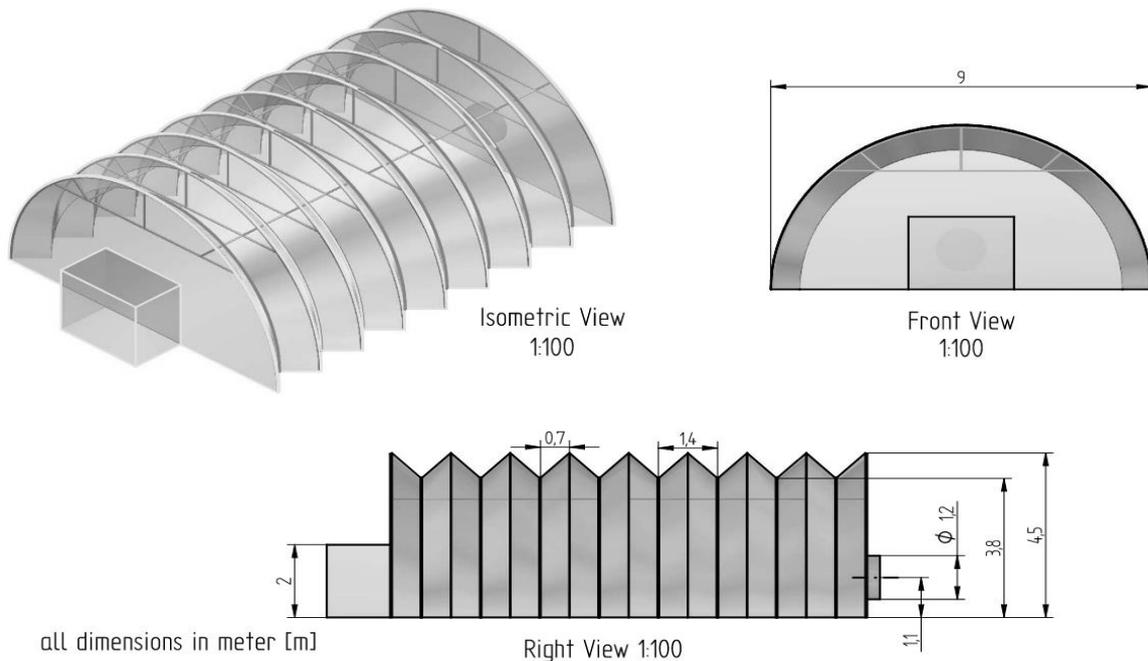




# Thermochemical Fluids in Greenhouse Farming

## Tunnel greenhouses with increased surface

Tunnel greenhouses are simple constructions for protected crop production used all over the world. They can be covered by just one sheet of plastic foil, allowing to create a sealed surface without complicated means of construction. A modified version of a tunnel greenhouse is developed in The GreeFa, allowing to be used to effectively create a closed atmosphere, by only using one piece of foil from one side to the other at a length of an entire roll of foil.



By the reduction of foil connectors, losses of (elevated) CO<sub>2</sub> and water vapor from the closed atmosphere are effectively reduced. For climate control in a closed greenhouse, a huge roof surface area is required, as all heat entering as solar radiation needs to be withdrawn by heat conduction within a 24 hours period. An increased surface is realized by a zig-zag structure between high points along construction bows and low points along tension belts. By using this structure, the surface area can be increased by a factor of 2-3, also allowing to withdraw 200-300% of heat, compared to a standard design. A secondary advantage relates to the strong slope between the high points and the low points, allowing to collect condensation droplets from the roof area during nighttime. This hinders a fallback of the droplets onto the vegetation, which would cause hygiene problems, mainly related to fungal growth on the leaves. The construction of a closed greenhouse can be provided by this design at low cost. The cost can even be lower than a standard tunnel greenhouse, as no ventilation flaps and openings have to be included.



TheGreeFa project has received funding from the European Union's Horizon 2020 Research and Innovation Program under grant agreement No 101000801.

The sole responsibility of this publication lies with the authors. The European Commission and the Research Executive Agency is not responsible for any use that may be made of the information contained therein.