CHAPTER IV

TRADITIONAL AGRICULTURAL PRACTICES

The Vedas, world's oldest scriptures, form a rich body of traditional ecological and agricultural knowledge. It is composed of hymns that reveal the reverence, the respect and admiration Vedic people had for nature. The Vedas represent the grandest homage ever rendered to the environment.

The *Atharvaveda*, the fourth Veda, describes the life of the ancient Indian agriculturist community. It is interesting to note that in Vedic times, agriculture was considered the most honourable of human activities. Farmer is an authority in the knowledge and acquirement of food and is therefore highly respected. The common people choose their king amongst the agriculturists. King is given the honour of being the first to plough the land. Everyone must cultivate the land and grow nutritious food. The farm is compared to the divine cow fulfilling all the desires of the hard working farmer.

Ancient Indian farmers evolved nature friendly farming systems and practices. Agricultural activities were designed to ensure ecological sustainability. India developed its own holistic scientific knowledge. It has a number of classical texts related to agricultural science. Kautilya's *Arthashastra*, Patanjali's *Mahabhasya*, *Krishi-Parashara*, Varahmihira's *Brhat Samhita*, and Surapala's *Vrikshayurveda* are some of the manuscripts that contain valuable information about agricultural implements, selection of seeds, land preparation, pest control, storage, plant nutrients, grafting, soil selection, plant propagation, diseases and plant protection, mixed cropping, crop rotation, intercropping, shifting cultivation, terrace farming etc. India's traditional agriculture has proved to be sustainable by maintaining the country's fertility and biodiversity over centuries.

Green revolution couldn't be sustained for more than three decades due to adverse impact on environment, health, soil and mono-cropping system. Environmental hazards in the case of modern agriculture arise mainly from the chemical control of weeds and pests and from irrigation works. Fertilizers, on the other hand, would not appear at present to pose a threat even at prospective level of their use in the developing countries. The side effects of insecticides and pesticides need to be watched fairly carefully. Their toxicity to fish and birds, as well as their persistence and mobility, make them a hazard beyond their target area.
Traditional knowledge exists worldwide in all communities covering varied areas including health, agriculture and natural resource management. In case of the developing world Africa and Latin America are also rich in traditional knowledge but they are to be found by and large only as oral traditions. Asia in general and India in particular have a distinction that traditional knowledge is found not just as oral tradition but also as classical literature that is written down with its own theoretical framework and with a clear exposition of the basic principles of world views.

The present study on traditional knowledge of Bhor and Mahad covering varied areas including prediction of rainfall, farming systems, tillage, mixed cropping, crop rotation, crop protection, terrace farming, agricultural implements, etc.

A) Prediction of Rainfall: The systematic study of meteorological science was made by our ancient astronomers and astrologers. Agriculture is totally dependent on rainfall. This fact was first realised by Indians. Hence they started gauging the sky for rainfall prediction. Parashra gave the techniques of rainfall prediction and agricultural practices for crop production. Garg invented the science of astrology. Aryabhata measured the time period of different planets and distance from earth. Varahmihira (600 AD) studied weather prediction and measurement of rainfall, touching zenith in the meteorological science. The hypotheses given by ancient scientists are simple and costly apparatus were not used. Observations coupled with experience over centuries developed meteorology (Varshney, 2007).

The methods used by local and indigenous people for forecasting rainfall and other weather conditions on the basis of bio-indicator and the phenology of plants and behaviour of animals is coined as a new term – Presage biology. The production and application of local forecasts are deeply localized, derived from intimate interactions with a micro-environment whose rhythms are intertwined with the cycles of seasonal changes. Local indicators and local knowledge systems can not be replaced with scientific knowledge, because they are holistic and specific to local situations, providing farmers and others with the ability to make decisions and prepare for the coming agricultural year. Mechanisms for integrating both traditional and scientific weather forecast systems would reduce uncertainties and improve farm management, as well as provide a basis for integrating scientific forecasts into existing decision processes of farmers (Acharya, 2011). Local people from Bhor and Mahad region used bio-indicators as well as Almanacs (Panchang) to predict the weather for a very long time and used different methods, some of which proved very effective and successful.
Farming systems:

In India the agricultural biodiversity consists not only of wild plants but also of crops like wheat, rice, jowar, pulses in case of species diversity. Rice crop has wide diversity in their characters, growth pattern and maturity from 60 to 200 & above days at varied elevations. Bhor and Mahad regions lie in Western ghat region of Maharashtra having elevation from sea level 1500 m. This area falls under heavy rainfall to medium rainfall and different types of farming systems (Plate – IV.1).

Local people from both areas perform mainly two methods of traditional farming systems:

1. Flat land agriculture

2. Shifting or ‘malkush sheti’ agriculture.

Cropping patterns are different in Bhor and Mahad Regions. The major crop in both areas is rice production during the monsoon season (Kharif)

1. Flat land agriculture:

Land preparation for seedlings of rice:

Selection of land for seedling preparation is defined by each farmers depending upon land holding. Raab is traditional ‘slash and burn’ agricultural practice and is the core economic activity of the local communities comprising Kunabis, Konkanas, Varlies and Mahadevkolis.

Seedbed preparation is performed by using farm yard manure or dry cow dung in first layer, second layer is of plant twigs, Butea monosperma (Lamk.) Taub. Calycoperis floribunda (Roxb.) Poir., Holarrhena antidysenterica A. DC. Tectona grandis L., Bridelia squamosa Gehrm.and Terminalia crenulata Roth. and third layer is of different types of grasses leaf litter. It is not uniform in all the regions of Bhor and Mahad and changes according to the availability of the plant material. The process of rab cultivation were analysed by taking interviews of 20 farmers in both region and data generated is presented in table – IV.1. (Plate – IV.2).
## Table IV.1 Collection of Rab cultivation information

<table>
<thead>
<tr>
<th>Form no.</th>
<th>Farmer Name</th>
<th>Caste</th>
<th>Village</th>
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<td>Pawar Bhagwan Nanaji</td>
<td>Maratha</td>
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<td>Mahad</td>
<td>March</td>
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<td>April</td>
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After clearing of ash from the seedbed, seeds are sown 2-3 days after *Rohini Nakshatra* is initiated in a bed of 40-50 sq. m. depending upon the land holder’s seedling transplanting area.

Fields are plowed a number of times in standing water (puddling). Puddling of soil facilitates easy transplanting of seedlings. Generally seedlings are one to one and 15 cm in length and spacing between to spots is 22.5 cm. At each spot about four seedlings are transplanted. Under the wet system of cultivation continuous standing of water into fields and the timely removal of weeds have been carried out. Local landraces of rice are playing major role in traditional agriculture (Plate – IV.3).

India’s rice possesses wide diversity in their characters. They vary in maturation pattern from 60 to over 200 days and can grow in varied elevations. At one extreme, the deep water rice growing between 6 and 15 cm of water and at the other rice is grown with an annual rainfall of barely 500 mm. This traditional practice was propagated based on the intimate knowledge of the rice varieties then prevalent in ancient India followed by the varietals choice (Sarawgi and Rastogi, 2000). Maharashtra state has rich diversity of rice due to variation in soil, climate and choice of local people. Kulkarni *et al.* (1998) reported 25 land races of rice like *Kala rice* (aromatic rice), *Varangal, Rajguda, Kolambi, Tamsal, Raibhog, Halva, Garva* and *White rice* collected from Western ghat of Maharashtra.

In many parts of the Bhor and Mahad regions, different varieties are still chosen for needs, definitely not for the yields alone. They were chosen for their ability to withstand droughts or floods, resistance to pests, susceptibility to disease, salinity tolerance, time of maturity, size of the grains, colour, aroma, taste, keeping qualities, nutritional values. There were early maturity rice landraces prefered by farmers. Patil *et al.* (2009) recorded different types of landraces used by local people for mitigating climatic conditions in Bhor region.

In Mahad region, some farmers can cultivate second crop of rice in Rabi season or winter season where irrigation facilities are available. Locally the method is known as *Waigan* cultivation.

Local strains like *Kolamba* having early maturity and less water requirement, *Patani* and *Dodga* which are drought resistant and suitable in coarse sand or *murmad* soils where water holding capacity of soil is very low are selected. *Kalbhat* is a scented type of rice and generally grown in the middle of the field due to destruction of crop before maturity by wild
animal like Bison. The yield of rice is very low but has economic value. *Kalisal* and *Tambsal* are important rice varieties grown landraces in Mahad region. *Mazarel* is a rice landrace specially used for Poha purpose. *Bhadshi* and *Kuthethivu* are some of the high yielding landraces of rice in Mahad region.

2. Terracing system of farming

Generally this system is found in hilly regions of Bhor and Mahad. Terracing, not only substantially reduce erosion but also make it easier to carry out practices like zero tillage. In sloppy land, small pieces are protected by stone bunds (*tali*) and cultivated rice during monsoon season. During the monsoon season only rice cultivation is preferred (Plate – IV.1.A).

3. Shifting or ‘malkush sheti’ agriculture

Shifting cultivation locally called 'Malkush Sheti' is still being practiced in the region. The tribal or local population resides in hilly regions and practice ‘slash and burn’ of forests followed by mixed cropping. After cultivation for some time, the land is left fallow, again to be cultivated after a few years. Rotation of cropping pattern is maintained for 3-5 years and later the land is kept fallow for regeneration of forest tree species. This controls soil erosion and helps forest development through coppicing. Farmers involved in this practice require a high degree of skill based on experience over a long period of time, which ensures compatibility amongst the mixture of species raised. Thus ensuring maximum returns under the given conditions. During shifting cultivation crops like Nagli or Ragi (*Eleusine coracana* L.), Vari (*Panicum miliaceum* L.), Sawa (*Panicum sumatrense* Roth ex Roem. & Shult.), Niger (*Guzotia abyssinica* Cass.), Til (*Sesamum orientale* L.), Kathal (*Seteria italica* (L.) Beauv.) are grown. Ragi has six land races like Mutka, Kolshi, Kalikaguni, Gulshi, Asani and Argadi which are grown in Mahad region. Having a great nutritive value nagali is considered more suitable than any other grain to the people doing hard physical work (Plate – IV.1.B).

4. Mixed cropping system

Mixed cropping pattern is being practiced virtually in every form of traditional agriculture - persists in Bhor and Mahad regions. There are some local landraces like *Dukari* and *Kawali* in Bhor taluka. These strains are cultivated in *Kharif* season. In case of *Dukari*, grain colour is yellow, maturity is in September and cultivated in light soils. White grain is a special characteristic of *Kawali*, cultivated in mixed cropping pattern. Mixed cropping pattern
ensures security in the event of monsoon failure and increases the returns from the land. These crops are superior in nutrient availability, water holding capacity and stages of growth. The numerous crop combinations found in small scale farms are finger millet (ragi) and mustard, groundnut, sorghum (jowar), pigeon pea (a pulse, also known as redgram), cowpea, *Guzotia abyssinica* Cass (karala), *Sesamum indicum* (kale til), *Phaseolus sp.* (fieldbean) and *Amaranthus sp.* (rajgira and tandulja) and chillies (Plate – IV.1.C).

5. Intercropping system:

Intercropping is a key element of traditional farming systems. Its superiority over sole cropping in several respects has been indicated by different studies. In this system, main crops like Jowar, Ground nut, Bajara, seeds of pulses or even some medicinal plants like Owa, Shepu, and Til, are intercropped. Pulses are playing major role in the diet of tribal communities. Tribal people from Bhor and Mahad region cultivating pulses as intercrop on flat land agriculture, like *Phaseolus vulgaris* L. (rajma) green pods are boiled and consumed during food shortage, *Castanospermum australe* A.Cumn. (black gram), *Vigna unguiculata* (L.) Walp. subsp. *ungui culata* (hulga, kulith), *Vigna unguiculata* (L.) Walp. subsp. *cylindrica* (L.) Van. (cow pea) in Kharif season.

6. Rabi season cropping system

Local people cultivate *rabi* seasonal crops after harvesting Kharif season crops. *Rabi* season does not require irrigation in the hilly region because the moisture content in the soil is sufficient till harvest. Some areas have crops like *Sorghum vulgare* Pers (jowar), *Triticum vulgare* Vill (wheat), *Cicer arietinum* L. (gram) and. *Dagdi* and *Jondhla* are grown in Bhor region. Local landrace Batwal is type of *Dolichos lablab* L. (wal or pavata) grown in Mahad region.

During the *rabi* season, *Cicer arietinum* L. (*harbhara*) is sown as mixed crop with wheat or Jowar. The green seeds in unripe stage are used as green vegetables to make curry. After harvesting, pulses are consumed as a supplementary food item. Mostly pulses are grown as mixed crop. This practice resulted into control of diseases and pests likely to be more evenly distributed as each crop has a different tolerance level. Due to mix cropping pattern total output is increased (Mishra et al., 2009) (Plate – IV.4).
B) **Agricultural implements:**

The tools and implements used are of a primitive nature throughout the Bhor and Mahad region of Maharashtra State. Traditional farm tools and implements for self sustenance have been developed and modified through experience over generations to meet emerging socio-economic and farming challenges. The type of soils and topographic conditions largely influence the type, size and shape of particular tillage tools/implements. (Plate – IV.5). The following is a list of local tools/implements found in Bhor and Mahad regions of Pune and Raigad district of Maharashtra.

1) Plough 5) Petari 9) Sickle handle
2) Yoke 6) Maind 10) Bullock cart
3) Harrow 7) Threshing pole
4) Hoe 8) Broom

1) **Plough:** Tillage is the basic operation in farming. It is done to create favourable conditions for seed placement and plant growth. This is done mainly with a plough. A full history of the evolution of plough is not available. Farmers have been using plough since time immemorial. The primitive model might have been a crooked twig or a branch of a tree. The basic components of the plough are a shoe, a share, a body, a handle and a beam. The shoe and body make one piece in the case of ploughs being used in Bhor and Mahad region. The joint between the shoe and the body is purposely avoided with a view to make the plough more rigid and robust, so that the implement can work on gravely soils with stones and other obstacles which are encountered during the course of ploughing (Plate – IV.6).

