

# SENSORY LANDSCAPE ARCHITECTURE PROJECT PROPOSAL FOR AN ACADEMIC GREEN SPACE

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**Abstract.** People are engaged to nature from the begging of time, and the perception of space and surrounding was possible through the five human senses. Several research studies show that the landscape design can influence wellbeing, also gardening activities have a good effect on health conditions. The present study purpose was to design a sensory layout using perennials in a landscape architecture project proposal carried out at UASVM in Cluj-Napoca. Using a selection of a varies ornamentals, the perennials are a good choice in terms of landscape sustainability.

**Keywords:** plant combination, perennials, sensory planting, therapeutic landscape.

## INTRODUCTION

Several research studies indicate that landscape design have a direct effect on the five human senses and the benefits of connecting with plants, nature, and gardening include an increased sense of belonging, responsibility, and connectedness to the environment. In accordance with this, a landscape analyses were carried out at UASVM CN, followed by the landscaping proposal of a sensory arrangement, engaged a part of the civil society in the activity of landscaping. The design concept of the landscape layout was to identify a suitable space in the university campus, in which the planting was chosen in correlation with the way people perceive them in the landscape, through visual, olfactory, auditory, tactile and taste analyzers. The selected species of perennial ornamentals presents various sensory valences and economic advantages in terms of landscape sustainability, offering sensory experiences throughout the year. As a result of the present study, landscape analyses highlight the possibility of integrating sensory layouts and the sensory plants used in landscaping have an aesthetic and functional potential and a strong influence on the human mental, physical and emotional well-being.

In the history of landscape architecture, most of the time, it was found that people intuitively walked through green spaces, at any time of year and regardless of their health or material situation. The permanent search for man to be in a direct connection with the surrounding nature, is highlighted in research studies conducted since the XXI century, where it is shown that, in addition to the aesthetic attraction of space, the search for nature reflects processes neurological that is performed at the interaction between man and plant living matter. Therefore, people sense of belonging to nature is validated by several theories, including Biophilia (Kellert, 1995) and Attention Restoration Theory (Kaplan, 1995).

Horticulture is defined as the agronomic science that study of garden cultivation, as well as the aesthetic aspect of landscape architecture, but horticulture therapy has been recorded since ancient Egypt (Marcus Cooper and Sachs, 2013; Straus and Simson, 1998; Kaplan, 1973) and includes landscape-mediated interventions, using plant elements and gardening activities (Söderback et al., 2004) made by professional staff to obtain medical results, using ornamental plants to create a therapeutic environment.

Therapeutic horticulture emphasizes the practical part of this domain, in order to perform passive recreational activities, relaxation or walking, and not medical ones (Kam and Siu, 2010; Gonzalez et al., 2009), or gardening activities (Adevi and Mårtensson, 2013), and currently it's application in the field of landscaping has the effect of healing and improving well-being of people who practice it. The role of plants in the areas surrounded by people can influence their wellbeing (Hartig et al., 2014; Relf, 2005) and the characteristic properties of perennials in therapeutic landscapes are multi-sensory and stimulate the activation of all senses in users (He et al., 2022; Krasilnikova et al., 2021; Göker and Kahveci, 2020; Haas and McCartney, 1996).

## MATERIAL AND METHODS

A landscape analyses was carried out at the University of Agricultural Sciences and Veterinary Medicine in Cluj-Napoca, followed by the landscaping proposal of a sensory planting plan. The aim of the experimental design of this research was organized following the main ways of evaluating and validating the benefits obtained from human-nature interaction.

In the concept phase, it was desired to design and set up a sensory platform within the premises of the UASVM campus in Cluj-Napoca. Thus, a visual analysis of the landscape was carried out, in order to identify a possible intervention area, so that it fulfills aesthetic and therapeutic functions. The whole surface of green space is approximately 20 hectares, including a built heritage (fig. 1.) with functions such as: didactic, administrative, sanitary, sports and research. As part of the landscape analyses, the water course of the Popii Stream (Cracăul Alb) was also identified, which borders the northeastern landscape (fig. 2.) of the university campus. From the point of view of green space (fig. 3.), four categories of green areas were identified (accessible or inaccessible to pedestrians, forestry and orchard-vineyard).

Within the areas accessible to pedestrians, medium and large vegetation, shrubs, and trees (deciduous and conifers), grassy lawns and flower beds are identified. Access to the university campus (fig. 4.) can be achieved both by car and on foot, identifying areas with mixed access. The design concept of the landscape layout was to identify a suitable space in the university campus (fig. 5.), in which the ornamental plants were chosen in correlation with the way in which people perceive them in the landscape, through visual, olfactory, auditory, tactile and taste analyzers.

