

RESOURCE USE (Adaptation and Mitigation)

# Genetic resources Climate change adaptation



## Parallel Thematic Session

RESOURCE USE (Adaptation and Mitigation)

### Genetic resources / climate change adaptation

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Supported by:



Start: 01/12/2016  
End: 30/11/2019

Budget: 376.475 €

## Operational Group:

Broadening and improving biodiversity for a more competitive and sustainable viticulture in the Colli Piacentini area

*Ampliamento e valorizzazione della biodiversità per una gestione competitiva e sostenibile della viticoltura piacentina in un contesto di mutate condizioni climatiche e sociali*

## Practical

### problem

Local wine industry is strongly affected by climate change and vineyards frequently undergo multiple summer stresses.

Croatina shows poor basal bud fruitfulness and, consequently, low suitability to full vineyard mechanization.

In addition, a more sustainable use of pesticides is needed.

## Partners

### Type:

Research institute

### Name:

Università Cattolica del Sacro Cuore

### SMEs

HORTA s.r.l.; Vinidea s.r.l.

### Farms

Mossi Aziende Agricole Vitivinicole srl Società Agricola; Cantina Sociale di Vicobarone Società Cooperativa Agricola; Azienda Vitivinicola Villa Rosa di Illari Andrea e C. SS Società Agricola; Az. Vitivinicola "I Salici" di Gazzola Claudio; Az. Agr. Il Poggiarello S.S. Società Agricola; Az. Agr. La Pagliara s.s.; Tenuta Borri Azienda Agricola di Andrea Pradelli; Az. Agr. Currado Malaspina

## Project

### Objectives:

Valorization of local biotypes able to retain high acidity under high heat loads.

Evaluation of new drought-tolerant rootstocks.

Find a solution to the alternate bearing pattern of the native cv. Croatina.

Achieve a significant reduction in pesticide use.

### Expected results:

The project is expected to:

i) introduce new genotypes to face challenges imposed by climate change; ii) promote full mechanization in vineyards; iii) implement new strategies for plant protection trying to compromise the needs for vine health and secured crop, reduction in pesticides and environmental impact; iv) promote the culture of "working in a vineyard" targeting young generations and immigrants.

### Results so far/first lessons:

Identification of some local varieties achieving optimal sugar concentration while retaining high acidity under the hot 2017 conditions.

Ortrugo and Malvasia di Candia aromatica cvs from vineyards established at ≥ 300 m a.s.l. achieved technological maturity with 10 days delay as compared to traditional areas.

Optimal yield and grape composition performance of cv Ervi as compared to cv Croatina.

### Who will benefit:

Growers, local wine chain, nurseries, SMEs providing agricultural services, technicians and consultants.

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Supported by:



Start: January/2018  
End: December/2020

Budget: 300.000 €

## Operational Group:

### ConVIGNA – Maize and cowpea intercrop.

*ConVIGNA – Consociação de milho com feijão-frade como uma técnica sustentável de adaptação da produção deste cereal às alterações climáticas em Portugal.*

## Practical problem

There are several cultivars of cowpea (*Vigna unguiculata*) in Portugal which can be intercropped with maize with various potential benefits. However, there is little information on this intercrop in Portugal or in similar contexts.

## Partners

### Type:

Research /Teaching

Agri Association

Agri enterprise

### Name:

INIAV - Instituto Nacional de Investigação Agrária e Veterinária, I.P.

ANSEME - Associação Nacional dos Produtores e Comerciantes de Sementes

Living Seeds Sementes Vivas; Living Farms Quintas Vivas; Curvas da Primavera; Sativa Rheinau AG

## Project

### Objectives:

To study portuguese cowpea cultivars intercropped with maize (for human consumption), grown organically under different production conditions.

### Expected results:

Identify the most promising cowpea cultivars to intercrop with maize in different regions of Portugal (North, Center and South);  
Monitor indicators such as yield, LER, drought tolerance and nutritional quality, using Bioversity International's descriptors;  
Develop a "best practices" manual for the maize-cowpea intercrop.

### Results so far/ first lessons:

Trials will only start in Spring of 2018.  
The existence of three trial sites managed by different entities adds potential for more insights, but also requires additional coordination efforts.