2) **Yoke:** Yoke is a long wood. The yoke has a projection at the centre to which a beam of implements like plough, leveller and harrow etc. are secured by a rope. Its special character is very smooth, not harming animal while pulling bullock cart or agricultural operations like ploughing, harrowing, hoeing, etc. The length of each yoke is different depending on operations. While hoeing bulls going on strips/rows of seedlings and hence yoke of *Dendrocalamus strictus* (Roxb.) Nees is used. Even for bullock cart yoke is specially prepared by wood of *Gmelina arborea* Roxb. (shivan). Due to long polls of *Casurina equisetifolia* J.R. & G. Forst are also used for yoke (Plate – IV.7).
3) **Harrow:** It has a wooden plank to which wood/iron pegs, handle and bamboo shaft are fitted. It is used for breaking soil crust after rain and also for uprooting weeds (Plate – IV.8).

4) **Hoe:** The hoe is used to weed out the stumps from the ground. This is a necessary operation to remove weeds, and aerate the crop root by the thorns in between the two rows. Two bullocks are yoked to the wooden hoe for performing the operation (Plate – IV.9).

5) **Petari:** A wooden soil leveller is known as Petari. It is used for levelling the ploughed land. This implement is made from different types of wood resources available in Bhor and Mahad region (Plate – IV.10).

6) **Maind** (*Ghutta*): A heavy wooden log, locally called as Maind, is pulled by two bullocks over the soil to crush the clods. Maind is made of any locally available wood. Extra weight is added to all type of planks by placing stones on it or having person(s) ride on it. As the name suggests Maind or ghutta, levellers are used for levelling land (Plate – IV.11).

7) **Sickle handle:** Sickle is one of the most popular multi-purpose tool that our ancestors used in agriculture. Design of the sickle is prepared for harvesting of crops like wheat, maize, barley, pulses and grass etc. Big sickle (*Darat*) is used to harvest fodder from trees. Gandasa (*chopper*) and axe are used to harvest crops like sugar-cane etc. Handle of sickle should be smooth and easy to handle (Plate – IV.12).

8) **Threshing pole:** On an auspicious day the threshing floor is dug and levelled carefully and then smeared with cow dung. A threshing pole or pillar is then fixed carefully. The produce of the farmer increases depending on the quality of pillar. The sage Parashra stated that the pillar should be made of *Ficus benghalensis* L. (Vad), *Alstonia scholaris* (L.) R.Br. (Saptaparna), *Gmelina arborea* L. (shivan), *Bomax ceiba* L. (Savar) or any other tree with milky sap. The wood of *Feronia elephantum* Corr., *Aegle marmelos* (L.) Corr, *Bambusa arundinace* (Retz.) Willd and *Cocos nucifera* L. (Naral, Palm) should never be used to make the pillar by one who wishes one self well (Sadhale, 1999) (Plate – IV.13).

9) **Broom:** Brooms are prepared from different plant sources. The function of broom is to clean floor. While performing agricultural operations in threshing yard, the grains are separated from waste threshing material. Twigs with leaves are very useful for this operation (Plate – IV.14).
10) **Bullock cart**: It all began as all wood transport vehicle pulled by a pair of bullocks. Later on the wheels were clad with flat steel bars and provided with steel axle to enhance its life. Different types of wood resources are used to prepare bullock cart (Plate – IV.15).

11) **Miscellaneous**: Farmers are using supporting agricultural implements for different operations such as, *Musala* (pestle) *Udukhala* (mortar) *Sarpa*, (winnowing bastes) *Dhanyakrt* (Winnowing fan), *Calani* (Siev) etc. Similarly these implements are used in Bhor and Mahad regions made of locally available wood resources (Plate – IV.16, IV.17).

C) **Seed treatments**

The seeds are stored in wood ash. Pulses are treated with mixture of red soil and salt to prevent beetles.

D) **Manuring**

Farmers are using organic manure which is made from animal wastes. They also use green plants and other residues for getting good yield. In recent years farmers are using Urea as basic spray on rice crop.

E) **Method of sowing**

Farmers are sowing their seeds in Kharif season by broadcasting in rab fields and samplings are transplanted in puddled fields in case of rice crop. Other seeds of ground nut, cowpea, jowar etc are sown in rows and furrows by dibbling method.

F) **Weed control**

After sowing of crop within 15-20 days hand weeding is done.

G) **Pest control**

Farmers from Bhor and Mahad region used organic method of pest control such as growing of *Tegetus erecta* L. (Zendu) crop along the border of field. Some people use inorganic pesticides when severe attack of pests on crops.
H) Harvesting methods

i. **Period of harvesting**: Generally crop is harvested when it is yellow in colour or ripening stage is measured with plucking of pods, seed grain size, bursting of leguminous pods, etc.

ii. **Harvesting practices**: Crops like rice, jowhar, wheat, etc are harvested with the sickle tool. Groundnut, Mung, Udid, etc harvested by uprooting whole plant.

I) Storage methods

Seeds of grain are stored in *Hatari* and *Kangi* made from plant resources. Seed of leguminous crops are stored in wood ash and even tubers of Ginger are stored in ash. Pumpkin, Kakadi, and Dodka plant seeds pasted on cow dung and cow urine on wall of house.

J) Landraces

Special land races were selected like *Kolamba* which is having early maturity and less water requirement, *Patani* and *Dodga* are drought resistant and suitable in coarse sand or *murmad* soils where water holding capacity of soil is very low. *Kalbhat* is a scented type of rice and generally grown in the middle of the field due to destruction of crop before maturity by wild animal like Bison. The yield of rice is very low but has economic value. Kalisal and Tambsal are important rice varieties grown in Mahad region. Mazarel is rice landrace specially used for Poha purpose. Bhadshi and Kuthethivu are some of the high yielding landraces of rice in Mahad region. Ragi has six land races like *Mutka, Kolshi, Kalikaguni, Gulshi, Asani* and *Argadi* which are grown in Mahad region having a great nutritive value and considered more suitable to people doing hard physical work than any other grain. There are some local landraces of *Sorghum bicolour* (L.) Moench (jowar) like *Dukari* and *Kawali* in Bhor taluka in Kharif season and Dagdi and Jondla in Rabi season. In case of *Dukari*, grain colour is yellow.*Triticum vulgare* Vill (wheat), *Cicer arietinum* L. (gram) and are grown in Rabi season in Bhor region. Local landrace Batwal is type of *Lablab purpurens* (L.) Sweet. (wal or pavata) grown in Mahad region.

kullith) in Kharif season and oil seeds like *Guizotia abyssinica* (L.f.) Cass (karala or Khrusani), *Sesamum orientale* L. (kale til) are locally available strains (Plate – IV.18).

**Traditional agricultural practices in Bhor and Mahad region**

1) **Botanical name: ** *Terminalia chebula* Retz.

   Family: Combretaceae  
   Local name: Hirda  
   Habit: Tree  
   Habitat: Common on hills slopes in forest.

   Leaves elliptic oblong, flowers harmaphrodite, often panicled spikes calyx cpanulate, glabrous outside, hairy within drupes pendulous ellipsoid brown obscuarly 5 ribbed.

   **Description of wood:** Wood colour is brownish grey with a greenish or yellowish tinge with an irregular small dark purple heart wood. Very hard, fairly durable. Dry wood having hardness 1192 Kg, density 929 kg/m$^3$, bending strength 1473 kg/cm$^2$, shearing strength 200 kg/cm$^2$, with 2% radial and 4% tangential shrinkage indicates very hard wood character. Such type of wood is suitable for making plough.

   **Traditional agriculture notes:**

   Plough: Wood is used for plough making.  
   Hoe: Wood is used for Dinda  
   Maind: Wood is used for crushing soil boulders.  
   Petari: Wood plates are used for making petari, used for levelling of soil. (Plate – IV.10.D)

2) **Botanical name: ** *Bridelia squamosa* (Lam) Gehrm.

   Family: Euphorbiaceae  
   Local Name: Asana  
   Habit: Common in monsoon.  
   Habitat: Moderate sized, deciduous tree.
Leaves glabrous. Flowers dioecious, greenish yellow or pink in axillary clusters, Corolla greenish, stamens 5, filaments connate below in a column. Drupes green with yellow tinge, glabrous, with persistent calyx.

**Description of wood:** Colour grey to olive brown. Moderately hard to hard, seasons well; durable, stands well under water.

**Traditional agriculture notes:**

Plough: Wood used for making plough.

Petari: Wood is used for making petari. (Plate – IV.10.A)

Maind: Wood is used for crushing soil clods.

Yoke: Wood is used for making yoke an agricultural implement.

3) **Botanical name:** *Tectona grandis* L.

**Family:** Verbenaceae

**Local name:** Sag

**Habit:** Large deciduous trees.

**Habitat:** Mixed deciduous forest abundant along the slopes of Western ghat.

Branchlets 4-angled, leaves opposite, subsessile. Flowers in large, erect, terminal branched, tomentose panicles. Corolla white 5-6 lobed. Stamens 5-6 exerted. Ovary 4-locular. Fruits subglobose, shallowly 4-lobed. Seed 2-4 brown.

**Description of wood:** Colour of sap wood white, usually small heart wood dark, golden yellow, turning brown, dark brown and finally almost black with age. A strong wood of average hardness and of outstanding merit in retention of shape and durability. Dry wood is having bending strength of 1036 kg/cm². Density of dry wood is 624 kg/m³, its hardness 470 kg. The impact strength of teak wood is 63 cm. Maximum crushing strength of wood is 554 kg per/cm². Shearing strength of wood is 121/1000/kg/m³, its dry weight 592 kg/m³. The radial shrinkage of green wood is 2%. The tangential shrinkage of green wood is 590. The specific gravity of dry wood is 0.57%.

**Traditional agriculture notes:**

Plough: Wood used for making plough.
Hoe: Wood used for making dind of hoe. (Plate – IV.9.D)
Maind: Wood used for making soil boulders.
Threshing pole: Wood used for making threshing pole.
Bullock cart: Wood is used to prepare frame of bullock cart.

4) **Botanical name:** *Mangifera indica* L.

- **Family:** Anacardiaceae
- **Local Name:** Amba
- **Habit:** Tall evergreen tree.
- **Habitat:** Widely cultivated for fruits and also found wild.

Leaves crowded at the end of branches, oblong-lanceolate, coriaceous. Flowers polygamous in large, terminal panicles. Petals 4-5, free or adnate to disk, stamens 1-5, inserted just with in disk or on it, usually only one perfect and much longer than others. Drupe large, fleshy, obliquely pyriform stone compressed, fibrous, seed oblong.

**Description of wood:** Colour grey; in old trees sometimes dark brown with black streaks. Wood in old trees is hard, in young ones coarse grained and soft; seasons easily and retains its shape after seasoning. Fairly strong, not very durable in exposed positions. Bending strength of dry wood is 1058 kg/cm². Density of wood is 624 kg/cm². Wood hardness is 645 kg. Maximum crushing strength of dry wood is 524 kg/cm². Wood stiffness is 133/1000/kg/m³. Weight of wood 608 kg/m³. Wood toughness is 345 cm-kg.

**Traditional agriculture notes:**

Hoe: Wood used for making hoe.
Maind: Wood is used for making crushing soil clods. (Plate – IV.11.D)
Kadvan: Y fork used for stone carrier.
Threshing pole: Wood is used for central pole in threshing area.
Bullock cart: Timber is used to prepare wooden planks of bullock cart.

5) **Botanical name:** *Syzygium cumini* (L.) Skeels

- **Family:** Myrtaceae
- **Local Name:** Jambhul
Habit: Large tree
Habitat: Common in the moist forests of Konkan and top hills of ghat region.

Leaves coriaceous, variable. Flowers dirty white, fragrant, crowded in the heads on the ends of laxly paniced cymes rising from the branches below the leaves. Petals calyptrate. Fruits dark violet, globose or ellipsoid smooth, variable in size

**Description of wood:** Colour reddish grey. Moderately hard, rough, strong, durable; lasts well under water. The bending strength of dry wood is 1343 kg/cm². The density of dry wood is 641 kg/m³. The hardness of dry wood is 671 kg/cm². The hearing strength of dry wood is 709 kg/m². The shearing strength of dry wood is 167 kg/m². The stiffness of wood is 162/1000/kg/m². The toughness of dry wood is 84 cm-kg.

**Traditional agricultural notes:**

Plough: Wood is used for making plough.
Harrow: Timber is used to make harrow beam.
Maind: Wood is used for making crushing soil clods. ([Plate – IV.11.C](#))
Bullockcart beam: Wood is used to prepare beam of bullock cart.

6) **Botanical name:** *Emblica officinalis* Gaertn.

Family: Euphorbiaceae
Local Name: Awala
Habit: Middle sized, deciduous tree.
Habitat: Deciduous forests, wild and planted on Western ghat.


**Description of wood:** Colour red. No heart wood. Hard; warps and splits in seasoning; durable under water.

**Traditional agricultural notes:**

Harrow: Timber used for making harrow. ([Plate – IV.8.C](#))
Plough: Wood used for making plough.
Bullock cart: Wood is used for beam of bullock cart.
Hoe: Wood is used to make dind of hoe.
Threshing pole: Wood is used for making threshing pole.

7) **Botanical name:** *Cocos nucifera* L.

**Family:** Arecaeeae

**Local Name:** Naral

**Habit:** Large or small perennial trees.

**Habitat:** Common in humid areas and cultivated widely for its fruits in the region.

Stems covered with leaf scars. Leaves large, forming a crown at apex. Flowers numerous, greenish white in pyramidal decom-pound spadices. Drupes large globose, hard.

**Description of wood:** A different structure from that of softwoods or hardwoods. Stem contain scattered vascular strands in the midst of softer tissues, becoming more concentrated towards the peripheral area. Wide outer ring strands are darker brown than the ground tissue, giving longitudinal face a streaky appearance. Hard, red outside, reddish brown and softer inside but not hollow.

