



## Miyawaki: A Technique Supporting Urban Afforestation

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### ABSTRACT

Living in a world facing environmental crises like climate change, global warming etc. appears to be disastrous for humanity. However, the worst victims of these crises are the people living in urban cities. Though they may be economically better off than people living in rural areas, the ironic fact is that they have to face the negative implication of environmental crises more severely and fatally than people in backward areas of the nation. They have no option but to live in an environment with rising air, water and noise pollution as well as soaring temperatures. These all are making the lives of the urban people difficult, making them feel as if they are living in hell. The city dwellers belonging to almost every age group are facing health issues like asthma, T.B., irritation in the eyes, heart and lung ailments etc. Making the situation worse, deforestation has been carried out on a large scale to make residential spaces for the increasing human population in the city. The green belt as earmarked in and around certain urban settlements like the ridge area in Delhi and Array Forest in Mumbai has been reducing day after day to meet urban settlement needs. The adoption of the Miyawaki technique could give new life to the dying urban ecosystem and decaying environmental quality. The technique allows for afforestation to small but dense patches of areas within the city limits, which are filled with different native species of plants and trees. The paper discusses the environmental issues, primarily noxious air being inhaled by city dwellers in India and the usefulness of the Miyawaki Technique in dealing with such issues along with the pros and cons of using such techniques. It also studies certain existing laws which indirectly support and safeguard Miyawaki plantation. Further, the paper also throws light upon certain Judicial pronouncements which support this technique along with suggestions for effective implementation of the technique.

**Keywords: - Miyawaki, environment, pollution, deforestation, and urban forestry.**

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## INTRODUCTION

***“The forest is the root of all life. It deepens our intelligence and increases our sensitivity as human beings.” - Akira Miyawaki***

It takes several decades for an area to be transformed into a forest in natural settings. Therefore, in order to meet growing CO<sub>2</sub> emissions, improve air quality, conservation of wildlife and ensure environmental sustainability, the need is to ensure the rapid formation of forests with minimum cost. The method developed by Akira Miyawaki aids and supports the rapid and thick growth of natural forest<sup>1</sup>. It involves the process of adding nutrients to the soil, improving water, restoring the capacity of soil by using coco peat and organic fertilizers, manure is added to the soil etc. mulching, wherein 15-30 species of local plants are planted together on degraded land to improve soil fertility. The process aims at preventing soil erosion, soil dryness etc. The plants are allowed to grow together and are able to adapt easily to local weather conditions<sup>2</sup>. The technique helps in bringing more diversity than monoclonal plantation and can be adopted in almost all types of soil and weather conditions<sup>3</sup>. During the initial 2-3 years of time frame, the area requires extensive care in the form of constant water supply and protection from weeding, etc. However, soon the plants grow and become self-sustaining. The technique ensures 10 times quicker plant growth and ensures the creation of a forest which is 30% dense<sup>4</sup> than by using conventional afforestation methods. This eventually results in the creation of thick forests within a short span of time.

Furthermore, there is no need to ensure the maintenance of forests, species of plants and animals after the initial 2-3 years as the forest becomes self-sustaining. Miyawaki's technique ensures the creation of Urban Forests, creating a complex urban ecosystem entangling a vibrant variety of species. Forest witnesses an annual growth of 1 meter without any use of chemical/synthetic fertilizers<sup>5</sup>. Forests help in the restoration of degraded land by adding scenic beauty to it, which can be enjoyed by everyone<sup>6</sup>. Furthermore, Miyawaki urban forests decrease noise levels<sup>7</sup>, and carbon emissions and thereby help in regulating temperature and also provide habitat for biodiversity.

## RESEARCH OBJECTIVES:-

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<sup>1</sup> Sourik Poddar, MIYAWAKI TECHNIQUE OF AFFORESTATION 1–8 (2021).

<sup>2</sup> *Id.*

<sup>3</sup> URBAN FORESTS, Urban forests use the Miyawaki method to create native forests URBAN FORESTS (2022), <https://urban-forests.com/miyawaki-method/> (last visited Aug 2, 2022).

<sup>4</sup> Poddar, *Supra* Note 5

<sup>5</sup> *id.*

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

The research has been conducted keeping in mind the following objectives:-

1. To study the Miyawaki Technique used for urban afforestation.
2. To know about the implications of the use of the Miyawaki Technique
3. To find out the various initiatives wherein the technique is being used in India
4. To make suggestions and recommendations for effective implementation of such technique.