### Who will benefit:

Maize and cowpea growers;  
Researchers of maize-legume intercropping;  
Organic seed producers;  
Society in general due to: lesser input use, better soil conservation and higher biodiversity conservation.

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Supported by:



PROGAMA DE  
DESENVOLVIMENTO  
RURAL 2014-2020



Start: February/2009  
Endless

Budget: PORVID

## Innovation Project:

### Genetic intra-varietal evaluation and conservation and Selection of Ancient Grapevine Varieties.

*Quantificar a variabilidade genética intravarietal, seleccionar e conservar as variedades antigas da videira.*

## Practical problem

Ancient varieties contain high intra-varietal genetic diversity concerning the most important traits. The intra-varietal diversity is essential to face climate changes and new demands of the vine and wine sector, thus, its conservation and evaluation is a priority for the sector sustainability.

## Partners

### Type:

Agri Association

### Name:

Portuguese Association for Grapevine Diversity (PORVID); AVIPE- Associação de Viticultores do Concelho de Palmela; ADVID- Associação Desenvolvimento da Viticultura Duriense; ATEVA- Associação Técnica dos Viticultores do Alentejo

Research /Teaching

ISA-Instituto Superior de Agronomia; UTAD-Universidade de Trás-os-Montes e Alto Douro; INIAV-Instituto Nacional de Investigação Agrária e Veterinária IP; IVDP-Instituto dos Vinhos do Douro e Porto IP

Agri enterprise

Aveleda, S.A.; Esporão S.A.; Sogrape Vinhos, S.A.; J. Portugal Ramos Vinhos SA; José Maria da Fonseca Vinhos, S.A.; Casa Ermelinda Freitas; Real Companhia Velha; Cooperativa Agrícola de Santo Isidro de Pegões; Cooperativa Agrícola de Reguengos de Monsaraz; Adega Cooperativa de Favaio; Herdade da Malhadinha Nova; Symington Family Estates

Other company

Vitisges-Sociedade de Consultoria, Investimentos e Serviços Agrícolas. Fundação Maria Rosa

## Project

### Objectives:

Conservation and evaluation of intra-varietal genetic diversity of the all Portuguese autochthonous varieties in a dedicated experimental farm for grapevine conservation. Carrying out selection with high genetic and economic gains.

Providing to nurseries and, consequently, to all wine and vine sector, selected material with high agronomic and technological performance.

Development of new methodological tools for grapevine conservation and selection.

### Expected results:

Conservation of 50000 genotypes from more than 250 grapevine varieties. Selection in 100 varieties, with prediction of genetic gains for the more economically important traits.

Multiplication of selected material of 100 varieties to plant new vineyards.

New methodological developments for grapevine conservation, evaluation and selection.

### Results so far/first lessons:

Development of a new and efficient methodology for grapevine conservation and selection, based on quantitative genetics and statistical theory.

Conservation of 30000 genotypes of about 200 varieties.

Selected material from 60 varieties with high genetic and economic gains.

Establishment of more than 500 ha for multiplication of selected materials, which are the main source of plants for the new vineyards.

### Who will benefit:

All vine and wine companies. Society in general.

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Supported by:

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 727230



Start: June/2017  
End: May/2021

Budget: 8.997.295 €

## Horizon 2020:

LIVESEED – Boosting organic seed and plant breeding across Europe

### Practical problem

Organic farmers currently use only few organic seeds as there is a lack of cultivars adapted to organic agriculture. Seeds and breeding companies have to overcome many obstacles for producing organic seed. This has negative effects on the productivity of organic farming.