**Traditional agriculture notes:**

Broom: Coconut leaves, especially veins are used for making threshing yard brooms (Plate – IV.14.C).

8) **Botanical name:** *Leucaena latissilique* (L.) Gillis.

**Family:** Mimosaceae

**Local Name:** Subabhul

**Habit:** Unarmed tree

**Habitat:** Common in tropical forests. Planted as avenue tree near villages and also naturalised.

Traditional agriculture notes:

Fodder: Leaves are used to feed cattle for lactating purpose.

Bullock cart: Timber used for making beam of bullock cart.

9) **Botanical name:** *Artocarpus heterophyllus* Lam.

Family: Moraceae  
Local Name: Phanas  
Habit: Large, deciduous tree  
Habitat: Rain forest of western ghat and Konkan. Often planted along roadside, near villages, garden and also widely cultivated.

Inflorescence cauliflora and also main branches enclosed by glabrous, deciduous, leafy scales. Male flowers in heads. Perianth 2-lobed. Female protruding. Syncarps oblong globose, perianth, thick, fleshy. Seed elliptic oblong.

**Description of wood:** Colour – sap wood pole; heart wood bright yellow, darkening on exposure. Moderately hard, strong; seasons easily without trouble or degrade; fairly durable. Bending strength of dry wood is 674 kg/cm². Wood density is 641 kg/m³. Maximum crushing strength is 449 kg/cm² and Stiffness of wood is 84/1000/kg/m³

Traditional agricultural notes:

Hoe: Wood is used for making hoe.

Maind: Wood is used for making maind, a clod crusher. *(Plate – IV.11.B)*  
Bullock cart: Wood is used to make beam of bullock cart.

10) **Botanical name:** *Terminalia paniculata* Roth.

Family: Combretaceae  
Local Name: Kinjal  
Habit: Large tree  
Habitat: Mostly in mixed deciduous forest; common along foot of Ghats and valleys of rivers
Leaves coriaceous, upper alternate, lower sub-opposite, usually 2 glands beneath. Flowers sessile in slender spikes forming compound panicles. Fruits rusty tomentose, sessile three winged, 2 of the wings much smaller than the third.

**Description of wood:** Colour grey with darker heart wood. Very hard, strong, fairly heavy, kiln seasoning produces good result.

**Traditional agriculture notes:**

Plough: Wood is used for making plough.

Yoke: Wood is used for making yoke.

Hoe: Wood is used for making hoe. (Plate – IV.9.A)

11) **Botanical name:** *Schleichera oleosa* (Lour.) Oken.

**Family:** Sapindaceae  
**Local name:** Kosimb/Kusumb  
**Habit:** Tree  
**Habitat:** Common in both dry and moist forests. Occasional on slopes of denuded hills.

Leaves alternate, pinnate, leaflet 2-4 pairs, oblong or elliptic oblong. Flowers white or yellowish regular polygamo-dioecious, fascicled on slender panicles; calyx 4-6 lobed. Disk with wavy margin. Drupes pointed, echinate with small blunt prickles. Seeds 1 or 2 enclosed in aril.

**Description of wood:** Colour of sap wood whitish; heart wood light reddish brown. One of hardest and heaviest wood, tough, durable requires slow seasoning. The bending strength of dry wood is 1248 kg/cm². The density of dry wood is 705 kg/m³. The stiffness of wood is 175/1000/kg/m². The maximum crushing strength of dry wood is 699 kg/cm². The radial and tangential shrinkage of the wood is 5% and 10%, respectively.

**Traditional agriculture notes:**

Plough: Wood is used for making plough.

Petari: Wood is used to make petari.
12) **Botanical name:** *Anogeissus latifolia* Roxb. ex DC. Wall.

Family: Combretaceae  
Local Name: Dhavada  
Habit: Medium sized deciduous tree  
Habitat: Very common in dry deciduous forests.


**Description of wood:** Colour grey, shining, with a small purplish brown, irregular shaped, very hard heart wood; sap wood in young trees and branches yellow. Hard, smooth, strong tough; not much durable, apt to split in seasoning. Produces a heavy hardwood with a density of 760-940 kg/m³. Shrinkage upon seasoning is moderate to high, and the wood is difficult to season. Heart wood absent or small; texture fine to medium and even as it is liable to warping, splitting and surface checking. It is possible to modify surface checking completely. The wood is hard, strong, and can be difficult to saw.

**Traditional agriculture notes:**

Plough: Wood is used for making plough. ([Plate – IV.6.C](#))  
Hoe: Timber used for trampling soil boulders.  
Roof: Branches are used for thatching.

13) **Botanical name:** *Ficus racemosa* L.

Family: Moraceae  
Local Name: Umbar/Fig.  
Habit: Large evergreen tree.  
Habitat: Common along streams and river blanks.

Leaves alternate coriaceous, bluntly pointed at apex. Receptacles shortly pedunculate on short leafless branches, pyriform or subturbinate, orange red, pubescent. Male flowers forming a ring near the mouth of receptacle, sessile.
Description of wood: Colour grey or greyish brown. Soft, not durable but said to last well under water; decays quickly if exposed.

Traditional agriculture notes:

Threshing pole: Wood is used for making threshing pole. (Plate – IV.13.B)
Stone carrier: Timber used to carry stone by using fork.
Bullock cart: Wood is used to make wooden planks which works as shock absorber between wheel and iron shaft of bullock cart.

14) Botanical name: Lagerstroemia microcarpa Wight.

Family: Lythraceae
Local Name: Nana
Habit: Small tree
Habitat: Common in semi-evergreen and moist deciduous forests.


Description of wood: Colour of sap wood is greyish white; heart wood red or reddish brown. Moderately hard strong, if handled carefully and dried slowly, air seasons without degrade liable to split; not durable in the open. The bending strength of dry wood is 1006 kg/cm². The density of dry wood is 657 kg/m³. The stiffness of wood is 112/1000/kg/m² and maximum crushing strength of dry wood is 514 kg/cm². Radial and tangial shrinkage of the wood is 4% and 6%, respectively.

Traditional agriculture notes:

Plough: Wood is used for making plough.
Yoke: Wood used for making yoke.
Harrow: Timber used for making harrow. (Plate – IV.8.A)

15) Botanical name: Haldina cordifolia (Roxb.) Ridsd.

Family: Rubiaceae.
Local Name: Hedu, Haldu.
Habit: Large deciduous tree.
Habitat: Rare in deciduous forest. Common in Konkan.


**Description of wood:** Colour yellow; lusters with smooth fell; no heart wood. Moderately hard, durable, strong; seasons well but sometimes apt to warp and crack decay soon when exposed to wet. Bending strength of dry wood is 847 kg/cm². Wood density is 673 kg/m³ and hardness is 488 kg. Impact strength is 71 cm. Maximum crushing strength of dry wood is 514 kg/m². Shearing strength of wood is 93 kg/m². Wood stiffness is 98/1000/ kg/m³.

**Traditional agricultural notes:**

Plough: Wood is used to for making plough.

16) **Botanical name:** *Melia dubia* Cav.

**Family:** Meliaceae
**Local Name:** Nimbara
**Habit:** Tall trees.
**Habitat:** In the evergreen and deciduous forests of konkan and rarely cultivated on bunds of fields.

Leaves 2-pinnate. Flowers greenish white, fragrant in stellately pubescent many flowered, branched panicles shorter than leaves. Stamens 10, tube 10 toothed at apex; each tooth bifid. Drupes ovoid or ellipsoid, smooth, yellowish, Seeds one in each cell. Smooth pointed.

**Description of wood:** Colour sap wood grey; heart wood reddish white. Soft light; not easily attacked by white ants; not so strong and durable. Bending strength of dry wood is 254 kg/m². Wood density is 336 kg/m³. Impact strength of dry wood is 187 cm and shearing strength of wood measures 62 kg/m². Stiffness of wood is 84/1000/kg/m³.

**Traditional agriculture notes:**

Plough: Wood used for making plough as an agricultural implement.
Preservation: Leaves are used to control store grain pest.

17) **Botanical name: Semecarpus anacardium L.f.**

**Family:** Anacardiaceae  
**Local Name:** Bibba/Bilva  
**Habit:** Medium sized tree  
**Habitat:** Occasional in moist deciduous forests. Abundant in dry forests of Konkan.


**Description of wood:** Colour greyish brown often with yellow streaks soft not durable.

**Traditional agriculture notes:**

Yoke: Wood is used for making yoke.

18) **Botanical name: Azadirachta indica A. Juss.**

**Family:** Meliaceae  
**Local Name:** Kadu Nimb/Neem  
**Habit:** Tree  
**Habitat:** A common tree growing in the dry region; usually planted along road side; also self sown, commonly found around villages, also cultivated.

Bark cracked. Leaves simply pinnate, crowded at the ends of branches; leaflets 9-12. Flowers in axillary panicles. Stamens 10, united. Ovary glabrous, 3 celled, the cells opposite to petals ovules 2 in each cell. Stigma 3 toothed. Drupes yellow, 1 seeded.

**Description of wood:** Colour of sap wood grey, heart wood red. Hard, scented, durable, owing to bitterness not attacked by white ants. Bending strength of wood is 971 kg/m². Wood density of dry wood is 769 kg/m³. Wood hardness is 779 kg. Impact strength of wood is 109 cm. Maximum crushing strength of wood is 521 kg/m². Shearing strength of wood is 142 kg/m². Wood stiffness is 98/1000/kg/m³. Weight of dry wood is 753 kg/m³.
Traditional agriculture notes:

Threshing pole: Timber is used to making middle pole of threshing area (Tiwada)
Yoke: Timber is used to prepare yoke.
Preservation: Leaves are used to preserve stored grain.

19) Botanical name: *Cassine glauca* (Rotth) O.Ktze

Family: Celastraceae
Local Name: Bhutyache lakud/Bhutkes
Habit: Shrub
Habitat: Occasionally on hill slopes of Western ghats.

Leaves opposite and alternate. Flowers numerous in axillary or extra-axillary, panniculate, dichotomously branched cymes. Petals orbicular. Stamens 4-5, inserted beneath the margins of disk. Drupes ovoid, apiculate, 2-seeded

Description of wood: Colour light brown, often with red tinge. The outer wood white but no distinct sap wood. Even and close grained. Moderately hard, season well. Bending strength of wood is 1248 kg/cm². Wood density is 801 kg/m³. Shearing strength of wood is 177 kg/m². Wood stiffness is 135/1000/kg/m³. Weight of dry wood is 624 kg/m³. Wood toughness is 288 cm-kg.

Traditional agriculture notes:

Threshing pole: Wood used for preparing threshing pole.
Harrow beam: Timber is used to make harrow beam.

20) Botanical name: *Bombax ceiba* L.

Family: Bombacaceae
Local name: Kate savar
Habit: Tall deciduous tree
Habitat: Fairly common in variety of habitats and often cultivated.
Leaves large; leaflet 3-7. Flowers solitary or in clusters showy, Petals 5, bright or faint red, imbricate. Stamens 60-80 in 6 bundles, seeds pyriform, smooth embedded in creamy white silky fibres.

**Description of wood:** Colour white when freshly cut, turning slightly darker on exposure. No heart wood. Very soft, perishable, weak. Bending strength of dry wood is 616 kg/m². Wood density is 464 kg/m³. Hardness of wood is 263 kg. Impact strength of dry wood is 38 cm and maximum crushing strength is 397 kg/m². Shearing strength of dry wood is 74 kg/m². Wood stiffness is 93/1000/kg/m³. Wood toughness is 116 cm-kg. Specific gravity of dry wood is 0.46.

**Traditional agriculture notes:**

Threshing pole: Wood is used for making threshing pole. (Plate – IV.13.A)

21) **Botanical name:** *Careya arborea* Roxb.

**Family:** Lecythidaceae

**Local Name:** Kumbha

**Habit:** Deciduous tree

**Habitat:** Common tree in semi-evergreen and moist deciduous forests, also in valleys and ravines throughout the drier areas.

Leaves sessile, broadly ovate, crenate-denticulate. Flowers sessile, 3-6 cm across, on thick rachis. Petals dull white. Stamens slightly longer than petals. Fruits 6-8 across, green.

**Description of wood:** Colour – sap wood whitish, large; heart wood dull red, sometimes claret coloured, very dark in old trees. Bending strength of dry wood is 1024 kg/m². Wood density is 913 kg/m³. Impact strength of dry wood is 86 cm. Maximum crushing strength is 574 kg/m². Wood stiffness is 110/100/kg/m³.

**Traditional agriculture notes:**

Plough: Timber is used to make plough.

Bullock cart: Wood is used to make beam of bullock cart. (Plate – IV.15.B)
22) **Botanical name:** *Eucalyptus globulus* Labillis.

Family: Myrtaceae  
Local Name: Nilgari  
Habit: Tree  
Habitat: Native of Australia, planted in gardens and as avenue tree.

Bark flakes off into long stripes. Leaves lanceolate. Flowers large 1-3 together on a short peduncle. Calyx tube hard, bluish white, lid of calyx and corolla conical.

**Description of wood:** Sap wood wide pale greyish, fairly clearly demarcated from pale yellow brown to pinkish grey heart wood. Texture medium, little figure. Timber often contains gum veins filled with dark gummy substance. Brittle heart wood common. Bending strength is 1301 kg/m². Wood density is 817 kg/m³. Hardness of dry wood is 882 kg. Impact strength of dry wood is 199 cm. Maximum crushing strength of dry wood is 735 kg/m². Shearing strength is 136 kg/m². Wood stiffness is 182/1000/kg/m³. Weight of dry wood is 657 kg/m³.

**Traditional agriculture notes:**

Plough: Wood used for making plough.

Preservation: Leaves are used for food grain preservation.

23) **Botanical name:** *Catunaregam spinosa* (Thunb.) Tirveng.

Family: Rubiaceae  
Local Name: Gala/Gelphal  
Habit: Large armed shrub or small tree  
Habitat: Common in deciduous monsoon and dry forests; also on hill slopes of Konkan and ghat regions.

