THE EU BIODIVERSITY STRATEGY FOR 2030 AND THE ROLE OF LANDSCAPE ARCHITECTS TOWARDS THE PROTECTION OF THE ENVIRONMENT

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ABSTRACT

This essay's role is to underline, in simplified terms, the important role of biodiversity for all living creatures of this planet, the threats that put in danger both biodiversity and remaining ecosystems on Earth, and of course the catalytic role of human beings, not only towards the destruction of the planet's natural balances, but also towards the restoration of what is already lost and the protection of what is still left behind.

'EU Biodiversity Strategy 2030' is one of the most ambitious tools employed by the European Union towards the achievement of these goals, and landscape architects have a crucial role to play in it for the preservation and restoration of the natural ecosystem.Here, we intend to delve into some of the most significant measures our profession can consider to contribute towards a more resilient and healthier society.

KEYWORDS

Biodiversity, The European Green Deal, The New EU Nature Restoration Plan, Nature Based Solutions, Sustainable Urban Mobility

1. BIODIVERSITY

By the term 'biodiversity' we refer to the 'variety of life on Earth'. It refers to all existing species, such as animals, plants, fungi and microorganisms (i.e., bacteria), and includes all the evolutionary, ecological and cultural processes which may result from their collaboration within an ecosystem in order to maintain the balance in nature and to support life. The biodiversity we encounter today is the result of 4.5 billion years of evolution. Humans are a part of the existing biodiversity and absolutely depend on it, as they feed, live and breathe because of it.

The loss of biodiversity, which is going to result in an extended collapse of the planet's ecosystem, is one of the greatest threats that humanity is about to face in the following decade. Furthermore, this will result in reduced productivity for crops and fish, as well as in increased economic loss from floods and other natural disasters and, finally, in the loss of potential new sources of medicine.

2. THE HUMAN INFLUENCE

The privatization of natural resources on a global scale is driving ecosystems to rapidly lose their taxonomic, phylogenetic, genetic and functional diversity. The result is habitat and climate

change, as well as the spread of pathogens for plants and for animals. Human activity has already changed over 70% of the earth's surface which is not covered by ice.

3. THE IMPORTANCE OF THE NATURAL ENVIRONMENT

The natural environment is the basis for our mental and physical well-being, as well as for society's ability to cope with global changes, such as natural disasters and health threats, such as (SARs CoV-2, Ebola, HIV, wild animal-to-human transmission populations etc.). Healthy and resilient societies are characterized by their ability to allow nature to develop to the necessary extent. Pandemics such as the one that the world experienced in 2020 have raised public awareness on the relation between the human health and the health of the ecosystem. The risk of the emergence and spreading of infectious diseases increases as the natural environment is degraded. Therefore, it is essential to reinforce the resilience of the natural environment, in order to prevent the occurrence and spreading of disease in the future.

4. EUROPEAN GREEN DEAL (GD)

Over 50% of the world's GDP, which includes construction, agriculture, medicine, food and drink, depends on the natural environment. The EU's development strategy for the recovery of biodiversity focuses on ensuring that these parts of the economy continue to be of service to society and that society is going to return to the environment more resources than it extracts from. The Paris Agreement (2015) aims in limiting global temperature to less than 1.5°C above pre-industrial levels. On the Earth's surface, high temperatures have forced animals and plants to migrate to higher altitudes or to higher latitudes, causing the loss of native species and mass mortality. Furthermore, 85% of wetlands have disappeared. In the oceans, the risk of irreversible loss of marine and coastal ecosystems has increased.'

The European Union (EU) is going to be the first major economic organization to meet this target. The Green Deal (2019) functions as a roadmap in order to transform the EU into a fair and prosperous society without greenhouse gas emissions by 2050. The Green Deal defines the timetable which the Commission and its members are going to follow in order to reduce greenhouse gas emissions by 50-55% by 2030, aiming towards climate neutrality by 2050.

