Guide to quality pig breeding for VET trainers

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Empowerment of VET system through sustainable entrepreneurial initiatives in quality pig breeding

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Guide to quality pig breeding for VET trainers

By the Consortium of the BREED Project

Based on the consultation of experts undertaken by the BREED project between December 2019 and January 2020 and the following survey to which VET teachers and trainers participated in the period June-July 2020

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Introduction

Background

In many European countries, consumer demand for products coming from animals bred in more natural conditions is continuously increasing. Free-range pig breeding responds to market needs. As a result, both existing and new farmers are starting free-range pastured pig farming. Suitable conditions in some countries cause that, for example, Italy and Spain have a long history of raising pigs outdoors. However, free-range pig breeding requires knowledge, skills, and the right attitude so that it could be a profitable business. A farmer needs to know a lot about animals and the farm, about the environment and the suitable production process. The environment in which the farmer operates often changes, and his/her situation is always unique.

Purpose

This Guide is produced by the Consortium of the European project BREED "Empowerment of VET system through sustainable entrepreneurial initiatives in quality pig breeding", implemented in the framework of the Erasmus Plus Programme. In order to foster the spread of sustainable entrepreneurial initiatives in quality pig breeding, the project delivers the free online course for VET learners, which is the core component of the OER BREED VET toolkit for sustainable entrepreneurial initiatives in quality pig breeding.
The purpose of this Guide is to support VET trainers and VET teachers to make the best use of the BREED course within their training and educational programmes or to encourage the self-learning of their students.
This Guide also includes the analysis of the results of a consultation of experts conducted by the project in Italy, Poland, Greece, Portugal and Lithuania; a following survey to which a smaller group of VET teachers and trainers participated after the experience of the online training during the COVID-19 lockdown; as well as best practices for free-range pig breeding (see Annex **Good practices in free-range pig farming**).

Traditional methods and e-learning

A critical skill is to obtain, assimilate, and apply the right knowledge efficiently, which is a schools' task. However, the school should equip the student not only with knowledge but with the ability to learn independently, which is so essential for lifelong learning. The teachers should take into account a completely new profile of the average student. The younger generation learns, thinks and processes information differently. What is more, the diversity of students is increasing, caused, for example, by the inclusion of disabled learners or by increasing migration rates. This diversity of students will enforce the consequent differentiation of learning objectives, materials, methods, and contexts. The need for a new school formula has been going on for years. The efficient learning cannot be restricted to closed classrooms and fixed timetables. Instead, the learning process should be promoted by complete and contextualized tasks, individually tailored to the students' abilities and pre-acquired knowledge.
In these circumstances, one of the possible solutions might be blended learning, which integrates the strengths of face-to-face and on-line methods (Garrison and Vaughan[1]). Combining remote and traditional classes, as well as their content and educational functions, may be arbitrary and should result from the substantive premises. The learning stages in both environments interact with each other, and their percentage may differ depending on the type of media used. In blended learning, the

1 Garrison, D. R., Vaughan, N. D. (2008). Blended Learning in Higher Education: Framework, Principles, and Guidelines. The Jossey-Bass higher and adult education series. San Francisco: John Wiley & Sons, Inc. from https://onlinelibrary.wiley.com/doi/pdf/10.1002/9781118269558.fmatter

essential part of teaching is in the classroom, but digital media is used during traditional lessons and as a complementary component (Hubwieser & Böttcher[2]).
Online learning (e-learning) is a contemporary and convenient form of teaching that uses digital technologies. It can be used in various disciplines at different levels of education for students with different needs. E-learning can be easily integrated with traditional forms of teaching. It provides additional support to students by providing supplementary materials available at any time online. The teacher can successfully implement mixed ways of teaching both synchronous and asynchronous.
Synchronous teaching means education occurring at the same time. A group of participants learns at the same time and in the same physical location as the class or the same online environment, such as during a web conference so that participants can interact with the teacher and other participants.
The benefits of synchronous learning include:

- Interaction between participants,
- Exchange of knowledge and experience between participants,
- Real-time feedback for the instructor,
- training takes place according to a set schedule.

Asynchronous teaching takes place at any time chosen by the student. There is no real-time interaction between the teacher and the participants. Online content is recorded and makes training materials and videos available online at any time or on-demand.
The benefits of asynchronous learning include:

- Participants can study in their own time and according to their own schedule,
- Requires less teacher involvement,
- Automating your activity limits repetitive work.

