



**«VALorization of Mediterranean small-scale FARMS by cropping wild  
UnExploited species»**

**Project Number: 1436**

**Project Acronym: Valuefarm**

**5<sup>th</sup> Semestrial report**

**Period covered by the report: from 01/09/2022 to 28/2/2023 (M24-M30)**

**Periodic report: 2nd**

***Partners:***

- University of Thessaly (UTH), **Greece**
- Instituto Politécnico de Bragança (IPB), **Portugal**
- Cyprus University of Technology (CUT), **Cyprus**
- Dokuz Eylul University (DEU), **Turkey**
- Ege University (EGE), **Turkey**
- Consejo Superior de Investigaciones Científicas (CSIC), **Spain**
- Bergische Wuppertal University (BUW), **Germany**
- Benha University (BU), **Egypt**
- University of Mostaganem (UM), **Algeria**

## 1 Explanation of the work carried per WP

### 1.1 Work Package 1

Working package 1 is related to the administration of the project, starting in M1 and ending in M48.

The evaluation meeting took place on 12<sup>th</sup> of September of 2022 where apart from the activities presented in the mid-term which covered M1-M18 of the project, an additional report for the period of March 2022-August 2022 (M19-M24) was also evaluated.

In the meeting all the WP leaders presented the activities related to the corresponding WP, while a discussion followed where the coordinator and all the partners responded to comments and questions raised by the evaluator and the representatives of the funding agencies that attended the meeting. In this meeting, the consortium also asked for an extension of 12 months of the whole project in order to mitigate deviations due to pandemic and other reasons that were explained in detail in the report. The evaluator and the funding agencies were favorable for granting the extension, while the overall progress of the project activities was also considered satisfactory with some minor comments that were described in detail in the evaluation report and will be considered in the 2<sup>nd</sup> period of the project. Moreover, in the meeting it was discussed the withdrawal of one of the Greek partners (GFV) from the projects due to personal and administrative issues. The consortium has unanimously decided to accept the partner's request and all the related activities to be taken over by UTH. The evaluator, the PRIMA officer and the representative of the Greek funding also agreed with this change.

After the evaluation meeting, an out of turn online internal meeting took place via zoom on October 26<sup>th</sup> 2022 where all the partners discussed the results of the evaluation report and the evaluator comments and made suggestions about how to address all the comments until the end of the project, especially regarding broadening the audience of the dissemination activities and the gender issues. Moreover, in this meeting it was decided to schedule four in person meetings until the end of the project, starting from Portugal in April 2023, where the 3<sup>rd</sup> technical meeting will also take place. Three more meetings were scheduled until the end of the project, in Autumn 2023 (Germany or Greece), Spring 2024 (Spain) and August 2024 (final meeting in Greece).

### 1.2 Work package 2

This working package is related to the evaluation of WEPs under innovative farming systems, starting in M1 and ending in M36, after the acceptance of our request to extend the whole project for 12 months. The specific task related to this semestrial report is **Task 2.3: Mixed cropping and intercropping systems, and short-term crop rotation systems**, as well as to Deliverables D2.3 Selection of the most environmentally sustainable WEP for each country conditions and D2.4 Selection of the most sustainable WEP and legume combinations for each country conditions both due on M36. However, some additional experiments were scheduled in order to address the evaluator's comment for better validating some of the obtained results of Task 2.2: **Agronomical characterization of WEPs under various cultivation conditions**.

The specific activities of each project partner are described below:

**Task 2.2:** The partners involved in this Task are UTH, CUT, DEU, EGE, BU and CSIC. The 2<sup>nd</sup> round of experiments is completed and the results have been integrated in deliverable D2.2. However, some additional experiments are being performed after the comments of the evaluators for validation of the existing results.

- **University of Thessaly (UTH)** is performing the following experiments:
  - (a) Field experiments regarding the use of mulching with plastic films in the cultivation of *Crithmum maritimum* and *Cichorium spinosum*.
  - (b) field experiments regarding the evaluation of irrigation requirements of *Cichorium spinosum* and *Crithmum maritimum*
  
- **Cyprus University of Technology (CUT)** has performed the following experiments for the evaluation of the agronomic performance of the selected species:
  - (a) Greenhouse (hydroponic-NFT) experiment regarding the potassium (K) and phosphorus (P) levels for *Sonchus oleraceus* and *Portulaca oleracea*. Experiments are completed. Analysis of samples is in progress.
  
- **Consejo Superior de Investigaciones (CSIC)** has performed the following experiment:
  - (a) A pot experiment where the effect of organic (compost extracts) and inorganic fertilization (different ratios of N-P-K) on the growth of *Sonchus oleraceus* and *Portulaca oleracea* was evaluated.
  