5. NEW EU NATURE RESTORATION PLAN

The New EU Nature Restoration Plan involves the improvement of existing and new protected areas and the restoration of diversity and resilience to the natural environment by reducing anthropogenic pressures on ecosystems, ensuring their sustainability, supporting natural recovery, limiting soil sealing and urban sprawl and dealing with pollution and invasive foreign species.
The European Green Deal strategy is developed according to the following two elements, which are able to positively affect biodiversity: Sustainable supply chains and the consumption methods of natural resources

75% of the Earth's surface has been modified, by significantly reducing the surface of natural environments. One million species are currently in danger of extinction. The biodiversity crisis and the climate crisis are inextricably linked. Climate change accelerates the destruction of natural resources through droughts, floods and fires.

The UN Biodiversity Summit, COP15 (Montreal 2022) has resulted into a significant agreement which aims at preserving biodiversity by protecting 1/3 of the planet by 2030.

5.1. The Role of Protected Areas and the Significance of Forests

Biodiversity manifests in more resilient forms in protected areas. However, the current network of legally protected areas is not large enough to preserve biodiversity. For the sake of the environment as well as the economy it is necessary to protect the natural environment to a larger degree.

It is crucial to protect at least 30% of the EU's surface, particularly areas of very high biodiversity value or potential, which are also the most vulnerable to climate change. On the contrary, at the moment only 3% of the land surface and less than 1% of marine areas are strictly protected in the EU.

Forests are an essential ally in the fight against climate change and biodiversity loss, as well as valuable ecosystems which accommodate a large part of Europe's biodiversity. Forest ecosystem services contribute to human health and well-being by providing food, medicine and raw materials, by reducing and controlling disaster risk, by stabilizing soil and by filtering air and water. Forests are a place of recreation, relaxation and education, as well as an integral part of human livelihood in general. Primary and older forest ecosystems have an exceptional ability to store carbon and remove it from the atmosphere.

5.1.1. Measures Towards Forest Protection

It is now vital to identify, to map, to monitor and to strictly protect all remaining primary-type forests in Europe. The completion of the Natura 2000 network is one of the most fundamental measures towards that goal. In addition, through the Trans-European Nature Network, the creation of ecological corridors is promoted, in order to prevent genetic isolation, to facilitate the migration of species and, finally, to maintain and reinforce healthy ecosystems. Furthermore, it provides the development of compensation systems for forest owners and managers, in order to maintain parts of their forests intact. Finally, this strategy is accompanied by a directive to plant three billion additional trees across Europe by 2030, while fully respecting all relevant ecological principles, such as the selection of suitable tree species and their positioning in the right place for the right purpose.

5.1.2. The Role of Landscape Architects in Forest Design

Landscape architects are able to bring forests closer to people in a meaningful way. Some of the most important tasks of their practice is preserving the natural areas which retain enough ecological value and reinforcing the experience and the bond between natural landscapes and people.

Designing woodlands from scratch is rare. However, the 'Metro-Forest Project' in Bangkok, Thailand, is an example of forest design produced by landscape architects, where an abandoned area of 4.75 hectares is now home to approximately 60,000 trees, of which 279 are unique species.

Some methods of forest design and restoration are:

5.1.2.1. The Introduction of New Clearings and the Management of Existing Ones in Order to Create Dynamic Environments, which Contribute Significantly to the Forest Experience, But Also Allow Sunlight to Reach Perennial Plants.

5.1.2.2. The Appropriate Design of Paths, Which are Able to Minimize the Impact of Visitors Walking Through the Forest.

5.1.2.3. The Creation of Scenic Viewing Points, in Order to Observe the Natural Forest Processes.

5.1.2.4. The Creation of Places in the Forest, with or without Structures, Visual Installations or Monuments, which are able to Offer Intimate Experiences to the Visitor, by Awakening Emotions, through Experience or Memory Recollection.

5.2. Natural Restoration of Agricultural Land

When pieces of land are used for agriculture, some animal and plant species may lose their habitat and face extinction. Therefore, farmers play a vital role in conserving biodiversity. In that way, they are able to produce safe, nutritious and affordable food, while earning the necessary income in order to thrive and grow. Part of the EU program is to cooperate with farmers and to encourage the transition to fully sustainable practices such as precision agriculture, organic farming, agroecology, agroforestry and stricter animal living standards.'