Running the course in an asynchronous way allows to use the saved time for other tasks. A comparison of both forms is presented in the following table.

Characteristics of synchronous and asynchronous teaching

Specification	Synchronous teaching	Asynchronous teaching
Type of class	Traditional class	Recorded class
Communication method	Direct two-way communication	One-way communication e.g. e-mails
Speed of information exchange	Instant feedback from the instructor and participants	Sending questions and waiting for an answer
Form of transmission of information	Telephone or Internet connection	Recorded voice message
Possibility of direct contact with the teacher	On-line training (direct contact possible)	On-line training (without direct contact)
Class time	Live webinar	Recorded webinar
Work pace	The pace set by the group	Individual pace
Access to classes for students	At the same time	At different times

There are many advantages in using the blended learning. It has the potential to transform how and when students learn. This approach matches current motivation theories (Deci and Ryan[3]). Proper motivation requires sufficient levels of autonomy, awareness of competence, and social relatedness. Contemporary learning theories, based on constructivism and brain-research, postulate problem-oriented teaching strategies, and learners' activation (Hubwieser & Böttcher). Regarding these trends,

2 Hubwieser, P., & Böttcher, J. (2014). Personal Learning Environments for Self-Determined, Active and Social Learning. In L. Gómez Chova, A. López Martínez, & I. Candel Torres (Eds.), ICERI2014 Proceedings. 7th International Conference of Education, Research and Innovation. November 17th-19th, 2014 - Seville, Spain (pp. 1024–1034). IATED Digital Library
3 Ryan, R. M. and Deci, E. L. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. Contemporary Educational Psychology. 25, 54–67

the organizational structure of learning processes should be changed towards more self-determination and develop activeness of the learners. Transferring activities to learners will allow them to update their knowledge and competences in the changing reality regularly. In blended learning, some knowledge is delivered through electronic information and communications technologies. It can increase the effectiveness of teaching when school attendance is low. Posting materials on the educational platform ensures their availability and reduces the harmful effects of absences.
Such a mix of traditional and online education is a way to empower teachers and learners with the skill and knowledge they need to gain comprehensive benefits.
The two forms of learning, learning face-to-face in the classroom and the learning online, free from a physical-temporal dimension, although substantially aiming at a coincident final goal, are characterized by differences, both of them presenting strengths and weaknesses, as well as advantages and disadvantages.
A first difference is represented by the rapidity of configuration and adaptation to needs.
Traditional learning tools or textbooks often fail to keep up with the speed with which information propagates, and the immediate change of needs that the new information generates. The materials available in online format can be updated, integrated, modified and made available with a certain ease and speed by introducing a new and revolutionary concept linked to the term “access”.
The online learning mode amplifies the opportunities of access which is potentially unlimited - both as regards the number of users who can use the information and as regards the quantity of such information.
In traditional teaching, learning is characterized by the direct comparison between teachers and students and between the students themselves, who observe each other, interact and have the opportunity to exchange directly and synchronously.
It is therefore clear that there is no winner between the two methods and that not necessarily one excludes the other, indeed one can go to the other’s rescue.
A recent example is the recent pandemic caused by COVID 19, which put many activities in crisis and, in many cases, required a remodulation of such activities. The school sector has been particularly impacted by this remodulation process. In this case, the normal training activity, typically face-to-face in the classroom, was diverted to the remote one: the educational institutions of every order and degree promptly organized themselves; some of them had to implement the contents however achieving remarkable results and demonstrating the prompt response and reactivity that e-learning allows, as well as the preparation, ability and resilience of the teachers involved in the change process.
The BREED course provides support to e-learning as well as to blended methodology, aiming to join the strengths of both methods and offer a comprehensive training on outdoor pig breeding usable in self-learning and traditional teaching.

› Advantages and issues of outdoor pig breeding

Agro-forestry-pastoral activities within the European territory boast centuries-old traditions. Particularly for cattle, sheep and goat breeding, the benefits of that the good practices of breeding can bring to the territory are now known and recognized, thanks to a carefully controlled grazing activity and the protection of the environment, guaranteed by the constant presence of breeders.
Outdoor and quality pig breeding has not been experienced at a similarly broad extent but it is now seen as a promising and innovative farming.
As a matter of fact, outdoor pig breeding does not mean/involve the abandonment of animals and territory to natural events, but requires careful management of animals with the aim of carrying on the economic activity whilst respecting the environment, thus achieving the availability of continuous resources without degradation.
The recent renaissance of outdoor farms across Europe, has been driven by a series of factors such as the low land value of the most marginal areas from one side, and, from the other side, the high costs of

management, feeding and operating facilities. Moreover, outdoor breeding also matches the breeders' and consumers' greater sensitivity towards animal welfare as well as the quality of the meat.
In this context, outdoor pig farming, if properly managed, can offer economic and work opportunities, since the quality of the meat obtained ensures the high interest of the market. Furthermore, in Europe cured meats and typical sausages are particularly appreciated and often contribute to increasing sustainable tourism and food and wine market.

