Best Practice 1

1. **Title of the Practice**

The Miyawaki Method for Creating Mini Forest at Yogi Vemana University Campus (Largest area of plantation in India in this method)

2. **Objectives of the Practice**

   1. To develop and conserve the complex & diverse life forms to co-exist in natural forests (includes not just plants but also birds, insects and soil fauna) in local conditions.
   2. To enhance biodiversity, conservation and carbon sequestration.
   3. To study the adaptability of various tree species to local agro climatic conditions.
   4. To study spatial distribution and interspecific associations of tree species.
   5. Students has to learn the forest development in the campus

3. **The Context**

Dr. Akira Miyawaki (29th January 1928–16th July 2021) is a Japanese Botanist and expert in plant ecology and specialist in the restoration of natural vegetation on degraded land. In this method planting different type of tree species close together in a small trench. He was professor emeritus at Yokohama National University and director of the Japanese Center for International Studies in Ecology since 1993. He received the Blue Planet Prize in 2006. Restored forests can benefit biodiversity, conservation and carbon sequestration, but restoration is a long and difficult process. The Miyawaki technique is a unique methodology proven to work worldwide, irrespective of soil agro climatic conditions. A completely chemical free forest in an organic way that sustains itself, supports local biodiversity, and attracts birds and insects. Miyawaki proposed a plan to restore native forests for environmental protection, water retention, and protection against natural hazards. The Miyawaki method of reconstitution of "indigenous forests by indigenous trees" produces a rich, dense and efficient protective pioneer forest in short periods (20 to 30 years), where natural succession would need 200 to 500 years.

4. **The Practice**

An innovative reforestation technique has been used successfully to restore patches of forest in bare soils of Yogi Vemana University campus where traditional reforestation methods have previously failed. In the campus 10 acres of degraded land near Botanical Garden of Yogi Vemana University has been selected for Miyawaki method of plantation. The method of Plantation raised during the year 2019 under Miyawaki method, planted

1,06,400 saplings covering 25 indigenous plant species of all canopy layers in Yogi Vemana University, Kadapa, Andhra Pradesh under MGNREGS.
This is the largest area of Miyawaki Plantation in India

THE METHOD OF PLANTATION INVOLVES

Stage 1:

- Rigorous initial site survey and research of potential natural vegetation
- Identification and collecting of a large number of various native seeds, locally or nearby and in a comparable geo-climatic context
- Germination in a local nursery
- Plantations respecting biodiversity inspired by the model of the natural forest. A dense plantation of very young seedlings is recommended. Density aims at stirring competition between species and the onset of phytosociological relations close to what would happen in nature.
- Plantations randomly distributed in space in the way plants are distributed in a clearing or at the edge of the natural forest, not in rows or staggered.

Stage 2:

- 200 No's trenches were dugout. Each trench to trench 1 Mt space is given and each trench size 60 mts length, 2mts width and 0.60 mts depth.
- The inspection paths are formed.
- Total area of the plantation was fenced with chain link fencing with precasted poles effectively.
- The trenches Earth Re-filled with Vermicompost, Rice husk and cocopeat.
- Pipelines connected with sintex tanks were established for effective watering to the plants.
- 532 plants of 25 species were planted in each trench, covering all canopy layers such as top canopy layer, tree canopy layer, sub-tree canopy layerand shrub canopy layer of all type of plants like flowering plants, fruit bearing plants, aesthetic and timber yielding plants. All the species are indigenous.
- Spreading of paddy straw (Mulching) on the covered soil.
- Watering, weeding and other cultural operations one watch and ward is provided for 20 trenches.

