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# A REVIEW OF THE MIYAWAKI METHOD: KEY FINDINGS AND RECOMMENDATIONS

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## INTRODUCTION

The Miyawaki method is an innovative reforestation technique used to create compact, diverse, and self-sustaining native forests. It was pioneered by Japanese botanist Akira Miyawaki who believed that, at the current perpetually high records of environmental degradation, ecological restoration cannot afford to wait for the extensive succession processes to occur.

Compared with the decades needed for such processes to yield mature ecological systems, the Miyawaki method can reach climax species within 15 years of implementation. The technique is also distinguished by its community-based approach that engages citizens of all ages and professions in tree planting and environmental education, its lower maintenance cost compared to traditional techniques, and its plantation density which accelerates forest restoration to reach climax species.

The method is based on the theory of potential natural vegetation (PNV), which cultivates native species naturally present in ecosystems prior to human influence. “Native forests by native trees” constitutes the cornerstone of the Miyawaki technique as it lays the groundwork for the resistance of the built forest and its ultimate self-sustaining nature<sup>1</sup>.

This brief outlines the primary conclusions of a bibliographic review that provided a comprehensive overview of relevant research regarding the Miyawaki method and the benefits over the traditional reforestation techniques, identifying gaps in the literature that could inform future research and implementation.

## WHY IS THE MIYAWAKI TECHNIQUE NEEDED TODAY?

The Miyawaki method could present a promising approach towards addressing the multiple environmental crises we are currently facing. As greenhouse gas (GHG) emissions remain on the rise, severe economic, social, and environmental consequences are likely to be observed<sup>2</sup>. At our current trajectories, capping global warming at 1.5 °C has become unrealistic. This raises the need for rapid, efficient, and cost-effective climate mitigation efforts.

According to the Intergovernmental Panel on Climate Change (IPCC), reforestation and afforestation efforts are among the simplest and most practiced climate change mitigation options<sup>2</sup>. Such interventions are also crucial in tackling the alarming rates of deforestation of 10 million hectares per year<sup>3</sup>.

With environmental degradation at an all-time high, human interventions are needed to accelerate natural ecological succession processes as traditional methods of reforestation may require 200 years to reestablish mature ecological systems<sup>4</sup>. As such, innovative reforestation techniques that require significantly less time to reach climax species are needed, and one such alternative could be the Miyawaki method proposed by Professor Akira Miyawaki. According to its creator, the method enables the growth of a multilayered forest in 15-20 years, thus exhibiting additional benefits compared with traditional forests.

Accordingly, the Miyawaki method can be integrated into global forestation and climate change mitigation initiatives such as the Reducing Emissions from Deforestation and Forest Degradation (REDD+) program established by the United Nations<sup>5</sup>. The method could present a more efficient means of offsetting carbon emissions compared with traditional reforestation approaches, but further studies are still needed to establish such concrete findings. Also, the Miyawaki method can serve as a significant potential towards establishing and contributing to national reforestation policies and strategies.

### **NED University of Engineering and Technology in Pakistan found that compared to conventional plantations, Miyawaki forests<sup>6</sup>**

Grow 10 times faster

Are 100 times more biodiverse

Have 30 times greener surface area

Have 30 times more carbon sequestration capacity

Have 30 times better noise and dust reduction ability





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## WHAT ARE THE STEPS OF THE MIYAWAKI METHOD?<sup>4</sup>



**PNV ASSESSMENT:**  
identifying the physical conditions and native species of the area



**GERMINATION:**  
collecting seeds and seedlings and nurturing them in nurseries



**SITE PREPARATION:**  
preparing the planting site by loosening and amending the soil



**CULTIVATION:**  
dividing planting area into 1sqm plots and sowing 3 plants in each



**MAINTENANCE:**  
ensuring maintenance for 1-3 years based on key monitoring indicators

## WHAT DOES IT TAKE TO IMPLEMENT THE MIYAWAKI METHOD?



**CONSULT WITH EXPERTS**



**BUILD PARTNERSHIPS**



**SECURE FUNDING**



**MONITOR AND EVALUATE**

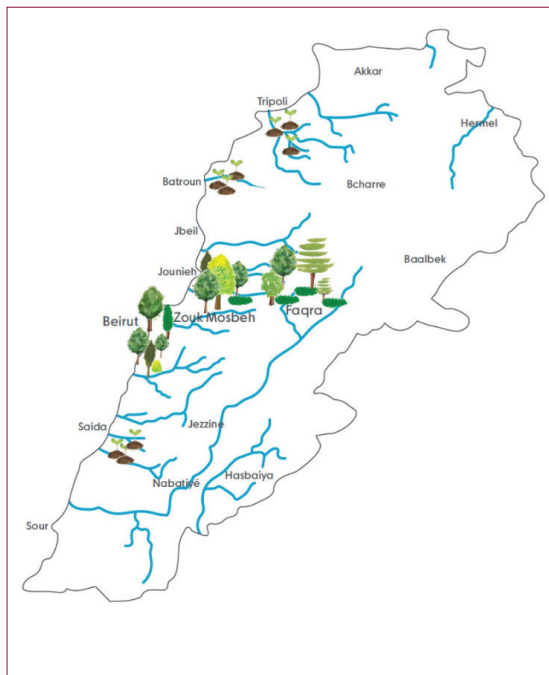


**ENGAGE CITIZENS**

## WHO'S WORKING ON MIYAWAKI IN LEBANON?

While [SUGI](#) and [Afforestt](#) are globally acknowledged experts implementing the Miyawaki method, it is essential to tailor the practices to the specific local context. [TheOtherDada](#), a regenerative consultancy and architecture firm, has successfully cultivated 11 Miyawaki forests in 4,038 sqm across Lebanon.

