

Designing Resilient Ecosystems:

The Future of Landscape Design According to Mario Rossi

Interview Brief – Greenitaly 2026

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What role do plants play today in the design of parks, gardens and green spaces? How does the choice of plant species contribute not only to the aesthetic quality of projects, but also to their environmental, social and landscape functions?

Today, the profession of landscape architect – and, as in my case, that of a forestry scientist working internationally – has definitively moved beyond – or should have done so quite some time ago, judging by what I see around me – the concept of design for the sake of mere ‘embellishment’.

Here at ambientStudio, our masterplan and design firm, we no longer design simple plant-based ‘scenery’ or ‘street furniture’; we design ecosystems, living infrastructure and, as defined by the Fifth United Nations Environment Assembly, in line with so-called Nature-Based Solutions (NBS).

NBS are “actions aimed at protecting, conserving, restoring and sustainably managing terrestrial, freshwater, coastal and marine ecosystems – both natural and modified – that address social, economic and environmental challenges in an effective and adaptive manner, whilst ensuring human well-being, ecosystem services, resilience and the benefits derived from biodiversity”.

Plants have always been the most sophisticated ‘technological’ material available to us as human beings to meet our basic needs for sustenance, shelter and construction; and today, more than ever, they are also essential for tackling the challenges of climate change and regenerating the urban fabric. The choice of plant species is at the very heart of this approach and operates on three fundamental levels, where aesthetics is the end result of a highly functional process.

1. Environmental Function: Green Infrastructure

In agriculture and forestry – and now also in landscape architecture in the broadest sense – a plant has always had to ‘work’. The selection of species is based not only on hardiness, but on the ecosystem services that a community of plants can provide:

Microclimatic Mitigation: The choice of trees with specific crown structures and transpiration rates is crucial for combating the Urban Heat Island (UHI) effect. Trees do not merely provide shade; they also cool the surrounding air through evapotranspiration and absorb various substances such as dust and chemical elements, including lead, cadmium, chromium, etc.



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Stormwater management (SuDS): Instead of channelling rainwater into sewers, we use interception systems – what the British call ‘rain gardens’ and ‘bioswales’ (bioretention basins). Here, the focus is on species capable of tolerating both periods of temporary flooding and prolonged drought, whilst filtering out pollutants carried by runoff and slowing its flow.

Supporting biodiversity: Monocultures of lawns are outdated and unsustainable.

We incorporate mixtures of herbaceous plants, grasses and shrubs (both native and non-native – used with the utmost caution – provided they are non-invasive and adaptable) to create complex habitats, ensuring staggered flowering periods that support pollinating insects and birdlife.

2. Aesthetic Evolution: From ‘Still Life’ to ‘Dynamic’

Contemporary landscape aesthetics have moved away from the geometric rigidity of the past to embrace ecology. We no longer seek a static image, but celebrate the cycle of life.

The Fourth Phase (Time): We design with the passing of the seasons in mind. Beauty also lies in dynamism: think of the blossoming of Kanzan cherry trees in Japan or the emergence of bulbs in spring (the daffodils distributed in New York by New Yorkers for Parks – 25 years of activity!), the summer foliage, the autumn colours and, above all, the architecture of seeds and dried stems in winter – a principle well known to all our farmers and esteemed gardeners: beautification and functionality, coordinated planting, the preservation of ecological corridors, the importance of headlands, resilience, hardiness, maintenance, and so on. All these technical foundations have since been adopted by the Dutch Wave and similar movements.

Structure and Texture: The combination of plant species is based on the contrast of leaf textures, on volumes and on the plant’s reaction to light or wind, creating dimensions and landscapes that engage all the senses and the beings around them.

3. Social and Landscape Value: Reconnection

Urban greenery has a profound impact on public health and social cohesion.

Biophilia and Well-being: Spaces designed with high plant diversity reduce stress, lower blood pressure and improve concentration (a phenomenon studied as Attention Restoration Theory).

‘Healing gardens’ in hospitals – (Roger Ulrich, 1984) – are a clinical example of this, alongside Forest Therapy – see examples from the Japanese Forest Therapy Society as well as from our own CNR and CAI.

Identity and Genius Loci: At the landscape level, plants tell the story of the local area. The skillful use of plant species helps to bridge the gaps between town and country, creating seed banks, unique gardens – such as that of Archeologia Arborea – and ecological corridors that reinforce a place’s cultural, gastronomic and geographical identity.