› Advantages and innovative aspects

The technique of breeding pigs outdoor, also known with the term free-range, differs from indoor pig breeding for the use of large fenced areas of land, within which the pigs have functional areas, set up and equipped for drinking, feeding and resting.
Typical of the free-range kind of breeding, in fact, is the practice of rotating the fences within a suitable crop rotation plan, aimed at maximizing the agronomic exploitation of the nutrients in the breeding areas released by the pigs on the ground, while at the same time minimizing the pollution of the surface and underground waters, soil erosion and damage to the vegetation.
Outdoor pig breeding is therefore considered today as an environmentally sustainable activity, capable of enhancing hilly and mountainous areas which are difficult to exploit, and especially able to promote the conservation of native pig breeds.
Outdoor pig breeding is exceptionally sensitive to the environmental and animal welfare needs but also fosters the entrepreneur's profitability whilst meeting the demand of the consumers, who require more and more typical and quality products.
Approaching our course, the teacher/trainer should be aware of the strong reasons that make outdoor pig breeding a breeding technique that directly looks to the future, from the point of view of new job opportunities as well as for the safety and quality of food.
Outdoor pig breeding is strategical considering the following assumptions:
• Increasingly more restrictive rules on animal welfare and waste management;
• Urban planning constraints to the construction of new pigsties;
• Progressive increase of investment and management costs required by intensive farming;
• Production guidelines on high quality pork meat;
• Availability of low-cost marginal land.
Outdoor farming also offers the possibility of extremely facilitated conversion to organic. Therefore, it is fundamental that pig breeders have the necessary knowledge of the rules on organic pig breeding.

› Components of the design

The planning of the outdoor pig farming will have to include the following:
• Choice and preparation of the soil
• Subdivision of breeding areas and fences
• Shelters for breeding animals, growers and finishers
• Feeding and watering equipment
• Choice of the genetic type

› Issues to consider

Outdoor pig breeding is an innovative breeding system, with specific management issues:
• Difficulty in distributing feed in rainy seasons, with risks of incomplete intake;
• Possibility that the water in the supply net of drinking water will freeze during winter;
• Overheating of the sheds and excessive sun exposure of pigs during the summer;
• Interaction between reared pigs and wildlife;
• Greater difficulties in carrying out interventions on animals;

Ideological conversion of the breeder

The design will have to well analyze these issues in order to find the best solution and ensure the success of the breeding.

Results of the surveys conducted on pig breed training, consulting experts and VET teachers and trainers

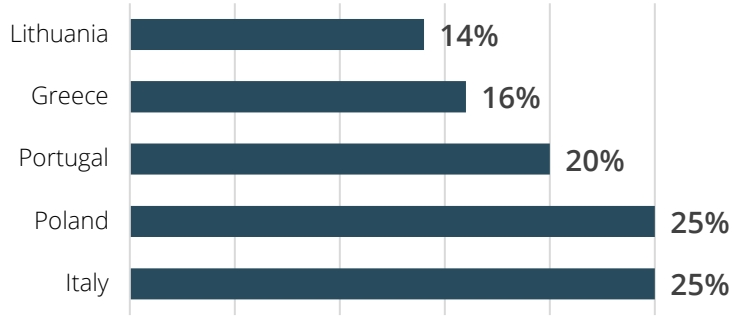
Consultation of national experts

In order to achieve high quality and usefulness, the creation of the BREED course was based on the examination of needs and expectations of the addressed final users. A special questionnaire was developed to identify the main issues which would have to be presented, best practices for free-range pig farming, media suggested to illustrate the topics of the course, methodical areas for the learning outcomes as well as organizational areas.

The survey was carried out in the period from December 2019 to January 2020, in the project countries Italy, Poland, Greece, Portugal and Lithuania.