### Partners

#### Names:

International Federation Of Organic Agriculture Movements European Union Regional Group (Se); Forschungsinstitut Fur Biologischen Landbau Stiftung (Ch); Diktyo Gia Tin Viopikilotita Kai Tin Oikologia Sti Georgia (Gr); Osterreichische Agentur Fur Gesundheit Und Ernährungssicherheit GmbH (At); Borgen Anders (Dk); Eidgenossisches Departement Fuer Wirtschaft, Bildung Und Forschung (Ch); Agrosursu Un Ekonomikas Instituts (Lv); Bingenheimer Saatgut Ag (De); Stichting Bionext (NL); Fondatsiya Za Biologichno Zemedelie Bioselena (Bg); Bundesverband Naturkost Naturwaren Ev (De); Consiglio Per La Ricerca E Sperimentazione In Agricoltura (It); Stichting Wageningen Research (NL); Feldsaaten Freudenberger GmbH & Co. Kommanditgesellschaft (De); Forschungsinstitut Fur Biologischen Landbau Deutschland Ev (De); Institut National De La Recherche Agronomique (Fr); Instituto Politecnico De Coimbra (Pt) · Institut Technique De L Agriculture Biologique (Fr); Instytut Uprawy Nawożenia I Gleboznawstwa, Państwowy Instytut Badawczy (Pl); Living Seeds Sementes Vivas, Sa (Pt); Louis Bolk Instituut (NL); Magyar Tudományos Akadémia Agrártudományi Kutatóközpont (Hu); Okologiai Mezőgazdasági Kutatóintézet Kőszasznu Nonprofit Kft (Hu); Progressive Farming Trust Ltd Lbg (Uk); Rete Semi Rurali (It); Sativa Rheinau Ag (Ch); Sociedad Espanola De Agricultura Ecológica (Es); Landbrug & Fodevarer F.M.B.A.(Dk); Institutul National De Cercetare-Dezvoltare Agricolă Fundulea (Ro); Union Bio Semences (Fr); Universidade De Evora (Pt); Università Politecnica Delle Marche (It); Universität Kassel (De); Vitalis Biologische Zaden B.V.(NL); Universitat Politècnica De Valencia (Es).

### Project

#### Objectives:

The project will help to increase the competitiveness of the organic seed and plant breeding sector across Europe, encourage greater use of organic seeds by farmers, and develop innovative breeding and seed health approaches suited for organic farming.

#### Expected results:

The research covers five main crop categories: legumes, vegetables, fruit trees, cereals and fodder crops in different cropping systems and climatic zones across Europe. LIVESEED will provide guidelines for cultivar testing and new strategies for seed health. It will also investigate socio-economic aspects related to the use and production of organic seed and their interaction with EU regulation.

#### Results so far/first lessons:

The project has just started but interest in the project is already broad and many seed companies, certifiers, organic associations have confirmed their interest and participation throughout the project. Results will be announced on the project website [www.liveseed.eu](http://www.liveseed.eu), once available.

#### Who will benefit:

The whole organic sector especially farmers, seed companies and breeding initiatives as well as national authorities.

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Supported by:



**Start: January / 2014**  
**End: December/ 2017**

**Budget: 600.000 €**

## PRODER:

### LUSARROZ - Breeding new portuguese rice varieties

Lusarroz – Novas variedades de arroz português

## Practical problem

The Portuguese are Europe's biggest rice-eaters, outpacing Spaniards and Italians. There was a lack of locally bred rice varieties: 1) well adapted to Portuguese soil and climatic conditions and 2) with appropriate carolino rice type quality, resulting in the need to import rice seed.

## Partners

### Type

### Name

Research

Instituto Nacional de Investigação Agrária e Veterinária

Agri association

COTARROZ – Centro Operativo e Tecnológico do Arroz

Farmer organization

BENAGRO - Cooperativa Agrícola de Benavente

Farmer organization

APARROZ - Agrupamento de Produtores de Arroz do Vale do Sado Lda.

## Project

### Objectives:

Create new varieties of rice in Portugal.  
Make available to farmers, rice varieties adapted to the soil and climatic conditions of producing regions.  
Provide the industry with a product with differentiated quality, as the true carolino rice with the necessary features for the Portuguese cuisine.

### Expected results:

Registration of a minimum of 2 new portuguese rice varieties  
Reducing production costs for farmers. Adding value to production by differentiating in quality. Allowing rice breeding program sustainability, through seed royalties.

### Results so far/first lessons:

The project enabled to create a network of multi-local adaptation trials within the scope of the rice breeding program. At the beginning of 2017, the first portuguese varieties were registered on the catalogue of varieties, after 30 years of lack of new portuguese entries.