Leaves fascicled, obovate, and cuneate at base. Flowers at the ends of short branches, fragrant, solitary or 2-3 together, peduncles short. Calyx teeths 5, soliaceous. Fruits leathery, obscurely longitudinally ribbed, crowded with large calyx limb, 2-locular. Seeds many, flat brown.

**Description of wood:** Colour white or light brown. Hard, compact and very numerous.
Traditional agriculture notes:

Hoe: Plants use for making hoe.
Harrow: Wood is used to make harrow. (Plate – IV.8.B)
Threshing pole: Timber is used to make threshing pole in centre of threshing yard.
Preservation: Fruits are used to preserve store grains.

24) Botanical name: *Gmelina arborea* Roxb.

Family: Verbenaceae.
Local Name: Shivan
Habit: Moderate sized tree.
Habitat: Frequent on hill slopes and common in deciduous forests.

Leaves broadly ovate or elliptic rhomboid. Flowers in dichotomously branched, velvety tomentose panicles of 3 flowered cymes. Corolla orange-yellow or yellowish, densely oblong, orange yellow or blackish.

Description of wood: Colour dull red. Even grained. Smooth moderately hard. Bending strength of dry wood is 729 kg/m$^2$. Wood density is 464 kg/m$^3$. Wood hardness is 363 kg. Impact strength of dry wood is 55 cm. Maximum crushing strength is 388 kg/m$^2$. Shearing strength is 95 kg/m$^2$. Wood stiffness is 90/1000/kg/m$^3$. Weight of dry wood is 400 kg/m$^3$. It can be easily worked strong & durable especially when used under water.

Traditional agriculture notes:

Yoke: Timber is used to prepare yoke. (Plate – IV.7.D)
Fodder: Leaves are used as fodder for cattle.

25) Botanical name: *Mitragyna parvifolia* (Roxb.) Korth

Family: Rubiaceae
Local Name: Kalamb/Kadamd
Habit: Large deciduous tree
Habitat: Deciduous forests and frequent in hill forests.
Leaves elliptic ovate or sub-orbicular. Flowers axillary, solitary, peduncled, globose heads. Corolla creamy white much exerted; stigma mitriform. Capsules forming a head, seeds many, black, minute.

**Description of wood**: Colour light pinkish brown. Even grained. Moderately hard; durable if not exposed to wet. Bending strength of dry wood is 674 kg/m². Wood density is 673 kg/m³. Impact strength is 71 cm. Maximum crushing strength is 362 kg/m². Wood stiffness is 84/1000/kg/m³.

**Traditional agriculture notes**:

Yoke: Wood is used for making yoke. (Plate – IV.7.A)
Harrow: Wood is used to make harrow.

26) **Botanical name**: *Maytenus senegalensis* (Lam.) Excell.

Family: Celastracea.
Local Name: Hekal
Habit: Tall shrub
Habitat: Common in dry open forests.

Branches spinescent bearing leaves and flowers. Leaves coriaceous, rounded at apex, tapering at the base into petioles. Flowers in axillary, furcately branched cymes. Disk fleshy, pericarp black, globose, 3-valved seeds brown, arillate.

**Traditional agriculture notes**

Harrow: Timber is used to prepare harrow.

27) **Botanical name**: *Cassia fistula* L.

Family: Caesalpiniaceae
Local Name: Bahava
Habit: A moderate sized deciduous tree
Habitat: Common in mixed forests and cultivated as avenue tree.
Leaflets 4-8 pairs, ovate, coriaceous. Flowers in lax dropping racemes. Corolla bright yellow; petals subequal. Stamens 10, all perfect. Pods cylindrical, straight or slightly curved, black seeds many, dark brown, polished.

**Description of wood:** Colour – sap wood white; heart wood varies in colour from grey or yellowish red to brick red; darkens much on exposure. Very hard durable difficult to work, usually of small dimension, somewhat brittle and liable to splinter, takes a good polish. Bending strength of wood is 1590 kg/m². Maximum crushing strength of wood is 771 kg/m². Wood stiffness is 145/1000/kg/m³.

**Traditional agriculture notes:**

Hoe: Timber is used to prepare hoe.

Maind: Wood is used for making maind. (Plate – IV.11.A)

Yoke: Wood used for yoke making.

Threshing pole: Wood is used for central pole in threshing area.

Plough: Timber is used to prepare beam of the plough

Harrow: Wood is used to prepare harrow beam.

28) **Botanical name:** *Erythrina variegata* L.

**Family:** Fabaceae

**Local Name:** Pangara

**Habit:** Medium sized tree

**Habitat:** In the deciduous forests in Konkan. Planted in gardens as well as on bunds of fields.

Branches smooth or prickly, Leaves 3-foliolate; leaflets rhomboid ovate to ovate. Flowers in terminal, horizontally spreading spicate racemes appearing before leaves. Corolla red, sub cylindric, distantly torulose. Seeds 6-8 sub-reiniform brown.

**Description of wood:** Colour white thay near the centre of darker colour but not a regular heart wood. Soft, spongy, light rather durable. Wood density of pangara is 2888 kg/m³. Weight of dry wood is 15 kg/m³
Traditional agriculture notes:

Threshing pole: Wood is used for making threshing pole in yard.

29) **Botanical name: Canthium dicoccum (Gaertn.) Teijsm.**

**Family:** Rubiaceae  
**Local Name:** Hadka/Tupa  
**Habit:** Large unarmed shrub  
**Habitat:** Common in the evergreen forests in the Konkan and frequent in semi-evergreen forests.

Young branches 4-gonous. Leaves elliptic-oblanceolate, coriaceous. Flowers 5-merous, in peduncled umbels in opposite axils. Corolla thick and fleshy, densely white hairy in throat; lobes 5. Fruits obvoid, didymous, warted, black when ripe.

**Description of wood:** Colour grey or reddish grey. Close grained. Hard very fine and numerous. Bending strength of dry wood is 1024 kg/m². Wood density is 753 kg/m³. Maximum crushing strength of dry wood is 449 kg/m². Shearing strength is 132 kg/m². Wood stiffness is 135/1000/kg/m³. Weight of dry wood is 592 kg/m³.

Traditional agriculture notes:

Plough: Wood is used for making plough beam  
Hoe: Timber is used to make hoe. ([Plate – IV.9.B](#))  
Maind: Wood is used for making maind.

30) **Botanical name: Casuarina equisetifolia L.**

**Family:** Casuarinaceae  
**Local Name:** Suru  
**Habit:** Tall trees with dimorphous branches  
**Habitat:** Planted as hedge plant also as wind breaker; also in gardens.

Leaves scale like, 6-8 in whorls, connate by their margins. Male spikes numerous, at the end of branchlets. Female cone globose or ovoid. Bracteoles 2, enlargening in fruit. Seed single, winged.
**Description of wood:** Colour white reddish brown at the centre. Very hard, heavy, difficult to work, cracks and splits. Bending strength of dry wood is 1451 kg/m². Wood density is 977 kg/m³. Wood hardness is 1118 kg. Impact strength of dry wood is 139 cm. Maximum crushing strength of dry wood is 719 kg/m². Shearing strength is 173 kg/m². Wood stiffness is 179/1000/kg/m³. Weight of dry wood is 785 kg/m³. Specific gravity of dry wood is 0.87

**Traditional agriculture notes:**

Yoke: Wood is used for making yoke.

Harrow: Timber is used to make beam for harrow.

31) **Botanical name:** *Albizia procera* (Roxb.) Benth.

Family: Mimosaceae

Local Name: Kinhai

Habit: Unarmed tree

Habitat: Common in moist forests. Rare in deciduous forests along streams.


**Description of wood:** Colour sap wood large, yellowish white not durable heart wood wood brown, shining with alternate belts of darker and lighter colour. Hard moderately durable, seasons well. Bending strength of wood is 1003 kg/m². Wood density is 657 kg/m³. Impact strength of dry wood is 145 cm. Maximum crushing strength of dry wood is 558 kg/m². Wood stiffness is 106/1000/kg/m³. Weight of dry wood is 608 kg/m³. Wood having the specific gravity 0.55.

**Traditional agriculture notes:**

Plough: Timber is used to make plough beam.

Harrow: Timber is used to make beam for harrow.

Maind: Wood used to make maind.

Bullock cart: Wood is used to make beam of bullock cart. (Plate – IV.15.C)
32) **Botanical name:** *Butea monosperma* (Lamk.) Taub.

**Family:** Fabaceae  
**Local Name:** Palas  
**Habit:** Deciduous tree with ash coloured, fissured bark  
**Habitat:** Common deciduous forests of konkan. Frequent in hilly areas in moist and dry deciduous forests.

Leaves 3 foliolate; leaflets obovate, ovate rhomboid. Flowers large, in dense rigid racemes; densely brown velvety. Corolla salmon or orange coloured, clothed outside with silvery hairs. Pods stalked, 1 seeded reticulately veined, silvery tomentose.

**Description of wood:** Colour grey or grey brown, white or brown it cut up fresh. Open grained. Soft light, spongy, not durable above ground but durable under water. Bending strength of dry wood is 464 kg/m². Wood density is 560 kg/m³. Maximum crushing strength of dry wood is 275 kg/m². Wood stiffness is 97/1000/kg/m³. Weight of dry wood is 432 kg/m³.

**Traditional agriculture notes:**

Plough: Timber is used to make plough beam. *(Plate – IV.6.B)*  
Yoke: Timber is used to make yoke.

33) **Botanical name:** *Actinodaphne angustifolia* Nees.

**Family:** Lauraceae  
**Local Name:** Pisa  
**Habit:** Moderate sized, evergreen tree  
**Habitat:** Common in forests along streams and plateaus i.e. ghat and konkan region.

Leaves coriaceous, in 2 whorls of 3 each, pinninerved. Flowers dioecious yellowish, from nuded branches. Stamens 9, the interior row of 3 with each reniform glands at the base of each filaments, glands in female flowers stalked. Stigma mushroom shaped. Berries red when ripe.

**Description of wood:** Colour light brown. Even grained. Moderately hard, strong and of excellent quality.
Traditional agriculture notes:

Plough: Wood is used for making plough. (Plate – IV.6.D)

34) **Botanical name:** *Carvia callosa* (Nees.) Bremek.

- **Family:** Acanthaceae
- **Local Name:** Karve
- **Habit:** Monocarpic shrub
- **Habitat:** Common along forest borders.

   Stem rigid, rough and warted. One of each pair of leaves obtain smaller than the opposite one, base tapering winglike petiole. Flowers axillary, in simple or branched ovoid, pedunculate, subtetragonal spikes. Corolla with white tube and purple limb, with yellow hairs in mouth inside. Capsules narrow at base, 2-seeded

Traditional agriculture notes:

- **Thatching:** Twigs are used for thatching of wall.
- **Stacking:** Sticks are used to stake the tomato seedlings in field.

35) **Botanical name:** *Vitex negundo* L.

- **Family:** Verbenaceae
- **Local Name:** Nirgudi
- **Habit:** Large shrubs or small tree
- **Habitat:** Frequent on waste places around villages; very common along the banks of rivers, konkan and Deccan.

   Leaves 3-5 foliolate. Flower in large terminal often compound pyramidal panicles. Calyx white tomentose, corolla bluish purple, tomentose outside. Drupes black when ripe

**Description of wood:** Colour greyish white hard.

Traditional agriculture notes:

- **Broom:** Branches are used to make broom for threshing yard purpose.
- **Preservation:** Leaves used to preserve store grains.
36) **Botanical name: Holarrhena pubescens (Buch.-Ham.) Wall.**

Family: Apocynaceae  
Local Name: Pandhara kuda  
Habit: Large shrubs or small tree  
Habitat: Common on hills slopes.


**Traditional agriculture notes:**

Broom: Local people used branches as broom.

37) **Botanical name: Lawsonia inermis L.**

Family: Lythraceae  
Local Name: Mehandi  
Habit: Shrub  
Habitat: Native of Middle East, planted as hedge plant.

Branchlets, thorny. Leaves broadly elliptic-lanceolate. Flowers 10-12 mm across in axillary panicles. Petals pale yellow or creamy white. Stamens 8, inserted in pairs of calyx tube. Capsules globose, supported by persistent calyx and happed with a style.

**Description of wood:** Plant is shrubby in nature and hard wood is not developed.

**Traditional agriculture notes:**

Broom: Plants used for making broom for the purpose of threshing yard. (Plate – IV.14.A)

38) **Botanical name: Leucas stelligera Wall.**

Family: Lamiaceae  
Local Name: Bharambi  
Habit: Erect, branched, softly pubescent or villous herb  
Habitat: Very common at higher altitudes.
Flowers sessile, in dense many flowered terminal and axillary whorls. Calyx pubescent or tomentose, glandular. Corolla white. Nutlets rounded at apex, the inner faces angular, the dorsal faces rounded, smooth.

Traditional agriculture notes:

Insecticidal plant: Plant is used as insect repellent & store grain pest control.

39) Botanical name: *Dalbergia horrida* (Dennst.) Mabb.

Family: Fabaceae
Local Name: Pendgul
Habit: Large scandent shrub
Habitat: Frequent on hill slopes in ever green forests.


Description of wood: Plant is a scandent shrub and hard wood formation is not seen.

Traditional agriculture notes:

Sickle handle: Local people used it for sickle handle.

40) Botanical name: *Pterocarpus marsupium* Roxb.

Family: Fabaceae
Local Name: Bilwa, Bibla
Habit: Large deciduous tree
Habitat: Common in konkan as well as deciduous monsoon forests. Rare on hill slopes.

Leaves imparipinnate, leaflets 5-9 subopposite, elliptic ovate or oblong. Flowers in short, axillary and terminal panicles shorter than leaves. Corolla yellow, petals with crisped margins. Pods orbicular, 4-5 cm across, 1-2 seeded, reticulately veined, broad, glabrous winged.

Description of wood: Colour of sap wood. Small, heart wood yellowish brown with darker streaks easily and develops a few defects which are not very serious.
Traditional agriculture notes:

Yoke: Wood used for preparation of yoke.
Plough: Timber is used to make plough.