In the studied green space, the proposed design aim was to improve the performance of the landscape with a punctual sensory intervention, inside the university campus (Hitter, 2020), near to the new UASVM library, with a northern exposure to the property line. Access to the inner courtyard is achieved from two main directions, one is a pedestrian access from the central area of the campus and the other

from the northern access related to the main artery Calea Mănăştur, made both as a pedestrian access - the northwest area, as well as a car access - the northeast area.



Figure 1. Landscape analysis regarding the functions of built heritage, source: original.



Figure 2. Landscape analysis regarding green and blue landscape, source: original.



Figure 3. Landscape analysis of the types of green spaces in terms pedestrian access, source: original.



Figure 4. Landscape analysis on access to green space, source: original.

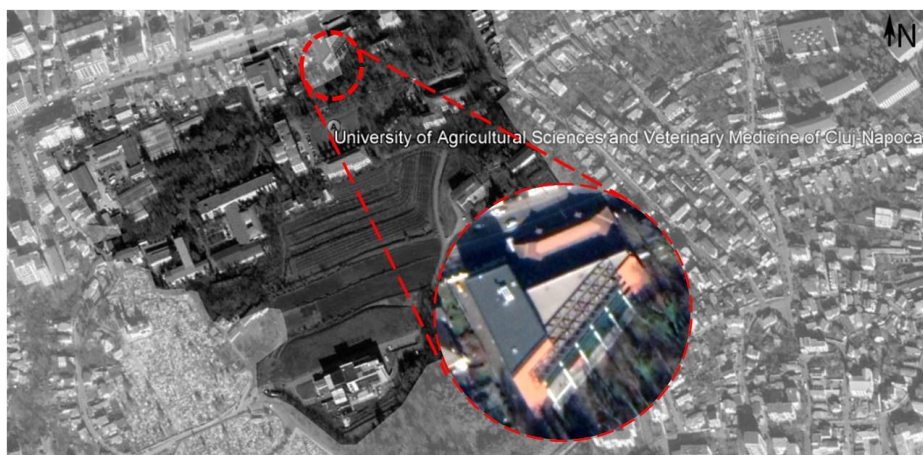


Figure 5. Identifying the landscape intervention site on the university campus, adapted source: [www.google.com/intl/ro/earth](http://www.google.com/intl/ro/earth).

The studied green space is rectangular form (fig. 6.), surrounded by a perimetral access roads. The space was predominantly devoid of vegetation, small shrubby species from the conifer group (*Taxus baccata*, *Buxus sempervirens*) being identified, isolated and parallel to the facade line (fig. 6.). Landscaping proposes zoning the space into 4 categories, depending on the grouping of perennial ornamental flowering plants.

The selection of plant material has an aesthetic role, beautifying the existing space, but also a sensory one, offering the experience of a personal and emotional landscape, both at the time of the landscaping works and post-development, when the space will be used for leisure purposes. The arrangement of the sensory plant selection follows an organic design style, so as to animate the existing situation which has been conformed in a geometric style. The presence of urban furniture integrated into the landscape was preserved, being taken into account when choosing the plant assortment.



Figure 6. Site views of the green area, source: original.

The processing of the measurements obtained in the field was possible by using the AchiCAD21 design program, and the processing of landscape plans was done using the Adobe package (Photoshop CS6).

The selected species of perennial ornamentals presents various sensory power and economic advantages in terms of landscape sustainability, offering sensory experiences throughout the year.

## RESULTS AND DISCUSSIONS

Therapeutic landscape has a strong influence on the human mental, physical and emotional well-being, and the sensory plants used in landscaping possess an aesthetic and functional potential. It can be stated that integrating more often in the design of the landscape project proposals layout ornamental flowering plants, for their sensory potential, facilitates the interaction between man and plants.

Due to sustainability of these perennial plant species, the maintenance costs are low, offering a long-lasting vegetation period. Although, green spaces design can be developed also to provide people's access to nature, especially in urban areas.

Following the landscape analyzes of the green space, an area of 12 square meter was highlighted, in which the planimetric zoning, the landscape and architectural composition of the space, respectively the pedo-climatic characteristics were observed, drawing up a proposal for sensory landscaping, using perennial flowering plants.

In the next table (tab. 1.), the ornamental plants were grouped according to shape, color, texture, fragrance, growth and development rate, decoration period, following the zoning of the green space, grouping their valences according to the stimuli transmitted to the senses.

