

DEPARTMENT OF BOTANY

STUDENT STUDY PROJECT

**Miyawaki Method: An innovative approach to
increase green cover in urban areas**



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Student Project Title:

Miyawaki Method: An innovative approach to increase green cover in urban areas

Abstract:

Especially in fast-developing economies (like India and China), rapid urbanisation, population expansion, and rural-to-urban migration have led to a rapid loss of forest cover and green space in numerous urban areas across the world. According to recent statistics, Delhi, the capital of India, only has a green cover of 20.6% and is experiencing a decline in the number of dense and extremely dense forests. In fact, when it comes to the magnitude of the loss of tree cover, India is among the top big nations. This is a worrying condition that is not good for the ecosystem or people's health in general. There is a need for immediate and long-term action to stop the loss of green space in most major metropolitan areas.

The concept of the Miyawaki forest offers a special remedy among the many suggestions made for slowing the rapid loss in the amount of green cover. The Miyawaki forest, created by renowned Japanese botanist Akira Miyawaki, is a quick, low-tech, low-maintenance way to quickly reestablish native plants on disturbed ground. Such forests may be cultivated by anyone using straightforward techniques, and it usually takes about a year to get a lush, green forest with local plants. Miyawaki forests have been successfully developed in a number of enterprises and cities to increase tree cover and improve the environment.

India has also successfully experimented with Miyawaki forests, and a number of start-ups assist people and organisations in establishing Miyawaki forests on their property. However, a large-scale implementation of this technique to boost the deteriorating air quality has not yet been tried. The concept of Miyawaki forest, its benefits, and the potential for its widespread use in India are discussed in the current paper. Its deployment's potential problems and potential fixes are also discussed. It is anticipated that Miyawaki forests will be able to stop the loss of trees, improve the environment, and boost air quality.

Key Words: Green cover, Ecosystem, Air quality, Environment, well-being

Introduction

Rapid urban environment degradation is a typical occurrence in economies that are developing quickly, leaving the locals craving for fresh air. Only a few days a year can be considered to have high air quality in Delhi, India, a prime illustration of this. The amount of greenery in Delhi and the majority of the other major Indian cities has dramatically decreased as a result of the overuse of vegetated fields for urbanisation. Rapid solutions are needed to address the associated health problems and environmental deterioration while maintaining economic and infrastructure development.

Unfortunately, trees and forests develop somewhat slowly, but the urgent need is for solutions that move quickly. Conventional forests can take decades or even centuries to develop, though many circumstances (such as, but not limited to, environmental conditions, little or no human influence, etc.) can speed up this process.

However, cities are running out of time to give inhabitants healthier air. In metropolitan areas, it is urgently necessary to restore degraded grounds. Miyawaki forests, which bear Dr. Akira Miyawaki's name, are a novel and (relatively) quick form of land regeneration. Throughout Japan, this technique has been utilised to restore trees and greenery in numerous locales. Additionally, it has produced encouraging outcomes in other regions of Asia.

This approach is based on identifying and growing native species in specific regions. Non-native plants that are typically introduced to provide green space or for other purposes have more stringent nutritional and environmental requirements. Such seeds therefore require more care and resources and have a slower growth rate. Local species are already accustomed to local soils and environmental conditions, so they have the opportunity to grow better and faster. The Miyawaki method takes advantage of the important advantages of this native vegetation. It is important to ensure conservation Planner for Conservation of Biology.

This technology supports the growth of dense mixed primary forests, yielding primary forest ecosystems such as small animals, rodents and birds. Diversity in natural forests is created by natural selection through competition between different types of native species. This method mainly supports the growth of crown trees. Different types of native seedlings (with extensive root systems) are randomly planted to match the natural forest system. Generally, growth rates of more than one meter per year are observed, ultimately leading to a complete, mixed and unique forest ecology within a few years rather than the decades (centuries) required by other planting systems.

The ability of plants to consume carbon dioxide and produce oxygen in the process of photosynthesis is widely considered to be the best deterrent to global warming. And the Miyawaki forest has the potential to act as a carbon sink for our cities, minimizing global warming. The purpose of the current work is to provide a quick overview of the Miyawaki forests technique, including its benefits, drawbacks, and potential solutions.

Health Effects of Air Pollution in Urban Environments:

The World Health Organization found that when population increases, global temperatures rise.

Despite the fact that half of the world lacks access to clean fuels or technologies, engines continue to emit harmful emissions. Air we breathe is becoming dangerously contaminated.

Nine people out of 10 today breathe filthy air. Although there are many diverse emissions sources that contribute to air pollution, motor vehicles and industrial processes are the main offenders. The health of the exposed population might be negatively impacted by ambient air pollution. Exposure to pollutants like ozone and particulate matter in the air has also been linked to an increase in hospital admissions. Studies conducted in the short term reveal effects.