Birds and insects, particularly pollinators, are the key indicators of an agroecosystem's health and they are vital to agricultural production and food security. In order to allow more space for wildlife and other natural pest regulators in nature, it is necessary to restore at least 10% of agricultural land into a high-biodiversity landscape (permaculture). In that way, it is expected to increase agricultural production and to ensure better connectivity between habitats.

5.2.1. The Role of Agroecology

Agricultural systems, as they operate today, face particular environmental and health challenges, while the food security crisis is already a reality.

Food production contributes to 1/3 of global greenhouse gas (GHG) emissions, while the use of certain agricultural products, pesticides and practices contribute to soil erosion, biodiversity deterioration, environmental pollution and water depletion. The purpose of the GD is to reduce by 50% the total use of all kinds of pesticides by 2030. Furthermore, the use of the most dangerous pesticides has to be reduced by 50% and 25% of the EU's agricultural land has to be organic by 2030.

Agroforestry and agroecology, including regenerative agriculture as defined by HLPE, are able to provide healthy food, while maintaining productivity, increasing soil fertility and biodiversity and reducing the carbon footprint of the food production process. At the same time, it can be an important tool for resolving challenges and providing sustainable solutions to issues such as: food security and food quality, the fight against poverty and social inequality, adaptation to climate change, the preservation of biodiversity and natural resources and the fight against zoonotic diseases.

The principles of agroecology apply to all forms of sustainable food production, such as crop cultivation systems, stock-raising, fishing, agroforestry and aquaculture systems. At the same time, on a socio-economic level, the application of these principles contributes to improving gender equality, making agriculture more attractive to younger generations, offering a decent income and building strong and innovative communities.

5.2.2. Introduction to 'Permaculture'

The term 'Permaculture' was introduced by Australian ecologists Bill Mollison and David Holmgren in the 1970s and refers to a holistic system of agricultural planning which imitates systems found in nature. Its purpose is to create sustainable communities and food production systems which are harmoniously integrated within the natural environment. The term 'permaculture' originates from the abbreviation of 'permanent agriculture' and 'permanent culture'.

The essence of this practice is the complementary relationship of all individual elements, in order to form stable and productive communities, which reproduce the synergy and efficiency that is found in natural ecosystems. At the opposite end, there is the practice of 'monoculture' which is the cultivation of a single species each time on a specific piece of land.

Permaculture is based on three very simple principles: caring for the planet, caring for people and the fair distribution of natural wealth between human beings and the environment.

5.2.3. The Role of Landscape Architects in Agroecology and Urban community Gardens

'Permaculture design' may be applied to both urban and rural environments and encompasses all scales, from an apartment balcony to a farm. On a domestic scale, it includes among others the cultivation of vegetables, fruits and aromatic plants or medicinal herbs, outdoors as well as indoors, either at ground level or on rooftops and terraces. Landscape architects are able to integrate this form of cultivation into the urban fabric, through the creation of community vegetable gardens:

5.2.3.1. In Abandoned Public Plots - Urban Voids.

5.2.3.2. On Green Roofs of Public or Private Buildings.

5.2.3.3. In School Facilities (school gardens), with the Participation of Teachers and Students During Environmental Education.

5.2.3.4. On Private Plots, Designated as Agricultural Zones and Located Mainly on the Fringes of Urban Areas.

5.2.3.5. In Urban Parks or Theme Parks.

Historically, urban vegetable gardens appeared for the first time in the 1960s, connected to the trend of environmentalism, which was increasingly strong at the time, and movements fighting for a more natural, fair and caring world. Since then, community gardens have developed much more than arable plots. Transforming empty urban spaces into productive, community gardens has positively contributed to improving people's mental and physical health, through exposure to nature, healthier food sources and an increased sense of community. There are many citizens who occupy an active role in community vegetable gardens, while the municipal authorities themselves are beginning to include them in the municipality's sustainability urban plans.

5.3. Restoration of Soil Ecosystems

Soil is one of the most complex ecosystems, as well as an extremely important and non-renewable resource, vital to humans as well as to the economy. Whether natural or man-made, soils have physical, environmental and chemical properties. Physical properties include organic

matter, water, drainage and aeration. Environmental characteristics include light and temperature and chemical properties include pH balance and the presence (or absence) of phosphorus, nitrogen and potassium.

