

# Consulting and Project Management Services

## 1.0 GENERAL

### 1.1 SCOPE OF WORK

Work includes, but is not limited to, providing consulting and project management services, on-site consultation and supervision, and Heijunka (平準化) simulation software support. Thus, we provide professional afforestation services to establish a forest using Miyawaki Method:

In general the work includes

- Afforestation consulting and project management
- On-site consultation and supervision
- Project management and reporting
- Growth monitoring and reporting

## 2.0 Work

### Afforestation Consulting Services:

- 2.1 Soil survey
- 2.2 Soil testing
- 2.3 Selection of biomass for soil conditioning based on soil strata
- 2.4 Calculation of quantified biomass requirement for every 100 Sq Meters
- 2.5 Quality inspection of the biomass ingredient material at source
- 2.6 Native species survey
- 2.7 Native species database development and management
- 2.8 Assigning the forest type based on client's requirement
- 2.9 Selection of species based on soil strata and conditioning
- 2.10 Making of a quantified species list with fixed ratios for every 100 Sq Meters
- 2.11 Quality, size and age inspection of saplings to be used for afforestation
- 2.12 Generate Heijunka (平準化) simulation for arrangement of saplings on the afforestation mound

### **Afforestation Project Management Services**

- 2.13 On-site quality inspection of biomass mix preparation
- 2.14 On-site quality inspection of mound making
- 2.15 On-Site plantation supervision and project schedule management
- 2.16 Selection of mulching material
- 2.17 Quality inspection of mulching material at the source
- 2.18 Obeya Setup for project management, project progress monitoring and KPI management for forest growth and maintenance
- 2.19 Excavation supervision
- 2.20 Mound-making supervision
- 2.21 Conducting plantation with labour/volunteers
- 2.22 On-site mulching supervision
- 2.23 Giving maintenance training to the maintenance staff

### **Forest Maintenance Management and growth monitoring services:**

- 2.24 Monthly growth monitoring using Height as KPI
- 2.25 Monthly growth monitoring using Girth as KPI
- 2.26 Monthly survival rate monitoring in percentage
- 2.27 Updating KPIs in Obeya
- 2.28 Generate monthly maintenance report

## **2.1 Soil survey**

- Collection of 3 soil samples at 3 locations, Viz.: Surface, depth of 1 meter, depth of 3 meters
- Survey of soil strata i.e. studying of the soil type and rock content
- Collection of rock samples for hardness and mineral content check



## **2.2 Soil Testing**

- Soil is tested to check the Nitrogen, Phosphorus and Potassium content; this is to determine the type and ratio of biomass ingredients to be added.
- Cation exchange capacity (CEC): CEC is the capacity of the soil to hold and exchange cations. It is a major controlling agent of stability of soil structure, nutrient availability for plant growth, soil pH and soil's reaction to chemical fertilisers and other amendments.

- Soil organic matter (SOM): Carbon based matter of animal and plant origin which is present in the soil in all stages of decomposition.

Sample Soil test report:

Parameters	Sample – 1	Sample – 2	Sample - 3
pH	6.06	6.14	6.23
EC	0.142	0.08	0.09
CEC	7	7	12
Exchangeable Sodium %age	3.2	2	3.8
Nitrogen [ppm]	285	357	268
Phosphorous [ppm]	15.9	23.29	29.53
Potassium [ppm]	214.5	268	178.6

### 2.3 Selection of Biomass:

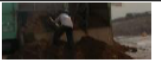




- Based on the soil testing report, appropriate biomass will be selected to be used for mixing into the soil. (Related pictures below)



### 2.4 Biomass calculation for every 100 Sq Mtrs. unit of afforestation:

- Based on analysis of nutrition content in the soil, the quantity of biomass required (in Kilograms) is determined. Sample data below.

## Afforestation Project: Scope of Work

Material								
Sl	Raw material	Specification	Packing type	Quantity	Measurement Unit	Quality Standard	Remarks	Photo
1	Extra Soil	>Biomass rich. >Pours	Loose	23	Cubic meter (m <sup>3</sup> )	>No Plastics. >No rocks/pebbles. >Rich in biomass.	May be required or may be not. Fertile red soil is the best here.	
2	Coco Peat	>50 Kg Std. bags.	Bags	729	Kg	>Electrical conductivity <1 > Ph.= 6.5 to 7.5	The standard gardener's coco peat.	
3	Organic Manure	>Vermi Compost. >50 Kg Std bags.	Bags	525	Kg	>No Plastics. >Totally decayed matter. >Vermi compost (if required)	Vermi compost is the best here, if expensive regular manure is OK.	
4	Crop Husk	>18 Kg std biodegradable bags.	Bags	525	Kg	> No moisture content. >Bags should not be torn. >No rice seeds.	Rice, wheat or any other seasonal crop will do.	
5	Crop Straw	>64 kg pallets.	Pallet	700	Kg	>Palletized > No moisture content. >No rice seeds.	Rice straw is the best here. Long grass may also be used.	