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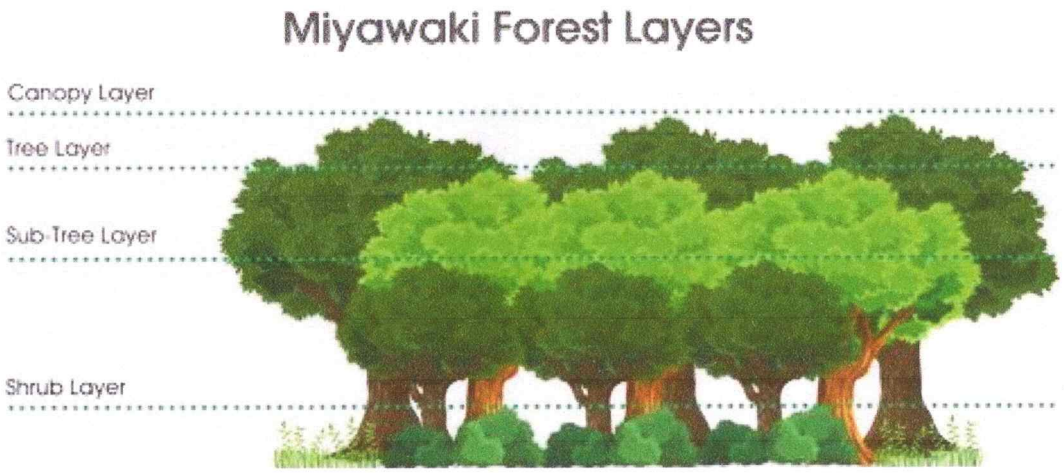

Miyawaki method of Multilayer, multispecies forests

5. Evidence of Success

Miyawaki method of Plantation site at Yogi Vemana University Campus

Land Preparation

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Miyawaki method of Plantation

GREEN | PRINT **Kadapa social forestry department uses Miyawaki method for afforestation**

Mini forest raised in 9 months at varsity

NAGESWARA RAO BALLEDA | DC
KADAPA, OCT. 19

A mini Miyawaki forest has been grown over 10 acres of land on the Yogi Vemana University campus by its botany department in just nine months utilising funds from the National Rural Employment Guarantee Scheme (MNREGS).

With the initiative of Kadapa district social forestry department, saplings of red sandal, bustard teak, Indian gooseberry, Arjuna (maddi), pongam, sacred fig, parijatam, Indian rosewood, pomegranate, guava, and so on, have grown very quickly, creating a pleasant atmosphere within the university.

The Miyawaki method of afforestation was introduced by the Japanese botanist Akira Miyawaki to grow forests double-quick. It is designed to prevent air pollution by growing more plants in a small area for generating oxygen. The plantation on Yogi Vemana University campus, stated to be the largest in the country, was taken up by its botany department in December 2019 in collaboration with the social forestry department.

- **THE AVERAGE** number trees required per head in the world are 422.
- **COUNTRY-WISE TREES PER HEAD ARE:** India: 28, the UK: 47; China: 130, Ethiopia: 143, France: 203, the US: 699; Australia: 3,266; Greenland: 4,964.
- **THE MIYAWAKI** method of afforestation was introduced by the Japanese botanist Akira Miyawaki to grow forests double-quick. It is designed to prevent air pollution by growing more plants in a small area for generating oxygen.

The project benefited labour too by wages amounting to ₹70 lakh under the MNREGS. Saplings have been planted over an extent of 10 acres with vermi compost, cow dung and urine mixture, cocoa peat, and organic fertilisers. A separate bore well was drilled specifically to water this forest. It has delivered excellent results within just nine months.

Speaking to Deccan Chronicle, divisional forest officer (social forestry) Bondala Nagaraju said that 1.06 lakh saplings have been planted by the department. The soil is salty. As many as 200 trenches were dug and 532 seedlings planted in each trench. In just nine months, the plants have grown into thick vegetation, where biodiversity is thriving.

Vice Chancellor Munagala Surya Kalavati said that the university has a total of two lakh plants including those cultivated under the Miyawaki method. This is providing plenty of oxygen for students on the campus. Madhusudan Reddy, an assistant professor with the university's botany department, said 25-30 varieties of plants have been planted here. Some of the plants have already grown to a height of 10 feet.

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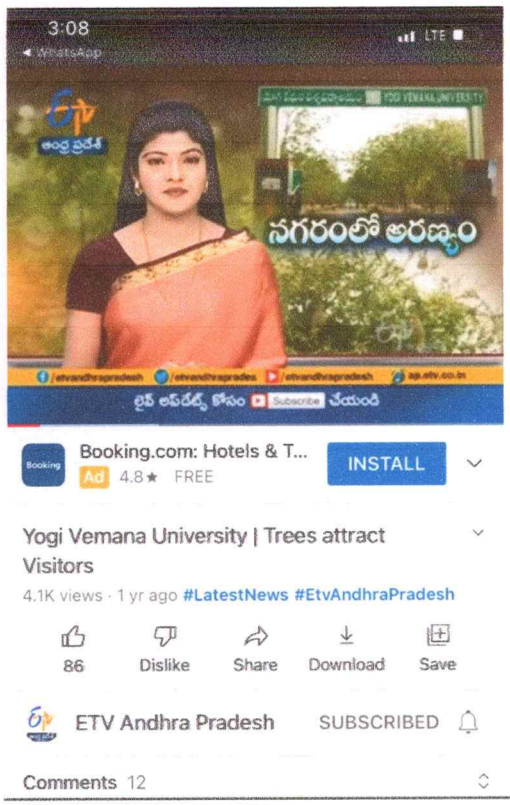

