



**DYNAMIC SOD MULCHING AND USE OF RECYCLED AMENDMENTS TO INCREASE BIODIVERSITY, RESILIENCE AND SUSTAINABILITY OF INTENSIVE ORGANIC FRUIT ORCHARDS AND VINEYARDS**

Yearly report of economic and environmental impact of management practices (2018-2019)



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1. INTRODUCTION

The work performed during the first year by the partners of the DOMINO project was meant to set up a methodology in order to gather data suitable for the assessment of the economic impact of the new orchard management methods at on-farm level and to evaluate the possible ecosystem services that the innovative methods could bring to farmers.

The determination of the economic impact is a basic condition for the adoption of the new agronomical practices by farmers into common practice. It shall be based on the analysis and comparison of cost of production and profits between current and with new methods. This allows considering explicitly the effects of proposed soil management practices on all aspects of farm assets and operations (Fig.1).

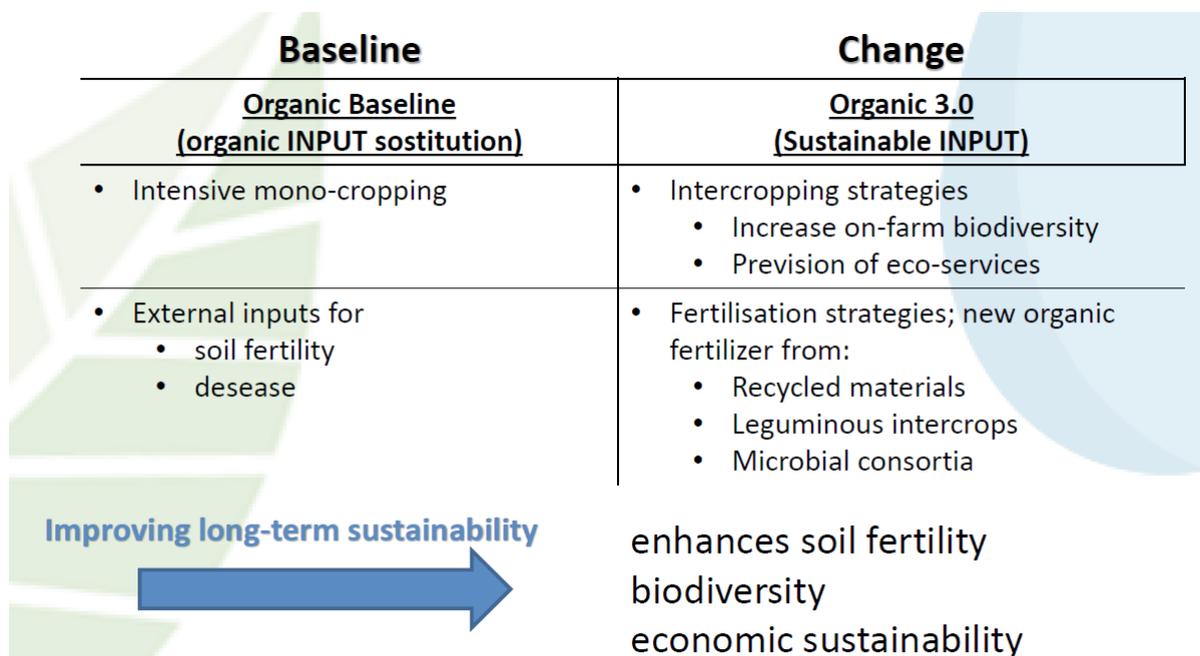


Figure 1 Estimated impact on ecosystem services by the project



The evaluation of ecosystem services considers the potential reduction of external inputs and increase of ecological benefits deriving from the new practices tested by the project. The evaluation is thus carried out in terms of environmental benefits through reduction in e.g. water contamination or energy use or increase in soil and agro-ecosystem biodiversity, which can provide data to policy makers necessary to support national and EU policies.

## 2. Activities performed

### A. Assessment of economic impact

The methodology for collecting the data from the trial sites and comparing them with the baseline (current organic) practices has been prepared. It derived after an exchange of opinions and discussions on the kind of data to be considered, taking also into consideration the differences of available data from the different countries.

The relevant parameters were finally organized in a guideline consisting in a handy instruction and a set of tables (available also in Excel format) to be used as template, shared by all partners. Data to be collected related only to the activities and work necessary to manage the innovative methods introduced by the project: inter-row management with new leguminous species, row management with introduction of a second cash crop for different purposes, use of locally produced organic fertilizers and installation of temporary nets for plant protection. Examples to be followed for collecting the data during the season were also provided. The collection of data is expected to start from the season 2019, since the



project started after the beginning of the growing season 2018 and the majority of trials were thus established late in the season or at the beginning of 2019.

