WaterFARMING

Improvement of water and nutrient retention and use efficiency in arable farming systems from field to catchment scale in Europe and North Africa

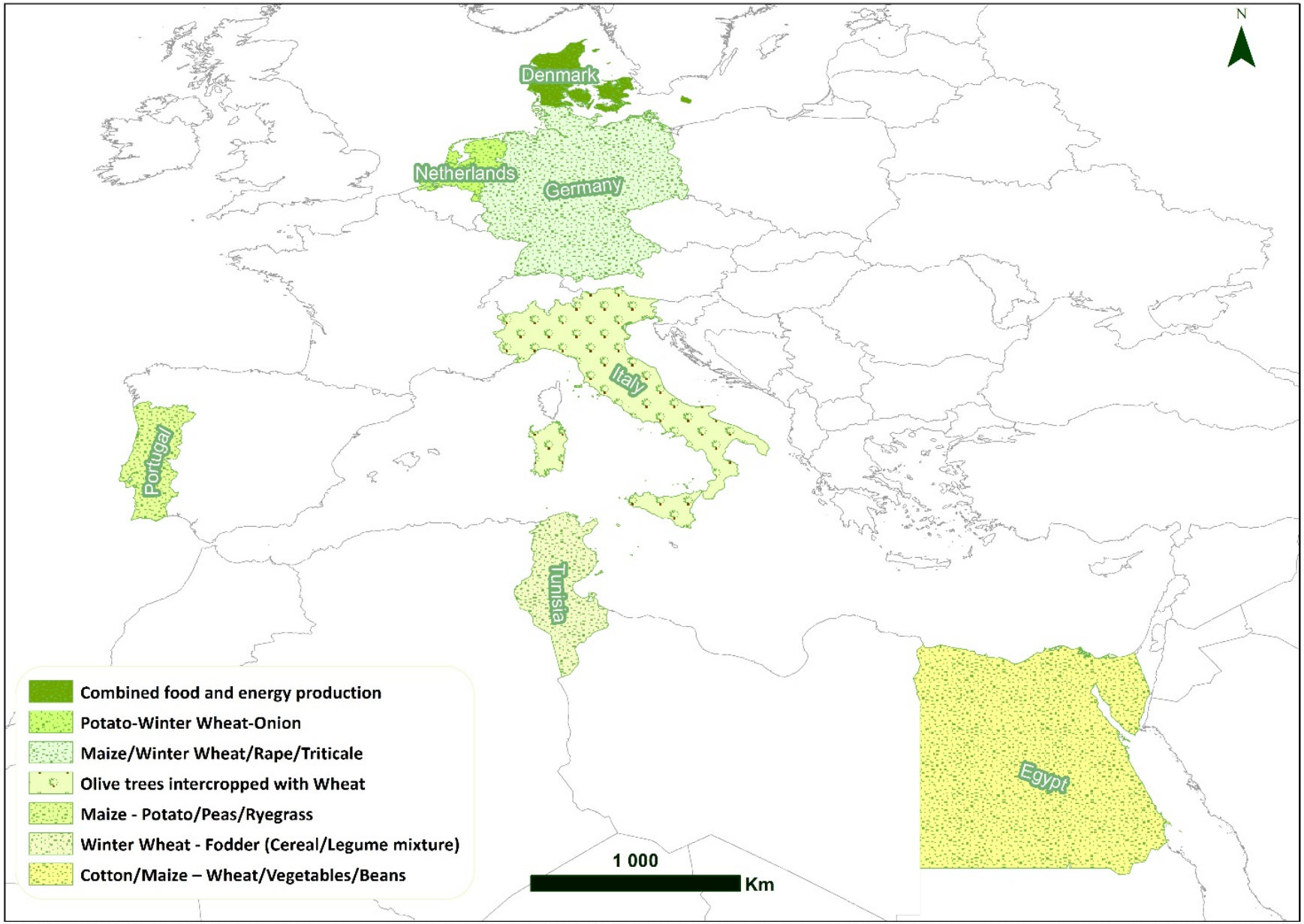
Common Kick-off meet in Stockholm

Consortium

Bhim B. Ghaley, UCPH (PI), Denmark
Seifeddine Jomaa (UFZ), Germany
Abd-Alla Gad (NARSS), Egypt
Marco Lauteri (CNR), Italy
Niels P.R. Anten (WU), Netherlands
Cristina M. Hanson (FFCUL), Portugal
Makram Anane (CERTE), Tunisia

Water JPI
WaterWorks2015 Cofunded Call
6 April 2017, Stockholm

CONSORTIUM


N
Denmark
Netherlands
Germany
Italy
Portugal
Tunisia
Egypt
Combined food and energy production
Potato-Winter Wheat-Onion
Maize/Winter Wheat/Rape/Triticale
Olive trees intercropped with Wheat
Maize - Potato/Peas/Ryegrass
Winter Wheat - Fodder (Cereal/Legume mixture)
Cotton/Maize – Wheat/Vegetables/Beans
1 000
Km

