



## Greenery development and sustainability support for corridor in national project of Ethiopia

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### Abstract

Botanical horticulture focusing on indigenous trees and ornamental flowers for greenery beautification provides multifaceted aesthetic, ecological, and socio-economic benefits to urban environments. The practice involves selecting and cultivating plants that are adapted to the local climate, which ensures resilience, reduces maintenance needs, and promotes sustainable landscaping. **Aesthetic Enhancement:** Indigenous ornamental plants contribute significant visual appeal through diverse colors, forms, and textures, which provides a necessary connection to nature in urban "concrete jungles". This beautification improves the quality of life, enhances property values, and creates a harmonious sense of place. **Ecological Resilience and Biodiversity:** Native species form the foundation of local ecosystems, offering crucial food and habitat for pollinators (bees, butterflies) and other wildlife that co-evolved with them. Their adaptability means they are more resistant to local pests, diseases, and climate extremes (drought, heat), reducing the need for chemical pesticides, fertilizers, and excessive water. **Environmental Services:** Strategically incorporated greenery mitigate environmental challenges. **Air Quality and Climate:** Trees and plants act as natural filters, absorbing pollutants like carbon dioxide and releasing oxygen. Transpiration and canopy cover help reduce the urban heat island effect by providing shade and cooling the surrounding environment. **Water and Soil Management:** Extensive root systems prevent soil erosion and improve water infiltration, which helps manage stormwater runoff and protect local waterways from pollution. **Socio-economic and Health Benefits:** Green spaces with indigenous flora promote physical and mental well-being by reducing stress, encouraging social interaction, and providing opportunities for recreation and education. The low-maintenance nature of native plants translates into cost savings for individuals and communities through reduced water and labor expenses. In conclusion, integrating indigenous trees and ornamental flowers into botanical horticulture practices for urban beautification is an economically viable and ecologically sound strategy for creating sustainable, resilient, and visually appealing environments that support human well-being and ecosystem health.

**Keywords:** Aesthetic, ecology, resilience biodiversity, socio economic, water and soil air quality and climate

### Introduction

Brothers Construction (officially Brothers Trading PLC) is an Ethiopian construction company founded in 2015, specializing in general construction, road slope protection, and landscape architecture. They are known for projects involving historic sites, roads, and recreational areas, emphasizing sustainability and innovation. The company aims to create sustainable landscapes and protect natural resources. They utilize the latest technologies, sustainable materials, and industry-leading expertise for complex projects.

Brothers Construction works to make environments and communities better through greenery and innovative soil conservation. Ethiopia's national "corridor development project" includes a significant focus on greenery, with the goal of increasing green coverage and enhancing urban livability, especially in Addis Ababa and other participating cities. This initiative integrates green spaces, parks, and public areas into urban planning to improve aesthetics, public health, and the environment, transforming cityscapes with sustainable, people-centered development. **Specialties:** General Construction, Road Slope Protection, Landscape Architecture, Landscape Designing

▪ **National Projects:** A.A and regional Development projects Wenchi Gebeta Lehager Chaka Landscape and Greenery Sheraton Landscape and Greenery Project Mexico to Sarbet Road Corridor Adwa 00 Project, Bole to Megenagna CMC to Goro Corridor 4 kilo plaza 6 kilo, kazanchise plaza and Garment to jimo 3 Hachalu

square Mekanissa, Sarbet to Biserat Gebreal Regional Development project Jimma Aba jifar Landscape Asosa Corridor development, Somalia Jigjiga, shebele Resort Ambo, Nekmite And also others corridor project development and soon regional others ongoing so many development projects

### The company aims to create sustainable landscapes and protect natural resources.

They utilize the latest technologies, sustainable materials, and industry-leading expertise for complex projects. The project aims to boost the proportion of urban areas dedicated to green spaces, with a long-term target of covering 40% of urban land with green areas:

**Enhanced Aesthetics and Livability:** By integrating trees and green spaces along urban corridors, the project enhances the beauty of cities and makes them more pleasant for residents and visitors.