Green spaces serve a wide variety of purposes: recreational, tourist, sporting, industrial or urban. What are the main differences in the design approach and the selection of plant solutions depending on the different intended uses?

In landscape design and contemporary urban afforestation, the guiding principle is 'performance-based design'. In theory, we would like to – and indeed should – carry out a careful cost-benefit analysis to guide and justify – economically – the best choices, taking into account the value of the area and the budget available, whilst considering complex factors such as the economic, social, historical and public benefits of the initiative – all aspects that the standard public administration usually overlooks when it comes to public green spaces (and I am prepared to be surprised), but one need only look at competitive tendering processes, and so on.

A green space is not a standard, replicable format; it is a living, 'bespoke' infrastructure that must absorb specific anthropogenic, ecological and management-related pressures.

The intended use dictates the design constraints (construction and maintenance budgets, footfall, pollution, safety), which in turn scientifically determine the botanical selection and the engineering and agronomic choices.

This is how we differentiate our approach across the main operational scenarios.

1. Urban Settings (Squares, Avenues, Neighborhood Micro-parks)

The city is an extreme environment for plants: compacted soils, limited root volumes, urban heat islands (UHI) and noise and air pollution. Greenery here must become 'technological' and must be designed to be resilient.

Design approach: Maximising ecosystem services (shade, PM10 filtration, stormwater management) in minimal spaces. Technologies such as soil cells are used to ensure explorable root volume beneath paving. We also design and specify underground water storage basins, concealed anchoring systems and protective grids.

Plant selection: Pioneer or highly adaptable species, resistant to water stress and pollution (e.g. *Celtis australis*, *Ginkgo biloba**, *Zelkova serrata*).

Preference is given to trees with tall canopies so as not to obstruct vehicular and pedestrian traffic, excluding species with fragile branches and specimens with *slippery, fleshy fruit.

2. Recreational Areas (Public Parks, Play Areas)

These spaces must withstand intensive human use, whilst ensuring safety and physical and psychological comfort. Green spaces are social and inclusive, and designed with safety—including visual safety—in mind, to facilitate the movement of law enforcement officers and members of the public.

Design approach: Creation of distinct micro-environments (play areas, shaded rest areas). The design of pathways regulates foot traffic to prevent damage to the turf.

Plant selection: Focus on trees with large, spreading canopies (e.g. *Platanus*, *Quercus*, *Tilia*) to maximise dust retention, minimise pollen release and maximise summer shade. Toxic species (e.g. *Nerium oleander*, *Taxus baccata*), thorny plants or those that are highly allergenic are strictly avoided. Grass surfaces require hardy mixtures with high tolerance to foot traffic (e.g.

Festuca arundinacea).

3. Sports Facilities

Here, aesthetics take a back seat to pure biomechanical performance. The turf is highly technical and intensive.

Design approach: Soil engineering (topsoil profile, drainage, precision irrigation systems) is paramount. The substrate is often sandy to ensure permeability and resistance to compaction.

Plant selection: Exclusive use of grass cultivars selected for their extremely high wear resistance and rapid regeneration capacity (e.g. *Cynodon dactylon* and *Paspalum vaginatum* for warm climates, *Lolium perenne* and *Poa pratensis* for cool climates). The level of maintenance required ranges from intensive to extremely intensive.

4. Industrial Estates and Infrastructure (Motorways, Landfills)

The role of greenery in these contexts is purely engineering and environmental. Greenery always serves a mitigating and restorative function. Consider 'Naturalistic Engineering', which we always recommend in preference to the conventional, concrete-based solution.

Design approach: Design of buffer strips for visual, acoustic and odour mitigation. The focus is often on phytopurification and phytoremediation (soil or water remediation using plants) and on the creation of ecological corridors in degraded areas.

Plant selection: Fast-growing, hardy species, often native to encourage the spontaneous establishment of wildlife. Hyperaccumulator species capable of extracting heavy metals (e.g. certain species of *Salix* or *Populus*) or dense shrub belts (e.g. *Viburnum*, *Cornus*) are used to filter particulate matter and reduce noise. Maintenance must be minimal (low-maintenance).

5. Tourist, Historic and Prestigious Spaces

Botanical gardens, parks of historic villas, resorts and prestigious central areas. Here, greenery is a defining feature and creates a spectacular setting.

Design approach: Enhancing the Genius Loci or seeking the 'wow' factor. The design guides the visitor's experience, with a very high level of architectural detail and a substantial maintenance budget.

