planetek italia + HEXAGON

Hexagon Diamond Partner

Improving sustainability of urban green spaces

SISPI SpA | *Italy*

The picturesque coastal city of Palermo is the capital of the Italian island of Sicily. Steeped in more than 2,700 years of history, Palermo, once part of the Roman Empire, is famous for its ancient architecture and rich blend of cultures. Modern day Palermo is known as one of the top street food destinations in the world and enjoys a thriving tourism market.

While Palermo prides itself on its history and historical significance, it is also dedicated to modernizing its public services and practicing sustainable urban development.

To that end, Sistema Palermo Innovazione (SISPI SpA) was founded in 1988 by the Municipality of Palermo with the aim of designing, creating and managing the Municipal Information and Telematic System (SITEC). Today, SISPI supports Palermo's strategic vision of addressing technological innovation in infrastructure and services and improving the quality of life of its more than 1.2 million residents.
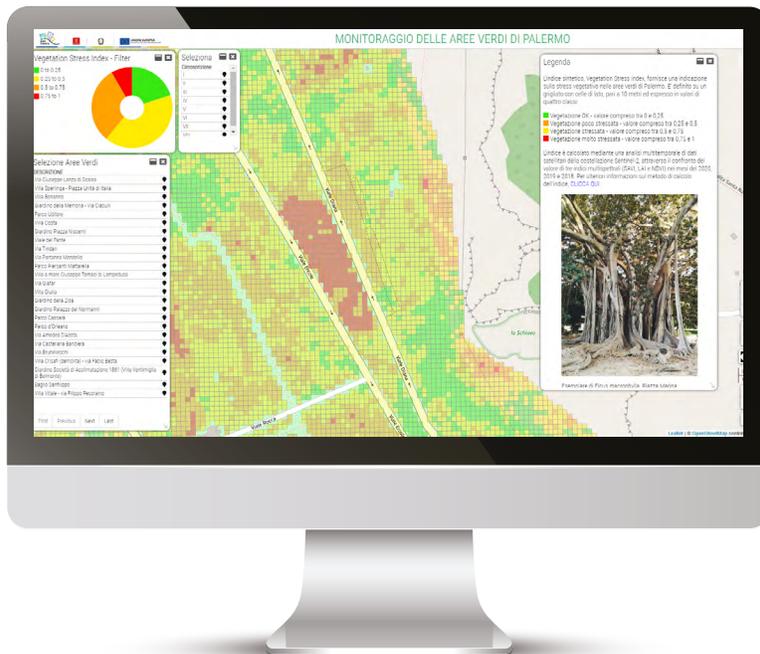
The Urban Green Spaces Monitoring Tool allows the user to quickly evaluate vegetative stress and place it in one of four classifications: OK, little stressed, stressed and very stressed.

SISPI needed a solution to improve the efficiency and sustainability of maintaining and watering Palermo's public green areas, safeguarding and improving the general conditions of the city's historic gardens, managing urban parks and mitigating the risks of fires in these areas. It turned to longtime Hexagon partner Planetek Italia, which developed the Urban Green Spaces Monitoring Tool built on Hexagon's M.App Enterprise technology.

Evaluating urban green spaces to increase sustainability

Urban green spaces can increase an area's quality of life. They provide a multitude of physical and psychological benefits to the well-being of city residents and contribute to the overall sustainability of a community. A major feature of green spaces is they promote psychological and physical health by filtering air, enhancing water quality, reducing traffic noise and adjusting wind speeds.

One of their most important benefits is contributing to the reduction of urban heat islands and helping to cool cities. Recognizing the importance of these spaces, Palermo needed to achieve objectives set forth by the Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU) initiative, which provides funding to support the green, digital and resilient revitalization of communities.

The lack of resources and knowledge about the health of urban green spaces in Palermo caused delays in maintenance intervention and led to degradation of vegetation. SISPI needed a solution that would meet three objectives: significantly improve the overall health of green areas, optimize irrigation operations in green areas and better manage vegetative stress caused by drought. To meet these goals, Planetek developed the Urban Green Spaces Monitoring Tool, built with Hexagon's M.App Enterprise, a unified geospatial enterprise platform that allows users to create geospatial applications that enable them to monitor real-world changes, evaluate their impacts and act on the results.