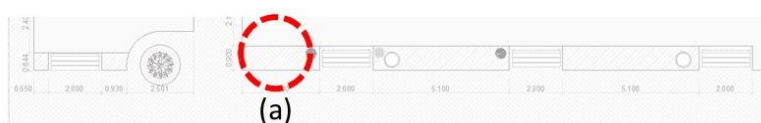
The area intended for the olfactory and gustatory senses (fig. 7.) was set up in the main entrance to the inner courtyard, to signal the presence of the sensory plateau, approaching a landscape design style, with chromatic accents. For this arrangement, species such as: *Salvia officinalis*, *Thymus vulgaris*, *Mentha piperita*, *Lavandula*

*officinalis* were used. Also, to improve the palette of aromatic plants, the annual planting of basil (*Ocimum basilicum*), which has an annual life cycle, was also proposed. Also, the continuation of the green area is intended for two other senses, auditory and tactile, highlighting the texture, color and shape of the chosen plant material, on an area of more than 4 square meter. Existing vegetation has been successfully integrated.

Table 1

The five human senses and some ornamentals recommended in a sensory garden

Taste	Smell	Sight	Touch	Hearing
<i>Salvia officinalis</i>	<i>Rosa sp.</i>	<i>Rosa sp.</i>	<i>Festuca glauca</i>	<i>Miscanthus sinensis</i>
<i>Thymus vulgaris</i>	<i>Lavandula officinalis</i>	<i>Lavandula officinalis</i>	<i>Stachys lanata</i>	<i>Carex oshimensis</i>
<i>Mentha piperita</i>	<i>Verbena canadensis</i>	<i>Festuca glauca</i>		
<i>Rosa sp.</i>		<i>Heuchera sanguinea</i>	<i>Sedum spectabile</i>	
<i>Lavandula officinalis</i>		<i>Hosta sieboldina</i>	<i>Carex oshimensis</i>	
		<i>Hosta undulata</i>	<i>Pennisetum alopecuroides</i>	
		<i>Hemerocallis fulva</i>		
		<i>Iris germanica</i>		



(a) Sensory planting design area for olfactory and gustatory sense

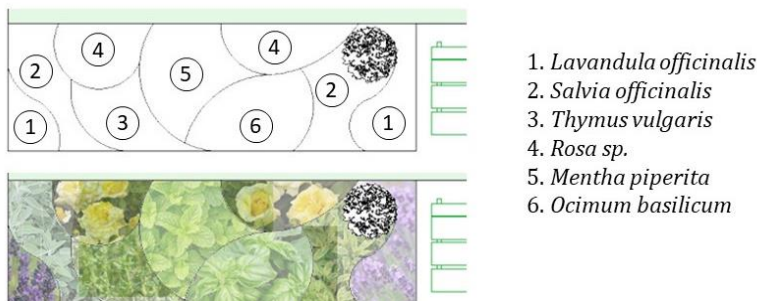


Figure 7. Planting design with sensory ornamental plants – olfactory and gustatory sense, source: original.

This area was designed to influence sensory, with the created of ornamental flowering plants, auditory and tactile senses (fig. 8 and 9). The use of ornamental grass compositions (*Miscanthus sinensis*, *Festuca glauca*, *Carex oshimensis*, *Pennisetum alopecuroides*) creates a specific auditory sensory stimulus during wind gusts. The sense of touch is activated by the texture of several ornamental species (*Stachys lanata*, *Pinus mugo*, *Heuchera sanguinea*). The chromatic focus was achieved by alternating the period of decoration (blooming), using the color of the flowers in complementary tones as yellow and purple, and with a different flowering periods species like *Hemerocallis*, *Iris*, *Lavandula*, *Rosa*, *Sedum* and *Verbena*.

In accordance with the project proposal, table 2 presents the selected ornamental perennials flowering phenology, since a landscape architecture design must be in accordance with the decoration and the blooming time, shape and colour of the ornamental plants (\*\*Bruns, 2022; Hitter et al., 2018; Cantor, 2016; Lord et al., 2012; Toma, 2009; Dumitras et al., 2008).