### 2.5 Biomass inspection at Supplier:

- Before procurement it's essential to inspect the quality of the biomass at the source i.e. the supplier. Due to seasonal factors, biomass quality may differ from time to time.

### 2.6 Native Species survey:

- Native species of the area are to be determined by surveying a natural forest nearby or by recording the naturally growing species individually or in clusters.



### 2.7 Native Species Database:

- All the species identified in the survey are recorded in a local species database. This database is the source of the species list generated for each mound (1 mound = afforestation area of 100 Sq Mtrs.)

Sample database:

Species list for Urban Afforestation in Gwalior Region			
Sl	Hindi Tree Name	Botanical Name	Description
1	अंजन	Hardwickia binata	Anjan is a medium or large deciduous ornamental tree.
2	अमरुद	Psidium guajava	One of the most gregarious of fruit trees. The fruit, exuding a strong, sweet, musky odor when ripe, may be round, ovoid, or pear-
3	अमलताश	Cassia fistula	This native of India, is one of the most beautiful of all tropical trees. It has showy racemes, up to 2" long, with bright, yellow, fragrant
4	अरेठा (रीठा)	Sapindus mukorossi	It is a deciduous tree, growing to 25 m tall. Reetha leaves are long stalked odd pinnate. The fruit appears in July-August and ripens by
5	अर्जुन	Terminalia arjuna	In Indian mythology, Arjun is supposed to be Sita's favourite tree. Arjuna is a large, evergreen tree, with a spreading crown and
6	आंवला	Phyllanthus emblica	Amla is a small to medium sized deciduous tree, which is known for its edible fruit of the same name. Ripening in autumn, the taste of
7	आचार	Buchanania lanzan	Chironji Tree is a medium-sized deciduous tree, growing to about 50 ft tall. It bears fruits each containing a single seed, which is
8	आम	Mangifera indica	Mango, one of the most celebrated of Indian fruits. Nearly evergreen, alternate leaves are borne mainly in rosettes at the tips of the
9	इमली	Tamarindus indica	Tamarind is very much used in cooking in India, particularly in the south. It was introduced into India so long ago that it has often
10	कचनार	Bauhinia variegata	Orchid tree is staggeringly beautiful when in bloom - and it blooms for several months! The blooming period then lasts until early
11	कटहल	Artocarpus heterophyllus	The tree is handsome and stately, 30-70 ft tall, with evergreen, alternate, glossy, somewhat leathery leaves. When fully ripe, the
12	कदम्ब	Neolamarckia cadamba	In Hindu mythology, Kadam was the favourite tree of Krishna. The fruits are small capsules, packed closely together to form a fleshy,
13	कनेर	Nerium oleander	The plants are almost free from pests and diseases and untouched by cattle and goats, due to their toxicity. In India they are thus the
14	कबाट (शोणभ apple)	Aegle marmelos	The fruit is eaten fresh or dried. The juice is strained and sweetened to make a Sharbat. Its a sacred tree, dedicated to Lord Shiva.
15	करंज	Pongamia pinnata	The tree is well suited to intense heat and sunlight and its dense network of lateral roots and its thick, long taproot make it drought
16	करींदा	Carissa carandas	Fruits usually occur in clusters somewhat resembling large purple grapes. Fruit quality is excellent in this author's opinion, somewhat
17	कुभी		
18	कुल्लू	Sterculia urens	Trees exude gum karaya used in foodstuffs as emulsifiers, stabilizers and thickeners. Seeds are eaten after roasting. Seeds and young
19	कुसुम	Schleichera oleosa	Kusum is a beautiful tree with a broad, shady crown, found widespread in India. This tree is mostly noticed because of its bright red
20	खमार	Gmelina arborea	It is a fast growing tree, which though grows on different localities. The plant is recommended in combination with other drugs for
21	खिरनी	Manilkara hexandra	Ceylon Iron Wood is a tree or a shrub, 3-12 m tall, with gray bark and smooth branchlets. Alternately arranged leaves are often
22	खेर	Acacia catechu	Cutch tree is a small tree, growing 3-15 m high. The stem is dark brown to black, with rough bark which peels off in long strips in
23	गूलर	Ficus racemosa	Goolar is an attractive fig tree with a crooked trunk and a spreading crown. The most distinctive aspect of this tree is the red, furry
24	चन्दन	Santalum album	Sandalwood is an evergreen tree. The trees have a long life, and may live up to one hundred years of age. Fruit is produced after three
25	चितवन	Alstonia scholaris	This elegant evergreen tree is found in most parts of India. Its is commonly known as the Devil Tree, as it is considered to be the
26	चिरौल	Holoptelea integrifolia	Indian Elm is a large deciduous tree, growing up to 18 m tall. It has grey bark, covered with blisters, peeling in corky scales on old trees.
27	जामुन	Syzygium cumini	Indian mythology describes the Indian subcontinent as an island, 'situated in the centre of the world', called Jambudweep. The fruit

## 2.8 Assigning the forest type:

- The type of forest to be grown is based on the client's needs. The following customisations can be done:
  - Natural fruit forests
  - Bird attracting
  - Wild deciduous/evergreen
  - Seasonal flowering forests

## 2.9 Selection of species for each mound:

- Species for plantation are selected using the native species database. The selection is based on the ability of their roots to penetrate into the soil strata of the mound.