MOTIVATION

State-of-the-art and the relevance of project

- In the EU, ~50% of the water resources do not meet WFD targets due to pollution from agriculture and industry
- Agriculture accounts for 25-80% of total water use in the EU and North Africa
- Excessive and inappropriate timing of fertilizers/manure use cause nutrient loss into the ground water/water bodies
- Climate change is predicted to result in 30% reductions and increased uncertainty in rainfall
- Overexploitation of ground water for irrigation has caused salinization leading to soil degradation and loss of fertility

OBJECTIVES

- Enhance retention and use efficiencies of water and nutrients at field, farm and catchment scale in a network of production systems in Europe and North Africa
- Identification of environmental, economic and social SMART indicators to evaluate the production systems
- Design innovative practices and sustainable water and nutrient use production systems
- Develop a web-based decision support tool for informed-decision making by farmers, advisory services and policy-makers

Work package description

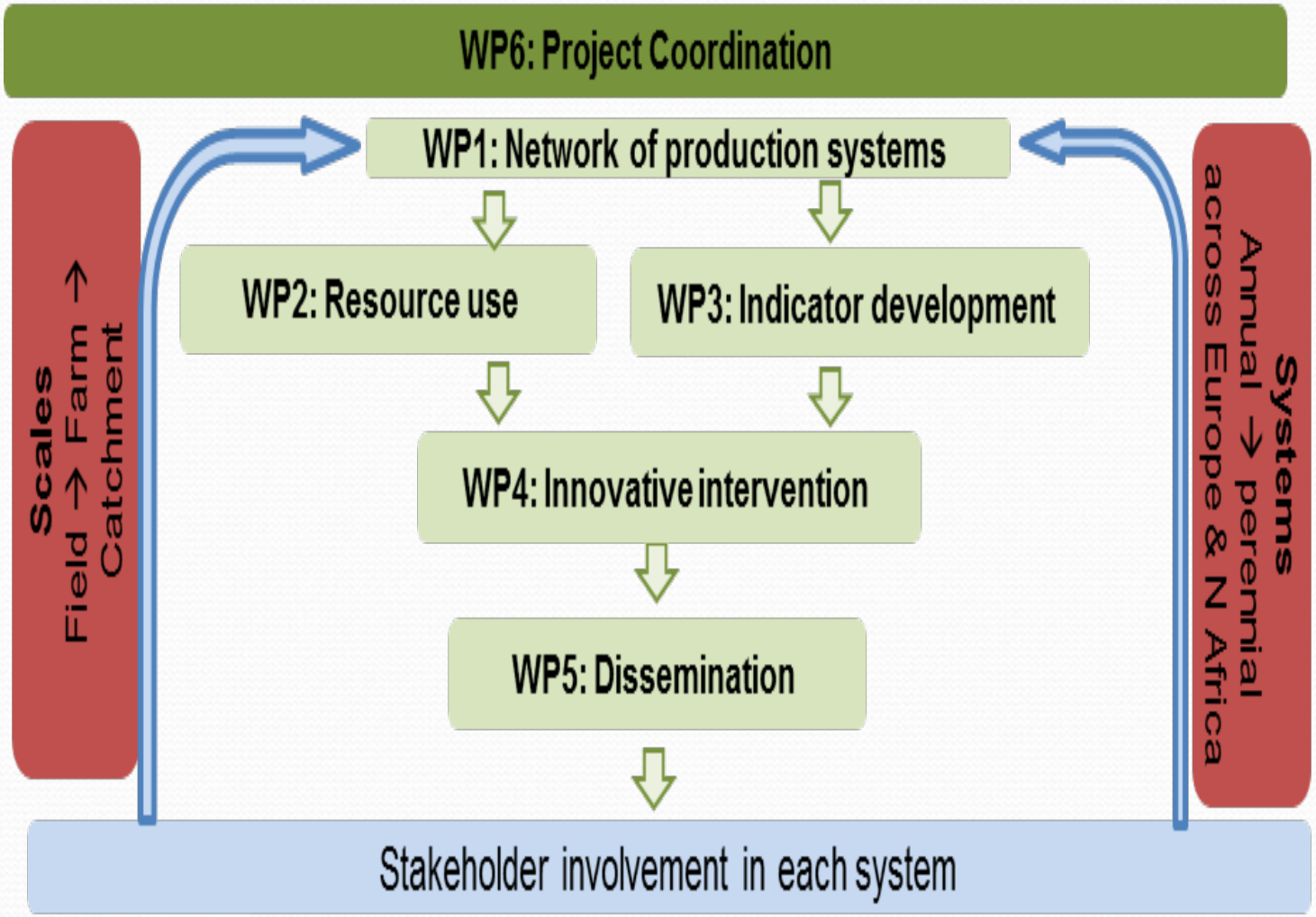


Figure 1: Relationship between WPs in WaterFARMING
Green: WPs flow
Blue: Stakeholders
Red: Systems and scale