- **Dokuz Eylul University (DEU)**
  - (a) pot experiments will be repeated to investigate the agronomic and morphological characterization of *Portulaca oleracea* under stress, using the variables of alkalinity in the soil, heavy metal pollution in the soil and water stress, as well as the effect of soil organic matter content.
  - (b) Greenhouse pot experiments have been also planned to evaluate the effect of drought stress on the growth of *Crithmum maritimum*, *Portulaca oleracea* and *Scolymus hispanicus* plants
  
- **Ege University (EGE)**
  - (a) Field and pot experiments have been scheduled to investigate the agronomic and morphological characterization of *Portulaca oleracea*, *Crithmum maritimum* and *Scolymus hispanicus* plants under drought conditions.
  
- **Benha University (BU)**
  - (a) Pot experiments are being performed to study the effect of salinity on the growth and chemical composition of *Portulaca oleracea* plants
  - (b) Pot experiments are being performed to study the effect of drought on the growth and chemical composition of *Portulaca oleracea* plants

The results of the completed experiments have been integrated and included in the electronic handbook (D2.2) which was submitted in M20 of the project.

**Task 2.3.** The involved partners (UTH, CUT, DEU, EGE, BU and CSIC) are performing the second series of experiments related to this task. BUW and CSIC will receive soil samples that will be analyzed and the results will be used in WP3.

In particular, the following activities are/will be performed by the individual partners:

- **University of Thessaly (UTH)** is performing the following experiments for the evaluation of the agronomic performance of the selected species:
  - a) field experiments regarding the use of *Cichorium spinosum*, *Sonchus oleraceus*, *Scolymus hispanicus* and *Portulaca oleracea*, in crop rotation systems, following the cultivation of *Phaseolus vulgaris* and *Pisum sativum* (ongoing experiments).
  - b) field experiments with *Portulaca oleracea* where the effect of intercropping with common bean and crop rotation is tested in comparison to sole cropping systems (ongoing experiment).  
Plant and soil samples will be collected for chemical analyses that will be performed within the framework of WP3 and WP4.
- **Consejo Superior de Investigaciones (CSIC)**
  - (a) has planned an experiment to study the effect of different cropping practices (crop rotation, mixed cropping and intercropping) with purslane (*Portulaca oleracea* L.) and peas (*Pisum sativum* L.) on plant establishment and yield, soil quality, rhizosphere bacterial and fungal communities is going on in field conditions.  
Plant and soil samples will be collected for chemical analyses that will be performed within the framework of WP 3 and 4.
- **Cyprus University of Technology (CUT)**
  - (a) has scheduled field experiments/demonstration and contacted local farmers in order to evaluate the species under field conditions and different cropping systems. The experimental set up is scheduled for Autumn 2023.
- **Dokuz Eylul University (DEU)**
  - (a) Field trials where the effect of green manuring, crop rotation and intercropping are in progress.
- **Ege University (EGE)**
  - (a) will repeat the field trial for the purpose of mixed planting and co-planting system of purslane (*Portulaca oleracea*), sea fennel (*Crithmum maritimum*) and *Scolymus hispanicus* L.) plants under field conditions.
- **Benha University (BU)**

- (a) is performing field trials for the second growing period with *Portulaca oleracea* in mixed cropping, intercropping and short-term crop rotation systems with legumes and other crops to define the most suitable cultivation systems.

### 1.3 Work package 3

This work package has started on M13. Specific tasks related to this WP include **Task 3.1 Evaluation of PGPRs, PGPFs and AMFs as novel cultural practices for WEPs; Task 3.2 Soil improving properties of WEPs; Task 3.3 The effect of root types on soil weathering; Task 3.4 The effect of root types of WEPs on functional and structural soil microbial diversity; Task 3.5 Evaluation of non-microbial biostimulants for WEPs cultivation**

- **University of Thessaly (UTH)** is performing experiments related to Tasks 3.1-3.4 in order to obtain samples that will be analyzed by BUW.
  - (a) field experiments regarding the use of manure in cultivation of *Cichorium spinosum*, *Crithmum maritimum*, *Portulaca oleracea*, *Sonchus oleraceus* within the context of incorporating the selected species in organic farming systems (Task 3.2-3.4).
  - (b) pot experiments regarding the use of manure and zeolite in cultivation of *Portulaca oleracea* and *Sonchus oleraceus* within the context of incorporating the selected species in organic farming systems (Task 3.2-3.4).
  - (c) Moreover, field and pot experiments are in progress in order to evaluate the effect of non-microbial biostimulants and biofertilizers on WEPs cultivation (Task 3.5).
  
- **Cyprus University of Technology (CUT)**
  - (a) Pot experiment, evaluating the plant residues/wastes from olive-mill and grape-mill wastes as a growing media for both *Sonchus oleraceus* and *Portulaca oleracea* (Task 3.5). Experiments are completed. Analysis of samples is in progress.
  - (b) Organize the next experiment on plant residues/waste on the examined species.
  