**Improved Public Health:** Greenery contributes to cleaner air, cooler temperatures, and a more attractive environment, which are vital for public health.

**Sustainable Urban Development:** The initiative promotes a shift towards sustainable, eco-friendly urban environments by integrating green infrastructure into city plans.

**Integrated Green Spaces:** The development involves the creation of parks, riverfront projects, and tree-lined walkways and bike lanes within the urban corridors.

A development corridor is a geographical area identified as a priority for investment to catalyse economic growth and development. This is usually through the creation of infrastructure such as railways or pipelines. They can be designed to attract new investments, boost agricultural production, open access to natural resources and facilitate development corridors have the potential to diversify and improve livelihoods by making trade, communications and services more efficient. They can also spread development opportunities to remote, poor and marginalised communities and regions, thus enabling countries to better achieve their Sustainable Development Goals. These significant benefits can be maximised if corridors are planned and implemented through an integrated approach using sound policies, plans and practice and new public spaces. The Addis Ababa City Corridor Project, also known as Smart City Project, is an ongoing urban planning project in the city of Addis Ababa initiated by the Addis Ababa City Administration in December 2022 to upgrade key routes and improve connectivity among the corridors. The Addis Ababa City Corridor Project, also known as Smart City Project <sup>[1]</sup>, is an ongoing urban planning project in the city of Addis Ababa initiated by the Addis Ababa City Administration in December 2022 to upgrade key routes and improve connectivity among the corridors. Due in 2025, the project aims to expand metropolis that incorporates the construction of bicycle routes, spacious pedestrian walkways, better roads, parks, libraries, and additional housing.

Evergreen Corridor Beautification Program refers to Addis Ababa's large-scale urban development initiative focused on transforming the city's appearance and infrastructure, with a strong emphasis on greenery and eco-friendly development, and incorporating community consultation and improvements to urban services. While a specific "Evergreen Corridor" program name isn't directly mentioned, this aligns with the broader "Corridor Development Project" and "Beautifying in Addis Ababa, which aim to enhance aesthetics, improve green coverage, and provide better infrastructure for residents and visitors. Cities in developing nations, such as Addis Ababa, deal with concomitant urban population growth and rising private vehicle ownership. Based on this, the government should implement several policies to improve urban mobility and make the city a more liveable place, including parking fees, congestion pricing, traffic calming, etc. To reduce traffic and improve the general quality of life for city people, governments and municipal administrations must prioritize sustainable transportation solutions. By taking these steps, cities may look and feel better, reduce traffic, and make public transportation easier to use. Authorities in such cities should move quickly to create and implement a range of solutions for their urban transportation networks in light of the challenges they face.

## Material and Methods

In order to achieve the objectives, data collection for a systematic review article was done through document analysis and an in-depth review of the literature related to the topic from various sources. In addition, this article has drawn information from online articles, studies, Addis Ababa, the political capital of Ethiopia and an important commercial and cultural center, is located geographically in the heart of the country, at 9° 2' north latitude and 38° 45'