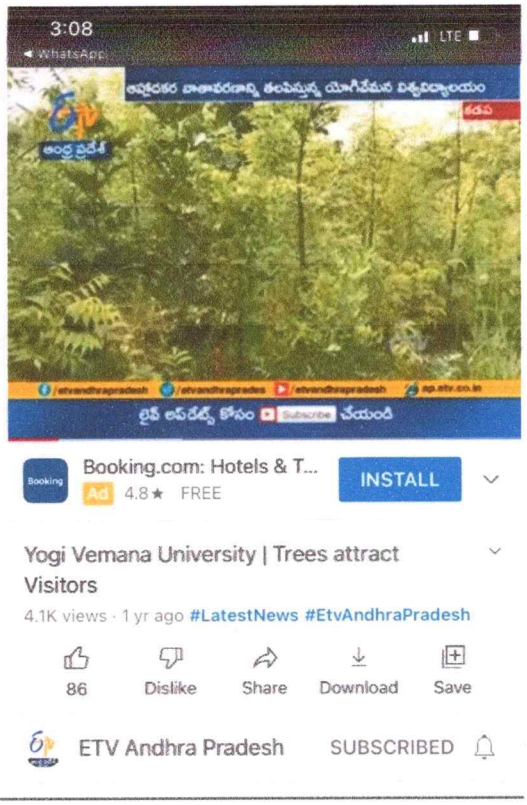

The following plants are planted in each trench (532 No's):

I. Top canopy layer

Sl.No.	Local Name	Botanical Name	Family
1	Vepa	*Azadirachta indica*	Meliaceae
2	Raavi	*Ficus religiosa*	Moraceae
3	Naarepi	*Hardwickiabinata*	Fabaceae
4	Neredu	*Syzygiumcumini*	Myrtaceae
5	Tellamaddi	*Terminalia arjuna*	Combretaceae
6	Vippa	*Madhuca indica*	Sapotaceae

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II. Tree Layer

Sl.No.	Local Name	Botanical Name	Family
7	Yerrachandhanam	*Pterocarpus santalinus*	Fabaceae
8	Chintha	*Tamarindus indica*	Fabaceae
9	Yegisa	*Pterocarpus marsupium*	Fabaceae
10	Jitregi/Rosewood	*Dalbergia latifolia*	Fabaceae
11	Velaga	*Limoniaacidissima*	Rutaceae
12	Gangaraavi	*Thespesia populnea*	Malvaceae
13	Spathodea	*Spathodeacampanulata*	Bignoniaceae

III. Sub Tree Layer

Sl.No.	Local Name	Botanical Name	Family
14	Rela	*Cassia fistula*	Fabaceae
15	Maredu	*Aegle marmelos*	Rutaceae
16	Neeruddhi	*Dolichandrone atrovirens*	Bignoniaceae
17	Devakachanam	*Bauhinia purpurea*	Fabaceae
18	Usiri	*Phyllanthus emblica*	Phyllanthaceae
19	Jama	*Psidium guajava*	Myrtaceae
20	Tebebuia	*Tabebuia rosea*	Bignoniaceae
21	Kanuga	*Pongamia pinnata*	Fabaceae
22	Modhuga	*Butea monosperma*	Fabaceae

IV. Shrub Layer

Sl.No.	Local Name	Botanical Name	Family
23	Sitapalam	*Annona squamosa*	Annonaceae
24	Dhanimma	*Punica granatum*	Lythraceae
25	Parijatham	*Nyctanthes arbor-tristis*	Nyctanthaceae/Oleaceae

6. Problems Encountered and Resources Required

- Faced problems, while collecting a large number of various native plants and seeds, locally or nearby and in a comparable geo-climatic context.