Poor land management, such as deforestation, uncontrolled overgrazing, unsustainable agricultural and forestry practices, construction and soil sealing, are some of the main causes of degradation for soil ecosystems. Erosion and the loss of organic carbon are increasing. Desertification is a growing threat in the EU.

Experts attending the 15th Conference of the Parties in the United Nations Convention to Combat Desertification (Abidjan, Cote d'Ivoire) have called for urgent action to address drought and various other threats to soil's health worldwide. Conference reports have showed that there has been a 29% increase in the occurrence of droughts since 2000 and that 75% of the world's population is going to be affected by severe droughts by 2050 if immediate action is not taken.

Some of the necessary measures against soil degradation are:the protection of its fertility, the increase of its organic matter, the identification of contaminated soils and soil restoration**.**

1/3 of the Earth's soil surface is already degraded and 3.2 billion people are facing the negative effects. The earth’s soil, which is the most significant kind of natural capital which is passed down from generation to generation, is experiencing an incalculable destruction and, the longer the delay in finding a solution, it becomes increasingly costly to restore.

5.3.1. The Role of Landscape Architects in the Protection of Soil Ecosystems

It is crucial that landscape architects identify the appropriate soil types and that they create successful design and management strategies, such as measuring soil structure and determining its permeability, in collaboration with other soil scientists, such as soil engineers. Through online soil research, landscape architects are able to study soil maps, to collect samples and examine them in a laboratory, in order to understand and solve its problems. ‘Planting Soils for Landscape Architectural Project’ is an important technical manual, which explains how to apply modern soil techniques in order to create sustainable soils for natural landscapes, through a series of technical approaches related to soil management.

5.4. Reinforcing Urban and Peri-Urban Green

Although cities correspond to less than 3% of the earth's habitable surface, they are actually responsible for 75% of global CO2 emissions, mainly due to the excessive use of grey infrastructure.Green urban spaces offer a variety of benefits related to physical and mental health, opportunities for business development and they create a refuge for nature. At the same time, they reduce air pollution, filter noise, provide protection from extreme events such as floods, droughts and heat waves and, finally, they reinforce the relationship between man and nature. However, the percentage of the population who chooses to live in urban areas increases drastically and, unfortunately, green spaces often lose priority against grey infrastructure.

5.4.1. Nature Based Solutions - BGI

The combined application of blue and green practices in public infrastructure, BGI (Blue Green Infrastructure), combined with the application of Nature Based Solutions (NBS), is able to promote sustainable solutions for friendly, resilient and adaptable cities for future generations.

NBS solutions are ‘in synergy with nature’ and include actions intended to protect, to sustainably manage and restore natural ecosystems and biodiversity, to protect human well-being on a physical and economic level and to focus on risk management from natural disasters. They are, essentially, a network of urban and peri-urban interconnections with nature, which provide ecosystem services that support human well-being and quality of life.

According to current estimations, it appears that nature-based solutions are able to provide nearly 37% of the results needed until 2030 in order to achieve the Paris Agreement goals.

Integrating BGI into urban central areas contributes to the sustainable management of storm-water, erosion processes, heat waves and droughts, improves air and water quality, reduces noise and visual pollution and increases biodiversity and the provision of cultural services.

BGI refers specifically to the integration of "blue" and "green" elements, in order to establish sustainable urban infrastructures, which are more resilient to climate and weather changes. In a way, it is an urban planning approach where infrastructure design aims to facilitate the natural water cycle within the urban environment and have a direct positive impact by providing ecosystem services such as reduced air pollution and more efficient water management in the irrigation of urban green spaces, such as urban parks, in the supply of local drinking water and in the prevention of flood disasters.

