GREEN INFRASTRUCTURES, ECOSYSTEMS SERVICES AND THE GREEN ECONOMY

Final Document

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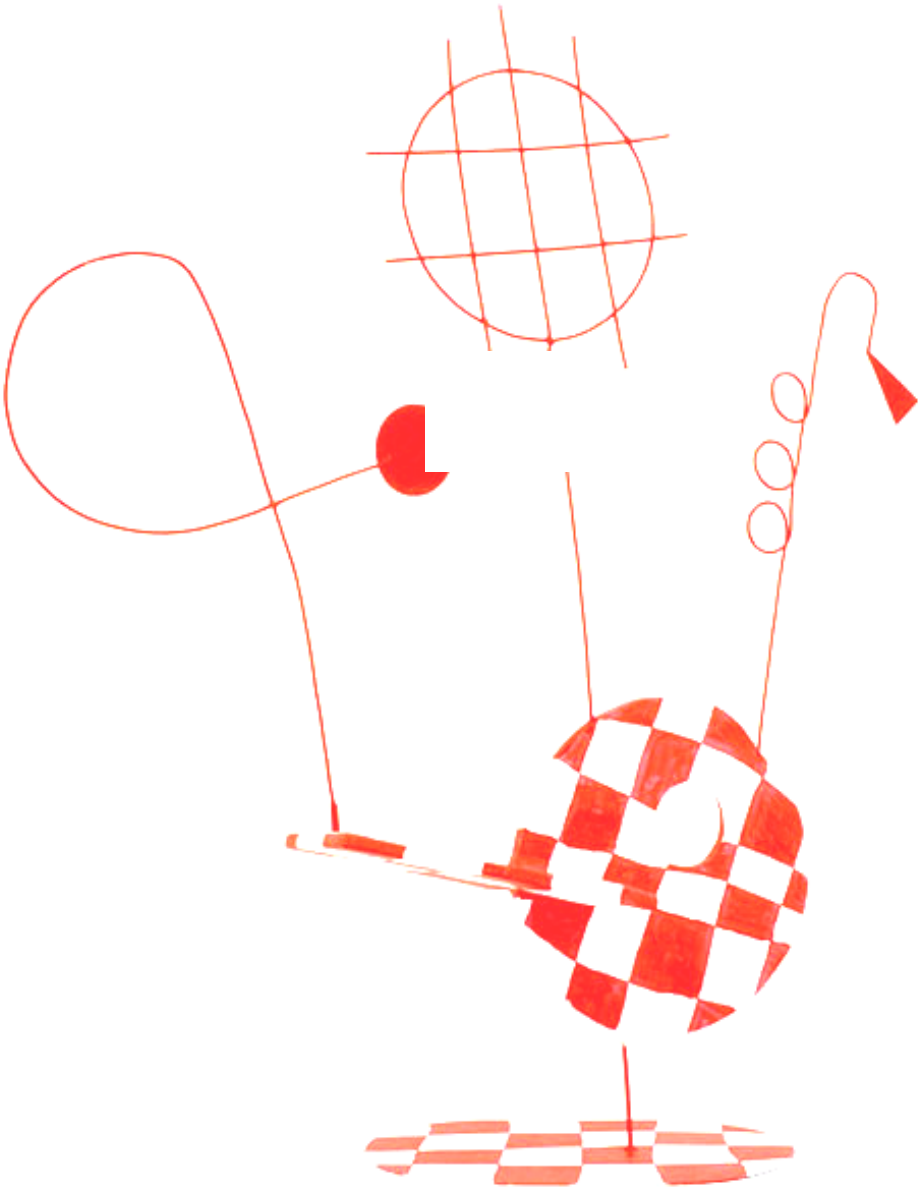

Green infrastructures and ecosystem services in Italy: a tool for the environmental action and the green economy