east longitude. Its average elevation above sea level is 2,400 meters, with Mount Entoto in the north being the highest at 3,200 meters. This makes Addis Ababa one of the highest capital cities in the world. Addis Ababa has a total area of 540 square kilometers, surrounded by mountainous terrain. Although no major rivers run through or near Addis Ababa, the city's small rivers and streams have played an important role in shaping its shape. Addis Ababa has a subtropical highland climate with constant moderate temperatures, with an average high of around 23°C and an average low of 11°C throughout the year. The main rainy season, Kiremt, is from June to early October, with a short rainy season called Belg from early March to mid-April. The average annual rainfall is approximately 1200 mm, which almost 80% falls in the main rainy season (NMA 2017). Addis Ababa is one of two municipalities in Ethiopia with the status of an autonomous region under the national federal government system. Addis Ababa is one of the fastest growing cities in Africa and the primary city of Ethiopia, with a population of about four million people, about 25% of the country's total urban population and more than ten times the country's population. Adama, the second largest urban center (MoUDHC 2015), cited in Erena D. *et al.*, (2017) City profile. Historically, Addis Ababa is known for its rich biodiversity, but this has diminished in some places due to urbanization and overcrowding. Biologically rich habitats (forests and 2 wetlands) have been converted to other land uses, mainly settlements. Although countless habitats were destroyed, the local biodiversity (plants, animals, birds, fungi, etc.) still protected them. They provide important stopovers for migratory species. In addition, the city government promoted the greening of the city. Currently, the region has around 60 public parks and more than hundreds of nearby green spaces. Little is known about changes in the composition and distribution of biodiversity and the challenges it faces. To better understand and conserve urban biodiversity, cities need a way to assess and monitor changes over time so that appropriate management decisions can be made. Information about which species of populations are decreasing and which are increasing; which species have disappeared over time; and which species arrive for the first time in recorded history are critical for biodiversity conservation (AAEPA 2024).

## 1. Objectives

Modernizing the city's infrastructure and improving urban living are the goals of the innovative Addis Ababa city corridor development project and regional project development. To tackle environmental issues, encourage social inclusion, and improve transportation, the government has been striving intensively to reduce traffic, boost economic growth, and improve urban infrastructure. Therefore, the main goal of the corridor development project is to make the capital cleaner and more attractive visually for the benefit of its citizens while preserving its position as a major international diplomatic center, as the government official's report reveals. As a result, the purpose of this study is to examine the effect of corridor development projects in Addis Ababa, focusing on urban mobility, and social, and environmental features of the city.

## 2. Corridor development

Development corridor lines, development ribbons, urban axes, concentration axes, communication axes, and

development axes are some of the terms used to describe corridor development (Kgantisi *et al.*, Citation 2018). The terms ‘development’ and ‘axes’ are frequently used interchangeably to describe the concentration of social and economic activities at growth or development nodes along communication axes that connect them (Geyer & Steyn, Citation 1989) [7].

The idea of corridor development is not new, especially in developed regions. Conurbation, a new form of urban growth that occurred after the Industrial Revolution, is characterized by the linear development of cities. Modern urban corridors and this concept are very similar, but the latter is on a much bigger spatial scale. These corridors, which link two or more metropolitan centers via passenger and freight traffic, are composed of a range of infrastructure, such as highways, railroads, bus lanes, cycling tracks, river canals, and water and air links (Kar & Mayank Varshney, Citation 2021). Corridor development usually serves four important purposes: it promotes globalization, promotes regional economic integration, integrates economies across regions, and enhances the welfare of residents in affected regions (Kuroda *et al.*, Citation 2007; Venables, Citation 2007; Vickerman, Citation 2002).

Development corridors may be the result of transportation infrastructure investments, but only if they connect nodes that are mutually dependent and economically active. It might then serve as a catalyst for regional development. Transportation channels are hence the servants and conduits of development axes. Although transportation infrastructure alone cannot foster social or economic development, it can establish a development axis or corridor by connecting prosperous, interdependent nodes that generate traffic flow (Mulenga, Citation 2013).

### **Botanical horticultural plants activities as some of brother's construction**

Botanical horticultural plants are cultivated for food (fruits, vegetables, nuts), ornament (flowers, greenery), medicinal purposes, and other specialized uses like spices and plantation crops. Classification helps in organization, grouping plants by their economic use (like pomology for fruits), growth habit (trees, shrubs, herbs), or lifespan (annuals, perennials) to understand their cultivation needs. Examples include food crops like apples and carrots, ornamental plants such as roses and also coffee.etc

is an unavoidable nature to develop a sentiment of change and transformation whatever the creature may be, centering human beings and their environment of course, peculiarly in the era of trying spirit of contest. Not only does this concept work for human beings but it also signifies the state of places especially cities and towns of the world. There are a number of metropolitan cities across the world, which can grab the attention of local dwellers *let alone* foreigners and visitors coming from abroad.