- **Consejo Superior de Investigaciones (CSIC)** has performed and scheduled the following experiments related to Tasks 3.1-3.4:
  - a) Completed field experiment: Cropping association with purslane and leguminous crops, testing intercropping and rotation effects on purslane yield and soil properties and biological communities. Soil samples have already been analyzed.
  - b) Analysis of soil physicochemical properties and enzymatical activities of all the experiments finished to the date.
  - c) Soil DNA (ITS and 16S) from two experiments was extracted and sequenced: Crop association purslane – leguminous crops; and the effect of an organic fertilizer made from waste derived from apiculture on purslane plants.
  - d) A new field experiment is scheduled as a continuation of the cropping association experiment, testing the effects of cropping systems on purslane yield and the effect on soil over time.
  - e) A new field experiment is scheduled in an orchard field for new experiments in 2023 spring – summer seasons, while two new experiments are scheduled under greenhouse conditions for the spring season.

- **Bergische Wuppertal University (BUW)**

- Finished with the analyses of the macro, micro, and toxic elements in the soils and plants samples of the first experiment (Task 3.2)
- Analyzing the PLFA in the rhizosphere soil samples in the first experiment (Task 3.2 and 3.4)
- Finished the second pot experiment with *Portulaca*, *Sonchus*, *Scolymus*, and *Plantago* using two degraded contaminated soils (used instead of the eroded soils in Germany) in four replicates (Task 3.3)
- Harvested the plants, separated to roots and shoots, air dried, and recorded the fresh and dry biomass (Task 3.3)
- Collected soil samples from all pots, air dried, crushed, and sieved to be ready for extraction and analyses (Task 3.3)
- Analyzed soil properties (pH, soil salinity, total organic carbon content, particle size distribution, oxides content) (Task 3.3)

Scheduled activities

Finishing the extraction of the pot experiment soil and plant samples as follow:

- Extracting the root and shoot samples (March-April, 2023) (Task 3.3)
- Extraction of the total content of macro-nutrients (C, P, K, Ca, Mg, S) in the soil samples (May-June, 2023) (Task 3.3)
- Extraction of the available (DTPA) content of macro-nutrients (C, P, K, Ca, Mg, S) in the soil samples (June-July, 2023) (Task 3.3)
- Microwave extraction of the total content of trace and toxic elements (Al, Ag, As, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, Sb, Se, Sn, Tl, V, and Zn) in the soil samples (July- August, 2023) (Task 3.3)
- Extraction of the available (DTPA) content of trace and toxic elements (Al, Ag, As, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, Sb, Se, Sn, Tl, V, and Zn) in the soil samples (August-September 2023) (Task 3.3)
- Analyses of the macro, micro, and toxic elements in the root and shoot samples (May-August, 2023) (Task 3.3)
- Analyses of PLFA in the rhizosphere soil samples (May-August, 2023) (Task 3.2 and Task 3.4)
- Contributing to the work on the communication activities (Work package 5)
- Contributing to the work on the dissemination of achieved knowledge (Work package 6)

- **Dokuz Eylul University (DEU)** will performed experiments related to Task 3.2 and 3.3.

- In particular, the soil alkalinity level and soil remediation effects of WEPs will be determined in case of soil contamination with heavy metals. The initial values of the first trial set have still been obtained. In addition, the distribution of metals in the soil according to chemical bonding types will also be considered. Different plant species (*Crithmum maritimum* and *Scolymus hispanicus*) will also be studied in future trial sets.
- The evaluation of the effect of *Portulaca oleracea* plant roots on soil decomposition (Task 3.3)

- **Ege University (EGE)**

n/a

- **Benha University (BU)** has planned to perform the following experiments related to Task 3.1 and 3.5:
  - a) The effect of bacterial strains *viz.*, *Azotobacter chroococcum*, *Paenibacillus polymyxa* GQ375783.1 on plant growth and chemical compositions of *Portulaca olearacea* (Task 3.1).
  - b) *Portulaca olearacea* plants were irrigated with different concentrations of saline water: 1000, 2000, 3000, 4000, 5000, 6000 ppm and control, while they were also sprayed with plant growth stimulants such as melatonin, proline and salicylic acid at different concentrations to evaluate the amelioration effects of these treatments on salinity stress related damage (Task 3.5).