41) Botanical name: *Carissa congesta* Wight.

Family: Apocynaceae
Local Name: Karvand
Habit: Stout shrubs
Habitat: Common in forest.

Thorns simple or branched, leaves broadly ovate to elliptic, opposite. Flowers in pubescent terminal corymbosce cymes. Corolla white. Ovules 2 in each cell. Berries ellipsoid or subglobose, purplish black, 4 seeded. Seeds discoid, brown.

Traditional agriculture notes:

Rab: Leaves used as rab. (Plate – IV.2.C)

42) Botanical name: *Tagetes erecta* L.

Family: Asteraceae
Local Name: Zendu
Habit: Erect stout, annual herb
Habitat: Native of Mexico. Commonly cultivated in gardens for its flowers.

Leaves opposite, pinnate. Heads solitary on long penduncles. Marginal florets female or neutral with yellow or orange coloured emarginated ligule. Central florets bisexual with yellow tubular or ligulate corolla. Achenes with unequal, pappus brishets at the top black.

Traditional agriculture notes:

Border plantation: Plants are planted on the borders of the field to control insect pest.

43) Botanical name: *Crotolaria calycina* Schrank.

Family: Fabaceae
Local Name: Khulkhuli
Habit: Erect herbs
Habitat: Frequent amidst grasses in open grasslands.


Traditional agriculture notes:
Broom: Herbs are used for making brooms.

44) Botanical name: *Cajanus lineatus* (Wight. & Arn.) van der Maesen.

Family: Fabaceae
Local Name: Rantur
Habit: Erect shrubs
Habitat: Common in forest and along forest clearings in moist deciduous and semievergreen forests.


Traditional agriculture notes:
Broom: Shrub is used for making broom on threshing yard. (Plate – IV.14.D)

45) Botanical name: *Ficus hispida* L.

Family: Moraceae
Local Name: Kala-umber
Habit: Shrubs or small trees without aerial roots
Habitat: Common along streams and rivers.


Description of wood: Colour dirty grey; No heart wood.
Traditional agriculture notes:

Threshing pole: Wood is used as a central pole in threshing yard.

Rab: Leaves are used as rab. (Plate – IV.2.B)

46) Botanical name: *Gnidia glauca* (Fresen.) Gilg.

Family: Thymelaeeae
Local Name: Rametha, Datpadi
Habit: Shrub
Habitat: Common on the ghats from the konkan southwards in deciduous forests.

Leaves opposite or scattered, simple flowers usually hermaphrodite, in axillary and terminal heads. Perianth regular tubular or compamulate silky pubescent. Stamens 10 ovary superior, 1-celled. Fruits dry, ellipsoid, pointed, enclosed in perianth.

Description of wood: Colour white or yellowish white. Hard

Traditional agriculture notes:

Threshing pole: Wood is used for making threshing pole.

Broom: Branches are used to make broom for threshing purpose.

Preservation: Leaves are used for food grain pest repellent.

47) Botanical name: *Clerodendrum serratum* L.

Family: Verbenaceae
Local Name: Bharangi
Habit: Shrub
Habitat: Common on hill slopes of ghat region.

Stems bluntly quadrangular. Flowers in lax villous panicles with brachiform leave at the base of cymus. Calyx cup like truncate or minutely 5-toothed pubescent. Corolla bluish. Stems definite, long exserted. Fruits drupaceous, 4-lobed; pyrenes one seed.

Traditional agriculture notes:

Insect repellent: Leaves act as insect repellent.
48) **Botanical name:** *Lantana camara* L.

Family: Verbenaceae  
Local Name: Ghanerri  
Habit: Straggling or scandent shrub  
Habitat: Native of tropical America, grown in gardens and also found as escape.

Leaves opposite or rarely ternate or whorled. Corolla yellow, turning orange-red; tubes 2-3 times longer than the lobes. Fruits drupaceous globose, bluish black, shining.

**Traditional agriculture notes:**

Rab: Leaves are used as rab. ([Plate – IV.2.A](#))  
Storage structure: Plants are used to make storage structures like *kanagi*.

49) **Botanical name:** *Colebrookea oppositifolia* J.E. Smith.

Family: Lamiaceae  
Local Name: Bhaman  
Habit: Much branched, densely wooly or hoary shrub  
Habitat: Common on hill slopes and along forest borders.

Leaves light green, crowded towards the ends, opposite or verticellate in threes. Flowers numerous in paniculate often ternately arrange spikes.

**Traditional agriculture notes:**

Rab: Leaves are used as rab. ([Plate – IV.2.D](#))  
Storage structure: Plants are used to make storage structures like *kanagi*.

50) **Botanical name:** *Bambusa arundinacea* (Retz.) Willd.

Family: Poaceae  
Local Name: Kate kalak  
Habit: Perennial  
Habitat: Wild or cultivated forming dense strand
Culms tufted, armed, 25m high erect branched, armed nodes prominent. Culms stem coriaceous linear lanceolate, with shift apex. Panicles compound with loose cluster of spikelets on spicate branchlets. Spikelets oblong 3-6 flowered. Grains oblong.

**Traditional agriculture notes:**

Yoke: Culms are used to make yoke for manually operated implements.

Hatari: Storage structure is prepared from culms.

Muzzle: Bullocks are tied by muzzle during threshing operation.

51) **Botanical name: Dendrocalamus strictus Roxb.**

Family: Poaceae

Local Name: Mes or Meskathi, Velu

Habit: Perennial

Habitat: Frequent in hilly regions and also found under cultivation

Culms densely tufted 6-15 m high, erect, branched, compound. Spikelets in dense globose Spinesect heads, fertile intermixed with smaller barren ones. Grains ovoid.

**Traditional agriculture notes:**

Storage structure: Storage structures like kanagi and hatari are prepared from culms.

Yoke: Culms are used to make yoke for manually operated implements. *(Plate – IV.7.C)*

Harrow: Culms are used to make harrow beam.

Hoe: Culms are used for making hoe beam.

Muzzle: Muzzle is prepared from bamboo strips to tie on bullock’s mouth during threshing.

52) **Botanical name: Olea dioica Roxb.**

Family: Oleaceae

Local name: Karapa, Parijumb

Habit: Medium sized tree

Habitat: Very common all along the ghats.

**Description of wood:** Colour light reddish. Brown sap wood is raddish grey, heart wood of old trees dark yellowish brown. Hard rather rough, strong.

**Traditional agriculture notes:**

Harrow: Timber is used for making head piece and beam of harrow.

53) **Botanical name:** *Ougeinia oogeinensis* (Roxb.) Hochr.

Family: Fabaceae
Local Name: Tiwas/Kala palas
Habit: A moderate sized deciduous tree
Habitat: Common in deciduors forests.

Branches terete, slender, leaves long ternte alternate, stipulate, petiolate. Leaflets coriaceous, glabrous or pubescent below, wavy; obliqueoval, obtuse, entire or crenate. Flowers numerous white or pale rose, fragment on slender pedicels forming short, fascicled racemes. Calyx sub-bilabiate.

**Description of wood:** Colour of sap wood. Small, grey; heart wood light brown, closed grained. Hard, stands shearing stresses to a remarkable degrees Durability fairly high. Bending strength of dry wood is 961 kg/m². Wood density is 881 kg/m³. Wood hardness is 1051 kg. Impact strength of dry wood is 114 cm. Maximum crushing strength of dry wood is 530kg/m². Shearing strength of wood is 192 kg/m². Wood stiffness is 103/1000/kg/m³. Weight of dry wood is 689 kg/m³

**Traditional agricultural notes:**

Tooth cultivator: Timber is used to prepare tooth cultivator.
Plough: Wood used for making plough.
Harrow: Wood is used to prepare harrow prongs.
Bullock cart: Wood is used to make beam of bullock cart. (Plate – IV.15.A)
54) **Botanical name:** *Artemisia japonica* Thunb.

Family: Asteraceae.
Local Name: Dhor davana, Davani, Tirmak
Habit: Inorous shrub
Habitat: Common on hill slopes in moist deciduous forests.

Lower leaves usually sessile, simple, crenate with a variously toothed and lobed apex; the upper leaves entire. Heads pedicelled, very numerous globose in panicked racemose, drooping, greenish; outer florets female, fertile; inner floret bisexual sterile. Achenes minute, smooth brown.

**Traditional agriculture notes:**

Preservation: Dried leaves are used for store grain pest.

Broom: Plant is used to make brooms. (Plate – IV.14.B)

55) **Botanical name:** *Madhuca longifolia* (Koen.) Macbr.

Family: Sapotaceae
Local Name: Moha
Habit: Tree
Habitat: Common in moist deciduous forest in konkan and ghat region.

Bark dark coloured, cracked, innerbark red, milky. Leaves clustered at the end of branches, elliptic oblong pubescent when young. Flowers in dense fascicles pale yellow or creamy. Fruits ovoid, fleshy.

**Description of wood:** Colour reddish brown. Sap wood large. Hard to very hard; durable. Bending strength of wood is 1712 kg/m². Wood haedness is 1486 kg. Impact strength of wood is 170 cm. Maximum crushing strength of dry wood is 902 kg/m². Shearing strength of dry wood is 154 kg/m². Wood stiffness is 237/1000/kg/m³. Weight of dry wood is 1105 kg/m³.

**Traditional agricultural notes:**

Store grain pest control: Leaves are used to control store food grain pest.

Hoe: Used to crush soil boulders.
Threshing pole: Wood is used to make central pole in threshing pole.

56) Botanical name: *Agave angustifolia* Haw.

Family: Agavaceae  
Local Name: Ghaypat  
Habit: Erect or under shrub  
Habitat: Native of West Indies, planted as hedges and cordage purpose.

Leaves linear-lanceolate, blades, spiny at apex marginal spines dirty brown.

**Traditional agricultural notes:**

Cordage: Leaves are used for making ropes by extracting fibers.

57) Botanical name: *Phoenicis sylvestris* (L.) Roxb.

Family: Arecaaceae  
Local Name: Shindi/Shel  
Habit: Small tree  
Habitat: Moist situations in dry regions; in fairly good quantity in Pune districts usually along banks and in beds of streams and water course.

Trunk straight or bent covered with persistent leaf scars. Leaves large, greyish green, densely fascicled, linear-densiform. Flowers numerous in spadix; spathes woody; spike numerous towards apex of peduncle in fascil. Drupe orange yellow.

**Description of wood:** Colour light brown; outer cylinder hard and rough inner soft. Durable.

**Traditional agricultural notes:**

Broom: Leaves are used to prepare brooms for the purpose of cleaning threshing yard.

58) Botanical name: *Jasminum malabaricum* Wight.

Family: Oleaceae  
Local name: Kushir  
Habit: Climbing shrub  
Habitat: Common along the semi-evergreen forest borders.
Leaves opposite, membranous elliptic. Flowers in lax trichotomously compound terminal cymes. Corolla white, glabrous, lobes 6-10 vary acute. Fruits elliptic, black.

**Traditional agricultural notes:**

Broom: Young branches are used to prepare broom during threshing time.

59) **Botanical name:** *Merremia umbellata* (L.) Hall. F.

**Family:** Convolvulaceae  
**Local Name:** Busharangali vel  
**Habit:** Slender twiner  
**Habitat:** Common on hill slopes and along forest clearings.


**Traditional agricultural notes:**

Cordage: Climber is used to tie Iraele or local umbrella.

60) **Botanical name:** *Wattakaka volubilis* (L.f.) Stapf.

**Family:** Asclepiadaceae  
**Local name:** Garudvel  
**Habit:** Large perennial shrub  
**Habitat:** Common on bushes.

Leaves broadly ovate or lanceolate, glabrescent with numerous glands at base of the midrib on upper surface. Flowers in dense, lateral umbellate cyme. Corolla green, glabrous, follicles divaricate tapering to blunt point, brown tomentose.

**Traditional agricultural notes:**

Cordage: Climber is used for tie purpose in agriculture.
61) **Botanical name:** *Argyreia elliptica* (Roth.) Choisy.

Family: Convolvulaceae  
Local Name: Bondvel  
Habit: Large climbing shrub  
Habitat: Common twiner on the forest borders.

Stem slender, pubescent when young, becoming woody and glabrescent at length, Leaves elliptic-lanceolate. Flowers in axillary lax corymbose or paniculate cymes; bracts deciduous. Corolla pink-purple-rose coloured, tubular, infundibuliform. Stamens 5; filaments dilated, hairy at the base. Berries globose.

**Traditional agricultural notes:**

Cordage: Veins are used as cordage for agricultural purpose.

62) **Botanical name:** *Pongamia pinnata* (L.) Pierre.

Family: Fabaceae  
Local Name: Karanj  
Habit: Small or middle sized tree  
Habitat: Common along streams and river banks. Planted as avenue tree. Very common near sea-coast.


**Description of wood:** Colour white turning yellow on exposure. Moderately hard not durable readily eaten by insects but is improved by seasoning in water. Bending strength of wood is 849 kg/m². Wood density is 785 kg/m³. Wood hardness is 1051 kg. Impact strength of dry wood is 119 cm. Maximum crushing strength of dry wood is 345 kg/m². Shearing strength of wood is 155 kg/m². Wood stiffness is 109/1000/kg/m³. Weight of dry wood is 608 kg/m³.

**Traditional agricultural notes:**

Sickle Handle: Timber is used to prepare sickle handle.  
Preservation: Leaves are used to control food grain pest.
63) **Botanical name: Pogostemon benghalensis Burm. F.**

- Family: Lamiaceae
- Local name: Pangali
- Habit: Large, much branched, shrub
- Habitat: Common in moist shady places.

  Branches often dark purple. Flowers in dense hairy pubescent or villous terminal and axillary stout spikes forming a paniculate inflorescence; whorls many flowered close. Corolla pink or white. Stamens much exserted filaments bearded. Nutlets broadly ellipsoid, the inner faces angular, shining brown black when ripe.

**Traditional agriculture notes:**

Preservation: Leaves are used to control store grain pest.

