ECOWHEATALY

Evaluation of policies for enhancing sustainable wheat production in Italy

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GUI

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Missione 4 Istruzione e Ricerca

GUI

WP3: Assessment under different green policies in tranquil times

- **Task 3.2** - Evaluation of environmental and wheat production impacts and options for policymakers. The task will assess an evaluation of the explored green policies on both the environment and the national wheat production for policymakers. The expected impacts on the environment will be explored by implementing the LCA framework built-in Task 1.2. This will produce time series of a set of environmental indicators. Some non-exhaustive suitable indicators are reported in OECD, 2001. Within this task, two web graphical interfaces to improve stakeholders' awareness of sustainability will also be developed.

4. Possible application potentialities and scientific and/or technological and/or social and/or economic impact

- A Graphical User Interphase (GUI) freely accessible via the web will allow users to run the models and conduct different analyses introducing update coefficients for inputs and outputs prices. Tables and charts will be available to be downloaded.

- A second web interface will highlight the environmental impact indicators of the farmer's choices in wheat production. This will represent a nudge in the adoption of more sustainable actions in farm management. Toward this aim, we will follow the example of the field print calculator proposed at http://www.fieldtomarket.org/fieldprint-calculator/.

- A much more complete tool is also available for Italy (www.granoduro.net). We do not intend to compete with this commercial tool which is a decision support system. We aim at providing a freely accessible web interface to improve the awareness of local stakeholders about the environmental footprint of wheat production.
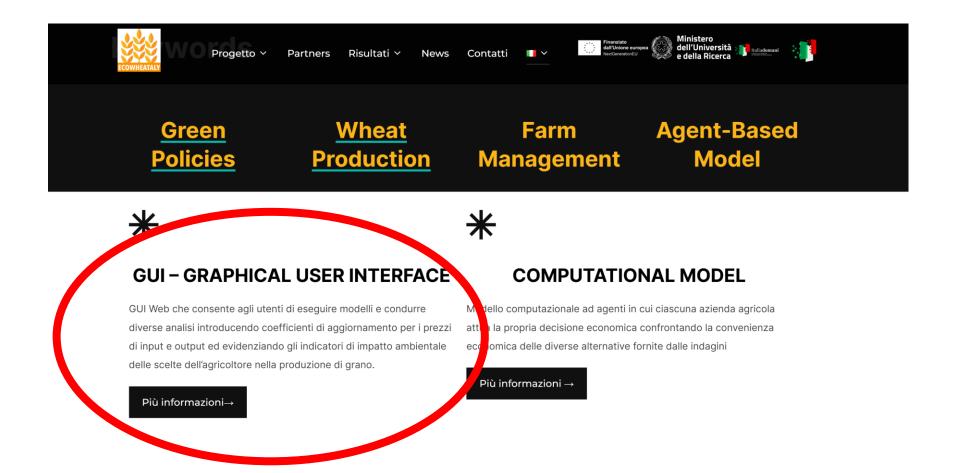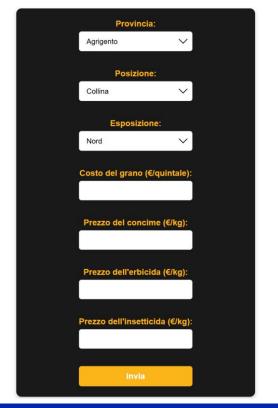
FIRST GUI

FROM PROJECT WEBSITE

TO GUI
DEV ENV

Risultati del Calcolo

Resa stimata: 38.72 quintali

Profitto stimato: 7528 €

Quantita di concime: 159.17 kg

Quantita di erbicida: 2.86 kg

Quantita di insetticida: 2.85 kg

Torna alla Form

Technical choices for GUI development

- The GUI needs to send the form inputs (geographic parameters and other agricultural parameters) to the optimization model and then show the output to the client

- For statistical purposes we decided to store all the form submissions on a DB

- The whole thing was developed using HTML, PHP, SQL and Python

What is missing to complete the first GUI?

- Complete integration with model (currently geographic parameters are fixed values) → **_WE ARE WORKING WITH GIANFRANCO_**

- A small information box to give simple information about the form fields and their definition → **_WE ARE WORKING WITH EDMONDO_**

- Creating a web scraping script to retrieve parameter values to insert into the form as suggestions (?) to provide the user with an estimated market value/cost → **_WHAT TO SUGGEST? WHAT IS THE BEST INFORMATION?_**

GUI – Information box for users

This Graphical User Interface (GUI) is designed to help farmers choose the optimal quantity of inputs to maximize their profit from wheat production.

Currently, the model reproduces a simple situation where wheat is produced employing **fertilizers**, **herbicides**, and **insecticides**.

The user can :

- In brief, the problem of choosing an input combination is a mathematical minimization, i.e., the farmer minimizes the cost through an input combination.

- In the model developed below, we will provide a new modelization of the yield function, based on the concept of yield gap. In our model we will assume a zero degree of substitution between fertilizers and herbicides. We will therefore use the Leontief production function.

- The yield realized by the farm is lower than the potential yield, and the difference between the potential and the actual yield is the yield-gap. The yield-gap is caused by limiting factors (water and nutrients availability) and reducing factors (weeds, pests and diseases, pollutants).

- In this case, we compute the level of x needed to achieve a given level of yield $\hat{y}$. It will be denoted with $\hat{x}$. and x the strength of the measure against the stress. $s \in (0,1)$ gives the share of the potential yield lost due to the stress.

GUI - Scraping data to external services

WHEAT:

1) *ISMEA [wheat average monthly prices at origin? Durum wheat?]*

2) *TESEO-CAL [fine-grained wheat? last available price -> average between min and max?]*

FERTILIZING:

1) *ISMEA [agricultural urea? last available price -> average between min and max?]*

GLYPHOSATE HERBICIDES:

1) *NOT OFFICIAL SOURCES (FITOITALY ??)*

FERTILIZING:

1) *NOT OFFICIAL SOURCES: For PROSARO a possible cost(online shop)*

Second GUI

Thank you for your attention