#### 1.4 Work package 4

This WP is related to the evaluation of quality, environmental footprint and nutritional value of WEPs and includes the following activities: **Task 4.1 Characterization of physical properties and quality; Task 4.1 Characterization of physical properties and quality; Task 4.3 Determination of individual bioactive compounds; Task 4.4 Environmental footprint for WEPs; Task 4.5 Statistical analysis and interpretation of the obtained data.**

The following activities are planned or ongoing:

- **University of Thessaly (UTH)**
  - (a) UTH has collected samples which is preparing to send to IPB for analyses related to quality and nutritional value of WEPs. Moreover, the data for LCA analysis of the new experiments will be sent to CUT for the evaluation of the environmental footprint of WEPs.
- **Cyprus University of Technology (CUT)**
  - (a) CUT provided the second set of samples to IBP, as prepared through freeze drying. CUT has finalized the mineral analysis (N, K, P, Mg, Ca, and Na).
  - (b) Collecting the relevant info for the Environmental footprint in different experiments performed by the consortium. Analysis is in progress.
  - (c) CUT has received relevant info from UTH for several experiments and is performing data analysis. More data will be received in due time.
- **Instituto Politécnico de Bragança (IPB)**

As the lead beneficiary of WP4, IPB has begun the assessment of the nutritional value and chemical composition, as foreseen in task 4.3., of the samples *Scolymus hispanicus*, *Cichorium spinosum*, *Sonchus oleraceus*, *Portulaca olearacea*, and *Crithmum maritimum*, with different fertilization treatments, different irrigation treatments, pot and field experiments provided by the project coordinator (UTH). In due time the evaluation of the bioactivity profile and phenolic compounds of samples provided by the partners involved in WP2 (namely the samples *Portulaca olearacea* and *Sonchus oleraceus* from the CUT partner) will be performed within the next months.



Nowadays, the totally number of obtained samples amounts to IPB is 159 (one hundred fifty-nine). To better visualize the samples and which analyses have already been, Annex I shows schematically the samples from Greece and Cyprus as well as the next steps for next semester.

Regarding the samples from Greece, nutritional value including total fat, crude protein, ash, total dietary fiber, and carbohydrates (by difference) was evaluated following AOAC methods. Energy was calculated according to the equation: energy (kcal per 100 g) = 4 x (g protein + g carbohydrate) + 2 x (g total dietary fiber) + 9 x (g fat). The total fat, crude protein, ash of the samples has already been done: eleven roots samples of *Scolymus hispanicus* from pot experiments with different fertilization regimes and field experiment with different irrigation regimes; fourteen samples of *Crithmum maritimum* from pot experiments with different fertilizers. The chemical composition and bioactivities properties were also evaluated by IPB partner. In terms of chemical composition (free sugars, tocopherols, fatty acids, organic acids), the samples of four species mentioned before have been injected, and they will be identification and quantification as soon as possible. The mineral content in terms of potassium, sodium, calcium, magnesium, iron, manganese, copper, and zinc will be performed in the next semester to one hundred twenty-five samples.

Regarding the samples from Cyprus, the hydroethanolic extracts have been performed and in the next months the bioactivity profile and phenolic compounds of these samples will be evaluated.

As further advances, complete nutritional and chemical profile will be performed in *Scolymus hispanicus* and *Crithmum maritimum* hydroethanolic extracts, while the samples from Cyprus will be prepared and the following bioactive properties will be evaluated:

- a) The phenolic profile will be obtained by HPLC-DAD/ESI-MS and identified through available standard compounds and literature information. Quantification will be performed using calibration curves obtained from available commercial standard compounds.
- b) The antioxidant activity will be evaluated through the lipid peroxidation inhibition using porcine brain cell homogenates by using the thiobarbituric acid reactive substances (TBARS) assay and oxidative hemolysis inhibition assay (OxHLIA).
- c) The antimicrobial activity will be evaluated using five Gram-negative bacteria: *Escherichia coli*, *Enterobacter Cloacae*, *Salmonella enterocolitica*, *Pseudomonas aeruginosa*, and *Yersinia enterocolitica* and three Gram-positive bacteria: *Bacillus cereus*, *Listeria monocytogenes*, and *Staphylococcus aureus*, which are strains of food interest. Strains of clinical interest were also tested namely *Escherichia coli*, *Klebsiella pneumoniae*, *Morganella morganii*, *Proteus mirabilis*, *Pseudomonas aeruginosa* (Gram-negative bacteria), and three Gram-positive bacteria (*Enterococcus faecalis*, *Listeria monocytogenes* and methicillin-resistant *Staphylococcus aureus* (MRSA)). The antifungal activity on the fungi *Aspergillus brasiliensis* and *Aspergillus fumigatus* was also carried out.
- d) The anti-inflammatory potential will be evaluated through the production of nitric oxide formed by lipopolysaccharides from the rat macrophage cell line RAW 264.7.
- e) The cytotoxic was performed by the sulforrhodamine B (SRB) assay and four human tumor cell lines will be tested: CaCo2 (human colorectal adenocarcinoma), MCF-7 (breast carcinoma), VERO (renal epithelial cells extracted from a monkey) and AGS (Human gastric adenocarcinoma). Finally, for the hepatotoxic effect on non-tumor cell lines, a cell culture prepared from pig liver obtained from a local slaughterhouse (PLP2) was used.

- **Benha University (BU)**
  - (a) BU has collected and sent samples to IPB for analyses related to quality and nutritional value of WEPs.
  