Addis Ababa (New flower in local language Amharic) has been trekking on the right track to make itself suitable for its inhabitants and being an earthly heaven for working and living in it.

The national corridor development undertaking is being properly carried out with a view to helping cities and urban areas meet required standards and being competent enough with those of the developed nations of the globe.

Equally, building outdoor classrooms, debris collection and litter removal, creating trails in natural areas and painting

over graffiti have to be well focused on as they do definitely have great importance in helping cities like Addis Ababa, jimma Asosa, Ambo, jigiga, Nekimite and etc regional city and metropoloyen citites among others have well defined standards to be competent enough in all circumstances.

Most definitely, investing in corridor or beautification projects help make citizens' more vibrant, foster local pride, as well as encourage a range of socio-economic and tourism developments.

Ethiopia has announced a plan to upgrade Addis Ababa's infrastructure and transport networks as part of a broader effort to modernize the city. True, the urban beautification and green development initiatives are well underway. Drawing important lessons from the capital regarding project implementation and task division, many cities and towns of the country are working well along this line.

The project involves major reconstruction and promotion of the city's landscape, aiming to modernize the city's infrastructure and improve its transport networks.

These beautification projects aim at enhancing the cities' aesthetic appeal, promote tourism, and provide recreational spaces for the public, which could have positive economic and social impacts.

The integrated corridor development project is to befit the name Addis Ababa and the move continues at the same rate to make other cities and towns in the country appealing. Beautifying cities, urban areas and towns, apart from evolving the look and feel of the city of Addis Ababa and others will have a significant impact in contributing to the development of service economic sectors. The successful completion of the projects in Addis Ababa has encouraged and served as a benchmark for other projects to be replicated in other parts of the country that are the main sites for tourism.

No doubt, green legacy initiative is a national go green campaign, endeavoring to raise public awareness about Ethiopia's alarming environmental degradation, and educate the society on the importance of adopting green behavior.

As stated time and again, Ethiopia has been hoping to significantly increase its forest coverage, and it has been working hard mobilizing citizens to make a difference in all aspects.

Since, the major environmental issues such as soil erosion, deforestation and biodiversity loss are stressing the world, projects like tree plantation, city beautification, and capitalizing on green economy would be of instrumental in helping the nation in general and cities and town in particular gain attractive feature. Clean environments also attract motivation and courage to be fruitful.

### **Key Aspects of Greenery Maintenance Activities Watering**

Water truck watering Provide adequate water to plants, especially during hot periods. Deep, infrequent watering encourages strong root growth, while methods like drip irrigation deliver water efficiently to the root zone.

### **Lawn Care**

Mowing the lawn to an ideal height maintains its appearance and density.

### **Pruning**

Trim trees, shrubs, and other plants to maintain their desired shape, encourage healthy growth, and remove dead or diseased branches.

**Top soil (Fertilizing and compost)**

Apply fertilizers or organic amendments as needed to supply essential nutrients, but avoid over-fertilizing, which can harm plants.

**Weed Control**

Regularly remove weeds or use mulch to suppress their growth by blocking sunlight.

**Debris Removal**

Clear away fallen leaves, branches, and other waste to keep the green space tidy and healthy.

**Pest and Disease Management**

Monitor plants for pests and diseases, and take steps to control them to ensure plant health.

Lawn care can include the following activities: spring raking combined with aeration and scarifying, fertilization several times a year, usually in spring, summer and autumn with special fertilizers for autumn fertilization, not containing nitrogen, but mainly potassium and phosphorus, mowing usually twice a month, raking up the grass clippings, watering during the dry season, controlling weeds, reseeding grass in bare and trampled spots.