## RESEARCH QUESTIONS

The researchers through this research try to find out solutions to the following questions:-

1. What is Miyawaki Technique?
2. Why Miyawaki Technique is useful for the protection of the urban environment?
3. What are the issues faced while using Miyawaki Technique?
4. What are the positive and negative impacts of using the Miyawaki Technique?
5. How the Miyawaki Technique is being used in India for protection of Environment?

## RESEARCH METHODOLOGY

The present research has been conducted by using descriptive and exploratory methodology. The researchers have tried to explore the Miyawaki technique concept and describe how the method can be used in India along with its implications. The research has been conducted using both secondary sources like books, journals, websites etc.

The technique is being used in India for the restoration of urban forests and degraded land. Individuals, NGOs and government agencies have been involved in implementing the technique in different parts of India. Miyawaki's technique helped in the creation of tiny green patches in the eastern Mumbai region. Bhakti Park located in the Chembur/Wadala region of the city hides a budding forest of about 1,100 native plants<sup>8</sup> which were planted on 230 sq m of area<sup>9</sup> over a period of 1 year. Similarly, 'Nandavanam' project has been undertaken in collaboration with Ranganathaswamy Temple with the objective of creating several urban green islands' in Srirangam, Samayapuram and Lalgudi<sup>10</sup> by using the Miyawaki method. Under the project, about 10,000 saplings of 53 native plant species<sup>11</sup> were planted in December 2019 which soon grew into a dense concrete forest<sup>12</sup> where one can enjoy bird sightings and chirping. In the words of M.R. Hari, Managing Director, Invis Multimedia "A natural forest takes 100 years to grow. But in the Miyawaki method, where

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<sup>8</sup> Sanjana Bhalerao, *Urban forests': Miyawaki technique helps create dense green patches in one year*, Indian Express, March 7, 2021, <https://indianexpress.com/article/cities/mumbai/urban-forests-miyawaki-technique-helps-create-dense-green-patches-in-one-year-7218624/> (last visited Aug 2, 2022).

<sup>9</sup> *Id.*

<sup>10</sup> Nahla Nainar, *Competing for growth: How Miyawaki forest projects are mushrooming in India*, The Hindu, November 20, 2020, <https://www.thehindu.com/sci-tech/energy-and-environment/quick-growing-forests-showcase-miyawaki-horticultural-technique-in-india/article33126240.ece> (last visited Aug 2, 2022).

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

plants compete for sunlight, and therefore tend to grow upwards faster than sideways, we get the same result in around 20-25 years. It will be a reasonably grown forest within 5-10 years, so it is possible for us to see them take shape in our lifetime,<sup>13</sup>”. The Government of Telangana has formulated the Yadari method at Warangal for growing dense green patches in urban areas on the lines of the Miyawaki technique<sup>14</sup>. Also, Tangedu Vanam has been developed in the Nalgonda District of Telangana by using the Miyawaki Technique<sup>15</sup>. About 125 acres of forest area which was cleaned for traditional plantation has been transformed into a mini forest by following the Miyawaki technique having native wild and flower-bearing trees<sup>16</sup>.

Corporations can also play a vital role in promoting and using this technique in India. Indian Oil Corporation Ltd. (IOCL) inculcated the Miyawaki technique as a CSR activity<sup>17</sup>. Under the initiative afforestation drive covering a 600 sq ft area in the Greater Chennai Corporation Owned Park<sup>18</sup> at Chennai in 2019. Also, NGOs like Thukkam through its CSR initiative called ‘Urban Forestry’ have been using Miyawaki Technique for afforestation in Chennai, Tiruvallur and Kanchipuram for planting within a distance of 2 -3 ft after duly enriching soil<sup>19</sup> with nutrients. It aims at creating a miniature forest of about 1000sq ft<sup>20</sup>. The CSR initiatives involve the planting of 150-250 trees that are native to the region and are planted next to each other.