*Grey infrastructure consists of urban constructions, such as buildings, roads, dams, parking areas with impermeable materials etc.
*Blue infrastructure consists of structures based on water features, such as rivers, canals, lakes, wetlands, floodplains, water treatment facilities, waterways, rain gardens, wetlands, permeable pavements etc.
*Green infrastructure (GI) consists of a designed and managed network of multifunctional green spaces which are able to provide a healthy living environment. This network may consist of single trees or clusters of trees, natural ground cover, hedgerows, parks, fields, woodlands, vertical gardens, roof gardens, nature reserves, pocket parks, cemeteries, green corridors, playing fields, floodplains, country parks, rainwater harvesting, forests etc.

Some examples of Nature-Based Solutions are:

5.4.1.1. Planting Trees in Cities and Creating Urban Parks

in order to absorb carbon. By providing shade, trees are able to reduce the temperature around them and mitigate urban heat islands and heat pockets in cities, which are formed as a result of accumulation of solar energy and reflection on hard surfaces. Consequently, this method is able to save up to 10% of local energy consumption by moderating the local climate. Furthermore, it has been observed that urban planting is able to increase property values between 5-15%, reduce crime, improve air quality by reducing traffic and emissions by 60% and contribute to storm-water management. It is possible to facilitate urban tree planting through the European Urban Green Platform, in the framework of the LIFE program.

5.4.1.2. Restoring Natural Soil on Slopes in Order to Prevent Landslides

For example, building and planting terraces with vegetation which stabilizes the soil and controls erosion, increases soil moisture and reduces runoff.

5.4.1.3. Planting Trees Along Coastal Areas

(i.e., mangroves), in order to protect human lives and properties during storms and provide habitat for fish, birds and other plants which enrich the local biodiversity.

5.4.1.4. Creating Urban Wetlands

which reduce the risk of flooding by retaining excess water, a phenomenon which has severely intensified due to climate change and sea level rise. Furthermore, wetlands sequester carbon, regulate the local climate and reduce the use of air-conditioners in the surrounding areas. Finally, they improve water quality, participate in wastewater treatment and provide refuge for wildlife.

5.4.1.5. Converting Former Landfills into Recreational and Clean Energy Production Parks.

Their topography is often ideal for solar or wind parks, or for a variety of sports fields, while at the same time they are able to offer picturesque views to their visitors.

5.4.1.6. Creating Urban Vegetable Gardens, Friendly Towards Pollinators.

5.4.1.7. Creating Accessible Urban Green Corridors in Combination to Rehabilitation Plans for Degraded Urban Rivers.

5.4.1.8. Introducing the Design of Green Roofs and Vertical Gardens.

5.4.1.9. Investing in 'Rain Gardens',

which are small, customized green areas, where rainwater is collected and simultaneously filtered through the soil in order to remove pollutants and other sediments.

5.4.1.10. Investing in Load-Bearing Pavement Support Systems

which provide ideal soil conditions for the development of root systems. Not every soil structure is favorable for the growth of plants and trees. The soil in urban areas rarely provides a suitable environment for plant growth. Soil compaction, lack of aeration, poor drainage, low nutrient levels and the presence of soil contaminants slow down root growth and make it nearly impossible for flora to establish successfully.

5.4.1.11. Investing in Sustainable Drainage Systems

5.4.1.12. Investing in the Development of Root Barriers

which divert roots downwards to a level where they can safely grow without surface damage.

5.4.1. Urban Heat Island

The heat island effect affects urban areas which display higher temperatures compared to their surrounding peri-urban areas. Structures such as buildings, roads and other "grey" infrastructure absorb and reflect back the sun's radiation to a larger degree compared to green surrounding areas.

Some of the main reasons which are able to increase temperature within the urban fabric of a city are the following:

5.4.1.1. Heat-Storing Materials

Dark surfaces (with low albedo) absorb more energy from sunlight compared to lighter and more reflective surfaces (with high albedo). The absorbed energy is then released as thermal energy to the atmosphere.

5.4.1.2. Lack of Trees and other Types of Vegetation.

Trees and vegetation in general, as well as natural soil, absorb and release moisture through evapotranspiration. In addition, they offer shade which has a cooling effect.

5.4.1.3. Tall Buildings Have the Ability to Create an "Urban Canyon" which blocks the flow of air, provides ventilation and cools the air above street level. It also prevents thermal energy emissions from being released into the atmosphere and creates a more comfortable microclimate.