Maintenance of tall greenery comprises the following activities: removing tree suckers, removing dry and broken branches as needed, forming trees, removing weeds around young trees, watering young trees during the growing season, plant protection treatments against diseases and pests.

Greenery maintenance services also include tree cutting and removal of trees broken by the wind. Feel free to contact us! A professional will prepare a quote for the scope of work adjusted to the needs of your plants and dedicated to improving the safety of your green sTree treatment provides tree and ornamental flowers shrub treatment services.

A plant becomes diseased when three factors occur simultaneously: the right host plant, the right pest or fungus, and specific environmental conditions. Hence, if you know these three factors well, you can either prevent the disease or implement a strategy to combat it in advance. To make a diagnosis, you must know the biology of pathogens (wintering site, infection conditions, annual number of generations). If you don't know the pest, you cannot take effective steps.

For the right diagnosis, you must always assess the habitat conditions [habitat is the non-living elements of the ecosystem, i.e. the site (terrain, exposure and size of the biologically active area, etc.) along with soil factors (granulometric composition, chemistry, moisture content, etc.), climatic (e.g. rainfall distribution) and many others] and get to know the environment of the "patient" (remember, this cannot be assessed on the basis of uploaded photos).

**Technical pruning and corrective tree trimming to adjust the shape of trees**

Technical tree pruning is aimed at reducing branches that threaten people, buildings, power lines, technical equipment, etc. Corrective tree trimming is intended to reduce wind resistance, which helps improve the safety of the tree and reduces the risk of loss of balance, as well as ensures that light reaches certain levels of the tree. In

addition, such cuts reduce the weight of the trees and lower the centre of gravity.

**Sanitary pruning of trees (section: tree and shrub treatment)**

It is aimed at removing 100% of dead and diseased plant parts (branches and twigs with pruning shears, as well as dead cones) and mistletoe in order to reduce the infectious potential of pathogens and limit the development of diseases of trees and shrubs, as well as increase the effectiveness of spraying against fungi and pests. Improving habitat conditions and fine-tuning the above measures enable effective treatment and improvement of the health of trees and shrubs. tree and shrub treatment)

Tying and staking trees, introducing supports for branches at risk of breaking off, which are designed to maintain the tree's structure until the tree is healed and strengthened, or permanently.

**tree and shrub treatment**

Care of trees and shrubs is aimed at keeping the plants healthy and, in a way, at forcing them to bear better fruit and look neat. The main activities that make up tree care are corrective and maintenance trimming, but they also include proper fertilization, general tree care, treatment of infected plants, pest control, parasite removal, and much more.

**Tree species of botanical management care**

All tree care work is carried out with arborist equipment, that is, equipment that is adapted for maintaining and "servicing" trees. The tree care processes include:

- removal of boughs and branches that bear signs of disease;
- shaping trees from the earliest years of their life for the most impressive result. The most common type of trees subject to shaping are fruit trees;
- removal of damaged elements of trees caused by weather factors and conditions, as well as human activity and random events;
- removal of branches that threaten the health and life of people, as well as impede transportation and interfere with infrastructure (power lines, telephone lines, etc.);
- pruning crossed branches, that is, branches that are crossing paths with another branch;
- corrective pruning, affecting the appearance of the tree, as well as reducing the risk of subsequent trunk and branch breakage, tipping, and generally improving the safety of trees, and thus people and property.

Please bear in mind that pruning should be done in accordance with the art of arboriculture and horticulture. Improper tree "care" can cause permanent damage to plants, destruction or even complete death of trees.

**Watering management care plant treatment systems at brother's construction?**

Mainly because the construction of such a system does not require a lot of money, and offers a number of advantages. With an irrigation system, you will be able to automate the process, and save both time and the amount of water necessary to meet the needs of the vegetation located in the garden space. Manual watering of your plants is quite a cumbersome process, as it is time-consuming and uses up a huge amount of water, especially is large water truck by greenery plants and shrubs flowers, at greenery development at trees and flowers, grass watering

Schedule watering bot service – what do the systems offer brothers construction care treatment?