### Outcomes of the activity

The major output of this activity was thus the preparation of guidelines with the methodology for the collection of economic data available on line at : [http://www.domino-coreorganic.eu/download/other/DOMINO\\_guidelines\\_economic%20assessment.pdf](http://www.domino-coreorganic.eu/download/other/DOMINO_guidelines_economic%20assessment.pdf).

### B. Assessment of ecoservices

Ecosystem services are defined as services provided by the natural environment that directly and/or indirectly affect human wellbeing. This definition can be linked to an economic assessment of agronomical practices that foster such kind of services. According to the methodology developed by the United Nations under the Millennium Ecosystem Assessment, the typology of ecosystem services were classified under four broad headings:

1. Provisioning Services: these are ecosystem services that describe the material or energy outputs from ecosystems. They include food, water and other resources;
2. Regulating Services: they are services that ecosystems provide by acting as regulators eg. regulating the quality of air and soil or by providing flood and disease control;
3. Cultural services: they are nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g., knowledge systems, social relations, and aesthetic values;
4. Supporting services: these are services that are necessary for the maintenance of all other ecosystem services. Some examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat.



Within the wide list of possible types of ecoservices for each of the above mentioned four services, the project has selected few that are likely to be affected by the innovation practices tested. These were selected on the basis of a confrontation and discussion with representatives of the Polish Association of Organic Fruit Producers during a workshop organized at their headquarter in Biata Rawska (Poland) and in Skierniewice at the INHORT premises. The parameter to be considered has been defined throughout participative activities involving producer and technicians (Fig.2).

Seminars, round tables and a specific section of the questionnaires, translated in all project partners national languages (available at <http://www.domino-coreorganic.eu/download/other/Multilingual-questionnaire-on-stakeholder-practices-and-priority.pdf> ), were also used to highlight the priorities for stakeholders.

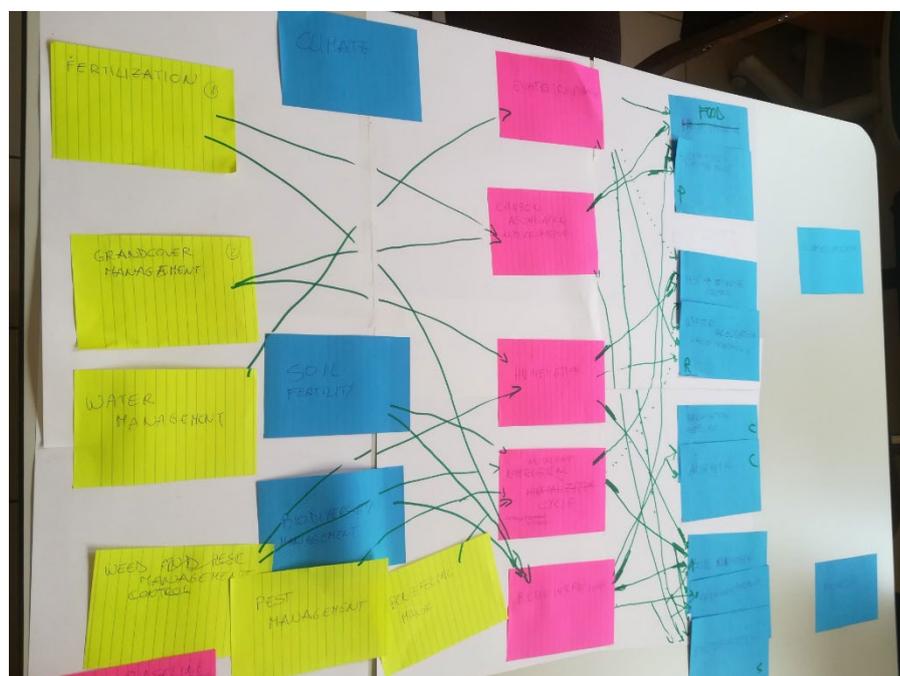


Figure 2 Tools for a participative decision taking in significant environmental parameters to be evaluated, run with Polish farmers and technicians.



A total of nine services were considered for evaluation. They ranged from production of food or other raw materials to effect on pollination and waste-water treatment to support to soil fertility (fig.3) and recreational and mental or physical health.