- **University of Mostaganem (UM)**
  - a) The samples will be dispatched by IPB after the determination of bioactive properties.
  - b) UM has performed the first series of analyses related to the *in vivo* anti-inflammatory activity.
  - c) Statistical analysis and interpretation of the obtained data
  - d) The *in vivo* anti-inflammatory activity – histological parameters (The results are presented in Annex 1

### 1.5 Work package 5

This working package is related to the communication activities of the project which include the following tasks: **Task 5.1 Information and communication campaigns; Task 5.2 Organization of awareness events; Task 5.3 Establishment of a Project website; Task 5.4 Establishment of physical and living lab platforms;**

Regarding the ongoing activities:

- **University of Thessaly (UTH)**
  - The ValueFarm Project was presented to participants of Erasmus+ Little farmers (<https://www.littlefarmers-erasmus2020-2022.com/448138275>) at the experimental farm of the university of Thessaly on February 23 2023 (~ 20 kids from Greece, Bulgaria, Romania and Turkey)







- **Cyprus University of Technology (CUT)**
  - (a) The ValueFarm Project was presented at a specialized training school (~ 50 undergraduate and postgraduate students), that it was organized by LIFE EBP ([www.lifeebp.eu](http://www.lifeebp.eu)), a LIFE+ project concerned with the valorization of the organic fraction of municipal solid waste towards fertilizer production for agricultural applications, between 13-14 October 2022, Limassol, Cyprus.



(b) A researcher mobility is scheduled at the end of Feb 2023 to Portugal, for exchange of knowledge and Cypriot samples analysis.

## 1.6 Work package 6

The activities related to WP6 include **Task 6.1 Development of physical labs; Task 6.2 Planning of Dissemination Activities; Task 6.3 Implementation of Dissemination Activities.**

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- More data are produced in WPs related with research activities (WP2, WP3 and WP4), which will result in further dissemination activities:

Brochures/leaflets/posters/banners have been created for the dissemination of the project in local fairs, exhibitions, conferences, educational institutions, during the farm and open days, etc. The printed material is prepared in English and Greek language. The English format will be used by the partners to prepare the corresponding versions in their own languages. All the material is presented as Annex III.

Regarding the dissemination of the project, particular ongoing and completed activities are presented below:

#### Open access publications

1. Beatriz H. Paschoalinotto, Nikolaos Polyzos, Maria Compochoi, Youssef Roupheal, Alexios Alexopoulos, Maria Inês Dias, Lillian Barros, Spyridon A. Petropoulos. 2022. Domestication of Wild Edible Species: The Response of *Scolymus hispanicus* Plants to Different Fertilization Regimes. *Horticulturae* 9, 103. <https://doi.org/10.3390/horticulturae9010103>.
2. Nikolaos Polyzos, Beatriz Paschoalinotto, Maria Compochoi, Maria Inês Dias, Lillian Barros, **Spyridon A. Petropoulos**. 2022. Fertilization of Pot Grown *Cichorium spinosum* L.: How it can affect plant growth, chemical profile and bioactivities of edible parts? *Horticulturae* 8(890): 1-22. <https://doi.org/10.3390/horticulturae8100890>

The publications are presented in Annex IV.

#### Manuscript preparations:

1. The plant genotype determines the functional and taxonomic composition of the microbiome in purslane rhizosphere. *Agriculture, Ecosystems and Environment* (submitted for publication).
2. Agronomical practices and management for commercial cultivation of *Portulaca oleracea* as a crop: A Review. *Plants* (submitted for publication).
3. Effects of inorganic and compost tea fertilizers application on the taxonomic and functional microbial diversity of the purslane rhizosphere. *Science of the Total Environment* (submitted for publication).

#### Conference proceedings:

- (a) Conference proceedings: Nikolaos Polyzos, Maria Kompochoi, Alexios Alexopoulos, Maria Ines Diaz, Beatriz Paschoalinotto, Lillian Barros, Spyridon A. Petropoulos. The effect of fertilization regimes on growth and chemical composition of *Cichorium spinosum* plants. 13th International Scientific Agriculture Symposium “AGROSYM 2022”. Jahorina, Bosnia and Herzegovina, October 6-09, 2022. Type of dissemination: poster.
- (b) Paraskevi Katsimantou, Stefania-Fani Plitsi, Chrysanthi Foti, Ourania Pavli, Spyridon A. Petropoulos. Seed priming enhances seed germination and seedling growth of five wild edible species. 13th International Scientific Agriculture Symposium “AGROSYM 2022”. Jahorina, Bosnia and Herzegovina, October 6-9, 2022. Type of dissemination: poster.
- (c) Conference proceedings: Carrascosa A, Pascual JA, López-García A, Ros M, Petropoulos S, Alguacil MM. “Microbial community structure in purslane rhizosphere after different organic and inorganic fertilizer rates” 13th International Scientific Agriculture Symposium “AGROSYM 2022”; Jahorina mountain (Bosnia and Herzegovina) 6- 9 October, 2022. Type communication: Poster