Introduction

The thematic session of the Conference of Rome "Nature of Italy", December 11 and 12, 2013 - prepared with a participatory process documented in a separated report - has been devoted to the issues of conservation and enhancement of natural capital and ecosystem services by means of the *green infrastructures*, that are considered a relevant and qualifying factor for a green economy. The development of green infrastructures has been examined for the two strategic agricultural and urban sectors. The green infrastructures in agriculture are coherent both with the guidelines of the new European Common Agricultural Policy (CAP) - which aims to enhance the multi-functionality - and with the increasing need for protection of the ecosystem services and the biodiversity that agriculture may provide and to preserve territory from hydrological threats. The green infrastructures can be an important factor to improve the urban quality and also for adaptation and mitigation of climate change. The circumstances in Italy are favourable to the green infrastructures, given the large and consistent work done creating the ecological networks - including parks and other protected natural areas, that are the most numerous and best quality in Europe - and the initiatives developed by many regions, provinces and municipalities for the protection of the natural assets of their territories. On the contrary, however, Italy suffers from large environmental criticalities, exacerbated by the climate change. The widespread phenomena of hydro-geological instability, landslides and floods are alarming and call for a strengthening and improvement of the countermeasures and therefore, among all, of the green infrastructures.

The reference framework: green infrastructures, ecosystem services and green economy

The green infrastructures, according to the EU definition, are "a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings".

The growing interest in green infrastructures in Europe is motivated by the recognized importance to plan and implement the connection of natural networks, but also of semi-natural and peri-urban agricultural spaces, to maintain and develop a wide range of ecosystem services. These services, provided by nature, are of various types: supply (food, water, timber, etc.), regulation (of the climate, the water cycle, the rainfall, etc.), support (photosynthesis, soil formation, air and water purification, etc.), quality of life (cultural,

educational, recreational , etc.). The increasing and unsustainable anthropogenic pressures - pollution, resource extraction, land use - are attacking and compromising the natural ecosystem services, impairing their resilience and depleting the biodiversity. Designing and implementing green infrastructures is advisable not only to stop the deterioration, but also to develop and enhance the ecosystem services. By this dual function, the green infrastructure play a strategic role for a green economy that focuses on an high quality environment and on the restoration and enhancement of the natural capital, the indispensable foundation of the human well-being and of a sustainable economic development. In the original definition by the UNEP, the green economy is pursuing well-being and a greater equity, while reducing the risks and costs of the environmental degradation and of the resource scarcity. The European Commission is now preparing a strategy on green infrastructures, to implement connections between existing natural areas and improve the quality and ecological functionality of the territories. The implementation of green infrastructures privileges an integrated approach to land management with positive effects, from the economic point of view, on the prevention and reduction of the repair costs of hydro-geological and environmental damages. This may activate businesses and investments, strengthening them in time. The investments for the planning, creation, maintenance, recovery, improvement, completion of the green infrastructures, produce results and also economic revenues, being suitable for generating new employment opportunities.

The green infrastructures have more than only a significance of an environmental services protection: they can be valuable alternatives for preventing landslides and floods, or suitable complements to the grey infrastructures, that make use of concrete and other inert materials, being more effective and less impacting. The development of green infrastructures - as well pointed out in the EU 2020 strategy for biodiversity protection - has also an important role for the restoration of degraded ecosystems and protects our natural capital: a necessary condition for succeeding in a green economy that may ensure a smart, and sustainable growth. The green infrastructures could also be profitably adopted in the remediation of contaminated sites, because in most cases they could ensure a better efficiency and the economic sustainability of the interventions. Among the objectives of the European Structural Funds 2014-2020, the green infrastructures are explicitly recommended for their strategic role of in the protection of the environment and natural resources. The European Cohesion Fund and the Regional Development Fund, finally, promote green infrastructures as a means for the protection and recovery of biodiversity.

General proposals for the development of green infrastructures

- To promote a legal framework for the green infrastructures, that defines their nature and characteristics, and allows their implementation in compliance with the regulations and the norms of the Italian territory.

- To integrate the green infrastructures in the national biodiversity strategy.
- To develop guidelines for the regions and local authorities for the promotion and development of green infrastructures.
- To develop guidelines for the green infrastructures for the environmental assessments , the EIAs and the SEAs.
- To develop criteria and technical specifications for public tenders related to projects that include or promote the use of green infrastructures.
- To strengthen research, training, technical assistance, information for distribution, consolidation and improvement of green infrastructures, even with the use of incentives and taxation.
- To promote pilot projects for green infrastructures.
- To establish protective belts along the riverbeds and, where possible, to allow also the widening of the floodplains, improving ecological corridors and habitats for the biodiversity, producing vegetation that can be used as a resource and giving a greater chance controlling the expansion of the floods.
- The renaturation of rivers would also improve the supply of sediment to the sandy seashores to mitigate the erosive action of the sea: mitigation that should be strengthened with actions for the protection and restoration of the coastal meadows of *Posidonia Oceanica*.

