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Layman's Report

Soil is life: do not damage it!











LIFE SAM4CP



Soil management models for public benefit

LIFE SAM4CP project aims at the limitation of land take for urban purposes, in addition to the preservation and improvement of ecosystem services (E.S.), which are freely provided by soil.

This project has set up a computer tool, defined *simulator*, following the *Guidelines on best practices to limit, mitigate or compensate soil sealing* engaged by a working group of European Commission (SWD(2012)101final), where they highlight the variety of functions and services that soil supplies, most of which have direct and indirect benefits to man and also to economy. The simulator evaluates repercussions, not only at environmental levels but also at economic levels, of urban development planning.

This tool, in order to be tested and improved, has been experimented showing satisfactory outcomes in the arrangement of urban modifications provided by four Municipalities of the Metropolitan City of Turin. These Municipalities were selected by a public request of interest in addition to their diverse characteristics from a morphological, demographic and socioeconomic point of view. The project, developed between June 2014 and June 2018, focused on the following goals:

- showing to what extent land planning, that integrates in decision-making processes an evaluation of environmental benefits granted by free soil, provides a considerable reduction in land take and an overall saving for the community, thanks to the preservation of natural and public financial resources;
- enhancing and complementing in local government tools 7 E.C. (carbon capture, biodiversities, purification of water - characterized by nutrient retention and water availability -, erosion of soil, timber production, pollination, crop production);
- protecting and providing a sustainable use of soil resource, highlighting the negative effects of land take for the environmental evaluation of a land;
- preserving and enhancing the overall ecosystem functions freely offered by soil to the community;
- avoiding public costs from the restoration of ecosystem functions provided by soil as well as land maintenance;
- protecting agricultural functions of soil by keeping the other functions unaltered.







1 Discovering land:

- Casalborgone
- 2 Discovering land: Chieri
- 3 International Seminar of Turin
- 4 Discovering land: Bruino
- 5 Educational moment: Middle school of None

Land take and ecosystem services

Did you know that free lands of the Metropolitan City of Turin are able to store 4.3 million tons of carbon?

Tackling the problem

Land is a finite, brittle and non-renewable resource 'consumed' by man: housing, streets, railways, harbours, factories are increasingly located on considerable portions of sealed soil, in addition to that, they alter its characteristics irreversibly.

However, there is a lacking awareness of the possible consequences that the increasing sealing and urbanization might, as a matter of fact, implicate; or at least we only become aware of environmental damages when they are evident and require expensive actions to remedy. On the other hand, we should always bear in mind that a soil at natural conditions, besides its intrinsic value, provides humanity with numerous "services" that are indispensable not only to life preservation, but also to a working economy: crop pollination, availability of freshwater, lands fertility, protection from floods, carbon capture and storage, biodiversity preservation, supply of raw material are just some of the numerous services provided by "Natural Capital".

Land take dangerously prevents free areas from performing such precious functions.

Did you know that in the Metropolitan City of Turin, between 1990 and today, 53,000 hectares of land (almost the size of Madrid) were used? A positive urban development planning should be able to limit further land take and forecast transformations of new free land portions, taking into account the importance of preserving land ecosystem functions. This might not only grant community the preservation of a finite and non-renewable resource, but also the saving of public finance.



Ecosystem services analysed by SAM4CP

Habitat quality

it is a supporting service that checks natural ecosystems' quality in order to preserve the biological and genetic diversity of land.

Carbon capture and storage

It is a regulating service of the soil. It is essential for the biodiversity, the mitigation and adaption to climate changes.

Crop pollination

It is an essential regulating and provisioning E.S. for the productivity of numerous crops. The reproduction of most plants and the subsequent production of food for consumption by animals and humans, partly rely on wild pollinator species.

Crop production

It is a provisioning E.S. linked to human use of soil for productivity purposes. Agricultural land covers 40% of the Earth's surface.









Timber production

It is a provisioning E.S. directly linked to the quality of the land and the market of goods.