5.4.1.4. Densely Populated Urban Areas accommodate heat-emitting devices such as vehicles and air-conditioners, resulting in additional heat concentration and contributes to even higher temperatures in urban areas.

5.5. Restoration of Marine Ecosystems

The loss of marine and coastal biodiversity is seriously affected by global warming. Environmental management of marine ecosystems needs to incorporate, among other methods, the establishment of strictly protected areas and the restoration of ecosystems which are rich in carbon and of important fish spawning areas. Marine resources need to be harvested sustainably and it is necessary to have zero tolerance for illegal practices such as unregulated fishing.

Healthy fish stocks are key to the long-term well-being of fishermen as well as to the health of oceanic ecosystems. Finally, protecting coastal wetlands could reduce insurance costs around €50 billion per year by preventing flood damages.

5.5.1. The Role of Landscape Architects in Marine Ecosystems' Restoration

Landscape architects have finally embraced the environmental and social challenges related to marine ecosystem protection. Historically, landscape architects have perceived water systems patterns as static ecosystems, which has contributed to a tendency towards creating seawalls and levees as flood defense. However, recently it has become clear that these water systems are definitely not static and therefore coastal planning is progressively imitating natural processes, by taking into account the dimensions of time and space and integrating ecological processes in the landscape.

This is achieved through the elaboration of designs which blur the boundary between land and water in favor of more resilient conditions, based on the planting of forest and shrub areas, creating barriers for strong winds, reducing erosion and protecting community assets, by utilizing canal systems, protective wetlands and living materials.

The "Sponge City", by Kongjian Yu, is a typical example and it is adapted to areas where immediate and effective flood control mechanisms are needed. It includes the design and

construction of a system of wetlands, lakes and parks which maintain rainwater in the city. According to the designer, “in cities, we can use nature to retain water so it doesn't drain away up to 60% and, if designed properly, it's a democratic water management system which consists of local solutions. Flooding in the era of climate change is an opportunity for landscape architects to develop an approach that resolves water-related issues, not with concrete pipes and cisterns, but with natural methods".

The key elements of the sponge city approach focus on the fact that it is possible to capture rainwater through the use of green infrastructure. These systems which act as "sponges" need to be evenly distributed throughout the urban fabric, so that they are able to absorb water on site, instead of transporting it further.

5.6. Restoration of Freshwater Ecosystems

Wetlands, rivers and floodplains are among the most important natural elements which support particularly diverse habitats and wildlife, although they occupy a relatively small area of the landscape (less than 1% of the Earth's surface).

Landscape architects are able to restore or to establish new freshwater ecosystems. Designed as part of larger conservation zones, catchment areas or watersheds, these projects explore the design of the border between land and water, as well as the tension between natural systems and the built environment. In this case, the basic design tools are the removal or the adaptation of physical obstacles which impede fish migration and the flow of water and sediments, the improvement of water quality, the removal of foreign, invasive species, the implementation of measures against soil erosion and the installation of appropriate planting in order to restore biodiversity.

A floodplain is a generally flat area of land which is located next to a riverbed. It is flooded with water during periods of high-water discharge from the adjacent river. Its surface may be significantly wide and extends from the edge of the riverbank to the edge of the valley. Wetlands are a type of floodplain.

These ecosystems play an important role in reducing flood risks and are also the natural habitat of many endangered species. By retaining water, floodplains are able to limit the impact of heavy rainfall and in that way protect communities and their economic activities from flood damage.

5.7. Pollution Reduction

Biodiversity is threatened also from the extreme use of chemical pesticides, pharmaceuticals, hazardous chemicals, municipal and industrial sewage and other waste, including plastics.

Air pollution is the most serious environmental health risk in Europe, despite the fact that air quality has improved in the recent decades. Although in most parts of Europe, it is not possible to see, feel or smell the atmospheric air, air pollution still causes premature death for nearly half a million Europeans. Vehicle traffic is by far the dominant source of global commercial emissions. Particulate matter (PM), nitrogen dioxide (NO_2), Sulphur oxides (SO_x) and ground-level ozone (O_3) are the pollutants that cause the most severe damage to human health and to the environment in Europe. The main sources of these pollutants are vehicle traffic, domestic heating, agriculture and industry.