Green infrastructures and agricultural areas

The area used for agriculture in Italy is worth 17.3 million hectares, the 57,4% of the whole national area. From 1990 to 2010, this area was reduced by something less than a quarter (-23.9%) due to the wide expansion of infrastructures for industrial and mainly for urban growth. Actually the cultivated agricultural area (SAU) is approximately 12.9 million hectares, decreased by approximately 30% compared to 1990. The difference, amounting to 4.4 million hectares, 25% of the total, is represented by no longer cultivated land, mostly in the hilly and mountainous inland areas. The agricultural areas, cultivated or abandoned, are per se green infrastructures of decisive importance for the Italian territory: they provide ecosystem services such as the fertility of the active substrate for crop production, nutrients cycle, carbon sequestration, hydrological cycle, pollination and photosynthesis. The agricultural areas are an essential part of the ecological network that play an essential role for the protection of biodiversity, for the safeguard of the territory, for the prevention and reduction of risks of hydro-geological instabilities.

These premises lead to two basic lines for environmental protection of the Italian territory:

- the protection of agricultural areas as green infrastructures of primary relevance, stopping the consumption of cultivated soil, already decreased by approximately 24% over the last twenty years;

- the improvement, development and management of agricultural areas as green infrastructures, giving more substance to the European policy for the development of multi-functionality in agriculture.

These two lines are also fundamental strategic choices to give value to the Italian agriculture, to its recognized quality and to its typicality, markedly tied to the diversity and quality of the territories. On the one hand, they promote the final abandonment of those dangerous farming practices that causes the depletion of environmental quality, the biodiversity loss, the soil erosion and the pollution. On the other hand, they strengthen the already growing trend toward an agriculture of high ecological quality that has a greater profitability for farmers and better chances over domestic and foreign markets. The management of the agricultural areas as green infrastructures requires a greater awareness, not only in the world of agriculture, and the promotion of concrete integrated initiatives, taking into account both the expected production and the environmental quality. Integrated initiatives, for example, that realize the interconnection of protected natural areas, the preservation of wetlands, the conservation of rural and traditional landscapes, the prevention and reduction of the impacts of floods.

The increased frequency and intensity of extreme weather events, caused by climate change, oblige us to reconsider the management of our land, and mainly that part of strategic importance made up of agricultural areas, that can contribute in a major way to make it more resilient and to face the climate threats. We have also to consider that the management of the agricultural areas as green infrastructures can allow to better appreciate the ecosystems services of farming. They are not only traditional but also more strictly environmental services, like the management and maintenance of the land and hydro-graphic network, the agro-energy, the touristic and recreational activities that can slow the abandonment of the countryside and encourage the return of young people, that is still giving an important contribution to the reduction the youth unemployment.

Proposals to develop green infrastructures in agriculture

- Support the planning and management of green infrastructures in agriculture.
- Support of sustainable agricultural practices, in particular those that use green infrastructures to sustain the delivery of ecosystem services.
- Development of an environmental accounting model, even to credit and quantify the added values of ecosystem services and of green infrastructures in agriculture.
- Recognize an economic value to the services of the green infrastructures, that even sustain the quality of agro-food production (service payment).
- Make an ecological classification of agricultural areas.
- Implement agriculture-forestry hydraulic interventions and promote multifunctional renaturation.

- Supporting more efficient irrigation systems and a reduction in the consumption of pesticides.
- Make available the method of calculation used by the National Inventory of Forests to calculate the reservoirs of carbon (carbon sinks).
- Establish practices for the maintenance of alpine grasslands, such as the maintenance and restoration of extensive grazing, exerted in a sustainable manner .

