

Making cities of the future more sustainable through the awareness of policymakers and citizens about the importance of the use of native flora in the urban environment.

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Urban forestry originated in the 19th century with the aim of making overcrowded cities healthier. United Nations demographic projections predict that in 2050, two-thirds of the human population will live in cities (Ritchie & Roses, 2018). This process entails challenges on the environmental and social sustainability of cities. The ecosystem services generated by urban forests represent the solution for mitigating the main problems linked to urban environments (Ferrini et al., 2017). The conscious choice of a floristic composition dominated by native species is precisely what can ensure greater biodiversity and greater resilience over time, permanently guaranteeing ecosystem services (Almas et al., 2016).



Fig 1. Panoramic view of the metropolitan city of Cagliari and the Molentargius wetlands

The technical-scientific collaboration with territorial administrations of Sardinia has allowed the transfer of knowledge and the awareness of political decision-makers on the importance of the conservation of spontaneous flora in urban and peri-urban areas and on how this is fundamental for the sustainable development of urban areas.

The Urban flora inventory project between CCB-UniCA and the Municipality of Assemini, with the aim of providing a tool for administrators useful in programming, planning and management choices. The results obtained were useful for the drafting of the city's green management plan, which has the following main points:

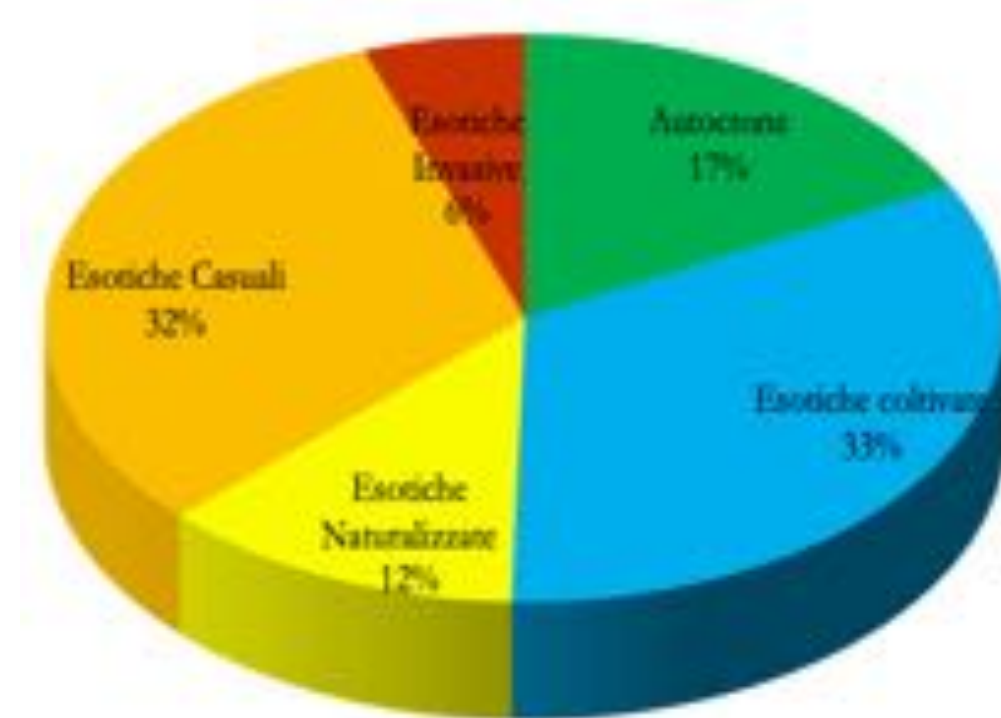


Fig 2. Assemini town urban forest chorological graph composition



Fig 3, Assemini town green areas views.

- Ban on new planting and/or introduction of invasive alien species;
- Select native species for new plantations or species replacement;
- Use species considering the specific ecological and climatic conditions of the environment and fauna present and sustainable for water management;
- Take into account the breeding and nesting period of native/migratory birds or burrows of small mammals for pruning plans;

A similar project is currently being carried out with the municipality of Quartu Sant'Elena. These two municipalities are the two largest of the Metropolitan City of Cagliari (Italy) after the homonymous capital.

The "Giardini Possibili" project involved various users (students, families, users of social services and rehabilitation communities, citizens in general) and provided them with knowledge, tools and methodologies for understanding the plant diversity and spontaneous flora of Sardinia. The aim is to create a connection between garden users and the surrounding area. Thanks to the different know-how of the actors involved, the result of the project is four shared and multifunctional gardens, an expression of the environmental and human diversity and richness of the territory which, from the poorest one in Sardinia, thus reveals its richness.