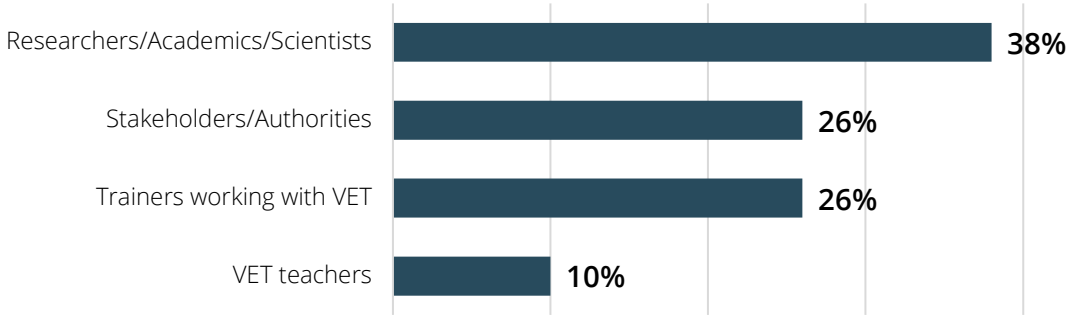
Initially, 122 experts have been involved in the project countries. In the survey, 106 respondents delivered valid answers. Among them, 25% were Italian, 25% were Polish, 20% were Portuguese, while 16% were Greeks and 14% were Lithuanians.

Figure 1 Distribution of the respondents – by country of origin



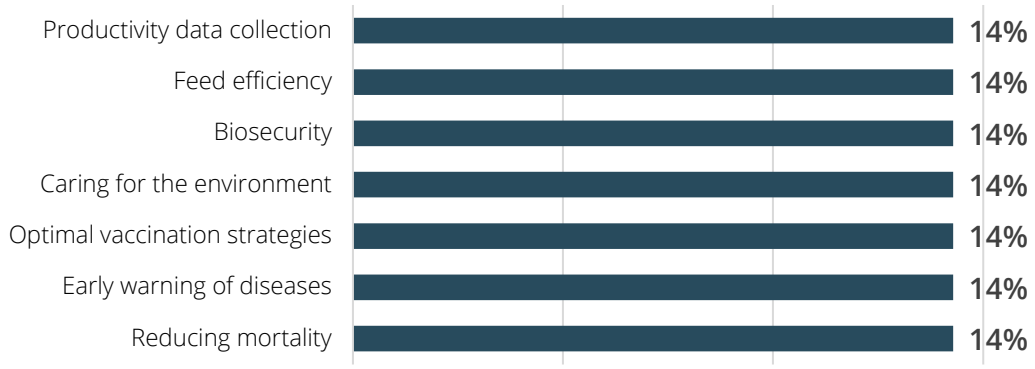
The respondents were working within VET as academics (38%), stakeholders and authorities (26%), VET trainers (26%), or VET teachers (10%).

Figure 2. Distribution of the respondents – by type of experts



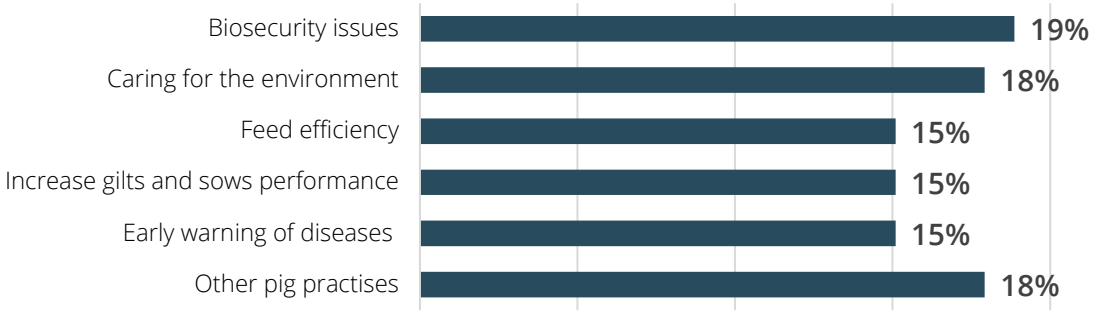
The experts indicated that seven areas of free-range pig farming are of main importance, such as: reducing mortality, early warning of diseases, optimal vaccination strategies, caring for the environment, biosecurity, feed efficiency, and productivity data collection for decision making.