#### INITIATIVES TAKEN UNDER MIYAWAKI TECHNIQUE

Miyawaki Technique is slowly growing in importance in the Anandvan Foundation in collaboration with the Forest Department of Pune and Air Products India, started its initiative of Anandvan Dense Forest.<sup>21</sup> The initiative is based on creating miniature forests on the basis of the Japanese Miyawaki Technique. Under the said initiative a mini forest covering 6000 sq.ft. is being developed for increasing environmental awareness and green cover on NIBM Road.<sup>22</sup>

<sup>13</sup> *Id.*

<sup>14</sup> Neeraja Murthy, *Telangana's Haritha Haram heralds Yadadri method of the green revolution*, The Hindu, July 2, 2020, <https://www.thehindu.com/sci-tech/agriculture/telanganas-haritha-haram-heralds-yadadri-method-of-the-green-revolution-based-on-japanese-miyawaki-technique-which-has-been-modified-to-suit-our-native-conditions-and-species/article31962352.ece> (last visited Aug 2, 2022).

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> Psu Connect, IOCL CSR intervention in developing Miyawaki Forest in Chennai City PSU News, Latest PSU News, Bank News , Psu Jobs - PSU Connect (2019), <https://www.psuconnect.in/news/IOCL-CSR-Intervention-in-developing-Miyawaki-Forest-in-Chennai-City/18049/> (last visited Aug 17, 2022).

<sup>18</sup> *Id.*

<sup>19</sup> Urban Forestry, CSR Projects India, Companies and CSR, NGO partners, CSR funding India, [https://csrbox.org/India-CSR-projects-proposal\\_Thuvakkam\\_Ensuring-environmental-sustainability,-ecological-balance,-wildlife-&-natural-resources-conservation\\_394](https://csrbox.org/India-CSR-projects-proposal_Thuvakkam_Ensuring-environmental-sustainability,-ecological-balance,-wildlife-&-natural-resources-conservation_394) (last visited Aug 17, 2022).

<sup>20</sup> *Id.*

<sup>21</sup> Punepulse (2023) *Pune news : 6,000 square feet miyawaki technique based Anandvan dense forest inaugurated on NIBM road - pune pulse, PUNE PULSE - Trusted-Connected-Targeted*. Available at: <https://www.mypunepulse.com/pune-news-6000-square-feet-miyawaki-technique-based-anandvan-dense-forest-inaugurated-on-nibm-road/> (Accessed: 02 July 2023).

<sup>22</sup> *Ibid.*

In order to deal with reducing green cover in Delhi, civic authorities like East Delhi Municipal Corporations and South Delhi Municipal Corporations have adopted Miyawaki Technique for the creation of mini urban forest in the region.<sup>23</sup> The Rise Foundation a NGO in collaboration with SDMC has successfully used the technique for growing mini forest in Brahma Apartments located in Sector 7 Dwarka, Kanganheri Village in Kapasheri and Badu Sarai Village in south West Delhi.<sup>24</sup> In all such locations native species of plants like jamun, karonda, kaner, sehjan, bel patra, neem and shami were used.<sup>25</sup>

Under BMC's Urban Forest Project Miyawaki drive was launched in 2020 wherein 64 Miyawaki Forests were created within the vicinity of Mumbai city.<sup>26</sup> Under the said initiative a miniature forest at Chandivali's Nahar Amrut Shakti Udyan in which 41,000 plants were planted over an area of 13 acres.<sup>27</sup> It is estimated that more than 4 lakh trees have been planted in these 64 forests.<sup>28</sup>

In the recent 'Mann Ki Baat' episode by Prime Minister of India, Narendra Modi mentioned about Miyawaki Technique for creating dense urban forests in a small area.<sup>29</sup> While giving the example of Raafi Ramnath, a teacher from Kerala, used the Miyawaki approach to plant 115 different types of trees on a barren piece of ground to create Vidyavanam, a miniature forest.<sup>30</sup> The forest through its scenic beauty attracts local people, tourists etc.

#### **Legislative Provisions dealing with Urban Forests Grown Through Miyawaki Technique and to Protect Trees:-**

1. **Section 2 (a) of the Environment (Protection) Act, 1986 states that "environment" includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property"**
2. **The Delhi Preservation of Trees Act, 1994 S.8 states that "Restrictions on felling and removal of trees.-Notwithstanding anything contained in any other law for the time being in force or in any custom or usage or contract and except as provided in this Act or the rules made thereunder, no person shall fell or remove or dispose of any tree or forest produce in any land, whether in his ownership or occupancy or otherwise, except with the previous permission of the Tree Officer: Provided that if the**

<sup>23</sup> Jasjeev Gandhiok, *Amid space crunch, Delhi tries out Miyawaki technique of mini-forests*, THE HINDUSTAN TIMES, February 19, 2022, <https://www.hindustantimes.com/cities/delhi-news/amid-space-crunch-delhi-tries-out-miyawaki-technique-of-miniforests-101645207314111.html> (last visited Jul 2, 2023).