The tool works by directly accessing open satellite data from Copernicus, the Earth observation component of the European Union's space programme. Green areas with a surface area greater than 1.5 hectares (e.g., parks, reserves and urban greenery) were analyzed, as well as gardens and private buildings occasionally accessible to the public. This analysis allowed Planetek to calculate a synthetic index, called the Vegetation Stress Index, which provides an immediate indication of vegetative stress.

The index was calculated by multitemporal analysis of satellite data from the Copernicus Sentinel-2 constellation, by comparing the value of three multispectral indices (SAVI, LAI and NDVI). The analysis is repeated periodically using Hexagon's Spatial Modeler technology, allowing SISPI to process the satellite data. The results are visualized through a dashboard built using M.App Enterprise.

Better understanding of urban green spaces

With the Urban Green Spaces Monitoring Tool, Palermo can monitor, maintain and manage its green spaces more easily. The data provided by the Vegetation Stress Index provides a better understanding of the health of these spaces because it reveals areas of vegetative stress. This means the city can closely monitor irrigation needs, especially during drought conditions, and keep its green spaces healthier.

In the future, SISPI plans to possibly add in higher resolution commercial data, detailed maps down to the vegetation species level and sensor data from irrigation systems.

"Using the tool boosts Palermo's sustainability initiatives by reducing the costs associated with ground inspections, maintenance and planning and allowing us to verify the effectiveness of any maintenance interventions," said SISPI Engineer Giorgio Sbacchi. "More importantly, it gives us a better understanding of the breadth of our green spaces and allows us to be better stewards of the health and sustainability of our city. When I am in a park or in a garden in Palermo, I know there are other eyes besides mine that observe and take care of the greenery."

> **Using the tool boosts Palermo's sustainability initiatives by reducing the costs associated with ground inspections, maintenance and planning and allowing us to verify the effectiveness of any maintenance interventions."**
>
> **Giorgio Sbacchi**
> Engineer
> SISPI SpA
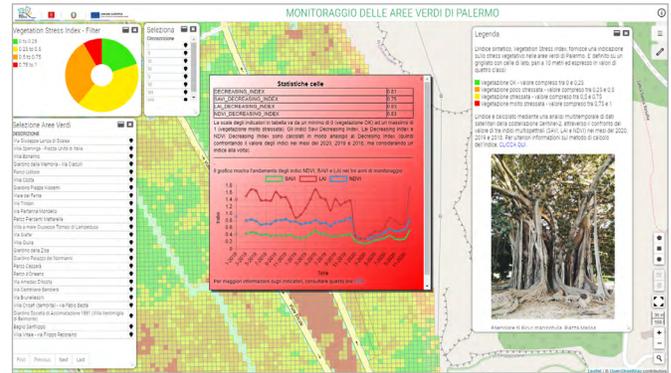
To better analyze each area, the user can click on each cell and visualize the historical trends of different vegetation indices.
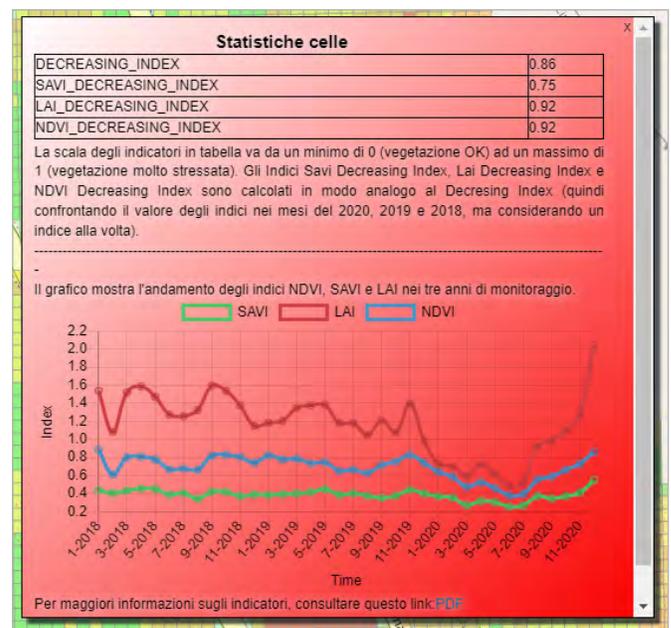
Visualizing SAVI, LAI and NDVI indices, advanced users can evaluate the evolution of vegetative stress.