Genetic resources
Climate change
adaptation
**Parallel Thematic Session**

**RESOURCE USE (Adaptation and Mitigation)**

**Genetic resources / climate change adaptation**

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INDEX

Broadening and improving biodiversity for a more competitive and sustainable viticulture in the Colli Piacentini area ................................................. 4

ConVIGNA - Maize and cowpea intercrop .................................................. 5

Genetic intra-varietal evaluation and conservation and Selection of Ancient Grapevine Varieties ................................................................. 6

LIVESEEDS ........................................................................................................ 7

LUSARROZ - Breeding new portuguese rice varieties ................................... 8

SoIACE- Solutions for improving Agroecosystem and Crop Efficiency for water and nutrient use (new genotypes to face multiple stresses) ................................................................. 9

STRAWBERRY TREE - Conversion of a wild plant into a profitable fruit tree species (Arbutus unedo) ................................................................. 10

To select the animals genetically more suitable for the production of quality milk, by determining the profile of caseins, isolated from milk ................................................................. 11

TOMGEM - A multi-actor approach for new tomato varieties with improved yield and quality to face climate change .................................. 12

TREASURE - Diversity of local pig breeds and production systems for high quality tradit. products and sustain. pork chains ............................ 13
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
Università Cattolica del Sacro Cuore
SMEs
HORTA s.r.l.; Vinidea s.r.l.
Farms

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:
1) introduce new genotypes to face challenges imposed by climate change; 2) promote full mechanization in vineyards; 3) implement new strategies for plant protection trying to compromise the needs for vine health and secured crop, reduction in pesticides and environmental impact; 4) 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 Envi as compared to cv Croatina.

Who will benefit:
Growers, local wine chain, nurseries, SMEs providing agricultural services, technicians and consultants.

Supported by:

Contact: Matteo Gatti
E-mail: matteo.gatti@unicatt.it

Start: 01/12/2016
End: 30/11/2019
Budget: 376.475 €

More information: www.aislisbon2017.com
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

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<tr>
<th>Type</th>
<th>Name</th>
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<tbody>
<tr>
<td>Research /Teaching</td>
<td>INIAV - Instituto Nacional de Investigação Agrária e Veterinária, I.P.</td>
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<tr>
<td>Agri Association</td>
<td>ANSEME - Associação Nacional dos Produtores e Comerciantes de Sementes</td>
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<tr>
<td>Agri enterprise</td>
<td>Living Seeds Sementes Vivas; Living Farms Quintas Vivas; Curvas da Primavera; Sativa Rheinau AG</td>
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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.

Contact: Paulo Martinho
E-mail: paulo.martinho@ls-sv.eu
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

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<tr>
<th>Type</th>
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<tbody>
<tr>
<td>Agri Association</td>
<td>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</td>
</tr>
<tr>
<td>Research/Teaching</td>
<td>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</td>
</tr>
<tr>
<td>Agri enterprise</td>
<td>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 Favaios; Herdade da Malhadinha Nova; Symington Family Estates</td>
</tr>
<tr>
<td>Other company</td>
<td>Vitisges-Sociedade de Consultoria, Investimentos e Serviços Agrícolas. Fundação Maria Rosa</td>
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</table>

Project

Objectives:
Conservation and evaluation of intra-varietal genetic diversity of 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.
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 Biologischenlandbau Stiftung (Ch); Diktyo gia Tin Vioplokiolitia Kai Tin Okologia Sti Georgia (Gr); Österreichische Agentur Fur Gesundheit Und Ernahrungssecurity GmbH (At); Bogen Anders (Dk); Eidgenössisches Departement Fuer Wirtschaft, Bildung Und Forschung (Ch); Agroresursu Un Ekonomikas Instituts (Lv); Bingenheimer Saatgut Ag (De); Stichting Bionext (Nl); Fondatsiya Za Biologichno Zamedelie Bioseleiena (Bg); Bundesverband Natursaat Naturwaren Ev (De); Consiglio Per La Ricerca E Sperimentazione In Agricultura (It); Stichting Wageningen Research (Nl); Feldsaaten Freudenberger GmbH & Co. Kommanditgesellschaft (De); Forschungsinstitut Fur Biologischen Landbau Deutschland Ev (De); InstitutNationalDeLaRechercheAgronomique(Fr);IstitutoPolitecnicoDeCoimbra(Pl);InstitutTechniqueDeLAgricultureBiologique(Fr);InstytutUprawyNawozeniaIGleboznawstwa,PanstwowyInstytutBadawczy(Pl);LivingSeedsSementesVivas,Sp(PT);LouisBolkInstituut(Nl);MagyarTudomanyosAkademiaAgrartudomanyiKutatoKozpont(Hu);OkologialMezogazdasagiKutatointezetKozhasznuNonprofitKft(Hu);ProgressiveFarmingTrustLtdLb(UK);Retesemirurali(It);SativaRheinauAg(Ch);SociedadEspanolaDeAgriculturaEcologica(ES);Landbrug&FodevarerF.M.BA(DK);InstitutoNationalDeCercetare-DesvoltareAgricolaFundulea(RO);UnionBioSemences(Fr);UniversidadeDeEvore(PT);UniversitaPolitecnicaDelleMarche(It);UniversitaetKassel(De);VitalisBiologischeZadenB.V.(NL);UniversitatPolitecnicaDeValencia(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, once available.