<sup>24</sup> *Ibid.*

<sup>25</sup> *Ibid.*

<sup>26</sup> Pratip Acharya, *PM Modi talks of Miyawaki forests in Mann ki Baat: What is this method, also being used in Mumbai*, THE INDIAN EXPRESS, June 18, 2023, <https://indianexpress.com/article/explained/explained-climate/pm-modi-miyawaki-forests-mann-ki-baat-what-is-this-method-8671133/> (last visited Jul 2, 2023).

<sup>27</sup> *Ibid.*

<sup>28</sup> *Ibid.*

<sup>29</sup> *Ibid.*

<sup>30</sup> *Ibid.*

*tree is not immediately felled, there would be grave danger to life or property or traffic, the owner of the land may take immediate action to fell such tree and report the fact to the Tree Officer within twenty-four hours of such felling.” Further, S.10 provides that “Obligation to plant trees.- Every person, who is granted permission under this Act to fell or dispose of any tree, shall be bound to plant such number and kind of trees in the area from which the tree is felled or disposed of by him under such permission as may be directed by the Tree Officer”*

**3. THE MAHARASHTRA (URBAN AREAS) PROTECTION AND PRESERVATION OF TREES**

**ACT, 1975 S.8 (1 )** dealing with restriction on the felling of trees states that *“On and after the date on which this Act is brought into force in any urban area, notwithstanding any custom, usage, contract or law for the time being in force, no person shall fell any tree or cause any tree to be felled in any land, whether of his ownership or otherwise, situated within that urban area, except with the previous permission of the Tree Officer.”* While **S.10** provides power to the Tree Officer for the planting of tree fallen in place of fallen or destroyed tree. *“Where any tree is fallen or destroyed by wind, fire, lightning or torrential rain, the Tree Officer may, suo motu or on information given to him, after holding such inquiry as he deems fit and giving a reasonable opportunity to the owner or occupier of the land where the tree existed, by order, require such owner or occupier 8[to plant one or more trees of the local species] in place of the tree so fallen or destroyed of the same or 9[other local species] at the same or other suitable place as may be specified in the order.”*

**4. U.P. Protection of Trees Act, 1976 S.4** imposes restrictions on felling of trees. It provides that *“Except as provided in this Act or the rules made thereunder, no person shall- (a) fell any tree standing on any land, whether included in a holding or not;(b) cut, remove or otherwise dispose of any tree other than a tree which is completely dead and has fallen without the aid of human agency on any such land.”*

**JUDICIAL PRONOUNCEMENTS ON THE USE OF MIYAWAKI TECHNIQUE IN INDIA:-**

Indian judiciary in recent years have played a major role in safeguarding and improving the national environment. Through its pronouncements, it has tried to provide justice not only to the environment but also to the creatures who are dependent upon it for its survival. It has always supported new ways and methods for protecting and improving the environmental quality. Talking about the adoption of the Miyawaki Technique, the judiciary through the following decisions has supported the implementation of the technique for ensuring urban afforestation.

In *Shivakumar & Ors. v. Chennai Metro Rail Ltd.* 2019 7MILJ 769 the Hon`ble Madras High Court held that *“84. It is also stated that a modern plantation viz., Miyawaki Plantation would be adopted to ensure that the tree cover in the area is not diminished. It is stated that this type of plantation is a form of planting trees to*

ensure dense plantation to recreate a cut tree cover and is used to rehabilitate degraded land, generate and enhance ecological wealth out of native natural resources and in attaining a stable eco system. In the written submissions filed by the CMRL it is stated that they intend to have in the four corners of park about 5200 trees which will provide sufficient greenery, flora and fauna, lung space and beautify the entire area. CMRL also intends to have trees planted around the periphery of the park with intention to transplant the existing trees wherever possible. It is stated that Miyawaki technique will enhance the flora and fauna in the area. It is stated in the written submissions that the Miyawaki technique has been successfully implemented in Koyambedu Station. It is stated that the trees which are going to be implanted are indigenous fast growing varieties and the dense canopy formed in a very short span of time of one and half years.”