64) **Botanical name: Aphanamixis polystachya (Wall.) Parker**

- Family: Meliaceae.
- Local name: Rakta-Rohiba
- Habit: Evergeem tree
- Habitat: Occasionaly seen in forest area.

  Leaves imparipinnate, leaflets 4-8 pairs. Male flowers numerous in axillary panicles. Calyx glabrous, 5-particle. Petals 3, staminal tube nearly as long as petals; another sub-sessile. Ovary hairy, globular, yellow when ripe. Seeds oblong, with scarlet aril

**Description of wood:** Bending strength of dry wood is 954 kg/m². Wood density is 608 kg/m³. Wood hardness is 752 kg. Impact strength of dry wood is 86 cm. Maximum crushing strength of dry wood is 449 kg/m². Shearing of wood strength is 109 kg/m². Wood stiffness is 117/1000/kg/m³. Weight of dry wood is 464 kg/m². Shearing of wood strength is 109. Wood stiffness is 117/1000/kg/m³. Weight of dry wood is 464 kg/m³.

**Traditional agricultural notes:**

Plough: Wood is used for plough making.
Harrow: Timber is used for preparing harrow.
65) **Botanical name: Ziziphus mauritiana Lam.**

- **Family:** Rhamnaceae
- **Local name:** Ber
- **Habit:** Large shrub or small tree
- **Habitat:** Common on waste places along hill slopes.

  Branches softly white tomentose. Flowers in axillary, many flowered sib-umbellate cymes. Petals greenish spatulate, delexed with the stamens. Disk 10 lobed. Drupes yellow or orange, stone longitudinally grooved 2 celled.

**Description of wood:** Colour reddish; no heart wood. Hard. Bending strength of dry wood is 1473 kg/m³. Wood density is 673 kg/m³. Maximum crushing strength of dry wood is 449 kg/m². Wood stiffness is 84/1000/kg/m³.

**Traditional agriculture notes:**

- **Yoke:** Wood used for making yoke.
- **Sickle handle:** Wood is used for making sickle handle. *(Plate – XVII.B)*

66) **Botanical name: Setaria italica (L.) P. Beauv.**

- **Family:** Poaceae
- **Local Name:** Kathal
- **Habit:** Annual herb
- **Habitat:** Cultivated for small scale for its grain.

  Culms tufted, terete. Leaves linear lanceolate, acuminate, sheaths ciliate, on the margins, mouth bearded. Panicles cylindric, dense, rachis hairy, branches short, bristles smooth, spikelets in clusts, oval.

**Traditional agricultural notes:**

- **Crops:** Crops are cultivated in adverse condition of crop season.
67) **Botanical name:** *Grewia asiatica* L.

Family: Tiliaceae  
Local Name: Dhaman/phalsa/ dhamani  
Habit: Shrub  
Habitat: Frequent in hilly areas as well as cultivated.

Young parts, sveltely pubescent. Leaves 5-6 nerv ed. Flowers in umbellate cymes. Petals yellow, tours, 2-3 mm long with a villous ring at top beneath the ovary. Drupes lobose, 1 celled, pilose. Fruits acidic and edible.

**Description of wood:** Sap wood white heart wood brown. Close grained. Light moderately hard, tough, elastic.

**Traditional agricultural notes:**

Harrow: Wood used as beam for harrow.  
Plough: Timber is used for making plough  
Cordage: Bark used as cordage.

68) **Botanical name:** *Teminalia alata* Heyne ex Roth.

Family: Combretaceae  
Local Name: Ain  
Habit: Tree  
Habitat: Common throughout the deciduous forests, frequent on hill slopes and stream banks.

Leaves alternate or subopposite, corlaceous often wrdatw at base with 1-2 glands near the base of midrib. Flowers bisexual in axillary spikes or terminal pancelies. Disk clothed with long fuloves haires. Drupes with 5 broad, coriaceous beown glabrous wings.

**Description of wood:** Colour of sap wood reddish white, heart wood dark brown hard, strong, tough apt to split in seasoning fairly durable.

**Traditional agricultural notes:**

Plough: Timber is used to make plough.
Hoe: Wood used for making hoe.
Maind: Wood is used to for crushing soil boulders.
Petari: Timber is used for making petari (Plate – IV.10.B)
Threshing pole: Timber is used for preparing central pole of threshing area.

69) Botanical name: *Acacia nilotica* (L.) Willd ex Del.

Family: Mimosaceae.
Local Name: Babhul
Habit: Small tree
Habitat: Common throught the coast of konkan (Mahad) as well as dry forests. Rare along streams in dry forest.

Leaves with glands between many of the pairs of pinnae and a large gland near the middle of petiole stipular spines hooked; pinnae 20-30 pairs. Flowers sessile in 1-4 nate axillary spikes Pods thin, glabrous, seeds 3-10 compressed.

Description of wood: Colous of sap wood yellowish-white; heart wood rather dark or light red, very hard, seasons well extremely durable is not attacked by white ants or by teredo.

Traditional agricultural notes:

Plough: Wood is used to prepare plough beam.
Hoe: Timber is used for making hoe.
Petari: Wood used for making petari. (Plate – IV.10.C)
Harrow: Timber used to prepare prong of harrow.
Carrier: Fork used to carry stone.

70) Botanical name: *Garuga pinnata* Roxb.

Family: Burseraceae
Local name: Kakad
Habit: Tree
Habitat: Occasionally found in hill forest
Bark furrowed the outer peeling of in flakes. Leaves crowded at the end of branches; leaflets 6-10 pairs and an odd one. Flowers in dense panicles; panicle tomentose pale yellow. Pyrenes 2, rugose. Seeds with membraneous wings.

**Description of wood:** Wood variable, colour sap wood white, large, heart wood reddish brown, hard and even grained. Soft readily attacked by insect, season well but not durable.

**Traditional agricultural notes:**

Sickle handle: Wood is commonly used for making sickle handle. *(Plate – IV.12.D)*

Maind: Used to trample soil boulders locally called as maind.

71) **Botanical name:** *Arnicratea grahamii* (Wight.) Halle.

**Family:** Hippocrateaceae  
**Local Name:** Lokhandi  
**Habit:** Scardent shrub  
**Habitat:** Common in the forest along streams.

Leaves opposite coriaceous. Flowers white in dense panicles longer than leaves. Fruit of 1-3 distinct carples each 2 valved. Seeds compressed, winged, funicle conspicuous at the centre.

**Traditional agricultural notes:**

Sickle handle: Timber is used for making sickle handle.

72) **Botanical name:** *Lannea coromandelica* (Houtt) Merr.

**Family:** Ancardiaceae  
**Local Name:** Madhal/Shimati  
**Habit:** Small deciduous tree  
**Habitat:** Common on slopes of hills in deciduous forests.

Leaves imparipinnate leaflets ovate oblong 3-5 pairs and an odd one. Flowers crowded in cymose fascicles along racemes; male racemes simple. Drupes reniform compressed, reddish brown.
Description of wood: Colour hart wood, light red, when fresh cut turning reddish brown on exposure. Sap wood large white close grained, moderately hard, works and polishes well.

Traditional agricultural notes:

Sickle handle: Wood used for making sickle handle.
Horrow: Wood is used to make harrow.
Yoke: Timber used for making yoke.
Threshing pole: Wood used for making a threshing pole in threshing yard.

73) Botanical name: Bauhinia racemosa Lam.

Family: Caesalpiniaeae
Local Name: Apata/Shid
Habit: Small tree
Habitat: Common on hill forests and around fields.

Leaves orbicular. Flowers in elongate racemes. Petals narrowly oblanceolate, white or pale yellow. Stamens 10, all fertile. Seed 10-20, compressed, rounded at apex, black.

Description of wood: Colour brown with irregular dark patches near the centre.

Traditional agricultural notes:

Yoke: Timber is used to prepare yoke. (Plate – IV.7.B)
Sickle handle: Wood is used for making sickle handle.

74) Botanical name: Carallia brachiata (Lour.) Merr.

Family: Rhizophoraceae
Local name: Ranphansi.
Habit: Moderate sized tree.
Habitat: Common tree at higher altitudes in semi evergreen and moist deciduous forests.

Leaves opposite, very variable in shape. Flowers sessile in small heads, on axillary trichotomous cymes. Petals white. Stamens twice as many as petals. Stigma 4-5 lobed. Fruit seeded.
**Description of wood:** Colour red, close grain, pores moderate size is large, some time very large. Often sub-divided, often septate, often filled with resin. Hard, heavy, seasons well without warping work well. The wood is very handsome and polishes well.

**Traditional agricultural notes:**

Sickle handle: Timber is used to make sickle handle. (Plate – IV.12.A)

75) **Botanical name:** *Wrightia tinctoria* R.Br.

- Family: Apocynaceae
- Local name: Kalakuda
- Habit: Small deciduous tree
- Habitat: Frequent in dry deciduous forests.


**Description of wood:** Colour white like ivory, even grain, pores scanty, very small, in short radial lines, moderately hard.

**Traditional agricultural notes:**

Sickle handle: Wood is used for making sickle handle.

Yoke: Wood is used to prepare yoke.

Tooth cultivator: Timber is used to make tooth cultivator for tillage operation.

76) **Botanical name:** *Cordia dichotoma* Forst

- Family: Boraginaceae
- Local name: Bhokar
- Habit: Deciduous trees
- Habitat: Frequent in deciduous forests near villages and also cultivated

Leaves broadly ovate, elliptic oblong or sub-orbicular, glabrous. Inflorescence axillary and terminal cymes. Flowers creamy yellow. Drupes ovoid or rounded, glabrous, yellow with pinkish tinge.
Description of wood: Colour greyish brown, pores moderate sized or large, scanty, scattered and frequently double of participation. Moderately hard rather light, fairly strong. Seasons well but not durable.

Traditional agricultural notes:

Sickle handle: Wood is used for making sickle handle. (Plate – IV.12.C)
Yoke: Wood is used to make yoke.
Bullock cart: Timber used for making bullock cart.

77) Botanical name: Mallotus philippensis (Lam). Muell.-Arg.

Family: Euphorbiaceae
Local name: Shendri
Habit: Much branched shrub or tree
Habitat: common on hill slopes.

Branchlets covered with tawny stellate tomentum. Leaves alternate, 3-nerved base. orbicular red glands benath. Flowers small, the males clustered in erect, terminal spikes forming elongated paniculate racemes, the females solitary in short spikes. Fruits globose, 3-lobed covered with brith red powder consisting of minute stellate hairs. Seeds sub-globose black.

Description of wood: The wood is whitish to pale reddish-grey, often with darker streaks, and fairly close and straight-grained. It is hard and moderately heavy, averaging 770 kg/m. It shrinks much and is susceptible to insect attack.

Traditional agricultural notes:

Sickle handle: Timber used to make sickle handle.
Plough: Timber used for making plough.
Yoke: Wood is used to make yoke.
Fodder: Leaves are feed as fodder for cattle.
78) **Botanical name:** *Memecylon talbotianum* Brand.

**Family:** Melastomaceae  
**Local name:** Anjan/karap  
**Habit:** Large shrubs or small trees  
**Habitat:** Frequent along streams

Leaves elliptic, coriaceous. Flowers small, sessile, few in axils of present and former leaves, buds pyriform petals orbicular, blue with a dark spot in the centre. Berries globose yellow.

**Traditional agricultural notes:**

- **Plough:** Timber is used to make plough.
- **Harrow:** Wood is used to make harrow.
- **Bullock cart:** Timber is used to make bullock cart.

79) **Botanical name:** *Calycopteris floribunda* Lamk.

**Family:** Combretaceae  
**Local name:** Ukashi/Ukshi  
**Habit:** Large climbing shrub  
**Habitat:** Common on hill slopes of forest.

Young branches slender, rusty pubescent. Flowers sessile in terminal panicles. Calyx densely hairy, accrescent. Stamen 10, unequal. Ovary densely villous outside. Fruits oblong or ellipsoid, 5 ribbed, crowded by persistant calyx lobes.

**Traditional agricultural notes:**

- **Cordage:** Climber is used for cordage purpose.

80) **Botanical name:** *Lagerstroemia parviflora* Roxb.

**Family:** Lythraveae  
**Local Name:** Bondara  
**Habit:** Tree  
**Habitat:** Infrequent on hill slopes.
Leaves elliptic-oblong, sessile or sub-sessile opposite. Flowers fragrant in axillary and terminal, few to many flowered panicles. Calyx enlarging in fruit. Petals 6, white with a long slender claw. Capsules ellipsoid, with a crown of woody, erect calyx teeths. Seeds winged, wings much longer than the seed.

**Description of wood:** Colour grey or greyish brown, often almost red, darker coloured near the centre. Pores moderate size and large, often sub-divided, surrounded singly or patches. Very hard, moderately heavy, very difficult to season; fairly durable, fairly easy to saw and work; can be finished easily to a fine finish. Timber has a fault of splitting a good deal at the centre.

**Traditional agricultural notes:**

Plough: Wood is used for making plough beam.

Rab: Leaves and twigs are used for rab cultivation.

81) **Botanical name:** *Terminalia bellirica* (Gaertn.) Roxb.

**Family:** Combretaceae

**Local Name:** Yela/Behada

**Habit:** Large deciduous tree

**Habitat:** Common on hill slopes in forests.

Leaves at the ends of branches, coriaceous, Flowers in axillary and terminal simple and branched spikes. Drupes broadly ellipsoid or subglobose, densely finely velutinous, brown, faintly 5-ribbed.

**Description of wood:** The timber is yellowish-grey, whitish, longitudinally fissured lacking heartwood, light to moderately heavy (volumetric mass 570-750 kg/m), fairly straight-grained, very coarse-textured. The wood has a density of 675-900 kg/m at 12% moisture content. Dry wood having hardness 1192 kg, bending strength 1473 kg/cm², shearing strength 200 kg/cm², with 2% radial and 4% tangential shrinkage wood character. It is not durable, and very prone to insect attack.
Traditional agricultural notes:

Harrow/Log wood: Wood is used for trampling soil boulders.