In Lebanon, the Miyawaki method presents a significant potential towards addressing environmental challenges in both urban and rural areas. In crowded cities, the method can be employed towards increasing forestation efforts in land-constraint areas. These mini-forests can serve as green lungs of urban areas by decreasing the levels of air pollution while also providing shade and reducing temperatures. Whereas in rural areas, the method can be employed to reduce soil erosion and to increase resilience to climate change.



Map of Miyawaki forests in Lebanon  
© theOtherDada



Transformation of the Beirut RiverLess Forest in 5 years  
© theOtherDada

## WHAT WERE THE FINDINGS OF THE REVIEW?

Our review presents an initial comprehensive examination of the Miyawaki method, offering an overview of the research conducted since its introduction. The methodology of the review entailed searching major databases for peer-reviewed published articles on the Miyawaki method. The key findings below could be helpful for both scholars looking to expand on previous work as well as stakeholders preparing to employ the Miyawaki technique.

### More effective climate mitigation potential

Miyawaki forests can present a significant potential for climate change mitigation especially in urban areas, as they require minimal space. Comparably with traditional forests, one study found that Miyawaki forests sequester more carbon, suggesting a more effective climate change mitigation option in the latter<sup>7</sup>.

### Alleviated urban heat island effect

Due to their density of plantation, Miyawaki forests play a significant role in small-scale meteorological phenomena. Studies indicate that Miyawaki forests showcase lower temperatures than outside areas, thus presenting a potential for urban heat island mitigation in urban areas<sup>8</sup>.

### Increased resistance to disasters

In comparison with monocultures, Miyawaki forests also present a significant potential in withstanding natural disasters, particularly earthquakes and tsunamis. Additionally, Miyawaki forests were proven to be able to stop wildfires from spreading in some cases<sup>9</sup>.



## Reinforced social cohesion

The planting of seedlings has been incorporated into festivals that unite public and private stakeholders, which can foster stronger social bonds and promote environmental consciousness. The support of volunteers also significantly reduces the costs of cultivation<sup>10</sup>.

## Enriched soil conditions

Compared to conventional plantations, Miyawaki forests exhibit better chemical, physical, and biological soil conditions, leading to improved soil fertility. This can be attributed to the large density of plantation as well as the rich contents in litters on the surface layer of the forest<sup>7, 11, 12, 13</sup>.

## Higher growth rate but debatable survival

The growth rate of Miyawaki forests is significantly higher than traditional plots<sup>1</sup>. However, the survival of plants remains debatable as some studies showcased promising survival rates<sup>4</sup>, while others attributed a “survival of the fittest” scenario<sup>17</sup>.

## Additional benefits

Additional benefits have been associated with the Miyawaki method such as its medicinal and ethnobotanical value<sup>14</sup>. Moreover, Miyawaki forests have shown promising potential in environmental restoration, especially in restoring dumpsites<sup>16</sup> and in dump slope stabilization<sup>15</sup>.

## RESEARCH GAPS AND RECOMMENDATIONS

Despite promising results, the review indicates there remains a lack of evidence-based consensus on the method's advantages and limitations. The research gaps below need to be addressed to develop an adequate body of knowledge on the Miyawaki method:

- Lack of data evaluating the technical performance of Miyawaki plots under varying climatic conditions.
- Lack of studies investigating the effectiveness of the Miyawaki method in mitigating natural disasters in locations outside of Japan.
- Lack of research focusing primarily on examining the social cohesion aspect of the Miyawaki method.
- Lack of studies detailing the method's limitations and suggesting ways to overcome them.
- Lack of analyses on the cost-effectiveness of investing and maintaining a Miyawaki forest in comparison with traditional techniques.
- Lack of comparative studies examining the method's climate change mitigation potential in comparison with traditional techniques.
- Tackling these research gaps requires a collaboration between researchers and locals implementing the Miyawaki method. This step could ultimately drive policy initiatives aimed at promoting the widespread adoption of this method on a global scale.







## CONCLUSION

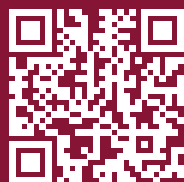
The accumulated evidence thus far suggests that the Miyawaki method presents a promising approach towards increasing forest restoration efforts worldwide and mitigating climate change. The findings of the study indicate that the method presents multiple advantages over traditional techniques both in terms of technical results, such as plant growth and soil conditions, and in terms of additional benefits such as social cohesion and disaster preparedness. Moreover, older Miyawaki plots exhibit improved performance compared with younger ones, showcasing the sustainability and the long-term value of investing in such forests. Nonetheless, there remains a significant gap in the literature around the Miyawaki method, raising the need for additional research to comprehensively understand the advantages and the limitations of the technique in different regions of the world.

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