In *the National Highways Authority Of India Versus Pandarinathan Govindarajulu & Another Lnindu 2021 Sc 4* The Hon`ble Supreme Court Of India laid emphasized upon exploring Miyawaki Forest Technique for environmental conservation.

In *Rashmi Singh v. National Thermal Power Corporation Ltd. & Others, M.A. No. 99/2022 and Original Application No. 459/2018*, Ld. National Green Tribunal viewed as under: “*The matter was earlier dealt with and disposed of vide order dated 6.4.2021 on the subject of compliance of environment norms by National Thermal Power Corporation (NTPC) at Bilaspur.*” The compliance status report was filed by Oversight Committee, one of the recommendations was that NTPC Sipat to identify 10 Acres of the area outside the project boundary in Bilaspur district in a radius of 10 km for Afforestation using Miyawaki technique for plantation. The Ld. Tribunal has accepted and directed to enforce the recommendation of the report of the Oversight Committee comprising of CPCB and MOEF& CC wherein emphasis was given on using the Miyawaki Technique.

In *Pandarinathan Govindarajulu v. Union of India W.P.Nos.21883, 15217 & 14997 of 2019* the Hon`ble High Court of Judicature at Madras held that “*If after ensuring the environmental viability of the project, its implementation resumes, the project proponent, and subject to the terms of the contract, the concessionaire, should first identify the places for planting the saplings of the same variety, preferably native trees, for every tree felled, and it must be grown first. The possibility of forming a “Miyawaki forest” has to be explored as well.*”

#### **THE POSITIVE ASPECT OF USING THE MIYAWAKI TECHNIQUE:-**

- **Faster Growth Than Natural Forest:-** Miyawaki as discussed above is a technique that helps in the rapid development of plants. It is a Japanese technique that involves planting saplings suitable to the local environment in small areas and ensures 10 times faster growth. It makes rapid urban afforestation

possible.<sup>31</sup> Furthermore, in absence of any human intervention it takes nearly 1000 years for fertile land to become a dense and thick forest, however, with human intervention this period may be drastically reduced to 100 years.<sup>32</sup> The Use of the Miyawaki technique could create fertile land into a forest within a duration of 10 years.<sup>33</sup> Under this technique the ground is made ready, and thereafter, trees are planted closer to each other<sup>34</sup>. Thereby, allowing plants to grow much faster and one could see the creation of a lush green forest within a short span of time.<sup>35</sup>

- **Checks Urban Pollution:-** Living in cities like Delhi and Mumbai may feel as if one is living in gas chambers. The pollution levels caused by vehicles and industries are abnormally high, making the urban dwellers suffer from respiratory diseases like lung cancer, T.B. & Bronchitis. Pollution makes leading a healthy lifestyle, a next-to-impossible thing. Besides this, there are other issues like constant irritation in the eyes and skin allergies which urban dwellers may also have to suffer with. The urban afforestation made possible by the use of the Miyawaki technique might provide a solution to this growing issue of urban pollution. The green patches grew in the urban areas by use of this technique, which keeps a check on pollution and provides a breathable atmosphere, ensuring urban dwellers live a healthy life devoid of respiratory diseases.
- **Provides Fresh Fruits, Vegetables And Regeneration Of Depleting Groundwater:-** The technique allows the growth of green patches in urban areas consisting of fruit-bearing plants and vegetables. These fruits and vegetables are organic and devoid of fertilizers cum pesticides. Thereby ensuring urban dwellers get organic foodstuffs essential for leading a healthy lifestyle free from diseases. Another challenge faced by urban dwellers is depleting groundwater tables. Every year urban areas suffer from acute water shortages, people have to wait in long queues to fetch water from the government or private water tankers. Further, cities like Faridabad have lost its shine in the form of Badkal lake because of the extensive exploitation of water. The green patches grown through the aid and assistance of technique helps in restoring and rejuvenating the groundwater in the cities. Thereby, enabling the city dwellers to effectively deal with the issue of water crises.

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<sup>31</sup> Stellar IAS Academy, Miyawaki method of urban afforestation, Stellar IAS Academy (2020), <https://stellariasacademy.online/miyawaki-method-of-urban-afforestation/26/10/#:~:text=Some%20environmentalists%20state%20that%20Miyawaki,or%20places%20close%20to%20cities.> (last visited Oct 26, 2022).