Plant selection: Priority is given to formal appearance, botanical rarity, continuous flowering and leaf textures, the revival of species from obscurity – often going against market trends, for example by contacting botanical gardens and horticultural centres, as seen in the restoration of lemon houses and rose gardens, and in our beautiful Italian-style gardens, their 'ragnaie'.

Consider the importance of education in traditional techniques, such as topiary art using *Buxus* or *Taxus*, or the contemporary naturalistic approach with extensive stands of perennial herbaceous plants).

Plants are true 'actors' on a stage.

Climate change is also posing new challenges for the green sector. How are designers and landscape architects responding to issues such as resilience, water management, biodiversity and the adaptation of plant species?

Climate change has significantly altered the botanical foundations and design manuals of the last fifty years. For us professionals in the sector – agronomists, foresters and landscape

architects – extreme weather events – prolonged droughts alternating with ‘flash floods’ – are no longer the exception, but the new baseline.

We – as I mentioned earlier – no longer design ‘landscapes’, but adaptive systems. The profession’s response is based on moving away from the concept of ‘permanence’ in favour of that of ‘ecological resilience’.

Here are the pillars of this new engineering-biological approach.

1. Water Resource Management: ‘Sponge Cities’

Rainwater is no longer regarded as a hydraulic problem to be quickly drained away via sewers, but as a vital resource to be retained, slowed down and infiltrated on site.

SuDS (Sustainable Drainage Systems): Instead of raised kerbs, we design rain gardens, bioswales and watercourses, as well as flood-tolerant squares. These topographical depressions are planted with ‘amphibious’ species, capable of withstanding both root asphyxia during periods of flooding and extreme drought in the months that follow (e.g. *Cornus sanguinea*, *Iris pseudacorus*, *Carex* spp.).

Advanced xeriscaping: In temperate and Mediterranean climates, we are phasing out irrigated lawns. In their place come dry gardens based on aggregates, deep layers of mineral mulch and combinations of shrubs and succulents, all with very low water requirements.

2. Species Adaptation: ‘Assisted Migration’

The dogma of using exclusively ‘native’ plants is changing and requires special attention. A species native to Milano, Paris, Roma or my Firenze of 50 years ago may no longer meet the requirements to survive the climate of those same cities in 2050.

Similar Climates: We designers are beginning to select species from warmer latitudes that simulate the future climate of project sites (e.g. the introduction of North African or Iberian species into southern and central Europe).

Phenotypic Plasticity: When selecting nursery stock, we look for genotypes with deeper taproot systems and leathery or tomentose foliage, capable of limiting transpiration and withstanding combined urban abiotic stress (heat + drought + pollution).

At the same time, one cannot ignore the terrifying effect of the landscape replacements currently taking place – often silent and overlooked – due to serious mistakes made in the past, such as the reckless introduction of species that have never been tested, with a very rapid growth rate and no ecological, agricultural or forestry value, such as *Alianto*, black locust and similar rubbish. Consider the displacement of chestnut and cypress trees from our Tuscan landscapes due to the uncontrolled spread of these alien species.

3. Biodiversity as an ‘Insurance Policy’

The vulnerability of traditional tree-lined avenues, based on historic monocultures (such as rows consisting entirely of pine, plane trees or palm trees), has proved catastrophic in the face of the arrival of new pathogens favoured by rising temperatures (e.g. *Ceratocystis platani* – the coloured canker of the plane tree; *Toumeyella parvicornis* – the pine tortoise scale insect; or *Rhynchophorus ferrugineus* – the red palm weevil).

Functional redundancy: Instead of planting a single species, we create multi-species urban ecosystems. If a pathogen or an abnormal heatwave eliminates 20 per cent of the trees, the

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remaining 80 per cent (comprising different genera) ensures the survival of the tree canopy and the maintenance of shade and air filtration.

Complex plant communities: We replace traditional monoculture ornamental beds with stratified communities (trees, shrubs of varying heights, perennial herbaceous plants, geophytes and ground cover plants). This approach mimics the dynamics of a real forest: the soil self-mulches, retains moisture more effectively and creates microhabitats for insects that prey on pests.

Greenitaly represents a meeting point between production, innovation and design. How important is it for green sector professionals to be able to find, at a single event, new solutions, technologies and plant varieties capable of meeting the needs of a constantly evolving market?

In our sector, the era of working in ivory towers is over. A forestry specialist, agronomist or landscape architect cannot design resilient green infrastructure without knowing what is actually available from nurseries; an architect cannot design a building without our specialist expertise, and for us, a multidisciplinary approach is now the norm. A nursery grower cannot plan multi-year crop cycles without understanding the new demands of landscape architecture dictated by climate change.

