

3D-CMCC-OLIVE model

<https://sergio-noce.maps.arcgis.com/apps/webappviewer/index.html?id=7da8a6061f2043c9a655e874c9a58e8e>

Open data software

GENERAL GUIDELINES

The algorithm supports the farmer in the olive tree planting project, showing the impact of the different combinations “for the best” optimized solution and providing the opportunity data to evaluate the performance of the olive grove.

The replicable field form imposed is 50 meters long and 100 meters wide. The algorithm has calculated the different combinations impact according to the scientific literature¹.

The user has to impose the range of possibilities of his own field or/and the results required, selecting inside the different classes distributed in the row the limitations he wants to impose, taking into account however their possible interdependence. The selection derived by holding down the left mouse button. On the bottom part of the screen, it appears the different configurations represented by an image: selecting each of them, it appears the specific attributes selected and so the values for the tree planting project.

LECCINO PLANTING FOR THE BEST

<https://t-acm.github.io/DesignExplorer/?ID=aHR0cHM6Ly9kcml2ZS5nb29nbGUuY29tL2RyaXZIL2ZvbGRlc nMvMXhsams4enltRXA1N3JtXzdRbzVOMEk0Z0ZOeXRoLWlNP3VzcD1zaGFyaW5n>

To planning the olive groves + considering Leccino cultivar and polyconic vase geometry, the “input” range of solutions that can be selected are: the terrain slope (0-10% or 10-25%), the cardinal direction the field faces (South, South-East, South-West, West, Est) where intermediate directions (South-West, South-East) are linked to the offset of the grid, canopy diameter foreseen (half meter step), spacing in grid types (rectangle or square), canopy distance beyond the canopy diameter (one meter step), distance along the first (X) and the second (Y) grid directions (both one meter step), the number of olive trees per hectare, which is the density.

The “output” range of solutions calculated, that can be selected, are: the biomass of all the olive trees (kg/he), the carbon (kg/he) and the CO₂ (kg/he) stock sequestrated and finally the annual energy values (kWh), related to the photosynthetic process and therefore to production in the different environmental contexts calculated with data by Italy (Perugia), Greek (Athens), Spanish (Malaga) and Israel (Tel Aviv).

DIFFERENT GEOMETRIES PLANTING FOR THE BEST

<https://t-acm.github.io/DesignExplorer/?ID=aHR0cHM6Ly9kcml2ZS5nb29nbGUuY29tL2RyaXZIL2ZvbGRlc nMvMXhxX0pPYW0yR2tNeW1PYjdJaGZyM1pmRHU2QVBJNjlxP3VzcD1zaGFyaW5n>

To planning the olive groves considering different vase geometries, the “input” range of solutions that can be selected are: the terrain slope (0-10% or 10-25%), the cardinal direction the field faces (South, South-East, South-West, West, Est) where intermediate directions (South-West, South-East) are linked to the offset of the grid, canopy diameter foreseen (half meter step), three principal vase geometries (free vase as sphere, polyconic vase as polycone, inverted cone vase as cone), spacing in grid types (rectangle or square), canopy distance beyond the canopy diameter (one meter step), distance along the first (X) and the second (Y) grid directions (both one meter step), the number of olive trees per hectare, which is the density.

The “output” range of solutions calculated, that can be selected, are the annual energy values (kWh), related to the photosynthetic process and therefore to production in the different environmental contexts calculated with data by Italy (Perugia), Greek (Athens), Spanish (Malaga) and Israel (Tel Aviv).

¹ Brunori, A., Dini, F., Cantini, C. *et al.* Biomass and volume modeling in *Olea europaea* L. cv “Leccino”. *Trees* **31**, 1859–1874 (2017). <https://doi.org/10.1007/s00468-017-1592-9>

SUPER INTENSIVE PLANTING FOR THE BEST

<https://tt-acm.github.io/DesignExplorer/?ID=aHR0cHM6Ly9kcml2ZS5nb29nbGUuY29tL2RyaXZIL2ZvbGRlcnMvMTIttdDFSLTJsdWhtVWNtd2tIV2dkUjhXSzdUN1I0aUY2P3VzcD1zaGFyaW5>

To planning the super intensive olive groves, the “input” range of solutions that can be selected are: the terrain slope (0-10% or 10-25%), cardinal direction the field faces (South, South-East, South-West, West, Est) where intermediate directions (South-West, South-East) are linked to the offset of the grid, canopy size foreseen (half meter step), trees height (half meter step), the distance between the rows of the trees and in particular between their canopy (half meter step), the distance inside each rows of trees and in particular between their canopy (half meter step), the distance along the first (X) and the second (Y) grid directions (both half meter step), the number of olive trees per hectare, which is the density.

The “output” range of solutions calculated, that can be selected, are the annual energy values (kWh), related to the photosynthetic process and therefore to production in the different environmental contexts calculated with data by Italy (Perugia), Greek (Athens), Spanish (Malaga) and Israel (Tel Aviv).