Bullock cart: Wood is useful for bullock cart.

82) Botanical name: *Sorghum bicolour* (L.) Moench.

Family: Poaceae

Local Name: Jowar

Habit: Annual herb

Habitat: Commonly cultivated as cereals for food grain & fodder (Kadaba).


Traditional agricultural notes:

Landraces: Different types like *Dukari, Kawali, Jondhala* and *Dagadi* are cultivated in Kharif and Rabi season in hilly parts of study area.

83) Botanical name: *Oryza sativa* L.

Family: Poaceae

Local Name: Rice/Bhat

Habit: Annual herb

Habitat: Extensively cultivated as cereal crop.

Leaf sheath compressed, keeled, glabrous, smooth, ligule spicuous, membranous, spitting at maturity; blades linear-lanceolate, scaberulous on nerves above and along margins glabrous below. Panicles large, effuse terminal long, rachis angular, scabrid, spikelets solitary or fascicled at the end of small branches, oblong, laterally compressed, pale green awned. Lower glume 1-nerved, mucronate, upper glume 1-nerved. Caryopsis oblong dirty white.
Traditional agricultural notes:

Landraces: Rice is major crop cultivated in study area and landraces are grown for family consumption.

84) **Botanical name:** *Vigna unguiculata* (L.) Walp.

**Family:** Fabaceae  
**Local Name:** Chavali  
**Habit:** Twinning glabrous annual herb  
**Habitat:** Cultivated as vegetable on bunds of field.

Leaves 3-foliate; petioles striate, stipules ovate-lanceolate. Leaflets ovate-deltoid or rhomboid lobed subacute at base, glabrous, acuminate stiples small deciduous. Flowers in condensed racemes or umbellate clusters, with timid nodes, bract ovate, acute, deciduous, bracteoles lanceolate. Calyx campanulate, teeth triangular shorter than tube. Corolla bright purple or lilac, standard yellowish outside, bluish, violet, inside. Pods linear, torulose, glabrous. Seeds white smooth.

Traditional agricultural notes:

Local people cultivated it in hilly region having different types are available.

85) **Botanical name:** *Eleusine coracana* (L.) Gaertn.

**Family:** Poaceae  
**Local Name:** Nachani/Ragi  
**Habit:** Annual herb  
**Habitat:** Cultivated for edible grain.

Traditional agricultural notes:

Landraces: It is a hardy crop that can be grown in very diverse environments. Finger millet has an excellent food value as its seeds contain protein and are particularly rich in methionine amino acid, iron, and calcium.

86) Botanical name: *Arachis hypogea* L.

Family: Fabaceae
Local Name: Bhuimug
Habit: Prostrate herb with hispid branches
Habitat: Cultivated in mixed farming for edible oil purpose.

Leaves paripinnate, leaflets 2 pairs, ovate lanceolate, thinly coriaceous cuneate at base entire along the margins, apex obtuse or mucronate. Petioles swollen at base. Flowers axillary, solitary calyx 5-lobed calyx tube filiform upper connate. Petals yellow and stemens inserted on calyx tube. Clawed stamens 8-9, monoadelphous, stigma simple. Pods geocarpic 1-5 seeded.

Traditional agricultural notes:

Landraces: Farmers cultivate local type.

87) Botanical Name: *Lablab purpureus* (L.) Sweet

Family: Fabaceae
Local Name: Pavata/Vaal
Habit: Twiner, large pubescent perennial
Habitat: Cultivated for its tender pods which used as vegetable.

Leaves 3 foliate, leaflets broadly ovate rhomboid. Flowers large in axillary and terminal racemes. Corolla lilac, pink or white, stigma capitate. Pods flat, sublimate, tipped with sharply incurved seeds 3-4.

Traditional agricultural notes:

Landraces: *Pavata* and *Val* are main protein sources of local people.
88) **Botanical Name:** *Memecylon umbellatum* Burm. f.

**Family:** Melastomaceae  
**Local Name:** Anjan  
**Habit:** Small tree  
**Habitat:** Common at higher altitudes in semi-evergreen forests.

Leaves elliptic or ovate glabrous, dark green above, pale beneath. Flowers numerous in umbellate cymes from the axils of fallen leaves on old branches. Berries globose, purplish black, crowned with conspicuous calyx limb, 1-seeded.

**Description of wood:** Wood is very hard and thick.

**Traditional agricultural notes:**

Plough: Wood is used for making plough.  
Hoe: Wood is used for hoe making. ([Plate – IV.9.C](#))

89) **Botanical Name:** *Macrotyloma uniflorum* (Lam.) Verdc.

**Family:** Fabaceae  
**Local Name:** Kulith / Hulga  
**Habit:** Herb  
**Habitat:** Commonly cultivated in mixed farming.

Leaves 3 foliolate, leaflets ovate-rhomboid or elliptic-lanceolate, villous. Flowers axillary, yellowish, green with purplish botch within. Peduncle oblong facate pubescent. Obscurely nerved, 5-6 seeded.

**Traditional agricultural notes:**

Crop: A good tonic for delivered women. Threshed material of the same plant is useful for storage of seed material

90) **Botanical Name:** *Amaranthus cruentus* L.

**Family:** Amaranthaceae  
**Local Name:** Rajgira
Habit: Erect herb
Habitat: Cultivated for leafy vegetable.

Leaves ovate oblong prominently, acute to shortly acuminated at base, gradually narrowed upwards nerved beneath. Flowers in clusters, arranged on axillary and terminal panicles. Perianth green or more often red-purple, mucronate. Stamens longer than tepals. Filaments equaling the perianth lobes. Uticles unceolate, pale green in lower half, purple in upper half. Seeds globose, dark brown.

Traditional agricultural notes:

Landraces: *Amaranthus* landraces are grown in borders of field.

91) **Botanical name:** *Amaranthus roxburghianus* Nevski

Family: Amaranthaceae
Local Name: Tandulja
Habit: Prostrate or diffuse herb
Habitat: Cultivated for leafy vegetable.

Stem stout grooved, glabrous, or thinly hairy, leaves, elliptic or obovate or spatheulate, cuneate at base. Flowers in dense, axillary cluster, in terminal simple or branched spikes. Seeds lenticular, globose, smooth, brown black.

Traditional agricultural notes:

Crop: Cultivated in mixed cropping system for vegetable purpose.

92) **Botanical name:** *Amaranthus viridis* L.

Family: Amaranthaceae
Local Name: Math
Habit: Erect or diffuse herb
Habitat: Cultivated for leafy vegetable

Leaves deltoid, ovate or rhomboid. Flowers in axillary clusters and terminal spikes or panicles. Flowers green, lower cluster axillary, upper ones in terminal, rather dense, continuous or interpreted male or female spike. Seeds trigonous, black, shining.
Traditional agriculture notes:

Crop: Cultivated along borders as intercrop.

93) **Botanical Name: *Cicer arietinum* L.**

Family: Fabaceae  
Local Name: Harbhara  
Habit: Much branched herb  
Habitat: Cultivated in rabi season.

Leaves odd pinnate stipules often lobed; leaflets ovate oblong or obovate 9-15 pairs, subopposite or alternate, elliptic oblong acute at both ends, glandular pubescent on both sides; petioles obscure; stipule obscent. Flowers axillary solitary. Petals exserted, often 2-seeded, glandular pubescent seed shortly beaked.

Traditional agricultural notes:

Landraces: Local strains of harabhara are cultivated by the traditional people.

94) **Botanical name: *Panicum miliaceum* L.**

Family: Poaceae  
Local name: Varai/Vari  
Habit: Erect annual grass  
Habitat: Cultivated in shifting cultivation practices.

Leaves alternate, simple; leaf sheath variously hairy; ligule membranous, ciliate; blade linear-lanceolate, variously hairy. Inflorescence a slender panicle or compact, erect or drooping. Spikelets solitary, stalked, ovoid-ellipsoid, 2-flowered, glabrous; glumes unequal, the upper as long as spikelet, many-veined; lower floret sterile, upper one bisexual with thick broad (c. 2 mm) lemma and palea, 2 lodicules, 3 stamens and superior ovary with 2 plumose stigmas. Fruit a caryopsis (grain), broadly ovoid, up to 3 mm × 2 mm, smooth, variously coloured.
Traditional agricultural notes:

Crop: It has a wide adaptability and can be grown in climates which are too hot and dry, and on soils which are too shallow and poor for successful cultivation of other cereals. Proso millet has one of the lowest water requirements. Most soils are suitable for proso millet, except coarse sand.

95) Botanical name: Panicum sumatrense Roth ex Roem. & Schult.

Family: Poaceae  
Local name: Sava  
Habit: An annual with erect or geniculate culms.  
Habitat: Cultivate in Malkush field or shifting farm.

Blade 8-20 cm long; sheath glabrous; ligule membranaceous, truncate, ca. 1 mm long, fringed with hairs. Panicle open, 5-15 cm long, terminal and axillary. Spikelets glabrous, acute, ca. 2.5 mm long; lower glume obtuse, 3-veined, 1/3 or less length of spikelet; upper glume and lower lemma equal, strongly 9-11 veined; lower palea membranaceous, nearly as long as spikelet; upper lemma smooth, shiny, brown at maturity, coriaceous.

Traditional agricultural notes:

Crop: Resistance to adverse agro-climatic conditions. The crop can be grown on very poor soil. Generally grown on light red soils and on hillsides as a rain-fed crop, never irrigated.

96) Botanical name: Cajanus cajan (L.) Millspaugh

Family: Fabaceae  
Local name: Tur  
Habit: Herb  
Habitat: Rain fed crop cultivated as intercrop.

Leaves three foliolate, leaflets ovate elliptic or lanceolate, flowers in axillary and terminal, petals yellow. Pods linear, long, acuminate, densely grey, tomentose with oblique depressions between the seeds. Seeds ovoid or ellipsoid.
**Traditional agricultural notes:**

Crop: Cultivated in Kharif season.

97) **Botanical name:** *Hordeum hexastichon L.*

Family: Poaceae  
Local Name: Satu  
Habit: Annual herb  
Habitat: Cultivated in inter cropping system.

Culms membranous tufted, stout, nodes waxy concealed with in the leaf sheaths, acuminate, striate, ligule membranous leaf base auricled. Leaves sharply ascending spikes emerging from the inflated sheath of the flag spikelets 10 in each rank. Glume & palea tightly closes the seed.

**Traditional agricultural notes:**

It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

98) **Botanical name:** *Guizotia abyssinica Cass.*

Family: Asteraceae  
Local Name: Kale til/Khursani  
Habit: Annual herb  
Habitat: Cultivated on shifting cultivation lands.

Leaves - opposite, oblong, lanceolate, serrate, acute, glabrous or minutely hairy on both surfaces. Flowers yellow, concepiseous in solitary or clustered heads, arranged in corymbs, ray florets female with bright yellow corolla, achenes of marginal florets three angled, those central florets four angled all black shining, pappus absent, cross pollinated probably by bees.

**Traditional agricultural notes:**

Crop: Cultivated in boarder of field or in mix farming.
99) **Botanical name:** *Brassica juncea* (L.) Czern.

**Family:** Brassicaceae  
**Local Name:** Mohari  
**Habit:** Annual herb  
**Habitat:** Cultivated in rabi season.

Erect, branched, glabrous sometimes glaucous or hispid. Lower leaves lyrate pinnatifid, obovate; upper one dentate, short petioled, gradually smaller, lanceolate. Racemes many flowered, terminal. Flower bright yellow, beak long, seedless seed globose, reddish brown 10 -20 in each locule.

**Traditional agricultural notes:**

Crop: Cultivated in rabi season.

100) **Botanical name:** *Vigna angularis* (Willd.) Ohwi & Ohashi

**Family:** Fabaceae  
**Local Name:** Udid  
**Habit:** Herb  
**Habitat:** Cultivated in Kharif season as intercrop.


**Traditional Agricultural notes:**

Crop: Resistance to adverse agro-climatic conditions. The crop can be grown on very poor soil. Generally grown on light red soils and on hillsides as a rain-fed crop, never irrigated

101) **Botanical Name:** *Sesamum orientale* L.

**Family:** Pedaliaceae  
**Local name:** Til  
**Habit:** Erect, stout, aromatic, annual herb  
**Habitat:** Available as willed and cultivated on margins of field in inter cropping.
Leaves decussately opposite in lower parts, arranged spirally and 3-lobed to 3-foliolate in upper parts; stipules absent; grooved above, at least at base; blade of lowest leaves ovate in outline, margin entire or partly toothed, higher leaves with narrowly elliptical lobes, margin entire or toothed, highest leaves narrowly elliptical. Flowers in small fascicles in upper leaf axils, bisexual, zygomorphic, bract with an axillary gland; calyx with oblong lobes, slightly fused at base, apex acute, long-hairy; corolla campanulate, stamens 4, ovary superior, oblong-quadrangular, style 1 cm long, with 2-lobed stigma. Fruit an oblong-quadrangular capsule; loculicidally dehiscent, many seeded.

Traditional agricultural notes:

Crop: Sesame thrives on moderately fertile and well-drained soils. Summer planting and newer cultivars have extended its range into more temperate regions.

102) Botanical name: *Triticum dicoccum* (Schrank) Schubler.

Family: Poaceae  
Local name: Khapali Ghahu/wheat  
Habit: Annual herb  
Habitat: Extensively cultivated for cereals in rabi season.

Culms terete tall leaf sheath smooth, ligule membranous, blade flat linear lanceolate to lanceolate. Inflorescence is a compound spike, spikelet has 2 glumes and 3-4 florets, the pistil with two pinnate stigmas, three stamens and three lodicules at the base of the floret. Grain entirely close in lemma and palea. Coleoptile 4-6 nerved.

Traditional agricultural notes:

Landraces: Commonly cultivate in rabi season.

103) Botanical name: *Acacia catechu* (L.f.) Willd.