### Who will benefit:

Farmers (seeds with lower cost, adapted varieties); national rice breeding program; Portuguese rice sector and consumer



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Supported by:

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 727247



Start: May/2017  
End: April/2022

Budget: 7.192.148 €

## Horizon 2020:

SolACE - Solutions for improving Agroecosystem and Crop Efficiency for water and nutrient use

## Practical problem

European agriculture is challenged by the need to produce more crops with fewer inputs of fertilizers, especially nitrogen (N) and phosphorus (P), under conditions of reduced or more variable water availability. Water limitation will affect nutrient availability and acquisition in general.

## Partners

### Names:

Institut National de la Recherche Agronomique (FR) ; Ait Austrian Institute of Technology GmbH (AT) ; Consiglio Per la Ricerca E Sperimentazione In Agricoltura (IT); Forschungsinstitut für Biologischen Landbau Stiftung (CH); The James Hutton Institute (UK); Kobenhavns Universitet (DK); Sabanci Universitesi (TR); Sveriges Lantbruksuniversitet (SE); Universite Catholique de Louvain (BE); Universidade de Evora (PT); Universitaet Hohenheim (DE); University of Newcastle Upon Tyne (UK); Universidad Politecnica de Madrid (ES); Eidgenossisches Departement fuer Wirtschaft, Bildung Und Forschung (CH); Arvalis Institut du Vegetal (FR); Con.Cer. Societa' Cooperativa Agricola (IT); De Ceuster Meststoffen (BE); European Conservation Agriculture Federation (BE); Inra Transfert S.A. (FR); Linking Environment And Farming Lbg (UK); Okologiai Mezogazdasagi Kutatointezet Kozhasznu Nonprofit Kft (HU); Ontwikkelingsmaatschappij Hetidee (NL); Sp Sourcon Padena GmbH (DE); Syngenta France Sas (FR); Vogt Wolfgang (DE)

## Project

### Objectives:

SolACE's overarching goal is to help European agriculture face the challenge to deal with more frequent combined limitations of water and nutrients in the coming decades. It will design novel crop genotypes and agroecosystem management innovations to improve water and nutrient use efficiency.

### Expected results:

- New crop varieties and agronomical innovations to cope with combined water and nutrient stresses;
- a better understanding of below-ground responses to water and nutrient limitations;
- tools for the training of farmers and farm advisors on the importance of below- and above-ground processes and traits;
- below-ground traits introduced as a novel concept for breeding to breeders.

### Results so far/first lessons:

As SolACE started only in May 2017, no results are available yet. Progress can be followed on the website: <http://www.solace-eu.net/>

### Who will benefit:

Farmers, farm advisors, agri-business industry, breeders, NGOs, policy makers, scientific community, the general public.



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Supported by:



Start: January/2012  
End: August/2020

Budget: 374 874 €

## PRODER

### Strawberry tree - Conversion of a wild plant into a profitable fruit tree species

O Medronho – Conversão da planta silvestre numa espécie fruteira rentável

#### Practical problem

Strawberry tree (*Arbutus unedo*), a Mediterranean species, known by its drought tolerance and regeneration after forest fires, presented the following main problems linked to the lack of:

- 1) high-quality plant material;
- 2) knowledge of the best cultural practices and
- 3) knowledge of new methods for fruit valorization and transformation.

#### Partners

##### Type:

Research/Teaching  
Research  
Research/Teaching  
Agri enterprise  
Agri enterprise  
Other Company  
Public/Local Authority

##### Name:

Instituto Politécnico de Coimbra /ESAC  
INIAP/Instituto Nacional de Investigação Agrária e Veterinária  
Faculdade de Ciências e Tecnologia da Univ. de Coimbra  
Greenclon, LDA  
LENDIA DA BEIRA, Unipessoal LDA  
TIAGO ALEXANDRE CRISTÓVÃO  
Direção Regional de Agricultura e Pescas do Centro

#### Project

##### Objectives:

The main goals were:

- 1) the propagation of selected adult plants for fruit production;
- 2) the mycorrhization of selected plants for edible mushrooms production;
- 3) the establishment of cultural technique for orchards;
- 4) the development of new products and a guide to monitor the "Medronheira" production.

##### Expected results:

Main expected results:

- 1) the propagation of selected adult plants for fruit production by micropropagation, followed by the establishment of field trials;
- 2) the establishment of a protocol for plant mycorrhization, to obtain a value-added co-product (edible mushrooms);
- 3) the optimization of orchard management systems;
- 4) the improvement of efficiency and quality of the final products.