Green infrastructures in urban areas

The cities are ecosystems dense of human presence that accommodate more than 50% of the world's population and about 70% of the Italian population. The cities tend to expand, to consume soil, to occupy the surrounding territory, giving rise to the phenomenon of urban sprawl by the dissemination and dispersion of the buildings.

In recent years, the green infrastructures assumed an important role in the regeneration of cities and peri-urban areas. This is the case of the British Green Belts, that are the policy instrument, in the UK urban planning, to ensure ecosystem functions of the territories, to control urban sprawl and to protect the landscapes. These green infrastructures consist of a green ring that restrains urbanization and protects and promotes agriculture and forestry. The green belts now cover 13% of the British territory with an area of 1.63956 million ha. Spain too realized many initiatives, as is the case, for example, of the Anella Verda in Barcelona which includes a network of 12 protected green areas around the city that are now interconnected by ecological corridors. One can cite other examples, like the Territorial Planning in the metropolitan area of Lisbon, as well as numerous green urban infrastructure projects in the United States.

In Nagoya, Japan, where the average temperature grew by about 2.7 degrees over the past 100 years, several measures have been taken to mitigate the impact of heat waves by developing green areas in the city. The urban green infrastructures - from parks to the gardens, the trees of the avenues, the green roofs and walls, the peri-urban agricultural areas and the urban forests - can be designed, managed and enhanced to perform specific services, such as the absorption of CO_2 and of the atmospheric pollutants, the mitigation of heat islands, the improved absorption of rain waters, the cost abatment of water purification, the diffusion of the bicycle and pedestrian mobility, the short-chain food production, the liveability and the recreational activities. The development of green infrastructures as well as the improvement of the urban environmental quality, are also capable of generating net increases in built capital values and of attracting new investments.

Proposals to develop green infrastructures in urban areas

- Develop guidelines for urban planning aimed at maintenance, recovery and enlargement of public parks and recovery of permeability of soils. Make regulations that promote private green spaces in buildings and appurtenant spaces.

- ❑ Develop and disseminate toolboxes for operators and enterprises to design green infrastructures and to evaluate the associated benefits.
- ❑ Stop the consumption of non-urbanized soil, including through green belts.
- ❑ Re-structure and re-naturalize, where possible, the patterns of the urban basins.
- ❑ Strengthen the connections between urban, peri-urban and suburban green areas.
- ❑ Implement urban programs of adaptation to the climate change based on green infrastructures, evolving from an ornamental to a multi-functional conception of the green.
- ❑ Encourage business policies that improve the eco-functional quality of the industrial sites.
- ❑ Promote a Green Infrastructures Public Procurement (GIPP), to favour, in the public tenders that involve significant changes of spatial planning, the use of green infrastructures with innovative solutions.

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Benefits of the green infrastructures *(source: EU EC SWD(2013) 155 final)*

Benefits group	Specific Green Infrastructure benefits
Enhanced efficiency of natural resources	Maintenance of soil fertility
	Biological control
	Pollination
	Storage of freshwater resources
Climate change mitigation and adaptation	Carbon storage and sequestration
	Temperature control
	Storm damage control
Disaster prevention	Erosion control
	Reduction of the risk of forest fires
	Flood hazard reduction
Water management	Regulation of water flows
	Water purification
	Water provisioning
Land and soil management	Reduction of soil erosion
	Maintaining/enhancing soil's organic matter
	Increasing soil fertility and productivity
	Mitigating land take, fragmentation and soil sealing
	Improving land quality and making land more attractive
	Higher property values
Conservation benefits	Existence value of habitat, species and genetic diversity
	Bequest and altruist value of habitat, species and genetic diversity for future generations
Agriculture and forestry	Multifunctional resilient agriculture and forestry
	Enhancing pollination
	Enhancing pest control
Low-carbon transport and energy	Better integrated, less fragmented transport solutions
	Innovative energy solutions
Investment and employment	Better image
	More investment
	More employment
	Labour productivity
Health and well-being	Air quality and noise regulation
	Accessibility for exercise and amenity
	Better health and social conditions
Tourism and recreation	Destinations made more attractive
	Range and capacity of recreational opportunities
Education	Teaching resource and 'natural laboratory'
Resilience	Resilience of ecosystem services