## 2.10 Assigning ratios to species:

- Ratios are assigned to each species based on its individual characteristics and merits



Species List PM018-M001-A			Affores 木木	
Sl	Botanical Name (学名)	Common Tree Name (地方名)	Percentage	Quantity
1	Azadirachta indica	Bevu, neem	8	24
2	Bauhinia racemosa	Banne, Basavanapada	8	24
3	Mangifera indica	Mavu	8	24
4	Pterocarpus marsupium	Honne, Bijasal	8	24
5	Terminalia arjuna	Thoramathi, Neermathi, Holemathi	8	24
6	Garcinia indica	Punarpuli, Wild mangosteen	5	15
7	Tectona grandis	Saguvani, Tega, Teak	4	12
8	Mangosteen	Garcinia mangostana	4	12

### 2.11 Sapling inspection at the source:

- Saplings will be inspected before being moved to the site to ensure that quality, health, height and age standards are met. Proper arrangement/segregation needs to happen at the source.



### 2.12 Heijunka (平準化) Simulation:

- The procured saplings will be assigned planting positions on the mound using Heijunka simulator software. Positions are assigned based on the synergistic integration of the species.

Sample list with plantation serial numbers assigned using the simulator software.

Plant List			Plantation Cluster									
Sl	Local Name	Botanical name	1	2	3	4	5	6	7	8	9	10
6	Naag Sampige	Michelia nilagirica	0	0		0	0	0	0		0	0
8	Neem (Bevu)	Azadirachta indica		0		0		0		0		0
10	Sampige	Michelia Champak		0		0		0		0		0
12	Teak	Tectona Grandis		0		0		0			0	
15	Tare	Terminalia Chebula		0			0			0		
17	Basvan Padu	Bahumia Resemosa		0			0			0		

### 2.13 Biomass mix preparation monitoring:

- Ensuring that the right quantities are mixed
- Ensuring that impurities are removed
- Ensuring thorough mixing



### 2.14 Mound preparation monitoring:

- Ensuring that the mound soil and biomass are uniformly mixed
- Ensuring that the mound surface is prepared for plantation



### 2.15 Plantation supervision and schedule management:

- Training the volunteers/labourers in proper sapling handling and plantation
- Ensuring the plantation methodology is strictly followed on-site

### 2.16 Selection of mulching material

### 2.17 Quality inspection of mulching material at the source:

- Ensuring quality mulch that is locally available is procured



### 2.18 Obeya set-up and project management:

- Master schedule preparation and monitoring
- Project progress management

## Afforestation Project: Scope of Work

- Project progress reporting and documentation



### 2.19 Excavation supervision

- Ensuring that the earth digging is done as per standards set



### 2.20 Mound-making supervision



### 2.21 Conducting plantation with labourers/volunteers



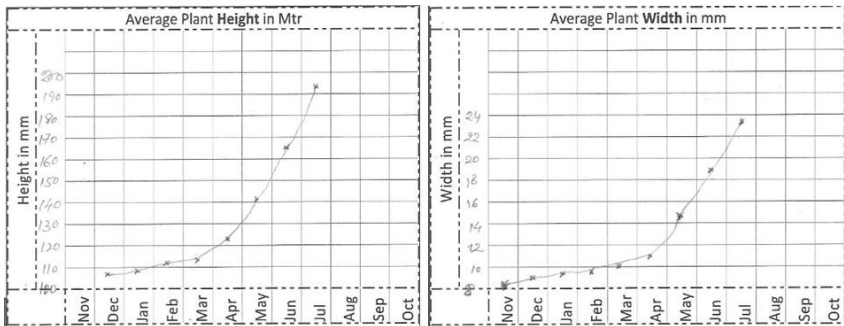
2.22 Supervising mulching work



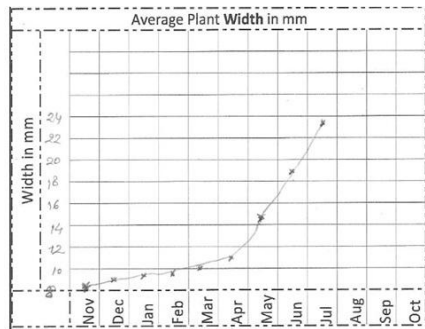
2.23 Maintenance training to the maintenance staff



2.24Monthly growth monitoring using Height as KPI



2.25Monthly growth monitoring using Girth as KPI



2.26Monthly survival rate monitoring in percentage



## 2.27 Updating KPIs in Obeya

## 2.28 Generate monthly maintenance reports