<sup>32</sup> Mónica Sánchez, Miyawaki reforestation method: Creating forests in record time Jardineria On (2020), <https://www.jardineriaon.com/en/metodo-de-reforestacion-miyawaki.html> (last visited Oct 26, 2022).

<sup>33</sup> *Ibid.*

<sup>34</sup> *Ibid.*

<sup>35</sup> *Ibid.*



- **Requires Less Space:-** Urban areas usually suffer from a shortage of space and residents have no other option but to reside in small areas. The growing population in cities like Delhi is a major concern as this population increase reduces the space for living. Therefore, in order to provide clean and green cover in such cities, we require such methods where plants can grow in small areas without much occupying space. The Miyawaki technique provides a solution to such an issue as it allows the growth of lush and thick green patches in the cities. Miyawaki Technique allows the creation of miniature forests on a small piece of land in a meter-wide strip also. Thus it makes it feasible and viable to create forests in and around residential areas and commercial buildings.<sup>36</sup>
- **Attracts Scenic Beauty:-** The green patches which grew through the aid of such a technique increase the scenic beauty of the areas where the patches are being located. Further, the beauty attracts birds and makes these patches ideal for bird-viewing activities. The scenic beauty also provides pleasure to the city dwellers. It also helps in providing mental and physical well-being to the city dwellers.
- **Reduces Temperatures:-** With global warming causing a significant setback and worries to the entire world community, the Miyawaki technique ensures that urban afforestation is taking place which reduces the carbon sink or emissions thereby reducing global temperatures.
- **Survival capacity:** Today we are facing issues like climate change, global warming, and severe water crises. There is a dire need for reforestation and new forest.<sup>37</sup> Miyawaki has helped in the creation of quasi-natural forests in a short span of time with a 100% success rate.<sup>38</sup> The method has proven to be successful in restoring native forests from the cold temperate zone to the tropical zone.<sup>39</sup> It has further aimed in safeguarding and protecting in the environment.
- **Low Maintenance Cost:** During the initial phase of three years the green patches requires high maintenance. However, after this initial phase comes to an end the plants grown in these green patches become self-reliant and require very less or neither amount of maintenance.
- **Acting as Carbon Sinks:** Miyawaki technique helps in the growth of miniature forests which helps in reducing carbon dioxide. This miniature forest helps 30 times more CO<sub>2</sub> absorption and accumulation than monoculture tree plantations.<sup>40</sup> This technique has a huge carbon sequestration capacity.<sup>41</sup>
- **Defence Mechanism Against Natural Calamities:-** Miyawaki techniques allow trees to grow and penetrate deep into the soil. This not only prevents soil erosion from taking place but also serves as a barrier against natural calamities like tsunamis<sup>42</sup> and floods.

<sup>36</sup> Anju Lis Kurian, *URBAN HEAT ISLAND MITIGATION AND MIYAWAKI FORESTS: AN ANALYSIS*, 39 *Poll Res.* 1–6 (2020).

<sup>37</sup> *Ibid.*

<sup>38</sup> *Ibid.*

<sup>39</sup> *Ibid.*

<sup>40</sup> *Ibid.*

<sup>41</sup> *Ibid.*

- **Generates Employment:-** Miyawaki technique leads to the creation of job opportunities. The Creation of miniature forests or green patches requires human intervention for mulching and planting tree saplings. Further persons are required for maintaining these saplings and providing them with all the essential materials like manure, water etc. till they become self-reliant. Thereby leading to employment generation in the form of gardeners, people working in nurseries and labour for the construction of fences around the green patches.
- **Increased Real Estate Prices:-** Living in a house surrounded by a lush green environment is the dream of every urban dweller. People living in urban areas travel to places in search of scenic beauty for their pleasure. The green patches in urban dwellers' backyards through Miyawaki will enable them to enjoy scenic beauty while living in the city. Also, it increases the price of the property as it is an additional benefit away from the basic amenities available to individuals while living or residing in city homes.