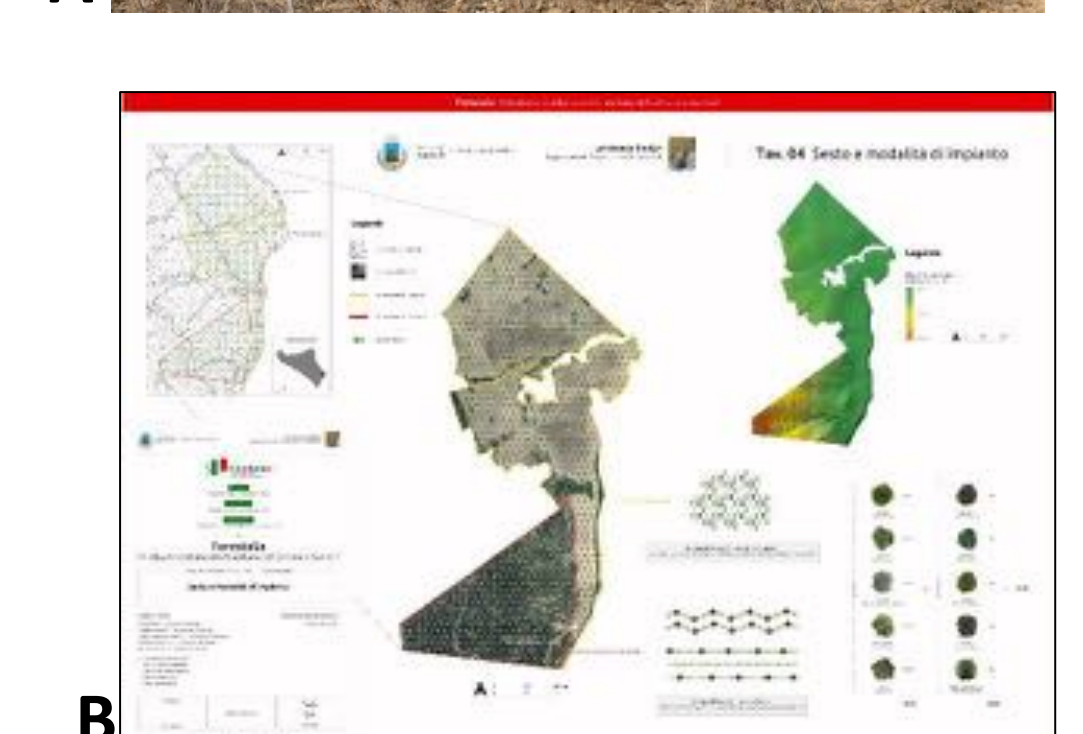
The aware knowledge of citizens and administrators about ecosystem services is a fundamental part of making the cities of the future sustainable. In particular, the transfer of correct practices from the research world to policymakers has proved to be the correct way to achieve the objectives of conservation of native flora and greater biodiversity in the urban environment.

Extra-urban reforestation projects have been carried out with the municipality of Sarroch, financed with PNRR funds, with the aim of adapting to climate change and urban pollution with nature-based solutions sustainable development of urban areas.

Area of the forestation plan has a surface area of about 50 hectares bordering the largest oil refinery in the Mediterranean.

The species chosen for the restoration project are compatible with vegetation series of the area, that are:

- Sardinian, thermo-Mediterranean series of wild olive (*Asparago albi-Oleetum sylvestris*)
- Sardinian, thermo-Mediterranean series of the turbinated juniper (*Oleo-Juniperetum turbinatae*)
- Sardinian, thermo-Meso-Mediterranean series of holm oak (*Prasio majoris-Quercetum ilicis quercetosum ilicis and phillyreetosum angustifoliae*)
- Mediterranean geosigmatum, sometimes subhalophilous, edaphohygrophilous, thermo-Mediterranean of the tamarisk (*Tamaricion africanae*)



SARROCH Reforestation plan			
Tree species	# Number	# Shrub species	# Number
Quercus ilex L. subsp. ilex	12.000	Phillyrea angustifolia L.	2.000
Juniperus turbinata L.	4.000	Prunus domestica L.	2.000
Chamaecyparis fasciculata (L.) Link	10.000	Melia azedarach L.	2.000
Pinus halepensis Mill. subsp. halepensis	10.000	Quercus ilex subsp. ilex	2.000
Quercus ilex subsp. ilex	4.000	Salix purpurea L.	1.000
Totale	40.000	Totale	10.000
Tot. 50.000 = 40.000 (80%) + 10.000 (20%)			

Fig 3: A: Area view; B Plant design; C: Species composition for the restoration project

The project is currently in the executive phase and will be delivered in early 2024



Fig 4. A: Garden plan; B & C: Children and adults engaged in creating the garden

References

- Hannah Ritchie and Max Roser (2018) - "Urbanization". Published online at OurWorldInData.org. Retrieved from: <https://ourworldindata.org/urbanization> [Online Resource]
- Ferrini, F., Van den Bosch, C. C. K., & Fini, A. (Eds.). (2017). Routledge handbook of urban forestry. Taylor & Francis.] Almas, A. D., & Conway, T. M. (2016). The role of native species in urban forest planning and practice: A case study of Carolinian Canada. Urban forestry & urban greening, 17, 54-62.