Highly specialised B2B events such as Greenitaly have ceased to be mere 'commercial showcases' and have evolved into genuine hubs for technological and cultural transfer. Having a single physical ecosystem in which the entire supply chain can converge — from the botanical researcher to the urban planner, from the agronomist to the specialist firm, to the builder — is now a vital necessity for our profession, for three fundamental reasons.

1. The Positive Feedback Loop between Production and Design

Historically, we have often suffered from a time lag: the architect would draw up a masterplan on paper, incorporating thousands of circles — specimens of a particular species, only to discover during the construction phase that the nursery market did not have the required sizes or quantities.

Co-design: Coming together in a single hub allows us to align demand (large-scale urban afforestation projects) with the strict biological timelines of supply. The producer ceases to be a mere end supplier and becomes a consulting partner right from the preliminary stages of the project, guiding the designer towards what is actually available or initiating dedicated cultivation contracts (what we in New York, working with NY City Parks, referred to as 'contract growing').

2. Testing Technological Innovation (GreenTech)

Contemporary green space management is data-driven. It is no longer enough simply to plant; one must ensure successful establishment, calculate soil and water volumes and costs, and monitor ecosystem services over time, whilst optimising increasingly tight maintenance budgets.

Systems Integration: At a single event, professionals can simultaneously analyse new engineered substrates, structural cell systems, smart irrigation systems (SCADA) and the



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software we use daily, such as Revit, BIM applied to landscaping and LIM – Landscape Information Modelling.

Seeing first-hand how these technologies interact with one another drastically reduces the time taken to adopt innovations in tender specifications.

3. Direct Access to Botanical Developments

As we have seen when addressing the issue of climate change, our ‘plant palette’ must be constantly updated.

Varietal Selection: Being able to observe and discuss in person with breeders the new cultivars resistant to water stress, the best-performing rootstocks for compacted urban soils, or the optimal varieties for phytoremediation, is invaluable.

The GreenItaly trade fair acts as a formidable catalyst for introducing ideas and experiences into our sectors of urban planning and design in general, overcoming the inertia, lack of preparation and fears of the public administration, and encouraging the updating of academic knowledge in collaboration with end-users.

In addition to its exhibition aspect, GreenItaly aims to be a forum for cultural and professional exchange on the themes of nursery production, the design and creation of green spaces. What value can this kind of exchange bring to the professional development of industry professionals?

In our sector, the physical display of a plant or a technology, if deprived of a solid cultural framework, risks being fruitless. A ‘climate-ready’ tree or an IoT sensor cannot, on their own, resolve urban challenges: they require design and management expertise capable of harnessing them.

The debates and technical panels at events such as GreenItaly represent the true driving force behind capacity building (skills development) for those working in the field. This horizontal exchange transforms the profession in three crucial ways.

1. Breaking Down Disciplinary the Ivory Towers.

Contemporary green spaces, understood as complex infrastructure, no longer allow for work in isolated towers. Today, a successful masterplan requires the integration of skills that were once separate.

A shared vocabulary: The landscape architect must understand the biological constraints outlined by the agronomist; the hydraulic engineer must grasp the fundamental requirements set out by the forester; the nurseryman must take on board the architect’s spatial vision. The cultural exchange at the trade fair creates that ‘common language’ essential for moving beyond the mere overlap of professionals towards truly integrated design.

2. Decoding Regulatory Developments

The legislative framework governing green infrastructure is undergoing unprecedented acceleration, driven by European directives on the Nature Restoration Law and ecological transition policies.

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Strategic direction: Publicly discussing complex issues such as the application of Minimum Environmental Criteria (CAM) for public green spaces or environmental certification protocols (such as LEED or SITES) enables practitioners to avoid viewing regulations as mere bureaucratic obstacles. The debate transforms these constraints into tools for raising the quality of tender specifications and protecting sound design from the logic of the lowest bid.

3. The Culture of 'Post-Occupancy Evaluation'

Perhaps the greatest value of a round-table discussion among professionals lies in the sharing of real-world data and, above all, the analysis of mistakes.

Learning from case studies: On paper, many Nature-Based Solutions work perfectly. But what happens to a rain garden five years after its construction, given that public maintenance is often lacking?

Professional forums enable the analysis of site feedback and long-term management, promoting adaptive management practices and preventing the entire supply chain from repeating the same design errors.



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