#### **NEGATIVE IMPLICATIONS OF MIYAWAKI TECHNIQUE**

- **Expensive Technique:-** As discussed above the amount of maintenance of green patches or miniature forest being created by Miyawaki technique is generally high. In the initial phase of this miniature forest, a huge investment is required to be made from planting saplings to supplying manure and water.<sup>43</sup> Apart from it these forests are required to be protected from any kind of disease which may be a deterrent to their lives. This requires the employment of human resources who shall take care of the maintenance of these forests. This further increases the maintenance cost.
- **Not a Substitute for a Natural Forest:-** Though the technique allows the growth of green patches in urban areas and leads to urban afforestation, however, these green patches of land cannot become an alternative to natural forests in toto. These patches fail to provide the rich biodiversity and the amount of natural resources that a forest usually provides. These patches also cannot bring or attract rains which natural forests can easily do. Furthermore, because of the dense green cover, the movement of Wildlife is difficult in these patches.<sup>44</sup> Furthermore, the technique may not be appropriate for tropical countries that receive a huge amount of rainfall. Therefore, it would not be wrong to state that while the technique could provide greenery in urban areas, it cannot be used in place of natural forests.<sup>45</sup>

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<sup>42</sup> *Ibid.*

<sup>43</sup> Chandrika Singh & Gaurav Saini, *Sustainable solution for urban environment: Miyawaki Forest*, 5 International Journal of Technical Innovation in Modern Engineering & Science 1–5 (2019).

<sup>44</sup> *Stellar IAS Academy, supra* Note 21

<sup>45</sup> *Ibid.*

- **Not Suitable for Non-Moisture Areas:-** Miyawaki Techniques require a constant supply of water and other essential nutrients which are initially provided by human beings.<sup>46</sup> However, once they start growing some plants especially trees absorbs more water and other nutrients than other plants growing beside them, thus some plants faces acute shortage of water and nutrients and they start dying.<sup>47</sup> Moreover, such a humongous amount of water absorption depletes groundwater table and aquifers.<sup>48</sup>

#### SUGGESTIONS FOR EFFECTIVE IMPLEMENTATION OF MIYAWAKI TECHNIQUE:

- **Spreading Knowledge About Miyawaki Technique:-** Miyawaki technique can be implemented in a better way if people have knowledge about it. Today very few people know about this technique. They hardly know its name, benefits, and method of using it. Therefore, it becomes necessary to spread information about it among the public so as to make its use more effective. Programs like Maan Ki Baat shall be telecasted for spreading such information. The Environmental studies taught in schools and colleges shall discuss about Miyawaki Technique and its importance for the urban environment. Government and its agencies shall undertake initiatives for spreading information about such techniques.
- **Adhering to the Basic Principles while Adopting Miyawaki Technique:-** There are certain fundamental principles and rules involved in Miyawaki Technique like planting native plants, mulching soil etc. People while adopting such technique must strictly adhere to such basic principles to make Miyawaki Technique effective. They should plant those plants which are native to the environment.
- **Recognition Through Rewards and Awards:-** In order to motivate people towards adopting Miyawaki Technique, the Government, its agencies, NGOs and Companies shall recognise the efforts of the people who adopted the technique either through rewards or awards. It boots moral and motivates others to adopt such technique

#### CONCLUSION

Modern problems require modern solutions. Living in urban areas may expose individuals to several environmental issues like global warming, high pollution levels, water crises, etc. Urban afforestation or miniature forests created through the Miyawaki method may provide solutions to most of these problems. The technique allows the growth of small green patches within the vicinity of cities, which helps in getting control over pollution levels, soaring temperatures, and water crises. Consequently, this makes sustainable living a

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<sup>46</sup> Manoj Misra, MIYAWAKI TECHNIQUE OF PLANTING IS UNNATURAL, AVOID ITS INDISCRIMINATE USE GAON CONNECTION (2022), [https://www.gaonconnection.com/lead-stories/miyawaki-forest-environment-japan-india-climate-change-water-health-plants-trees-50638?infinitescroll=1#.YIVPdJm0r\\_E.whatsapp](https://www.gaonconnection.com/lead-stories/miyawaki-forest-environment-japan-india-climate-change-water-health-plants-trees-50638?infinitescroll=1#.YIVPdJm0r_E.whatsapp) (last visited Jul 3, 2023).

<sup>47</sup> *Ibid.*

<sup>48</sup> *Ibid.*

dream come true for city dwellers. Apart from providing solutions to environmental issues, these green patches provide scenic beauty to the city. Furthermore, these miniature forests can grow in very small areas, require low maintenance in the long term, provide protection against natural calamities, and conserve biodiversity, which has made the Miyawaki technique quite popular. It has been used all over the world to make cities greener and cleaner. Despite of high initial maintenance costs, they are low in the long run, and the benefits of employing such a technique are extensive.

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