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Introductory Chapter: Concept and Ambition of Project TREASURE

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1. Background

After the Second World War, agricultural systems in the western society undertook an “industrial strategy” of intensification, specialization and large-scale production. Having experienced negative side effects (social, ethical and environmental) of efficiency-driven animal production systems, the persistency or sustainability became important. “Sustainability of agricultural system” is based on holistic philosophy and denotes resource efficiency and functional integrity and concerns environment, genetic diversity, ethical and social aspects and economic value [1]. Capital-driven animal husbandry systems led to abandoning of many pig breeds (and other livestock species), which were not profitable and became endangered. In the context of the (internationally binding) preservation of biotic diversity, the interest for autochthonous (local) breeds was revived in the past 30 years. In spite of that, these breeds are still largely supported by special policy mechanisms in order to ensure their preservation [2]. This is one of the critical points for the future because most of the local breeds are presently not managed in a secure way and depend upon financial support from the governments for preservation programmes. The best conservation strategy is the one that makes the breed self-sustaining without the use of external subsidies [3]. Theoretically, the self-sustainable condition of a local pig breed should be reached by the exploitation (sale) of products characterized by an extra added value, which in return assures breeding of a sufficient number of animals to have an adequate genetic diversity [4]. Nevertheless, this condition is seldom attained in the local pig breeds, and the intervention of public bodies is often considered essential for preservation [5]. A sustainable use of local breeds is possible with better exploitation of the reputation of local breeds (extrinsic cues) as well as quality attributes associated with their products (intrinsic cues). Studies show that for consumers, the importance of extrinsic cues for quality inference is increasing [6], while the intrinsic cues are important as a limiting factor of the acceptability and repurchase. Therefore, the activities to increase market potential and value of products are the key strategy in support of *in situ* conservation of the breed. The link between local breed, geographical area, and the product quality (its intrinsic cues) is important for the success of commercial strategies as demonstrated by the examples in Spain or Portugal, where the traditional local pigs (Iberian in Spain and Alentejano in Portugal) are kept in special

agro-sylvo-pastoral ecosystems (“dehesa” in Spain and “montado” in Portugal). There is a constant increase of general interest and research activities in local pig breeds, but also a clear gap between Iberian and many other local breeds in Europe, which remain untapped, characterized by small populations and reared in geographical areas where the availability of natural resources is not abundant [4]. Self-support in feeds and nutrients is an important issue of sustainability, particularly delicate in pig production as pigs are concurrent to human population for available crops. Exploitation of local pig breeds in their production systems, which are based on local feeding resources, providing products with attributes that are demanded and appreciated by the consumers is the basis for sustainable chains. The economic potential of local or traditional breeds and their production systems is far from being optimally exploited and represents a challenge and opportunity for the pig sector in the future.

2. Rationale

Modern intensive pig production is often confronted with bad public image due to animal welfare and environmental issues [7, 8], which casts doubts about its sustainability. As a consequence, a decline in pig production and self-supply is witnessed in many European regions. As around one-third of the global cereal production is supplied to animals [9], pigs as omnivores represent a direct competition with human population for the available crops. However, pork is the most consumed meat in the world and in Europe, accounting for more than 36% of world meat consumption [10]. Therefore, it can be expected that the future sustainability of pig production systems will depend on the use of locally available feeding resources [11] which differ according to agro-climatic conditions. Local pig breeds are better adapted to local conditions, and thus besides their value as a genetic resource, they represent the opportunity for developing the sustainable pork value chains, especially important for the regions where available arable land and/or cereal production is limited [12]. Local pig breeds are also raised in specific production systems which matches better the societal expectations regarding the environment (at least some environmental aspects, see [13]), animal welfare and food quality and healthiness [14]. The products they provide often represent the gastronomic heritage of various European areas and have an excellent image by consumers due to typical quality attributes, which cannot be assured with pigs from conventional intensive husbandry [15]. Presently, there are only few cases in Europe where pork-value breed chains were developed using local pig breeds, while the majority of the breeds remain untapped regarding the scientific evidence of their characteristics and market potential.

3. Project concept and ambitions

The overall concept of the project was based on a change in the paradigm of pig production systems suggesting a development of pork chains that would reside on better utilization of local resources (feeding and pig breeds). In addition, these breeds provide products with attributes related to production system that are appreciated by consumers [16], which is an asset of local pig breeds and their products with special sensory quality. Local pig breeds involved in the project (**Figure 1**) are for the most part unexploited and often endangered, thus enhancing the incomes from farming activities that would facilitate their conservation.



Figure 1.
 Local pig breeds studied in the project TREASURE.

In order to improve the supply and their market potential, it is essential to acquire more scientifically based knowledge about their genetic singularity and adaptive capacity, to evaluate different management practices, their nutritional requirements and use of local feeding resources, the impact on environment, and to evaluate their socio-economic merit.

The ambitions were thus focused on:

- genotypic and phenotypic characterization of local pig breeds by studying genetic structure and diversity of local pig breed populations, their resilience and adaptive capacity;
- multi-criteria evaluation of local pig breeds in their respective production systems (performance, welfare, environmental impacts and nutritional requirements) and assessing local feeding resources and innovative approaches in management strategies;
- quality of traditional products from local pig breeds studying aspects of link with production systems, innovations to enhance their nutritional value and consumer acceptance, quality toolbox development and its application for breeding;
- cost-benefit analysis at farm and society level, consumer preferences and willingness to pay to evaluate market potential, and marketing strategies for local pig breed products;

- measures to maximize project's impact characterized by intense dissemination and communication activities along with ambition to create a joint umbrella trademark for products from local pig breeds.

4. Conclusion and perspective

The key motive of the project was to enhance knowledge, skills and competences for the benefit of a development of sustainable pork chains based on European local pig breeds, which are for the most part marginally used and their potential unexploited. Many local pig breeds and consequently many partners were involved in the project with multi-actor approach meaning that not only universities and research institutes but also non-academic partners take active role in the project. The emphasis of the project was on the untapped local pig breeds and products from different European regions. Still, some partners from the regions with already well established pork chains (Iberian, Schwäbisch-Hällisches pig) were engaged. On the one hand, these breeds and their value-chains also need further developments, while on the other hand, their experiences and “know-how” in science and in practice can be transferred to partners and regions where local pig breed value-chains are just at a start-up. European local pig breeds together with their respective production systems possess an inherent value that is exceptional in terms of agricultural biodiversity and unique taste of their products, and thus represent the opportunity to develop pig production that answers key societal concerns of today, the preservation of genetic resources, care for the environment and animal welfare and can contribute to diversified agricultural activities and to the economic growth of the regional agro-food sector.

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