Family: Mimosaceae  
Local name: Khair  
Habit: Small tree  
Habitat: Rare along streams in dry forest.
Leaves with glands between many of the pairs of pinnae and a large gland near the middle of petiole, Stipular spines hooked, pinnae 20-30 pairs. Flowers sessile in 1-4 nate axillary spikes. Pods thin, glabrous. Seeds 3-10 compressed.

**Description of wood:** Colour - sap wood large, whitish; heart wood pinkish white, turning reddish brown on exposure. Hard, very durable, a very good shock resisting ability, air seasons with fairly good results;

**Traditional agricultural notes:**

Bullock cart: Wood is used to make bullock cart.

Plough: Timber is used to make plough.

Harrow: Wood is used to make harrow.

104) **Botanical name:** *Acacia chundra* (Rottl.) Willd.

Family: Mimosaceae

Local name: Lal khair

Habit: Shrubs or small tree

Habitat: Common on hill slopes in deciduous forest.


**Description of wood:** Colour sap wood, yellowish white, heart wood rather dark or light red. Very hard, seasons well, takes a fine polish, extremely durable, is not attacked by white ants or by teredo. The wood has a density of about 0.88 g/cm³.

**Traditional agricultural notes:**

Plough: Timber is used to prepare ploughs.

Harrow: Wood is used to make harrow.

Bullock cart: Timber is used to make centre of bullock cart wheel. *(Plate – IV.15.D)*

Yoke: Wood used for preparing yoke.
105) **Botanical name:** *Albizia lebbeck* (L.) Willd.

Family:  Mimosaceae  
Local name:  Shiris  
Habit:  Tree  
Habitat:  Commonly occur in scattered forest and cultivated along roadsides.

Leaflets 8-18, unequal sided rigid glabrous or pubescent, obtuse, 2.5-4.0 cm, flowers white, fragrant glabrous or downy, larger than its last species. Heads many flowered on peduncles 3-4 together, arising from the upper most axils. Fruit legume, yellow brown, thin 6-12 seeded.

**Description of wood:** Colour sap wood large, white or yellowish, heart wood dark brown, streaked with lighter or darker streaks. Hard wood strong moderately durable seasons well, rather difficult to saw and work, can be finished to a good surface by hand, polishes well, absorbing little polish, a hand some wood, the burrs are particularly valuable.

**Traditional agricultural notes:**

Bullock cart: Wood is used to make bullock cart  
Plough: Timber is used to make plough

106) **Botanical name:** *Erythrina stricta* Roxb.

Family:  Fabaceae  
Local name:  Ranpangara  
Habit:  Large tree  
Habitat:  Common in dry deciduous forest

Leaves trifoliate, leaflets reniform, cordate to ovate-cordate. Flowers in terminal horizontal racemes arranged in fascicles of 2-3 long rachis. Corolla bright scarlet, standard 4 times as long as wings. Pods 1-3 seeded.

**Description of wood:** Colour that greys near the centre of darker colour but not a regular heart wood. Soft, light, spongy, fairly durable.
Traditional agricultural notes:

Rab: Leaves are used for rab cultivation.

Threshing pole: Wood is used by people for threshing pole. *(Plate – IV.15.D)*

107) **Botanical name:** *Euphorbia ligularia* Roxb.

Family:  Euphorbiaceae

Local name:  Sabar

Habit:  Much branched shrubs.

Habitat:  Frequent on hill slopes in dry region.

Stipular spines reddish brown, divergent. Cyathia 1-3 together in axillary cymes; the central usually with male fasciles of male flowers. Fruits sharply 3-lobed, glabrous.

**Description of wood:** Colour white, even grained. Pith large round. Pores small very scanty, usually in pairs. Medullary rays extremely fine and numerous.

Traditional agricultural notes:

Threshing pole: Wood is used by tribal people for threshing pole. *(Plate – IV.13.C)*

108) **Botanical name:** *Flacourtia latifolia* (Hook.f & Thoms) Cooke

Family:  Flacourtiaceae

Local name:  Tambat

Habit:  Small Tree

Habitat:  Frequent in moist deciduous forest.

Leaves coriaceous. Flowers in slender, lax pubescent, bracteates racemes or in acemose clusters, sweet scented. Ovary obscurely 3-4 lobed at apex. Berries dark purple when ripe.

**Description of wood:** Colour red. Close and even grained. Pores small in redial lines. Durable hard, splits but does not warp; takes a good polish without abosobing much polish

Traditional agricultural notes:

Rab: Plant twigs are used for rab cultivation.

Beam: wood is used to make plough part.
109) **Botanical name:** *Glochidion ellipticum* Wight.

Family: Euphorbiaceae  
Local name: Bhoma  
Habit: Tree  
Habitat: Common in forest.

Male flowers on capillary pedicles. Female flowers few. Sessile, in small clusters usually of deeper yellow then male. Ovary glabrous style subglobose 3-4 notched at apex. Capsules nearly sessile, 6-8 lobed, much depressed in centre. Seeds 2 in each cell, rounded on back.

**Description of wood:** Colour reddish brown. Pores small and moderate sized scanty, in radial lines between at the fine med. Rays moderately hard.

**Traditional agricultural notes:**

Harrow: wood is used to prepare harrow bar (Dind). ([Plate – IV.8.D](#))

110) **Botanical name:** *Grewia tiliifolia* Vahl

Family: Tiliaceae  
Local name: Dhaman  
Habit: Tree  
Habitat: Common in forests.

Leaves cordate at base, 5-nerved. Flowers 3-6, in axillary cymes. Petals yellow, notched at apex, gland about 1-3 the length at petal, densely white, villous on margins. Torus rather long, ribbed, glabrous. Drupes black, distinctly 2-lobed.

**Description of wood:** Colour – sap wood white, heart wood small, brown. Close grained. Annual rings marked by a line and the harder autumn wood. Pores moderate sized, numerous, uniformly distributed. Light, moderately hard, tough, tough elastic; takes a good polish without absorbing much polish; easily worked.

**Traditional agricultural notes:**

Plough: Wood used for making plough. ([Plate – IV.6.A](#))
Hoe: Wood is used for hoe making.

111) Botanical name: *Tridax procumbens* L.

<table>
<thead>
<tr>
<th>Family</th>
<th>Asteraceae</th>
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<tbody>
<tr>
<td>Local name</td>
<td>Dagdi pala</td>
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<tr>
<td>Habit</td>
<td>Herb</td>
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<tr>
<td>Habitat</td>
<td>Frequent on rocky hill slopes.</td>
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</tbody>
</table>

Leaves in distant pairs, elliptic-ovate to lanceolate. Heads radiate, solitary on straight, erect peduncles, hirsute with long spreading hairs. Marginal florets 4-8, white or yellow. Central florets many, with yellow corolla, Achenes densely silky, black. Pappus of many aristate bristles.

Traditional agricultural notes:

Preservation: Leaves are used in storage of grains

112) Botanical name: *Capsicum annuum* L.

<table>
<thead>
<tr>
<th>Family</th>
<th>Solanaceae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local name</td>
<td>Mirachi</td>
</tr>
<tr>
<td>Habit</td>
<td>Annual herb</td>
</tr>
<tr>
<td>Habitat</td>
<td>Largely cultivated for pungent fruits.</td>
</tr>
</tbody>
</table>

Stem angular, much branched. Leaves variable, alternate or sub fascicled, ovate, cuneate at base, acute or acuminate, shining green above, paler beneath. Flowers axillary solitary, erect or pendulous, white. Calyx copular, much enlarging in fruit, truncate. Corolla white, divided more than half way down; lobes ovate, acute. Anthers yellow. Fruits elongate, tapering to a point, varieg, red at maturity. Seed discoid flat.

Traditional agricultural notes:

Landraces: Local people used chilli in their food for pungent taste.

113) Botanical name: *Heteropogon contortus* (L.) P. Beauv.

<table>
<thead>
<tr>
<th>Family</th>
<th>Poaceae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local name</td>
<td>Kusal</td>
</tr>
</tbody>
</table>
Habit: Annual or perennial herb.
Habitat: Common on open grasslands and along roadsides.

Leaves flat, linear-lanceolate, glabrous or sparsely hairy, acuminate. Racemes solitary, terminating the culms and branches, with lower awnless, homogamous spikelet pairs and upper awned forming twist. Spikelets closely imbricating, subsecund, the lower 2-6 or more sessile, male or neuter, the upper sessile spikelets, long awned, female. Lower glume 7-9 nerved, upper glume involute, 3-nerved. Upper lemma linear, stiptiform. Stamens 3. Grains enclosed by lemmas.

Traditional agricultural notes:

Rab: Grass is used to prepare rab for rice cultivation.

114) Botanical name: Themeda triandra Forssk.

Family: Poaceae
Local name: Gathya gavat
Habit: Perennial Herb
Habitat: This grass is widespread in grasslands, in areas of average to high rainfall.

Culms tufted, terete, erect or ascending, branched, glabrous: nodes glabrous. Leaves linear-lanceolate, glabrous or sparsely hairy. Panicles elongated, lax or with congested clusters of spikelets. Spatha boat shaped, margins hairy with tuberculate bristle. Involucral spikelets oblong-lanceolate, inserted at the same or different levels. Sessile spikelets oblong, awned. Lower lemma lanceolate; upper lemma linear, awned. Pedicelled spikelets linear-oblong, unawned.

Traditional agricultural notes:

Rab: Grass is used to prepare rab for rice cultivation.

115) Botanical name: Arthraxon lanceolatus (Roxb) Hochst.

Family: Poaceae
Habit: Annual Herb
Habitat: Common in grass land
Culms tufted, erect or geniculately ascending, rooting at lower nodes; nodes glabrous. Leaves glaucous, linear-lanceolate ciliate on the margins. Racemes 2-4. Spikelets 2-nate. Sessile spikelets narrowly linear-lanceolate, callus very short, awned. Glumes 4, lower purple, with hyaline tip, the keels serrately bristly with strong curved teeth, 5-7 nervèd, muricate, upper Involucral glume similar, lanceolate, acuminate, 3-nerved. Lower floral glume acute; upper floral glume hyaline. Pedicelled spikelets unwaned.

**Traditional agricultural notes:**

Rab: Grass is used in rab cultivation for slash and burn purpose.

116) **Botanical name:** *Nephrolepis exaltata* (L.) Schott.

Family: Lomariopsidaceae  
Local name: Neche  
Habit: Ferns  
Habitat: Commonly found in swamps and wetlands.

The fronds are 50-250 cm long and 6-15 cm broad, with alternate pinnae, each pinna being 2-8 cm long. The pinnae are generally deltoid, as seen in the picture to the right. The pinnate vein pattern is also visible on these highly compound leaves. The edges appear slightly serrate. The species has gracefully arching fronds.

**Traditional agricultural notes:**

Broom: Leaves are used to prepare broom.

117) **Botanical name:** *Psidium guajava* L.

Family: Myrtaceae  
Local name: Peru  
Habit: Small Tree  
Habitat: Cultivated in field or in kitchen garden for fruits.

Traditional agricultural notes:

Rab: Twigs and leaves of plants are used in rab practices.

118) Botanical Name: *Justica adhatoda* L.

Family: Acanthaceae
Local Name: Adulsa
Habit: Large shrub
Habitat: Cultivated around the house.


Traditional agricultural notes:

Rab: Leaves are used for rab cultivation.


Family: Bignoniaceae
Local name: Kharshing
Habit: Large deciduous tree
Habitat: Common on deciduous hill slopes.

Oppositely arranged leaves are double-pinnate, 1-4 ft long. Leaflets are 3-9 cm long, elliptic, oblong, sharp tipped, with a rounded base. Fragrant white flowers appear in dense panicles at the end of branches. Flowers are 4-6 cm long, funnel shaped, white tinged with yellow. Stamens are 4 in unequal pairs. Capsules are long up to 1 m, 5 cm wide, curved and woody.

**Description of wood:** Stem is short and erect, with grey, soft, scaly bark. The wood is strong and light and used to make agricultural implements.

Traditional agricultural notes:

Yoke: Timber is used to prepare yoke.
120) **Botanical name: *Dichanthium annulatum* (Forsk.) Stapf.**

Family: Poaceae
Local name: Punava
Habit: Perennial herbs
Habitat: Common in waste places.


**Traditional agricultural notes:**

Rab: Grass is used in rab method for burning purpose.

121) **Botanical name: *Gliricidia sepium* (Jacq.) Walp.**

Family: Fabaceae
Local Name: Giripushpa
Habit: Tree
Habitat: occurs naturally in early and middle successional vegetation types on disturbed sites such as coastal sand dunes, river banks, flood plains and fallow land. It establishes well on steep slopes.

Leaves are alternate and pinnate, leaflets, papery, oblong with a distinctive pointed tip. Leaflet size increases towards the distal end of the leaf. Flowers arranged on conspicuously short, upward-curving to erect inflorescences, which are usually pink, fading to whitish-brown or pale purple with age. Pods explosively dehiscent, strongly laterally compressed and pale green or reddish-pink when unripe, turning pale yellow-brown when fully ripe. Seeds transversely oriented, lenticular, not constricted in the middle. Seeds uniformly light brown, turning dark brown with age; 3-10 seeds in a single pod.

**Traditional agricultural notes:**

Green manuring: Leaves are used for decomposition in the field as a green manure.
122) **Botanical name:** *Crotalaria juncea* L.

**Family:** Fabaceae  
**Local name:** Dhaincha  
**Habit:** Annual shrub  
**Habitat:** Grown as a source of green manure, fodder.

Leaf simple, broad, linear or oblong, obtuse or subacute, apiculate, pubescent on sides, hairs appressed, silky. Petiole stipules almost absent. Inflorescence an erect terminal and lateral raceme, 12-20-flowered Pedicel c.3–7 mm long. Bract minute; bracteoles 2, below the calyx. Calyx c.1.8-2.0 cm long, pubescent, teeth linear-lanceolate. Corolla bright yellow. Vexillum ovate-oblong, slightly exserted. Fruit, sessile, pubescent, 10-15-seeded.

**Traditional agricultural notes:**

Green manure: Crop is grown in the paddy field and buried in the soil for green manuring purpose.