- (d) Conference proceedings: Beatriz H. Paschoalinotto, Miguel A. Prieto, Nikolaos Polyzos, Maria Compochoi, Spyridon Petropoulos, Isabel C.F.R. Ferreira, Maria Inês Dias, Lillian Barros. “Functionality assessment of *Scolymus hispanicus* (golden thistle) for its daily-basis incorporation in the Mediterranean diet”. *Ciência 2022 – XVI Encontro de Química dos Alimentos* Castelo Branco, Portugal, 23-26 October, 2022. Type of dissemination: poster
- (e) Conference proceedings: Beatriz H. Paschoalinotto, Miguel A. Prieto, Nikolaos Polyzos, Maria Compochoi, Spyridon Petropoulos, Isabel C.F.R. Ferreira, Maria Inês Dias, Lillian Barros. Crop rotation and irrigation experiment effects the nutritional and chemical profile of *C. spinosum*. *XVI Encontro de Química dos Alimentos* Castelo Branco, Portugal, Portugal, 23-26 October, 2022.
- (f) Conference proceedings: Beatriz H. Paschoalinotto, Miguel A. Prieto, Maria Compochoi, Nikolaos Polyzos, Spyridon Petropoulos, Isabel C.F.R Ferreira, Maria Inês Dias, Lillian Barros. Avaliação da influência da adubação via solução nutritiva no perfil nutricional de *Scolymus hispanicus* L. *IV Congresso das Escolas Superiores Agrárias*, Santarem, Portugal, November 3-4, 2022. Type of dissemination: oral
- (g) Conference proceedings: Beatriz H. Paschoalinotto, Miguel A. Prieto, Nikolaos Polyzos, Maria Compochoi, Spyridon Petropoulos, Isabel C.F.R. Ferreira, Maria Inês Dias, Lillian Barros. “Impacto del riego en el perfil nutricional y químico de las partes comestibles del cardo dorado (*Scolymus hispanicus* L.). *III Congreso Nacional de Jóvenes Investigadores en Ciencia, Ingeniería y Tecnología de los Alimentos*, Salamanca, Spain, 10-11 November, 2022. Type of dissemination: oral
- (h) Conference proceedings: Paschoalinotto B. H., Prieto M.A., Compochoi M.; Polyzos N.; Pires, T.C.S.P.; Petropoulos S.; Ferreira I.C.F.R.; Dias M.I.; Barros L. Estudo integrado da influência do tipo de cultivo e irrigação nas propriedades bioativas de *Cichorium spinosum* L. *XXVI Encontro Galego-Português de Química*, Santiago de Compostela, Espanha, 16-18 November, 2022. Type of dissemination: oral
- (i) Conference proceedings: Paschoalinotto B. H., Prieto M.A., Compochoi M.; Polyzos N.; Pires, T.C.S.P.; Petropoulos S.; Ferreira I.C.F.R.; Dias M.I.; Barros L. Combinação de diferentes regimes de fertilização e irrigação para a produção de cardo dourado (*Scolymus hispanicus* L.) de alto valor nutricional e mineral. *XXVI Encontro Galego-Português de Química*, Santiago de Compostela, Espanha, 16-18 November, 2022. Type of dissemination: oral
- (j) Conference proceedings: Polyzos N., Papaioannou E., Paschou M., Petropoulos S.A. Commercial exploitation of *Sonchus oleraceus*: the response of plants to fertilization regimes. *4th Mediterranean Forum*, Chania, Greece, 4-7 December, 2022.

#### Scheduled activities

#### Manuscript preparations:

1. Effect of ammonium to total nitrogen ratio on *Portulaca oleraceae* grown in hydroponics. Under preparation.

2. Environmental footprint for unexplored vegetables production
3. A review paper regarding the chemical composition of wild edible species
4. A review paper regarding the integration of wild edible species in Mediterranean farming systems

#### Participation in conferences

1. Chrysargyris A, Tzortzakis N. 2023. *Origanum dubium* and *Sideritis cypria* plant waste as a substitute growing medium component for sowthistle production in nurseries. 10th International Conference on Sustainable Solid Waste Management, CHANIA2023.
2. Chrysargyris A, Xylia P, Tzortzakis N. 2022. Olive-mill and grape-mill waste as a substitute growing medium component for unexploded vegetables production in nurseries. 9th International Conference on Sustainable Solid Waste Management, CORFU2022, 15-18 June 2022, Corfu Island, Greece. (Oral)
3. Chrysargyris A, Hajisolomou E, Tzortzakis N. 2022. *Origanum dubium* and *Sideritis cypria* plant waste as a substitute growing medium component for *Portulaca oleraceae* production in nurseries. 9th International Conference on Sustainable Solid Waste Management, CORFU2022, 15-18 June 2022, Corfu Island, Greece. (Poster)

#### Participation in exhibitions

1. UTH will participate in Agrothessaly, an exhibition that will take place in Larisa, Greece on March 2-5, 2023. The results of the project will be disseminated via printed material (posters, banners and flyers) as well as with in-person interactions with participants.