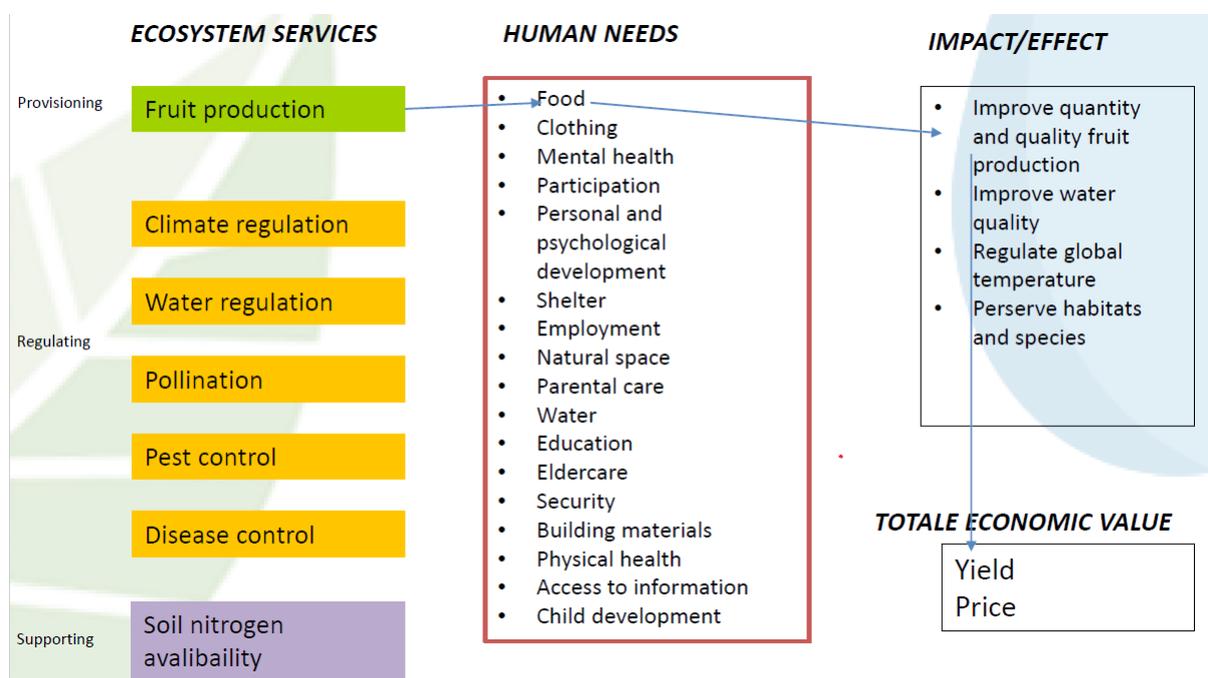


Figure 3 Ecosystem services evaluated by the project.

On the basis of this outcome, the methodology to perform the evaluation was set. The research was based on a two-level approach. The first level aims to asses the perception of the operators (farmers, researchers, advisors, etc.) about the impact the innovative practices could have on the selected service. The second level is meant to monetize the value of the services. For this purpose, the different kinds of data collected by the project (i.e. yield, biodiversity, soil nutrients dynamics, etc.) will be utilized to translate them into the services and into its monetary value.

For the assessment of the perception about the ecoservices, a questionnaire was prepared and started to be filled by operators in the different countries.



More than hundred were already collected. This initial data is expected to provide information about the “feeling” of farmers on the innovative practices proposed by the project. It is than planned to have the same questionnaire filled again at the end of the project, when the results of the trials will be available and presented to the stakeholders, comparing thus the perceived impact to the one based on clear evidences.

Outcomes of the activity

The major outcomes of this activity were thus the guidelines for gathering and assessing data and the initial collection of questionnaires on the perception of the ecoservices provided by the innovation tested by the project. The preliminary analysis of the questionnaire indicated a high consideration of the added value of the living mulches in terms of aesthetic value and marketing claim for farmers selling directly on farm their products. A lower impact was generally estimated as for additional food and raw material production. A relevant exception was represented by farmers able to transform and valorise directly on-farm the secondary products. Organic confitures, produced with the strawberries adopted as living mulches, an herbal teas from strawberry leaves are some of the products sold directly to farm customers. Such products contribute to raise the attention on the multifunctional approach of the alternative soil management strategies (Fig.4).



Figure 4 Recreative activities: picking strawberries from mulches at Colle Stefano vinery (IT)