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

Contact:Bram Moeskops
E-mail:bram.moeskops@foam-eu.org

More information: www.aislisbon2017.com
**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**

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<tr>
<th>Type</th>
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<tbody>
<tr>
<td>Research</td>
<td>Instituto Nacional de Investigação Agrária e Veterinária</td>
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<tr>
<td>Agri association</td>
<td>COTARROZ – Centro Operativo e Tecnológico do Arroz</td>
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<tr>
<td>Farmer organization</td>
<td>BENAGRO - Cooperaativa Agrícola de Benavente</td>
</tr>
<tr>
<td>Farmer organization</td>
<td>APARROZ - Agrupamento de Produtores de Arroz do Vale do Sado Lda.</td>
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**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.

**Contact:** Ana Sofia Almeida
E-mail: sofia.almeida@iniav.pt
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 fur Biologischenlandbau Stiftung (CH); The James Hutton Institute (UK); Kobenhavns Universitet (DK); Sabanci Universitesi (TR); Sveriges Lantbrukshogskola (SE); Universite de Louvain (BE); Universidade de Evora (PT); Universitats Hohenheim (DE); University of Newcastle Upon Tyne (UK); Universidad Politecnica de Madrid (ES); Eidgenoessisches 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 Kozhasznz 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.
PRODER

Strawberry tree - Conversion of a wild plant into a profitable fruit tree species
O Medronho – Conversão da planta silvestre numa espécie frutífera 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
Name: Instituto Politécnico de Coimbra /ESAC
Type: Research
Name: INIAV/Instituto Nacional de Investigação Agrária e Veterinária
Type: Research/Teaching
Name: Faculdade de Ciências e Tecnologia da Univ. de Coimbra
Type: Agri enterprise
Name: Greenclon, LDA
Type: Agri enterprise
Name: LENDA DA BEIRA, Unipessoal LDA
Type: Other Company
Name: TIAGO ALEXANDRE CRISTÓVÃO
Type: Public/Local Authority
Name: 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

Supported by:

Start: January/2012
End: August/2020
Budget: 374 874 €
**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**

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<tr>
<td>Research/Teaching Association</td>
<td>Instituto Politécnico de Bragança - Escola Superior Agrária</td>
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<tr>
<td></td>
<td>ANCRAS - Associação Nacional de Criadores de Cabras da Raça Serrana</td>
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<tr>
<td></td>
<td>LEICRAS Cooperativa de Produtores de Leite da Raça Serrana</td>
</tr>
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**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
- 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

**Expected results:**

- 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.

**Results so far/first lessons:**

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

**Who will benefit:**

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

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**Contact:** Alvaro Mendonça

E-mail: alvaro.mendonca1@hotmail.com
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);
- Universidad de Buenos Aires (AR);
- 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.
- 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.

Who will benefit:
Farmers, breeders and consumers.
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 Gozdnarska Zbornica Slovenije; Kmetijsko Gozdnarski Zavod Novo Mesto (SI); Ifip-Institut du Porc Association (FR); Institut National de la Recherche Agronomique (FR); Baeuerliche Erzeugergemeinschaft Schwabisch Hall Wv (DE); Sveucilište u Zagrebu Agronomski Fakultet (HR); Sveucilište 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 Ministerija (LT); Instituto Politecnico de Viana de Castelo (PT); Universidade de Évora (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 Deinvestigaciones Científicas (ES); Centro 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.