The aim of the European Green Deal is to achieve a cleaner atmosphere by 2030 and zero pollution by 2050.

The following changes are proposed regarding the transportations sector:

5.7.1. More Effective Control of Air Pollutant Emissions Originating from all New Vehicles.

5.7.2. Updated and Stricter Emission Limits.

5.7.3. Stronger Regulations on Micro-Plastic Emissions from Brakes and Tires

5.7.4. Increase in the Amount of Time in Which New Cars Need to Remain 'Clean'.

5.7.5. Rapid Development of Electric Vehicles with New Rules which will Regulate the Durability of The Batteries Installed in them.

5.7.6. Use of Digital Tools Inside A Vehicle, Such as Sensors, in Order to Measure Emissions Throughout its Lifetime.

5.7.7. Finally, It is Possible to Dramatically Improve Air Quality in Urban Areas by Reducing Car Traffic and Changing Our Current Mobility Patterns.

5.8. Sustainable Urban Mobility

Vehicle emissions account for around 25% of the EU's total greenhouse gas emissions and the role of urban mobility holds a special place in the European Green Deal.

Through the European Urban Mobility Framework, published by the European Commission, measures are proposed so that cities are able to meet the challenge of making their mobility systems more sustainable and of shifting the focus from vehicles to people, through the use of urban planning and digitalization.

Some of the measures which are proposed in relation to sustainable urban mobility are the following:

5.8.1. The Reinforcement of Micro-Mobility, which is the Use of a Variety of Vehicles Whose Speed Does Not Exceed 45 Km/H, Such as Electric Scooters and Bicycles.

5.8.2. The Replacement of Private Vehicles with an Interconnected Multi-Modal Transport System, Through the Use of Technology and Applications, Which Combine All Available Transport Options Such as Taxis, Public Transport, Shared Cars, and City Bikes in a Single Mobile Phone Service (E.G., Whim By Maas).

5.8.3. Modelling and Simulating Passenger Travel Flows Through the Use of Detection Technologies Such as Cameras, Radar and Traffic Meters and Data from the Internet and Smartphones.

5.8.4. The Overall Reduction in the Number of Private Vehicles and the Development of Pedestrian and Bicycle Paths.

5.8.5. The ±15-Minute City: Human-Centered Design in Action and Mobility for More Sustainable Urban Spaces with Identity and Inclusiveness.

Fueled during the COVID-19 pandemic, the idea of an accessible city where people are able to walk or cycle everywhere from home within 15 minutes has become particularly attractive. As a result, through the interaction of pedestrians with each other and also with the urban environment which they use, it is now possible to revive urban neighborhoods, mainly urban historic centers, to stimulate the sense of security and belonging and to promote better environmental practices, such as the reduction of the use of private cars and therefore carbon emissions, of noise pollution and the overall improvement of air quality.

One of the main objectives of this concept is to regain the time spent on commuting to and from work in more personal activities, which improve mental well-being and physical health, through active ways of mobility and physical activity. Finally, economic benefits are also important, on a micro- as well as on a macro-economic scale.

The designer of this model was Carlos Moreno and it was highlighted by Anne Hidalgo in the wake of the pandemic in 2020, during her electoral campaign as Mayor of Paris. Today, it is one of the most discussed topics in urban planning, in practice as well as in academia. The key design principles focus on:

5.8.5.1. The Equal and Fair Planning of Infrastructure for All.

5.8.5.2. The Accessibility and Proximity to Basic Services and Public Transportation.

5.8.5.3. Mixed Land Use, Depending on the Population Density, which is Able to Support Local Business and Services with a Specific Number of Customers.

5.8.5.4. The Extension and Connectivity of Pedestrian Networks (Walkability) and Bicycle Networks (Cyclability), Which Guarantee the Interconnection of All Areas within the City.

5.8.5.5. The Creation of Sustainable Public Spaces, Through 'Placemaking' and 'Tactical Urbanism'.

5.8.5.6. The Concept of the 'School Street'.

The starting point of a sustainable city is to guarantee the health and safety of its most vulnerable inhabitants: children.