Watering systems offer the possibility of supplying water to vegetation both by the system being turned on manually and through a fully automated process. The most convenient option to guarantee low water consumption is one that uses controllers that turn the system on automatically thanks to a series of sensors, depending on the conditions in the garden. These solutions will make the garden stand out and will attract the attention of any passerby. Forest and Garden, by offering the garden irrigation service – Warsaw and the surrounding localities, will select an irrigation system based on the needs of the garden space and the client's preferences. We use proven methods to ensure that the project is completed quickly and efficiently. Investing in smart irrigation systems will pay off, save you a lot of your precious time and guarantee that a well-kept garden will become a unique place to relax and will attract the attention of your guests.

At each stage of implementation, we provide advice to ensure that the project is carried out in the best possible way, taking strictly into account the investor's recommendations. We do our best to make the irrigation system not only effective and easy to use, but also invisible in the garden space. Based on these guidelines, each of the systems that we install will perfectly fit the most complex projects, guaranteeing the satisfaction of each client.

The application must be accompanied by a drawing or map indicating the location of the tree or shrub in relation to the boundaries of the property and structures existing or under construction on the property; if the applicant is not the owner or perpetual usufructuary of the property, the application must also include the owner's consent to remove the tree or shrub.

### Urban Greening

Addis Ababa is actively involved in urban beautification and green development through initiatives like the planting of millions of shade, beautification, and fruit tree seedlings, with institutions and banks playing roles in their upkeep.

### Horticultural Sector Development

A collaborative effort led by focuses on enhancing the competitiveness and sustainability of Ethiopia's horticultural sector through capacity building for producers, cooperatives, and service providers.

### Sustainability

Ensuring the long-term sustainability of botanical gardens and the horticultural sector requires strategic conservation measures, habitat restoration, community involvement, and robust land-use planning to mitigate environmental and developmental pressures.

Ethiopia is undertaking a widespread "corridor development" initiative, not a physical "collider" development, to transform urban areas by upgrading infrastructure like roads, pedestrian walkways, drainage, and green spaces. Launched in Addis Ababa, this project aims to improve living conditions, create modern neighborhoods, and boost economic growth. The initiative is expanding to other cities, but it has faced criticism regarding resident displacement, compensation, and costs.

## What is the Corridor Development Project?

### Urban Transformation

The project focuses on revitalizing urban areas, including slum redevelopment, to create more "hospitable and livable" environments.

### Infrastructure Upgrades

Key components include constructing better roads, expansive pedestrian walkways, bicycle lanes, improved drainage systems, and more green spaces.

### Utility Modernization

The project also involves upgrading essential services like electricity and internet infrastructure.

### Scope

The initiative began in Addis Ababa and has since expanded to numerous other cities across the country.

### Collaborative Efforts

These brother's construction projects are a result of collaborative efforts involving the federal government, subcity zonal and city administrations, and public participation.

### Mixed Reception

While the government highlights improvements in infrastructure and quality of life, the projects have faced criticism from displaced residents and business owners, with concerns about lack of transparent compensation and forced evictions, according to hln.org and Amnesty International.

### Economic and Social Goals

The projects are seen as crucial for Ethiopia's economic resilience and long-term prosperity, aligning with the nation's focus on industrialization and creating a diversified, modern economy.

### Future Vision

"Human Collider" Concept: Beyond physical development, the initiative includes a vision for a "Human Collider" that aims to foster talent in coding and other tech-related fields to drive innovation and contribute to a prosperous Digital Africa,

ddis Ababa City Corridor project offers a range of corridor types designed to enhance urban mobility, accessibility, and aesthetic appeal. Each corridor incorporates features like strategic lighting, green spaces, and visually appealing designs that add beauty to the cityscape while ensuring safe, efficient, and sustainable passageways for all residents.