Water availability

It is a regulating E.S. that enables the storage and provide considerable amount of water to surface vegetation, before this water flows on the surface or infiltrates due to refill processes of deep aquifer basins. This service reduces the possibility of floods thanks to a better soil drainage.

Nutrient retention

It is a regulating E.S. provided by water and land ecosystems that contributes to filter and rot organic waste that reach groundwater, sea and coastal ecosystems, contributing to potable water supply.

Sediment retention

It is a regulating E.S. in which soil in good conditions mitigates the loss of the surface land layer (the richest in organic matter) as a consequence of the action of surface run-off waters and rains.



PLAYSOIL

A web tool to evaluate the effects of different types of land transformations on ecosystem services



Playsoil is an information and awareness raising web tool created by LIFE SAM4CP. It is based on GIS system and it is free. Its aim is to raise awareness on the value of ecosystems on land and to introduce, through some simple simulations, to what extent and what we would lose depending on how and where we decide to transform land.

It provides a map reading of the services' allocation provided by land, in addition to a cartographic presentation enhanced by the following features:

- tables and histograms that provide the quantity of the current biophysical value of each E.S., and the simulation of current economical and biophysical values of a surface area of maximum 1,000,000 m²;
- graphic tools which summarize current (biophysical) and projected (biophysical and economical) values.

www.sam4cp.eu/playsoil

SIMULSOIL A helping tool to public decision-makers to make sensible and sustainable choices about the use of a finite and non-renewable resource

Simulsoil is an app created by the Project to analyse possible value changes as a result of assumed transformations of land take. This app records the sensitivity of environmental services granted to land changes, estimating the overall cost, in terms of value changes of the available Natural Capital.

Thanks to the computerisation of a series of data processing that usually is managed separately by means of the use of different models of InVEST software (Integrated Valuation of Ecosystem Services and Tradeoffs) usability has been immediate and simplified, supported also by a specific "user manual" of the tool.

As a result of that, even inexperienced users can perform ecosystem analysis and "simulations" which would, otherwise, require a complex data processing and deep knowledge of computer procedures related to GIS.

In particular, algorithms referred to 8 Ecosystem services were computerized. These services are provided by free land selected among a considerable variety of services provided by nature which were previously described (habitat quality, carbon storage, water availability, pollination, timber production).

This tool gives data related to national or local land take (just in the area of the Metropolitan City of Turin). As an alternative to the preloaded data, it is also pos-



sible to personalise it through the loading from external sources or the "re-drawing" of land uses, with an improved thematic detail and geometrical precision.

www.sam4cp.eu/simulsoil

Land take restraint by Chieri, None, Bruino and Settimo Torinese municipalities

BRUINO

Bruino is a municipality of about 8,500 inhabitants located southwest of Turin. Through the test of the simulator, it has arranged an urban variation (Variante Strutturale n. 3, ex comma 4, art. 17, Lr 56/77 e smi) aimed at facilitating opportunities of socioeconomic development, but in the meanwhile to improve the ecological quality of the industrial area planned by the urban-development plan in force approved in 1993, not entirely realized yet.

With Zoning Variance n. 2, Bruino had already laid the basis for a considerable improvement of ecosystem services in its territory, given the state of affairs, it made choices to enable a potential in-



Gradual land take in Bruino

crease of 12% compared to the initial forecasts of the urban-development plan. The town board has started Variance n. 3 with the resolution n. 2 of 20/02/2017, after the right public debates, the whole ecosystem value will be further increased thanks to an increment of E.S. supply in areas that had major critical conditions, in the analysis performed by the simulator.





CHIERI

Gradual land take in Chieri









olution named "Fonaneto 3" was planned by the urban-development plan in force, but it has never been carried out.

If urban forecasts of the urban-development plan in force had been entirely carried out, 800,000 m² would have been taken.

Variance n. 15, launched by the town board with the resolution n.99 of 11/11/2017, on the one hand will facilitate an increase of E.S. provided by the local land, by transforming the forecast project of a golf course into an area with a rural park whose surface is of 70 ha; on the other hand, 18 ha of areas, which are currantly industrialized, will be zoned for agricultural use.