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- Problems faced while plantations randomly distributed in space in the way plants are distributed in a clearing or at the edge of the natural forest, not in rows or staggered.
- Digging of 200 No's trenches were difficult in degraded soil and Each trench to trench 1 Mt space is given and each trench size 60 mts length, 2mts width and 0.60 mts depth.
- Total area of the plantation was fenced with chain link fencing with precasted poles effectively also difficult and trenches Earth Re-filled with Vermicompost, Rice husk and cocopeat also cost.
- Water Pipelines connected with sintex tanks were established for effective watering to the plants costly. 532 plants of 25 species were planted in each trench is difficult, covering all canopy layers such as top canopy layer, tree canopy layer, sub-tree canopy layerand shrub canopy layer of all type of plants like flowering plants, fruit bearing plants, aesthetic and timber yielding plants and all the species are indigenous.
- In summer Watering, weeding and other cultural operations one watch and ward is provided for 20 trenches is difficult.

7. Notes (Optional)

An innovative reforestation technique has been used successfully to restore patches of forest in bare soils of Yogi Vemana University campus where traditional reforestation methods have previously failed. In the campus 10 acres of degraded land near Botanical Garden has been selected for Miyawaki method of plantation. The method of Plantation raised during year 2019 under Miyawaki method, planted 1,06,400 plants covering 25 indigenous plant species of all canopy layers in Yogi Vemana University, Kadapa, Andhra Pradesh under MGNREGS. This is the largest area of Miyawaki Plantation in India. NSS PO's, NSS Volunteers and other staff members were participated in this program.

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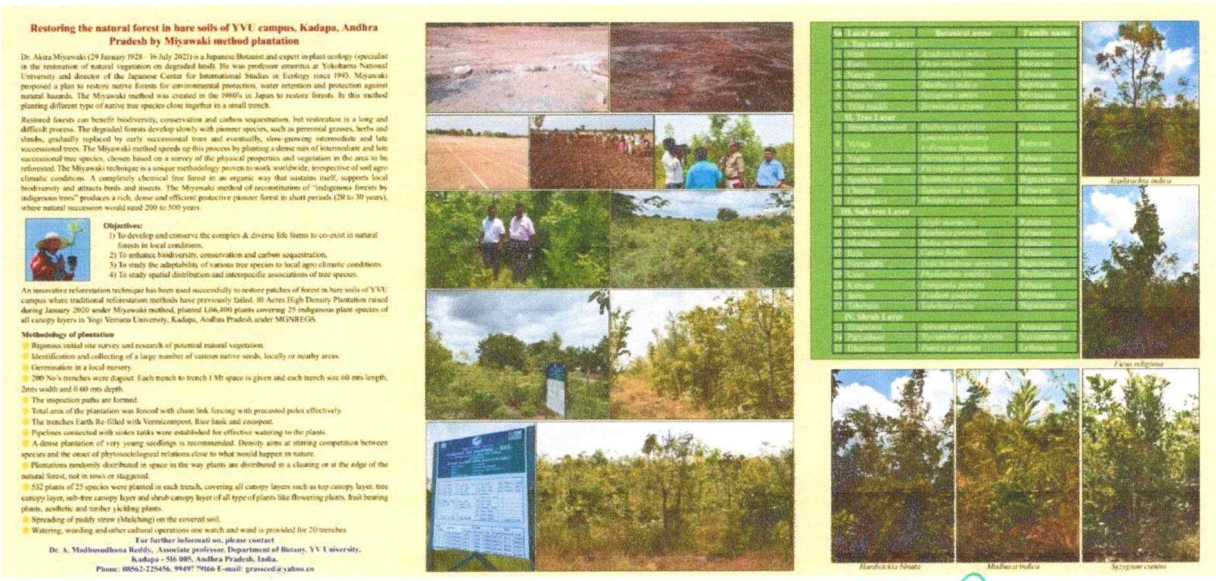

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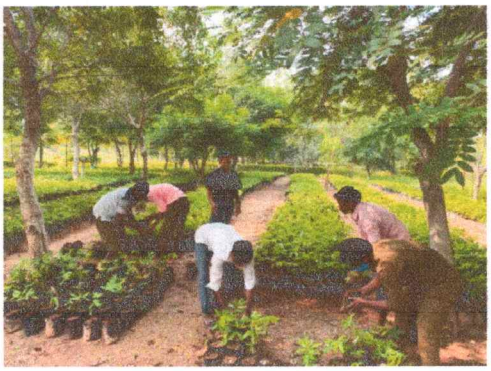
The Miyawaki method for creating mini forest at Yogi Vemana University



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