Table 4. List of deliverables of Valuefarm project, displaying re-scheduled delivery months (in bold font). Completed indicates that the deliverable has been reached.

#	Deliverable name	WP	Lead	Type	Dissemination level	Due month	New due date
1.1	Technical meeting organisation	1	UTH	OTHER	CO	2	Completed
1.2	Constitution of the Steering Group	1	UTH	OTHER	CO	2	Completed
1.3	Semestrial internal progress report	1	UTH	R	CO	6	Completed
1.4	Technical meeting organisation	1	UTH	OTHER	CO	12	Completed
1.5	Semestrial internal progress report	1	UTH	R	CO	12	Completed
1.6	Annual report	1	UTH	OTHER	CO/PU	12	Completed
1.7	Semestrial internal progress report	1	UTH	R	CO	18	Completed
1.8	Technical meeting organisation	1	UTH	OTHER	CO	24	Completed
1.9	Semestrial internal progress report	1	UTH	R	CO	24	Completed
1.10	Annual report	1	UTH	R	CO/PU	24	Completed
1.11	Semestrial internal progress report	1	UTH	R	CO	30	30
1.12	Technical meeting organisation	1	UTH	OTHER	CO	33	33
1.13	Semestrial internal progress report	1	UTH	R	CO	36	36
1.14	Final report	1	UTH	R	CO/PU	36	48
2.1.1	<b>A DATABASE map of the selected WEPs in the participating countries</b>	2	CSIC	DEC	PU	6	Completed
2.1.2	<b>A DATABASE map of the selected WEPs in the participating countries</b>	2	CSIC	DEC	PU	6	Completed
2.2	<b>Multilingual electronic handbook of technical information and best practice guides of the selected WEPs</b>	2	CSIC	R	PU	8	Completed
2.3	Selection of the most environmentally sustainable WEP for each country conditions	2	CSIC	OTHER	PU	24	36
2.4	Selection of the most sustainable WEP and legume combinations for each country conditions	2	CSIC	OTHER	PU	24	36

3.1	Report for soil chemical properties in soil samples collected from the second field experiment	3	BUW	R	CO	30	42
3.2	Determination of plant nutrients and potentially toxic elements in both soil and plant samples collected from the first experiment	3	BUW	R	CO	30	42
3.3	Report for soil chemical properties in soil samples collected from the second field experiment	3	BUW	R	CO	30	42
3.4	Determination of plant nutrients in both soil and plant samples collected from the second experiment	3	BUW	R	CO	30	42
3.5	Determining the soil microbial community in soil samples collected from the second field experiment	3	BUW	R	CO	36	48
3.6.1	Reports	3	BUW	R	CO, PU	36	36
3.6.2	Reports	3	BUW	R	CO, PU	36	48
3.7	Publications in peer-reviewed scientific journals in an open access mode	3	BUW	OTHER	PU	36	48
4.1	Proximate composition and chemical profile of the different WEP's	4	IPB	R	PU	18	36
4.2	Report with the most suitable extraction conditions and mathematical models obtained by RSM) of the dependent variables used in the optimization of the extraction of the bioactive compounds from WEP's	4	IPB	R	CO	20	38
4.3	Overall composition description reports of the different WEP's	4	IPB	R	PU	24	42
<b>5.1.1</b>	<b>Public meetings</b>	<b>5</b>	<b>CUT</b>	<b>DEC</b>	<b>PU</b>	<b>12</b>	<b>Completed</b>
<b>5.1.2</b>	<b>Public meetings</b>	<b>5</b>	<b>CUT</b>	<b>DEC</b>	<b>PU</b>	<b>24</b>	<b>Completed</b>
5.1.3	Public meetings	5	CUT	DEC	PU	36	36
<b>5.2</b>	<b>Project website</b>	<b>5</b>	<b>CUT</b>	<b>DEC</b>	<b>PU</b>	<b>4</b>	<b>Completed</b>
<b>5.3.1</b>	<b>Communication and Publicity material</b>	<b>5</b>	<b>CUT</b>	<b>DEC</b>	<b>PU</b>	<b>6</b>	<b>Completed</b>
5.3.2	Communication and Publicity material	5	CUT	DEC	PU	33	45