Implementing the measures identified requires a budget. It is essential to estimate the budget

### Select the Agro-Ecology

The agro-ecology of a site where the GC is established determines which measure, physical and biological, to select and apply. Some conservation measures are agro-ecology specific, and cannot be applied in all areas, and this includes tree/shrub species involved in biological measures

### Elements of Green Corridors

Green corridors, besides many socio-economic and ecological services, should allow safe movement of animals to facilitate gene exchange between and among anchor

points. To balance the different requirements of humans and wildlife GCs, similar to protected areas, can have three different zones: The core zone should have good, ideally native, vegetative cover and human presence is very limited. The core zone provides shelter for animals to rest while travelling through the corridor.

### Result

Recent studies and environmental reports indicate that greenery, vegetation, trees, grasses, and flowers are highly vulnerable to increasing summer heat and climate variability, experiencing significant stress, phenological shifts, reduced productivity, and in some cases, widespread die-offs. The rapid pace of climate change often exceeds the ability of plant species to adapt. The primary results for the impact of extreme summer heat on plant life highlight widespread disruption across various Ecosystems: Physiological Stress and Damage: High temperatures damage the photosynthetic machinery, denature proteins, and disrupt metabolic balance. Plants respond with mechanisms like leaf rolling, wilting, and stomatal closure to conserve water, which further reduces their ability to perform photosynthesis and cool themselves via transpiration.

### Reproductive Failure and Reduced Yields

The reproductive stage is particularly sensitive to heat extremes. High temperatures can cause pollen sterility, flower and fruit drop, and shorten the grain-filling period, development yields are expected to decline significantly with continued warming).

- **Phenological Shifts:** Plants are exhibiting earlier spring events (like flowering and leafing) and sometimes later autumn events due to warmer temperatures. These shifts can disrupt the synchronized interactions between plants and their pollinators, affecting the survival and reproduction of both.
- **Habitat and Range Shifts:** Plant species are shifting their geographical ranges toward the poles or to higher elevations to track suitable climatic niches. However, the rate of climate change is often too fast for natural migration, leading to range contractions and biodiversity loss in vulnerable areas like alpine and polar regions.
- **Increased Vulnerability to Other Stressors:** Heat stress often occurs alongside drought conditions, which exacerbates negative effects and increases mortality risk. Stressed plants are also more susceptible to pests, diseases, and the invasion of non-native species that can better adapt to the new conditions.
- **Ecosystem-Level Impacts:** Widespread tree die-offs have been observed in some regions after severe heat events, altering forest composition and function. For example, studies in western North America and Australia have documented extensive forest damage and mortality caused by heatwaves.

In summary, the pervasive and intensifying summer heat is acting as a major disruptive force on plant life globally, challenging the stability and function of natural and agricultural ecosystems.

Addis Ababa's approach to plantation maintenance, plant treatment, and greenery involves a mix of large-scale government initiatives (like the "Green Legacy Campaign"), the integration of indigenous and exotic species, and efforts to address significant urban development challenges.

### Discussion

Incorporating native trees and flowers into a greenery plan is a highly effective strategy for creating a sustainable, low-maintenance, and ecologically functional landscape. These species are specifically adapted to the local

**Reduced Maintenance Costs and Effort:** Native plants require significantly less human intervention to thrive.

**Water Conservation:** Once established, native species are typically drought-tolerant and can survive on natural rainfall, drastically reducing or eliminating the need for supplemental irrigation.

**Fewer Chemicals:** They have evolved natural defenses against local pests and diseases and are adapted to the native soil conditions, reducing the need for expensive and environmentally harmful pesticides and fertilizers.

**Less Pruning/Mowing:** Their natural growth patterns align with the local ecosystem, requiring less frequent pruning or mowing compared to conventional turf grass lawns.