##### Results so far/first Lessons:

Main results:

- 1) plants were selected, micropropagated and 2 clonal trials were established;
- 2) fruit production/quality was evaluated: in a field trial (5 years old) clonal plants produced 8.9 more than seedlings;
- 3) mycorrhizal plants with *Lactarius deliciosus* were established *in vitro*;
- 4) a fertilization trial was established and monitored; 5) new products and a guide for fruit transformation were developed; 6) the results were disseminated (technical/scientific articles, workshops, particularly, with forestry and agricultural producers).

##### Who will benefit:

Forestry/agricultural producers, their associations, sectors linked and also the scientific community

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Supported by:



Start: October / 2011  
End: March/ 2015

Budget: 185 038 €

## PRODER:

To select the animals genetically more suitable for the production of quality milk, by determining the profile of caseins, isolated from milk  
Seleção de Animais da Raça Serrana de acordo com o seu perfil de Caseínas

### Practical problem

The aim of our work was to know the distribution of different kind of genes responsible for casein alpha s1 production. Different genes are responsible for different kind and amount of casein production and casein is determinant for cheese coagulation and its properties.

### Partners

#### Type

Research/Teaching  
Association

#### Name

Instituto Politécnico de Bragança - Escola Superior Agrária  
ANCRAS - Associação Nacional de Criadores de Cabras da Raça Serrana  
LEICRAS Cooperativa de Produtores de Leite da Raça Serrana

### Project

#### Objectives:

To know what kind of casein genes exists in the region, for selection purposes  
To know the properties of milk/genes, for cheese purposes

#### Expected results:

To know the frequency of genes, in females and males, responsible for each kind of casein alpha S1 (A, B or E) associated with high or low performance of milk coagulation. Perform some trials in cheese production to evaluate the rennet properties and its ability for high quality cheese production

#### Results so far/first lessons:

The milk, and blood samples in males showed a frequency of 77% of gene E (casein alpha S1), associated with medium performance for renneting. 20% of the samples showed gene B and only one female exhibit the A gene, both associated with high performance for the renneting. In conclusion the frequency of these genes in the flocks may not be the ideal for milk/cheese production..

#### Who will benefit:

All the farmers producing serrana milk, farmers specialized in genetic resources and cheese producers

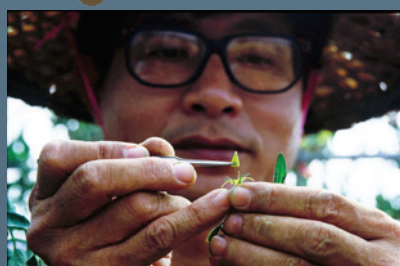
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Supported by:

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 679796



Start: March/2017  
End: February/2020

Budget: EUR 5.671.945 €

## HORIZON 2020 PROJECT

**TOMGEM** - A holistic multi-actor approach for towards the design of new tomato varieties and management practices to improve yield and quality in the face of climate change

### Practical problem

Climate change calls for designing new strategies for growing crops under harsh conditions. TomGEM addresses yield stability in high temperature conditions with the aim to produce or yield superior genotypes that are better adapted to high temperature conditions.

### Partners

#### Names:

Institut National Polytechnique de Toulouse (FR); John Innes Centre (UK); Max-Planck- Gesellschaft Zur Forderung Der Wissenschaften Ev (DE); Royal Holloway and Bedford New College (UK); Agencia Estatal Consejo Superior de Investigaciones Cientificas (ES); Universita degli Studi di Napoli Federico II (IT); Asian Vegetable Research and Development Center (TW); Universidad de Buenos Aires (AR); Institut National de la Recherche Agronomique (FR); Maritsa Vegetable Crops Research Institute (BG); Alma Seges Societa Cooperativa (IT); Enza Zaden Centro de Investigacion Societade Limitada (ES); Biotecgen SRL (IT); Fundacion Cajamar de la Comunidad Valenciana (ES); European Research and Project Office GMBH (DE); National Taiwan University (TW); Rougeline (FR); Norfolk Plant Sciences Limited (UK)

### Project

#### Objectives:

- Select superior tomato genotypes.
- Identify genetic variations associated with heat tolerance of fruit yield.
- Set up optimal growing conditions.
- Design innovative breeding and management strategies for a broad range of geographical conditions.