When the route to school is safe, families prefer walking or cycling instead of using a car. This means that over the years, children are able to develop a sense of independent and alternative mobility to the car as adults. In addition, their freedom to move and play in their immediate neighborhood without adult supervision is strengthened and increases their chances of meeting classmates and practicing their social skills.

Focusing on the urban environment and especially on school mobility, architects, landscape architects, urban planners, communities and various other actors, are able to contribute, through the process of participatory design, to the development of solutions based on playing, exhibitions, workshops and educational programs, in order to raise awareness and reinforce society's acceptance towards smart and sustainable mobility solutions around schools.

Such workshops are able to formulate policy recommendations for school commuting strategies and encourage citizen and especially youth representation in policy-making for sustainable urban

planning. The introduction of the "School Street" in school environments is an example of the above process.

This is a temporary and exclusive street for pedestrians and bicycles, which functions during the dropping off and the picking up of children from the school entrance and is usually implemented through the use of temporary barriers. School streets are a safe environment for children, which promotes independent mobility, reduces local congestion and, at the same time, improves air quality.

5.9. Dealing with Foreign Species

Invasive foreign species are plants, animals, pathogens and other organisms which are not native to an ecosystem and may cause significant economic (i.e. crops) or environmental damage, by negatively affecting biodiversity and human health and facilitating the emergence and spreading of infectious diseases. Even a small number of these species is able to become immediately invasive. Their seeds are disseminated by wind, water and wildlife and their dispersion is accelerated by their root system and, finally, by human involvement.

5.9.1. The Role of Landscape Architects in Dealing with Foreign Species is Based on

5.9.1.1. Increasing Public Awareness Regarding Local, Regional and National Foreign Species and Proposing Suitable Control Measures.

5.9.1.2. The Cooperation Between Landscape Architects, Ecologists, Horticulturists, Nurseries, Botanical Gardens, Public Services and Organizations Related to the Detection of Invasive and Potentially Invasive Species and the Development of Effective Management Plans, Creation of Sustainable Public Spaces, Through 'Placemaking' and 'Tactical Urbanism'.

5.9.1.3. The Selection of Non-Invasive Species for Landscape Projects.

5.9.1.4. Encouraging Nurseries and Suppliers to Provide Only Non-Invasive Plants.

5.9.1.5. The Implementation of Plans for the Control and Elimination of Existing Invasive Plants within the Project Facilities.

5.9.1.6. The Cooperation with Local Organizations in Order to Develop or to Revise Local Guidelines which are Related to the Use and Dispersion of Invasive Species.

5.9.1.7. Encouraging Elected Officials to Fund Research and to Provide a Specific Budget Related to the Control and Removal of Existing Invasive Species which Threaten Parks, Open Spaces, Woodlands, Wetland Ecosystems Etc.

5.9.1.8. The Establishment of Environmental Programs which are Able to Educate Citizens About the Environmental, Health and Economic Effects of Invasive Plants.

6. CONCLUSION

Protecting and restoring biodiversity is the only way to maintain the quality and continuity of human life on Earth. The commitments proposed through this strategy pave the way for

ambitious and necessary changes which are able to ensure the physical and economic well-being of current and future generations in a healthy environment.

The work of the European Environment Agency (EEA) has shown that unsustainable production and consumption systems, especially those related to food, mobility and energy, lie at the core of sustainability challenges, including pollution. These systems are deeply rooted in our lifestyle and cannot be changed overnight. However, for the first time in modern history, we have the means to generate energy, travel and grow food without polluting the environment. We do not have to accept pollution anymore as an inevitable by-product of progress.

It has been proven that it is possible to make progress with firm and binding legislation. When harmful technologies are forbidden, it is possible to find alternative, better ways of operating.
The transition to a circular economy, as a framework for solutions which address global challenges, is able to reduce pollution, reinforce the economy and lead to more sustainable production and consumption solutions. European industry is becoming cleaner, advanced wastewater treatment is reaching more and more communities, and agricultural practices are evolving.

"Never again" is a phrase that the human species needs to repeat to itself on a regular basis.

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