमा प्रारभिंक वातावरणीय परिक्षण र ५० टन भन्दा बढी संकलन गर्नु परेमा वातावरणीय प्रभाव मूल्याङ्कन गर्नु पर्ने व्यवस्था भएको

**स्थानीय स्वायत्त शासन ऐन (सन् १९९८):**

ग्रामीण क्षेत्र भित्र भएका वन क्षेत्र तथा खेर गएको जग्गामा समेत समूह मार्फत जडिबुटीको संरक्षण र प्रवर्धन गर्न प्रोत्साहित गर्ने ।

**वन क्षेत्र नीति (सन् २०००):**

जडिबुटीको संरक्षण र प्रवर्धनको लागि निजी क्षेत्रको भूमिकालाई पहिलो पटक आत्मसात गरेको

**हर्बल तथा जडिबुटी विकास नीति (सन् २००४):**
जडिबुटीको विकास, संरक्षण र प्रवर्धनको लागि वाह्य लागत भित्राउन रणनिती तयार गर्ने, जडिबुटीको दीगो विकासको लागि संरक्षण योजना वनाउने, दीगो संरक्षणमा जनसहभागीता बढाउने, जडिबुटीको प्रमाणिकरण र कर प्रणालीमा सरलता ल्याउने, जडिबुटीको व्यवसायिक खेती विस्तारको लागि सचेतना, शीप र क्षमतामा अभिबृद्धि गर्ने, वनसम्पदामा आधारित जडिबुटी उद्योगको प्रवर्धन गर्ने, सरकारी तथा गैरसरकारी निकायको क्षमता अभिवृद्धी गर्ने, आर्युवेदिक उद्योगको विकास र विस्तार गर्ने, निजी क्षेत्रको लगानीलाई प्रोत्साहित गर्ने, सन २०२० सम्म जडिबुटीको विकास र विस्तार मार्फत नेपाललाई आर्थिक रूपमा सवल र सक्षम वनाउने

**नेपाल जैविक विविधता रणनिती कार्यान्वयन योजना (सन् २००६):**
जडिबुटीको संरक्षण र प्रवर्धन मार्फत जैविक स्रोत सम्पदा, जीविकोपार्जन र आर्थिक विकासमा टेवा पुर्‍याउने

**व्यापार ऐन (सन् २००९):**
दीगो आर्थिक विकासको लागि जडिबुटीको व्यावसायिकरण गर्ने र सुगन्धित तेलजन्य जडिबुटीको प्रवर्धनमा विशेष प्राथमिकता र जोड दिने ।

**तीन वर्षे अन्तरिम योजना (सन् २०१०(२०१३):**
जडिबुटीको उत्पादन, प्रशोधन र वजारीकरणको लागि नीजि तथा सार्वजनिक क्षेत्रको साझेदारीतालाई प्रवर्धन गर्ने

**औद्योगिक नीति (सन् २०१०):**
जडिबुटीको दीगो विकास र विस्तारकालागि ससानास्तरका उद्योग संचालन गर्न उत्प्रेरित गर्ने

**नेपाल व्यापार एकिकृत रणनिती (सन् २०१०):**
समाजका अति विपन्नवर्गको लागि जडिबुटीको संरक्षण र प्रवर्धनबाट लाभ हुने कुराको ग्यारेन्टी गर्न ती वर्गको क्षमतामा अभिबृद्धी गर्ने खालका एकिकृत योजना संचालन गर्ने

**वर्तमान चुनौतीहरू**

- वन ऐन, नीति, रणनिती तथा नियमावलीका कतिपय दफा तथा उपदफा अन्य ऐन जस्तै स्थानीय स्वायत्त शासन ऐनका कतिपय दफासँग तालमेल नहुनु ।
- जडिबुटीको उपयोग र विकासमा स्थानीय संरक्षणकर्ताको हकअधिकार सम्बन्धि स्पष्ट व्याख्या हुन नसक्नु
- समुदायमा वन हस्तान्तरण पछि पनि जडिबुटीको संकलन, भण्डारण तथा व्यवसायीकरणमा ठेकेदारको मनोमानी हुनु
- सामुदायिक वनको कार्ययोजनाले जडिबुटीको संरक्षण र प्रवर्धनका कतिपय सबाललाई समेट्न नसक्नु
- वन पैदावारसँग सम्बन्धित उद्योगकोहकमा तराईमा वनक्षेत्र भन्दा ५ किमि टाढा हुनुपनर्ने व्यवस्था भएपनि सोको कार्यान्वयन नभएको र उद्योगस्थलको चयन गर्दा जिल्ला घरेलु उद्योग कार्यालय, जिल्ला वन र नापी कार्यालयको सहमतिमा गर्ने व्यवस्था भएपनि सोको कार्यान्वयन नहुनु ।
- जडिबुटीको संकलन गर्दा प्रारभिंक वातावरणीय परिक्षण र वातावरणीय प्रभाव मूल्याङ्कन गर्ने परिपाटीबाट ठेकेदारहरू निरूत्साहित हुनु, जडिबुटीको दर तय गर्दा उपभोक्ताको सबाललाई नसमेटनु ।
- जडिबुटीको प्राविधिक पक्षको बारेमा स्थानीय वनउपभोक्ता अनभिज्ञ हुनु जसले गर्दा ठेकेदारले मनमानीपूर्वक जडिबुटीका संकलन गर्नु ।
- जडिबुटीको प्रशोधन गर्ने प्रशोधनकेन्द्रहरू कम हुनु जसले गर्दा कच्चा पदार्थ सिधा रूपमा निकासी गर्नु पर्ने अवस्था आउनु ।

## थप जानकारीको लागि सम्पर्क:


**जैविक विविधता तथा जीविकोपार्जनको लागी जडीबुटी प्रवर्द्धन कार्यक्रम**
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*सन्दर्भ सामग्री : विजयमान स्थापित, सुगन्धित जडीबुटीको खेती र प्रशोधन विधि परिचय, आई.डि.ई. नेपाल, (२०११) पश्चिमी तराई भु-परिधि विकास आयोजना (२०१२), सगुन कपिलबस्तु (२०११)*

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