Figure 3. Areas of importance for free-range pig farming



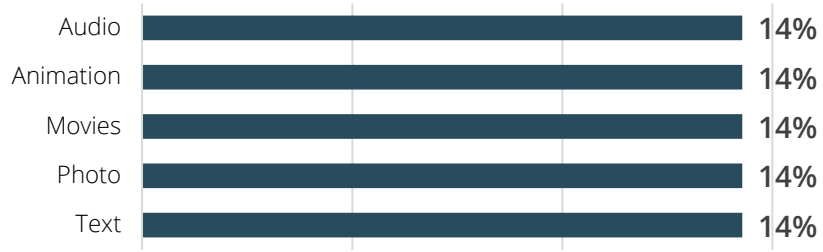
The experts additionally indicated 160 good practices that may be used in free-range farming (see the Annex 'Good practices in free-range pig farming').
The great majority of good practices concerns biosecurity issues (20 practices), caring for the environment (19 practices) and increase of gilts and sows performance (16 practices), feed efficiency (16 practices), early warning of diseases (16 practices).
These suggestions were included during the elaboration of the content of the BREED course.

Figure 4. Importance of pig practices for free-range pig farming



The experts suggested the media to illustrate the topics of the course.
The results of the survey indicate that text and photos are the most suitable media to illustrate the topics of the course. The media were suggested in nine topics. The use of the text alone was suggested only for presenting regulations on free-range pig farming. Respondents suggested that the optimal media for presenting four other topics are text and photos and movies. The respondents recommended animation and audio very rarely; however, it might be considered in the case of two topics. These suggestion were incorporated in the specifications of the modules of the BREED course.

Figure 5. Distribution of media suggested to illustrate the topics of the course



With a view to addressing high quality and applicability in the process of the creation of the BREED course, the experts' opinions were taken in due account. The suggested learning outcomes approach was used, as this approach has many advantages. Learning outcomes play a significant role as assessment standards while deciding about the orientation of the education. They can also indicate how a learning experience could be graded. However, any benefits depend on the way learning outcomes are understood, defined, written and applied. Learning outcomes are essential for the trainee and the teacher. Those statements clarify what a learner will know, be able to do and understand, after completing a module or the whole course. They support an initial choice of training. In the course, each module has a unified description structure containing module aim, learning objectives, learning outcomes divided into knowledge, skills, and social competences.

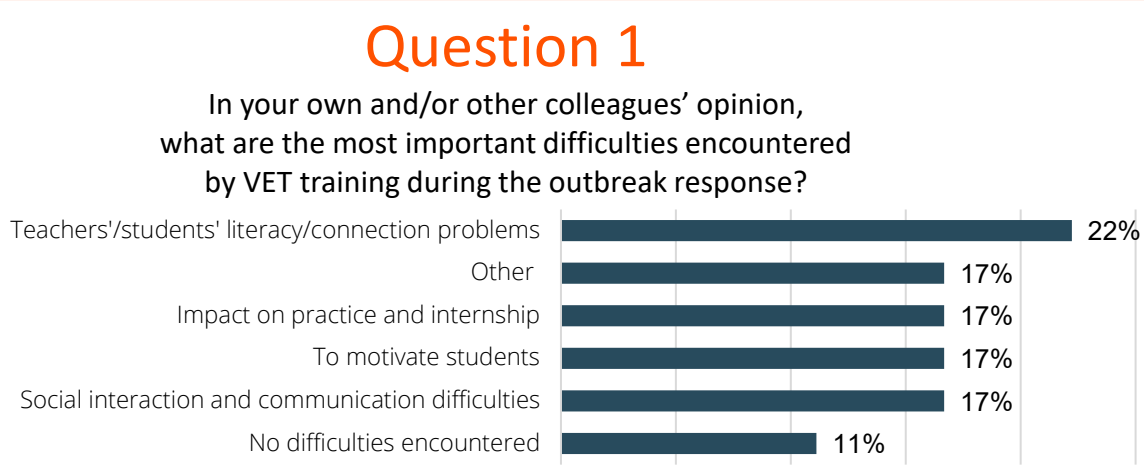
Consultation of VET teachers and trainers

Since the declaration of the worldwide pandemic status, the BREED Consortium started a reflection on the impact that the safety measures was producing on the VET training methodologies and the possible changes of the training needs that were identified in the survey previously undertaken.

