

Effectiveness of the Miyawaki Afforestation: A Case Study of NACONS Miyawaki Projects in the Sangli-SMKC of Maharashtra

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Abstract: Deforestation caused by agriculture, urbanization, industrialization and mining activities has become a major global environmental issue. The world has lost almost half of its tree cover since 1960s and India is not an exception to this. The disastrous effects of vegetation loss are evident in the form of increased carbon emission, global warming, melting glaciers, rising sea levels, flash floods, droughts, frequent forest fires and loss of biodiversity. It would be too late to restrict this, if we do not act now. Considering the gravity and urgency of the situation, team NACONS, Sangli has taken steps to contribute in the global attempt to restore the lost green cover. Projects of indigenous tree planting around urban and rural areas are frequently undertaken. In the last few years, conventional plantation has been supplemented with modern forest creation techniques such as 'Cluster Afforestation Method and Miyawaki Method'. Creation of such multiple 'Micro-habitats' is a small but significant step towards increasing the overall vegetation on earth.

An attempt has been made through this research paper to analyses the Miyawaki afforestation technique with the help of detailed case study of Miyawaki Projects developed by NACONS (Nature Conservation Society) in Sangli, Miraj & Kupwad Municipal Corporation (SMKC) of Maharashtra. Team NACONS have created and developed tiny Miyawaki forest at two places of Sangli-SMKC viz. Miraj, and Kupwad. Miyawaki Afforestation Technique has been successfully implemented by NACONS in various places of Sangli SMKC. It has several merits as well as limitations. Fast & dense forest growth, native biodiversity enhancement, carbon sequestration, community engagement and ecosystem services are the some major merits of the Miyawaki afforestation method. On the other hand, initial capital investment, appropriate selection of native species, monotonous nature and maintenance requirement for first three years are some concerned areas where work has to be done.

Keywords: Miyawaki Afforestation, Micro-habitats, Mini Forest, Indigenous Tree, Cluster Afforestation Method. Conventional Plantation, Modern Forest Creation Techniques

I. INTRODUCTION

Deforestation caused by agriculture practice, urbanization, industrialization, mining activities and growing needs of over population has become a major global environmental issue nowadays. Every year, the world has been losing 10 million hectares of forest since 2015 [UN, 2023]. The world has lost almost half of its tree cover since 1960s and India is not an exception to this. India has lost 19% of its forest cover in last 23 years [Geography Host, 2023]. The disastrous effects of deforestation are evident in the form of increased carbon emission, greenhouse effect, global warming, melting glaciers, rising sea levels, flash floods, droughts, frequent forest fires and loss of biodiversity. Therefore, there is huge need of afforestation, tree plantation in all over the world. In the last few years, conventional plantation has been supplemented or replaced with modern forest creation techniques such as 'Cluster Afforestation Method and Miyawaki Method'. Creation of such multiple 'Micro-habitats' is a small but significant step towards increasing the overall vegetation on earth.



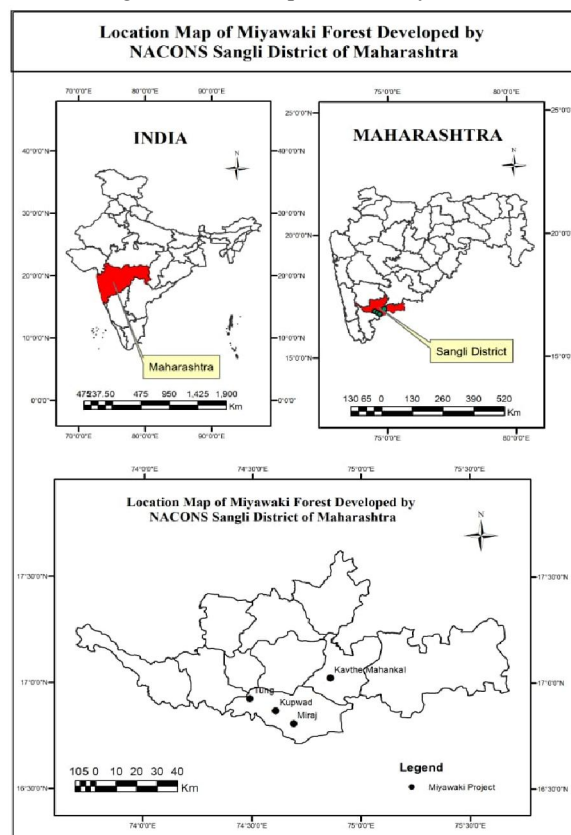
The Miyawaki Method is a technique for creating ultra-dense, fast-growing, native micro-forests in small areas, developed by Japanese botanist Dr. Akira Miyawaki. It involves planting native species at high densities (3-5 saplings/m²), resulting in forests that grow 10 times faster, are 30 times denser, and become self-sustaining within 2–3 years. Nowadays, major projects globally totalling hundreds of hectares, notably in Japan, India, and Europe. The world's largest Miyawaki forest is a 470-acre project in Kutch, Gujarat, India, with others found in Japan (Yokohama University), France, Belgium, and Australia