**Enhanced Environmental Sustainability and Ecosystem Health:** Native plants are the ecological foundation of the local environment.

**Biodiversity Support:** They provide essential food (nectar, seeds, foliage) and shelter for local wildlife, including pollinators like bees, butterflies, and birds, which are vital for a balanced ecosystem.

**Soil Health & Erosion Control:** Their deep, extensive root systems help stabilize soil, prevent erosion, and improve water infiltration, which reduces stormwater runoff and protects local water quality.

**Climate Change Mitigation:** Native trees and plants help sequester carbon dioxide, a greenhouse gas, thus helping to combat climate change and reduce the urban heat island effect.

### Aesthetic and Economic Value

**Natural Beauty:** Native species offer a unique and authentic aesthetic that reflects the regional character, providing seasonal diversity and visual interest throughout the year.

**Cost-Effectiveness:** While initial planting costs may be comparable, the long-term savings on water, labor, and chemical inputs make native landscapes more cost-effective over time.

**Property Value:** Sustainable landscapes with native plantings can enhance a property's value and appeal to buyers who value eco-friendly the maintenance and plant treatment setup for a native plant landscape shifts from intensive, chemical-dependent care to management that supports natural processes.

**Initial Establishment:** New native plantings require some watering and weeding during the first one to two years to get established.

**Long-Term Care:** Once established, ongoing maintenance is minimal, primarily involving seasonal check-ups, occasional weeding of invasive species, and potentially annual mowing or burning (in appropriate settings) to manage growth.

In conclusion, utilizing native trees and flowers is a practical, sustainable, and responsible choice that benefits the project, the local ecosystem, and the community by creating resilient, self-sustaining green spaces.

The city's greening efforts are driven by the Addis Ababa City Administration Greenery and Butification bureau. The primary goals are to combat climate change effects (heat islands, flooding, air pollution), enhance biodiversity, and create recreational spaces for residents.

**Indigenous Trees and Flowers:** The city's current policies encourage the use of native species, recognizing their value for biodiversity, soil conservation, and cultural significance. Common indigenous trees include *Juniperus procera*, *Hagenia abyssinica*, *Olea europaea* subsp. *cuspidata*, *Cordia africana*, and *Acacia abyssinica*. Notable native flowers include the *Bidens macroptera* (Meskel Flowers) and the *Rosa abyssinica* (Ethiopian Rose).

**Exotic Species:** *Eucalyptus globulus* remains prevalent, particularly on the Entoto mountains, largely due to its fast growth and continued use for fuel and construction materials. However, there are efforts to replace it with native trees in some areas.

### Conclusions for Addis Ababa Green Projects

**Shift to Indigenous Species:** Studies confirm high survival rates and performance rated Planning Essential: A city-wide, holistic approach is crucial, integrating green spaces with grey infrastructure and connecting them via corridors, but current planning lacks this connectivity. **Implementation Gaps:** Significant challenges exist, including budget shortages, weak policy enforcement, lack of coordination, insufficient public awareness, and non-statutory plans that are easily ignored.

**Governance & Community:** Moving towards user-centered, participatory models and better institutional setups (public-private partnerships) is vital for sustainable management.

### Final Recommendation

For successful corridor development, focus on a legally-backed, well-funded strategy that emphasizes indigenous biodiversity, integrates green spaces into the urban fabric, fosters community involvement, and builds strong institutional capacity to manage these vital assets sustainably, moving beyond traditional, isolated approaches.

Measures for Green Corridor establishment those activities implemented in part or whole of the selected corridor routes to make it suitable to provide connectivity or linkage between anchor points in a landscape. The measures can be biological and/or physical. Either one or combination of both types of measures, depending on the landscape matrix,

may be required, and the preference is for measures that ensure multiple benefits with minimum cost. A range of physical and biological measures have been identified. The most appropriate measure is determined by several factors: that suit various agro-ecologies, land use and land ownership conditions, corridor elements, and as well as production targets measured.

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