Network of production systems

Country	Production systems	Research issues
Denmark	combined food and energy production	Water use, nutrient inputs and soil fertility
Germany	Barley-rye-rapeseed-Maize	nitrogen and phosphorus fertilizer management
Netherlands	potato-winter wheat-onion rotation	optimal water management, spring and summer droughts
Portugal	maize- potato/peas/ryegrass (irrigated)	Water and nutrient use efficiency and drought
Italy	olive trees intercropped with wheat	drought, soil erosion, landslides, flooding events
Egypt	cotton/maize – wheat/vegetables/beans	drought, water logging, salinity, evapotranspiration
Tunisia	wheat - fodder(cereal/legume mixture)	drought, salinity, soil fertility, groundwater depletion

Increasing water shortage and supply uncertainty

Work package description

WP 1	**Network of production systems and stakeholder platforms in Europe and North Africa**				Start Month: 1	End Month: 36	
Lead/Partners	UCPH	UFZ	NARSS	**CNR**	WU	FFCUL	CERTE
Person-Months	3	1	2	2	1	1	2

Objectives

1. Description of a network of production systems and catchments
2. Formation of local stakeholder platforms associated with each study site
3. Development of a working protocol for stakeholder involvement

Work package description

WP 2	**Assessment of water and nutrient use efficiency from field to catchment scale**			Start Month: 1		End Month: 36	
Lead/Partner	**WU**	UFZ	NARSS	CNR	UCPH	FFCUL	CERTE
Person-Months	16	2	4	4	10	1	5

Objectives

1. Develop and validate a crop model approach for our network of production systems
2. Determine water and nutrient use efficiencies, gaps therein and leakages of the production systems
3. Develop and validate a hybrid model approach that links field to catchment scale

Work package description

WP 3	**Development of indicators for productivity, environmental and economic performance**			Start Month: 1		End Month: 36	
Lead/Partner	UCPH	UFZ	NARSS	CNR	WU	FFCUL	**CERTE**
Person-Months	7	1	2	2	2	1	15

Objectives

1. Development of a comprehensive list of productivity, environmental and economic indicators
2. Identification of SMART indicators for the assessment of the network of production systems
3. Mapping of the production system efficiencies at catchment scale based on WaterFARMING indicators

Work package description

WP 4	**Design of innovative water and nutrient efficient production systems**				Start Month: 1		End Month: 36
Lead/Partner	UCPH	**UFZ**	NARSS	CNR	WU	FFCUL	CERTE
Person-Months	3	6	2	2	1	1	2

Objectives:

1. Simulation of management measures by application of field-to-catchment scale indicators developed in WP3 and use of the map developed in WP2
2. Analysis and short listing of different measures in consultation with the stakeholder platforms
3. Carry out on-farm trials for improvement water, nutrient and soil conserving practices in the network of production systems
4. Assessment of on-farm trials with the stakeholder platforms for gaps and improvements

Work package description

WP 5	**Dissemination of outputs and communication to stakeholders**			Start Month: 1		End Month: 36	
Lead/Partner	UCPH	UFZ	**NARSS**	CNR	WU	FFCUL	CERTE
Person-Months	3	1	5	1	1	1	5

Objectives:

WP5 will devise communication pathways and dissemination materials to share the results of the project with the stakeholder platforms and the wider farming and end-user community, via awareness creation, publications, workshops and online tools for informed decision making by hierarchy of stakeholders (farmers, extension services and policy makers). A decision support tool will be developed to synthesize the innovative tools

Work package description

WP 6	**Project Co-ordination**			Start Month: 1		End Month: 36	
Lead/Partner	**UCPH**	UFZ	NARSS	CNR	WU	FFCUL	CERTE
Person-Months	6	1	8	1	1	1	1
Objectives: 1. To facilitate communication among all parties and actors involved in the project 2. To ensure high scientific quality of the deliverables 3. Effective kick-off meeting and project coordination meetings 4. Formation of advisory board to provide feedback and future direction on project activities							

WaterFARMING Innovative elements

- WaterFARMING will adopt an innovative case-study approach by bringing together a network of locally relevant production systems in Europe and N. Africa
- The consortium represents a wide range of geographical regions and land-use systems with complementary roles and multi-disciplinary expertise
- Exchange of researcher visits, students, online and campus courses, will enhance the visibility of the project outputs far beyond the project countries
- The partnership will be hub for connecting with other researchers in the region and establishing long term research collaboration in soil and water pollution issues
- The consortium will identify gaps in their own prioritized issues of water and soil pollution relevant to the local production systems by use of innovative methods and tools from field to catchment scale
- WaterFARMING will develop a common set of tools to quantify water and nutrient use efficiency from field to catchment scales across a wide variety of production systems taking environmental, social and economic indicators of sustainability into account