Considering the need and urgency of the situation, team NACONS (Nature Conservation Society) in Sangli District of Maharashtra has taken steps to contribute in the global attempt to restore the lost green cover. NACONS-Nature Conservation Society is a non-profit organization, which has been working for the cause of nature conservation and environmental protection since 2008. Projects of indigenous tree plantation around urban and rural areas of Sangli district have been frequently undertaken by NACONS. They have created and developed tiny Miyawaki forest at four places of rural and urban areas of Sangli district viz. Miraj, Nangole, Kupwad and Tung. In the present study an attempt has been made to analyses the Miyawaki afforestation technique with the help of detailed case study of Miyawaki Projects developed by NACONS (Nature Conservation Society) in Sangli, Miraj & Kupwad Municipal Corporation (SMKC) of Maharashtra namely at two places of Sangli-SMKC viz. Miraj, and Kupwad.

II. STUDY REGION

In the present study two places of Sangli-SMKC viz. Miraj, and Kupwad developed by NACONS (Nature Conservation Society) have been selected as study region to analyses the Miyawaki afforestation technique. These two places are located in the area of Sangli, Miraj & Kupwad Municipal Corporation (SMKC) of Maharashtra.

Fig.1 Location Map of the Study Area



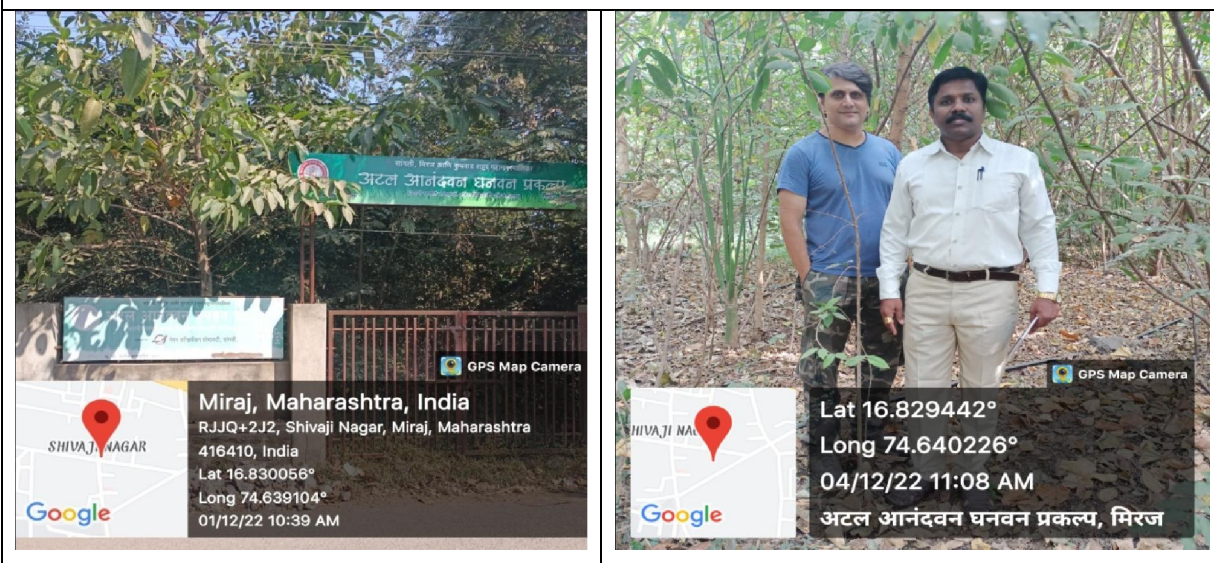
Objectives:

The prime objective of this research paper is to analyse the Miyawaki afforestation technique with the help of detailed case study of Miyawaki Projects developed by NACONS in Sangli (SMKC) of Maharashtra viz. Miraj and Kupwad and also to assess merits and demerits / limitations of Miyawaki afforestation.

III. DATA BASE & METHODOLOGY

The present work is based on primary as well as secondary source of information. Primary information has been collected by field visit to Miyawaki Project situated at Miraj and Kupwad and visual information observed during the visits. A detailed interview with Dr. Harshad Divekar- Vice President of NACONS Sangli has been conducted. Secondary information has been collected from books, research papers and website developed by NACONS. The case study research approach has been utilized to comprehend the implementation of the Miyawaki Method.

Photo Plate I Visit to Atal Aamand Ghanvan Project- Miraj by Researcher-Dr. R. L. Kore & Interview with Dr. Harshad Divekar, Vice President of NACONS Sangli



Findings:

The procedure for growing the Miyawaki forest is as below:

- Understand the texture of the soil so that the required corrective materials can be added.
- Identify native species of different heights (trees and shrubs)
- Provide for water pipes and bore wells or any other source of water
- Excavate the soil up to 3-4 feet, mix the dug out soil with cereal husk, coco peat, cow urine, and vermin compost and refill the area.
- Make pits, about 3 in one square meter area. Put one sapling in each pit.
- Apply about half a kilo of mulch to each tree.
- Water the saplings immediately and thereafter daily in the morning or evening.
- Take the care of saplings for at least three years.



Case Study: Atal Aanand Ghanvan Project- Miraj

The first Miyawaki forest created by NACONS is in Miraj, Sangli district of Maharashtra state. The project was executed on an open piece of land owned by Sangli, Miraj, Kupwad city Municipal corporation and was funded by the corporation itself. About 1550 saplings of indigenous trees were planted. The project was completed two years ago and eventually a dense, completely bio-diverse patch of urban forest has been developed at the site.



Photo Plate 2 Atal Aanand Ghanvan Project- Miraj

Case Study: Miyawaki Forest, Kupwad

NACONS third Miyawaki forest has been created in Kupwad MIDC, Dist- Sangli of Maharashtra state. The project was executed in botanical garden of Nav-Krishna valley school, Kupwad and funded by Suraj foundation, Sangli. More than 700 saplings have been planted there and a patch of tiny dense forest has become visible within just 2-3 year.



Photo Plate 3 Miyawaki Forest, Kupwad

Floral Biodiversity:

All the two Miyawaki projects have more than 40 species of indigenous trees. Flowering in these forests has started within just one year. Many plants such as White leadwort (*Plumbago zeylanica*), Red leadwort (*Plumbago indica*), Jungle geranium (*Ixora coccinea*), Adulsa (*Justicia adhatoda*), Karavi (*Strobilanthes integrifolia*), Kachnar (*Bauhinia variegata*) are in full bloom during first flowering season.



Faunal Biodiversity:

Miyawaki forests created by NACONS are frequently visited by various types of insects, butterflies, birds and small mammals. They have recorded 10 species of beetles and bugs, 12 species of butterflies, 20 species of birds and 2 species of small mammals in these micro habitats.

Nesting by Birds:

They have recorded nests of Purple Sunbird (*Cinnyris asiaticus*), Red vented Bulbul (*Pycnonotus cafer*) and Euresian collared dove (*Streptopelia decaocto*) in their Miyawaki projects. Nesting was done within just two years after tree planting. It is a good sign of acceptance of their tiny forests by local wildlife.