The gradual alteration in the composition of the atmosphere is caused by the combustion of fossil fuels. Air pollution also has a number of negative consequences on health, such as increased risk of heart disease, lung cancer, and stroke. Even if you live in a luxury region, it is difficult to escape air pollution from the surroundings. The study demonstrated that exposure to the natural environment had an independent impact on health and behaviour related to healthy living. Pollutants that are too small to see can enter our respiratory and circulatory systems deeply. It harms our heart, brain, and lungs. The effect of international air pollution on the climate and environment is the current area of emphasis in atmospheric research. The absence of visibility makes it abundantly evident that the air is unhealthy. Toxic contaminants can be found in the air all around the world, and they exceed the recommended yearly average levels.

where harmful technologies and fuels are regularly utilised, especially at home for cooking, heating, and lighting. The most vulnerable groups are women and kids, who tend to spend more time indoors. Additionally, it harms the ecosystem over time and poses a serious risk to people's health and wellbeing.

The cost-effective solution to the problem of urban air pollution, which is becoming more of a concern in many places, is to plant trees. While the cooling effect is 2 degrees Celsius, the average reduction in particle matter near trees was between 7% and 24%. People who reside in urban areas already benefited greatly from trees. Inefficient energy generation, distribution, and usage, particularly in the industrial, transportation, and building sectors, as well as a deficient waste management system, are the main causes of air pollution in 2016, according to the WHO Health Statistics.

Advantages and disadvantages of Miyawaki Forest

The identification of local plant species is one of the foundations of the Miyawaki forest approach. A thorough field survey is required to identify the type of vegetation for this purpose.

Along with the phytosociological survey and environmental description, there is a field survey. It is crucial to look into how basic soil qualities, lighting conditions, and environmental factors affect seedling survival in three types of degraded vegetation. Studying and categorising the vegetation in the area, it is determined whether it is native or substitute flora (PNV). The prospective natural vegetation is then determined for restoration purposes by comparing this data to the actual vegetation present at the site of interest. Each unit of species combinations makes up the potential natural vegetation. The seeds of the potential natural vegetation are collected and planted after being recognised.




These are let to establish their root systems completely while growing in pots. By doing this, the challenges of transplanting bare seedlings of natural vegetation are removed. The seedlings from the pots are then combined with comparable seedlings from different types of natural plants and planted in a dense yet random pattern. To guarantee a truly natural vegetation, this is done. To lessen the soil dryness, the degraded area may need to be treated by mulching with rice straw and other comparable organic materials (of agricultural sources). Other benefits include defence against cold and the ability of the employed organic components to fertilise the soil (particularly on steep slopes and during extreme precipitation events). Weeding may be required once or twice in the first few years of the growth phase. Another source of mulch is the grass that has been weeded. Natural selection eventually prevails, and a dense, mixed, native forest develops over time. The results include extensive natural woods teeming with local wildlife like birds, insects, squirrels, etc. Numerous sites have recorded growth rates of roughly one metre per year. The method has been employed at a few places in India and is growing in popularity. Several startups are attempting to popularise this technique and make it accessible to those who are interested people or organisations. These include Saytrees, Banyan Nation, Digital Green, Waste Ventures, and others.

Miyawaki woods provide a number of benefits over traditional forests, such as quick land restoration, the formation of a whole ecosystem (rather than just plants), a great deal faster growth of greens, little maintenance and care, low cost, etc. The drawbacks include the need for extensive field surveys (in the event that potential native vegetation is unknown), the need for a

large area of land (unlike vertical gardens), the high initial cost (for land preparation, survey, planting, etc.), and the somewhat uniform appearance brought on by the trees' similar ages.

Forests, not plantations.



- 1 Tree per 10 Sqmt
- Limited Varieties
- Single layered greenery
- Extensive maintenance
- Susceptible to pests and diseases

- 30 Trees per 10 Sqmt. (100 Sqft.)
- Minimum 50 different species.
- Multi layered green forest.
- Maintenance free.
- 100% organic, 'Zero' pesticides used.
- Natural biodiversity.

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Conclusion

Because of their capacity to provide oxygen, act as carbon sinks, provide shade, food, and wood, among other things, forests are essential to human life. However, human selfishness has caused a sharp decline in the amount of forest cover in several cities across the nation. Along with the loss of trees, this has also caused soil erosion and land degradation. Urban areas desperately need woods and to guarantee acceptable air quality, use vegetation. A viable alternative is the use of Miyawaki forests, a low-maintenance method that promotes the establishment of local plants. In Japan and some other Asian countries, the strategy has had great success.

In India, it hasn't really taken off yet. To achieve the restoration of our damaged lands and destroyed forests, government assistance, increased awareness, and cooperation from NGOs and other organisations are required. Miyawaki forests are anticipated to contribute to the expansion of the nation's forest cover and to the provision of a cleaner, better environment for both present and future generations.






THANK YOU



Miyawaki Forest




Why in news?

India has pledged to re-grow forest areas upto 33% of its land area. Miyawaki method provides a great opportunity to reach the target.

Criticism

- The cost of preparing the soil and land can be high.
- The number of saplings needed increases.
- Stress on fragile water resources of an area.




What is Miyawaki forest ?

- The Miyawaki method, also called the Potted Seedling Method, is an afforestation technique that uses native species to create dense, multilayered forests.
- It is an initiative to utilise available land and increase green cover in the city.

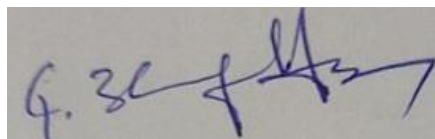
Benefits

- Lowering temperature
- Making soil nutritious
- Supporting local wildlife
- Sequestration of carbon
- Prevents water run-off
- Recharging groundwater


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