ΝΟΝΕ

None (8,000 inhabitants) is a municipality located southwest of Turin. It has started an urban variance (Variante Strutturale n. 4, named "Della Qualità Ambientale", ex comma 4, art. 17, Lr 56/77 e smi) planned to partially and functionally modify the town planning section related to environmental qualification of some pieces of the town land, and to promote sustainable development.

The objective to reduce land take has been a priority. This goal would have been realized by the town planning approved in 2011 (Variante n. 3 ex Lr 1/2007), in particular, the town planning section about urban quality and implementation increase and ecological conditions and connections. From a quantitative perspective, the new Variance n. 4, started by the town board with resolution n. 47 of 20/11/2017, has taken action in some urban forecasts of the town planning in force, allowing a reduction in land take equal to almost 120,000 m², an increase in urban green areas equal to 50,000 m², as a result of that an increase in the positive council budget of ecosystem values of the council.





Gradual land take in None



SETTIMO TORINESE

Settimo Torinese (about 47,500 inhabitants) located northeast of Turin, has started a general revisioning Variance, to the town planning, aimed at overhauling forecasts, of the town planning in force, that were not realized yet (Partial Vari-

Gradual land take in Settimo Torinese





ance n. 33), these forecasts would have been set by the realization of the Partial Variance approved in 2016.

The urban variance focused on the rationalisation and simplification of the town planning legislation, the land take control, the urban regeneration of neglected areas, the stabilization of urban areas, and the strengthening of ecological compensation areas and ecological corridors. Likewise, after several public debates, the town board has officially launched General Variance n. 34 to the town planning, with the adoption of resolution of 03/03/2018.



What is soil heritage? Communication activities in Italy and abroad

Public conferences

Over the duration of the project 7 public conferences were organized in Italy: in Turin, Milan and Rome. Some conferences were related to the launch phase, the mid-term progress and the final part; others addressed the participation of municipalities in choosing some test places. Moreover, there was an international conference to facilitate an exchange of experiences with other people from other countries, who work on the same topics.



Overseas seminars

The project was presented in several international occasions in order to acknowledge the other European countries, such as:

- Workshop on Science-Policy aspects on soil-related Ecosystem Services Mapping and Assessment - MAES - organized by EC - DG Environment in Gand (2nd- 3rd June 2016);
- Meeting of the MAES Soil Pilot Group organized by EC - DG Environment in Bruxelles (8th March 2017);
- LIFE Platform meeting on Ecosystem Services "COSTING THE EARTH? translating the ecosystem services concept into practical decision" in Tallinn, Estonia (10th-12th May 2017), organized by LIFE programme and hosted by Baltic Environmental Forum;
- LIFE Viva Grass seminar "Integrating ecosystem service concept into spatial planning - for sustainable land-use in grasslands and beyond" in Sigulda, Latvia (16th-18th May 2018).

Further events:

- a meeting with EC officials from Joint Research Centre (JRC) in Ispra (24th April 2018);
- a public seminar in Montpellier at the Department of Herault (30th May 2018);
- a public seminar in Grenoble (13th June 2018).

Training workshops on the use of the Simulator

In order to promote and facilitate the use of the simulator, even after the closing of the project, by the main stakeholders – administrators and municipal technicians, who are professionals and experts on urban and land planning – 4 editions of training workshops were held (3 in Turin and 1 in Rome).

Communication tools

A graphic design was developed, by using standard colours of urban cartographies, it blends from green to red referring to the passage from natural and rural areas to urban ones. It has, therefore, been adapted and used in all the several communication tools: website, leaflet, poster, notice board, press releases, communication totems, newletter, scientific and technical publications.







Activities with citizens

A wide range of events, with an educational purpose, were organized to involve citizens:

- workshops with students from middle schools to high schools of the leading municipalities;
- walks about land reading with students from middle and high schools of the leading municipalities;
- walks about land reading and 'forumcafès' addressed to citizens, in several areas of the land of the Metropolitan City of Turin.