Nesting by Honeybees:

Honeybees are one of the most prominent pollinators of Nature. Hence, honeybee nesting in any plantation project is the strongest indicator of success. They have recorded two nests made by Indian honeybees (*Apis cerana indica*) in tiny Miyawaki forests created by them.

IV. MERITS & DEMERITS OF MIYAWAKI FOREST

Merits

1. **Fast & Dense Forest Growth:** One of the main advantages of the Miyawaki and Mini Forest concepts are their ability to promote fast and dense forest growth. By densely planting a variety of native species in a small area, the technique encourages competition among plants, leading to accelerated growth rates compared to traditional reforestation methods.
2. **Native Biodiversity Enhancement:** The methods prioritize the use of native plant species, which helps restore and preserve local biodiversity. By recreating natural ecosystems, these reforested areas can provide habitats for a wide range of flora and fauna, supporting ecosystem services such as pollination and soil health.
3. **Carbon Sequestration:** Mature forests are important carbon sinks, absorbing and storing large amounts of carbon dioxide from the atmosphere. By rapidly establishing dense forests, the concepts have the potential to contribute significantly to carbon sequestration efforts, helping mitigate climate change.
4. **Community Engagement:** Miyawaki and Tiny Forest projects often involve local communities, fostering environmental awareness, and ownership of green spaces.
5. **Ecosystem Services:** These miniature forests contribute to air purification, carbon sequestration, and storm water management, enhancing urban environmental quality.

Demerits / Limitations:

1. **Initial Capital Investment:** Implementing the Miyawaki Forest method can require significant resources, including labour, materials, land and energy which may pose logistical and financial challenges.
2. **Applicability Concerns:** Some practitioners question the methods' applicability in diverse ecological environments, e.g. arid areas, emphasizing the importance of context-specific approaches to afforestation and restoration.
3. **Maintenance Requirements:** Sustaining healthy Miyawaki Forests requires on-going management, including weeding, pruning, and monitoring for pests and diseases for first three years.
4. **Appropriate Native Species Selection:** Choosing appropriate native species for Miyawaki Forests is crucial to their success, considering factors such as soil conditions, climate suitability, and wildlife habitat needs.
5. **Monotonous Nature:** This method has also been criticised due to its monotonous nature since all the trees are in same age in this mini forest.



V. CONCLUSION

After analysing the two projects developed by NACONS in Sangli district of Maharashtra viz. Miraj and Kupwad, it may be concluded that Miyawaki method has been successfully implemented by NACONS in Sangli- SMKC. All these projects have been developed with the help of Municipal Corporation, NGO or fund received from any other agency or person. It has several merits as well as demerits. Fast & dense forest growth, native biodiversity enhancement, carbon sequestration, community engagement and ecosystem services are the some major merits of the Miyawaki afforestation method. On the other hand, initial capital investment, appropriate selection of native species, monotonous nature and maintenance requirement for first three years are some concerned areas where work has to be done by developer and planners.

REFERENCES

1. Alka Parikh & Aisha Nazrana (2023): Analysis of the Miyawaki Afforestation Technique, International Journal of Development Research, Vol.13, Issue, 10, pp.63913-63915, October, 2023
2. Bartolomeo Schirone, Antonello Salis & Federico Vessella (2011): Effectiveness of the Miyawaki method in Mediterranean forest restoration programs, Landscape Ecol Eng 7:81–92, DOI 10.1007/s11355-010-0117-0
3. Dhruv Harivallabhdas (2023): Achieving Urban Forest Restoration Using the Miyawaki Method: A Case Study of Sabarmati Oxygen Park, Ahmadabad, IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT), e-ISSN: 2319-2402, p- ISSN: 2319-2399. Volume 17, Issue 10 Ser. 2, PP 34-45
4. Geography Host (2023): Forest Cover in India– Important statistics <https://geographyhost.com/forest-cover-in-india-important-statistics/>.
5. <https://nacons.org/plantation-with-afforestation/>