5.4	Establish physical and living labs	5	CUT	DEM	PU	6	36
6.1.1	Scientific publications	6	DEU, EGE	R	PU	24	36
6.1.2	Scientific publications	6	DEU, EGE	R	PU	30	42
6.1.3	Scientific publications	6	DEU, EGE	R	PU	36	48
6.2.1	Video/DVD material	6	DEU, EGE	DEC	PU	24	36
6.2.2	Video/DVD material	6	DEU, EGE	DEC	PU	36	48
6.3.1	Handbooks	6	DEU, EGE	R	PU	18	30
6.3.2	Handbooks	6	DEU, EGE	R	PU	36	48
<b>6.4.1</b>	<b>Publicity material</b>	<b>6</b>	<b>DEU, EGE</b>	<b>DEC</b>	<b>PU</b>	<b>6</b>	<b>Completed</b>
<b>6.4.2</b>	<b>Publicity material</b>	<b>6</b>	<b>DEU, EGE</b>	<b>DEC</b>	<b>PU</b>	<b>12</b>	<b>Completed</b>
<b>6.4.3</b>	<b>Publicity material</b>	<b>6</b>	<b>DEU, EGE</b>	<b>DEC</b>	<b>PU</b>	<b>18</b>	<b>Completed</b>
6.4.4	Publicity material	6	DEU, EGE	DEC	PU	24	36
6.4.5	Publicity material	6	DEU, EGE	DEC	PU	30	42
6.4.6	Publicity material	6	DEU, EGE	DEC	PU	36	48

Table 5. List of milestones of the Valuefarm project, showing re-scheduled due month. Completed indicates that the deliverable has been reached. New milestones are highlighted with yellow color.

Milestone number	Milestone name	Related work package(s)	Means of verification	Due date (in month)	New due date
<b>M1.1.1</b>	<b>Reports on technical meetings</b>	<b>1</b>	<b>Reports available on the project website (PW)</b>	<b>2</b>	<b>Completed</b>
<b>M1.1.2</b>	<b>Reports on technical meetings</b>	<b>1</b>	<b>Reports available on the project website (PW)</b>	<b>12</b>	<b>Completed</b>
<b>M1.1.3</b>	<b>Reports on technical meetings</b>	<b>1</b>	<b>Reports available on the project website (PW)</b>	<b>24</b>	<b>Completed</b>
M1.1.4	Reports on technical meetings	1	Reports available on the project website (PW)	33	33
M1.1.5	Reports on technical meetings	1	Reports available on the project website (PW)	45	45
<b>M1.2</b>	<b>Establishment of steering committee</b>	<b>1</b>	<b>List of the Steering Committee members available on the PW</b>	<b>2</b>	<b>Completed</b>
<b>M1.3.1</b>	<b>Semestrial and annual progress reports completed</b>	<b>1</b>	<b>Reports available on the PW and sent to PRIMA</b>	<b>6</b>	<b>Completed</b>
<b>M1.3.2</b>	<b>Semestrial and annual progress</b>	<b>1</b>	<b>Reports available on the PW and sent to PRIMA</b>	<b>12</b>	<b>Completed</b>

	<b>reports completed</b>				
<b>M1.3.3</b>	<b>Semestrial and annual progress reports completed</b>	<b>1</b>	<b>Reports available on the PW and sent to PRIMA</b>	<b>18</b>	<b>Completed</b>
<b>M1.3.4</b>	<b>Semestrial and annual progress reports completed</b>	<b>1</b>	<b>Reports available on the PW and sent to PRIMA</b>	<b>24</b>	<b>Completed</b>
<b>M1.3.5</b>	<b>Semestrial and annual progress reports completed</b>	<b>1</b>	<b>Reports available on the PW and sent to PRIMA</b>	<b>30</b>	<b>30</b>
M1.3.6	Semestrial and annual progress reports completed	1	Reports available on the PW and sent to PRIMA	36	36
M1.3.7	Annual progress reports completed	1	Reports available on the PW and sent to PRIMA	48	48
M1.4	Final report completed	1	Final report on the website and sent to PRIMA	36	48
M3.1	Development of experimental design and implementation for the first field and pot experiment	3	Field and pot experiments have been done, agronomic measurements have been done, soil and plant samples collected, and ready for analyses	24	36
M3.2	Providing data of the first experiment	2	Analyses have been finished and the results are collected, validated, and available	30	42
M3.3	Development of experimental design and implementation for the second field experiment	2	Field experiment results	30	42
M3.4	Providing data of the second experiment	2	Analyses have been finished and the results are collected, validated, and	33	45

			available for publication		
M3.5	Preparing scientific paper(s)	1,2,4	Submitted/Published paper	33	45
M4.1	Up-scalable and eco-friendly extraction processes for bioactivities compounds	4	High yields in the procedure of extraction	18	36
M4.2	Optimized conditions for bioactive compounds profiling and fingerprinting	4	Parametric estimation responses resulting from RSM	24	36
M5.1	Establishment of physical and living labs	5	On-line and printed questionnaires filled by users, comments through the project website	6	36
M5.2	Video material prepared	5	Video material available in project website and the Internet	33	45