(b) Sensory planting design area for the auditory and tactile sense

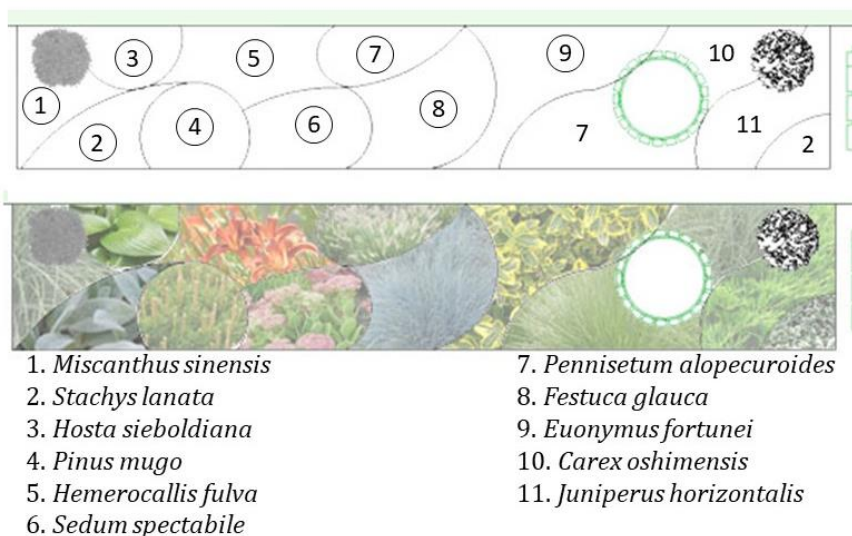


Figure 8. Planting design with sensory ornamental plants - auditory and tactile, source: original.

Landscape analyzes highlight the possibility of integrating sensory layouts in existing spaces, which can facilitate the interaction of the local community for better sense development. These plants are sustainable for the environment, with a reduced maintenance request, cost efficient and with a long-lasting decoration period. Following the previously conclusions, the recommendation was defined to integrate in the landscape project proposals layout design more often ornamental flowering plants, for their sensory potential, in order to facilitate the interaction between man and plants.

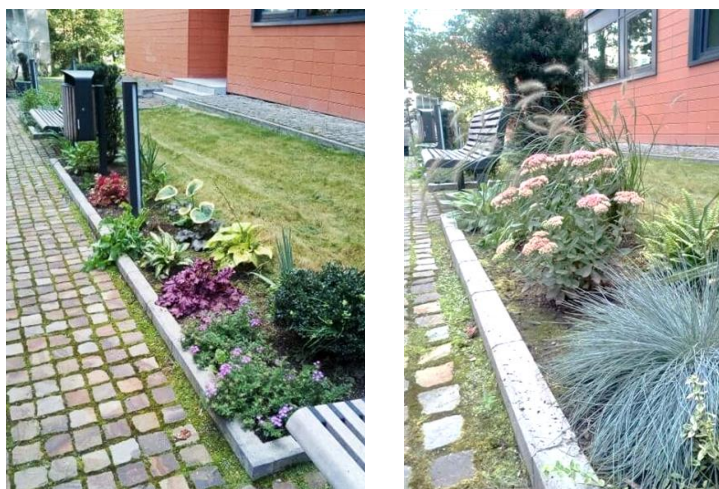


Figure 9. Planting design with sensory ornamental plants after construction, source: original.

Blooming time of studied annual plants

Table 2

No.	Species	Decoration time												Habitat Height (cm)
		J	F	M	A	M	J	J	A	S	O	N	D	
1	<i>Carex oshimensis</i>				■	■								15-20
2	<i>Festuca glauca</i>						■	■						15-20
3	<i>Hemerocallis fulva</i>						■	■	■	■	■			40-50
4	<i>Heuchera sanguinea</i>						■	■						60
5	<i>Hosta sieboldina</i>						■	■						30-50
6	<i>Hosta undulata</i>						■	■						30-40
7	<i>Iris germanica</i>						■	■	■					70-90
8	<i>Lavandula officinalis</i>						■	■						30-50
9	<i>Mentha piperita</i>					■	■	■	■	■				25-30
10	<i>Miscanthus sinensis</i>							■	■	■				90-170
11	<i>Pennisetum alopecuroides</i>							■	■	■				35-50
12	<i>Rosa sp.</i>						■	■	■					40-50
13	<i>Salvia officinalis</i>						■	■	■					40-50
14	<i>Sedum spectabile</i>							■	■	■				40-60
15	<i>Stachys lanata</i>							■	■	■	■			50
16	<i>Thymus vulgaris</i>							■	■	■				10-15
17	<i>Verbena canadensis</i>							■	■	■				30

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## CONCLUSIONS

Site analyses highlight the possibility of integrating sensory layouts and the sensory plants used in landscaping have an aesthetic and functional potential and a strong influence on the human mental, physical and emotional well-being. With perennial plants and imaginative sensory design, a garden becomes a sensory feast and brings people together to make plans and share ideas. Sensory gardens can be used to help reduce the symptoms of chronic stress or dementia, which may improve their life quality. Other benefits include a calming and relaxing place, providing a feeling of independence.

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