#### Expected results:

- New improved varieties and management strategies:
- Evaluation of a tomato germplasm pool including heat tolerant wild relatives.
  - Identification of most suitable genotypes for hot climates.
  - New knowledge on plant-environment interactions and suitable combinations.
  - of genotypes, breeding and management practices.
  - Novel breeding strategies transferred to the breeding sector.

#### Results so far/first lessons:

A collection of tomato germplasm was phenotyped in different geographical locations (Spain, Italy, Bulgaria and Argentina) in greenhouse and open field. A phenotyping database has been generated. Highly performing genotypes are being grown in different locations for genetic characterization to uncover/capture genes and loci responsible for heat tolerance/sensitivity.  
Project website: <http://tomgem.eu/>

#### Who will benefit:

Farmers, breeders and consumers.



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#### Supported by:

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 634476



Start: April/2015  
End: March/2019

Budget: 3.395.987 €

## Horizon 2020:

TREASURE: Diversity of local pig breeds and production systems for high quality traditional products and sustainable pork chains

### Practical problem

Despite a revived interest for the local (indigenous) pig breeds, their preservation often depends on public subsidies. The best conservational strategy is to make the breed self-sustaining, which can be best achieved through its sustainable economic exploitation.

### Partners

#### Names:

Kmetijski Institut Slovenije - Agricultural Institute of Slovenia (SI); Univerza V Ljubljani (SI); Kmetijsko Gozdarska Zbornica Slovenije, Kmetijsko Gozdarski Zavod Novo Mesto (SI); Ifip-Institut du Porc Association (FR); Institut National de la Recherche Agronomique (FR); Baeuerliche Erzeugergemeinschaft Schwabisch Hall Wv (DE); Sveuciliste u Zagrebu Agronomski Fakultet (HR); Sveuciliste Josipa Jurja Strossmayera u Osijeku Poljoprivredni Fakultet u Osijeku (HR); Agris Sardegna - Agenzia per la Ricerca in Agricoltura (IT); Associazione Nazionale Allevatori Suini (IT); Università Degli Studi di Firenze (IT); Alma Mater Studiorum-Università di Bologna (IT); Stazione Sperimentale per L'industria Delle Conserve Alimentari (IT); Lietuvos Sveikatos Mokslu Universitetas (LT); Instituto Politecnico de Viana de Castelo (PT); Universidade de Evora (PT); Institut Za Stocarstvo Beograd-Zemun (RS); Faculty Of Agriculture - University Of Belgrade (RS); Instituto Nacional de Investigacion y Tecnologia Agraria y Alimentaria (ES); Agencia Estatal Consejo Superior De Investigaciones Cientificas (ES); Centre de Recerca en Economia i Desenvolupament Agroalimentari-Upc-Irta (ES); Centro de Investigaciones Cientificas y Tecnologicas de Extremadura (ES); Institut de Recerca i Tecnologia Agroalimentaries (ES); Asociacion Espanola de Criadores de Cerdo Iberico (ES).

### Project

#### Objectives:

Enhance the knowledge, skills and competences necessary to develop and create sustainable pork chains based on European local pig genetic resources which answer consumer demands for quality and healthiness of pork products, societal demands for animal welfare, environment and rural development.

#### Expected results:

Characterisation of local pig breeds at phenotypic, genomic and functional level, assessing their productivity, environmental impact, nutritional requirements, use of locally available feeding resources, quality and healthiness of pork products from these breeds including innovative traditional products, their socio-economic relevance and market potential of their products.

#### Results so far/first lessons:

- genetic material of 20 local pig breeds & DNA isolated
- productive traits collected & analysed with review of > 300 data sources
- 15 experiments on 12 breeds (nutritional requirements, local feeding resources, innovative practices)
- common toolbox for product quality evaluation
- studies with consumers in 6 countries (preferences, willingness to pay, sensory acceptability of products)

<https://treasure.kis.si/>

#### Who will benefit:

Farmers (associations) esp. of untapped local pig breeds which are at start-up stage.



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[www.aislisbon2017.com](http://www.aislisbon2017.com)