With the aim of finding potential areas of improvement of the BREED course, the project distributed online a short questionnaire.
The survey was publicly addressed to VET teachers and trainers and was undertaken from June to July 2020.
The survey was based on three open-text questions plus an optional field for recommendations and suggestions.
A total of 18 valid answers was registered.

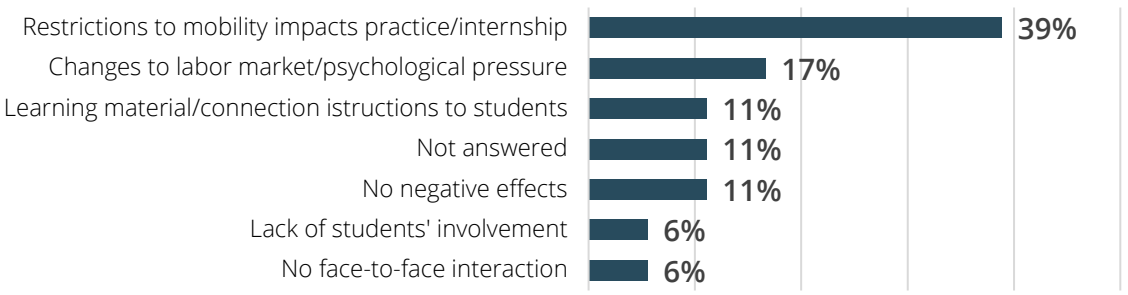
The first question was focused on the identification of the most important difficulties encountered while teaching/training online during the outbreak.
A few participants did not have difficulties.
At the same level of importance teachers and trainers reported the following difficulties associated to the social interaction and communication, not only between teacher and students, but also among teachers and trainers; related to the impact on practice and internship, concerning the efforts to motivate students, and other difficulties such as the complexity of undertaking evaluations.
The teachers/trainers who participated to the survey reported that the most important difficulties encountered were related to the digital competences of teachers and students as well as to the management of poor connectivity and/or instructions to the students.

Figure 6. Question 1, answers of teachers and trainers

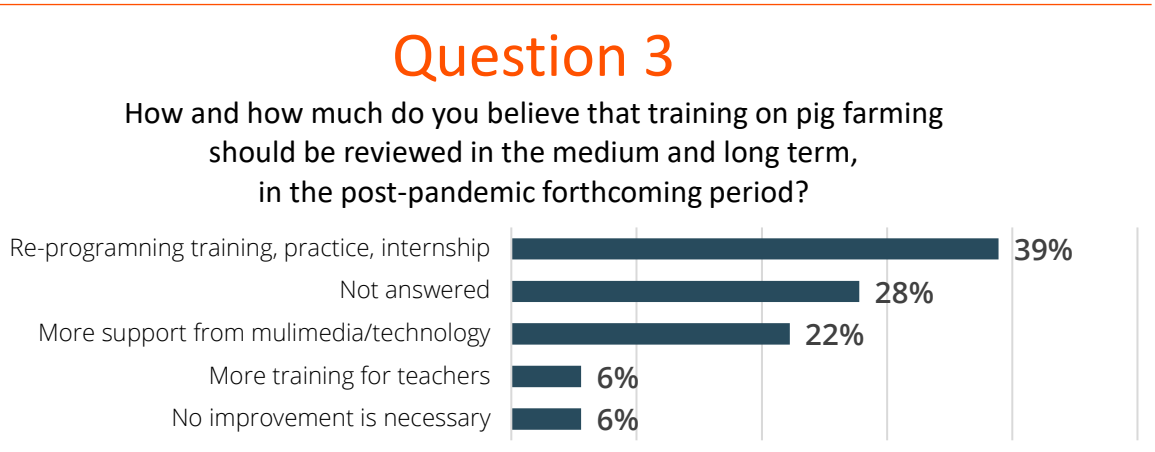


The second question was related to the specific difficulties of the teaching/training on pig breeding.
A few participants did not answer.
One of the participants to the survey indicated 'No face-to-face contact between the trainers and the participants', while another one reported the 'Lack of students' involvement'.
At the same level of importance teachers and trainers reported that did not have any issue as well as that their training was negatively impacted by the need to prepare the learning material and to manage the technical instructions to the students.
Some participants described the negative impact of the uncertainty regarding the next changes to the labour market and the psychological pressure on participants.
The majority of the participants reported that the most important difficulties encountered were related to the impact that restrictions to mobility had on practice and internship, as well as on experiential learning and on-the-job training.

Figure 7. Question 2, answers of teachers and trainers

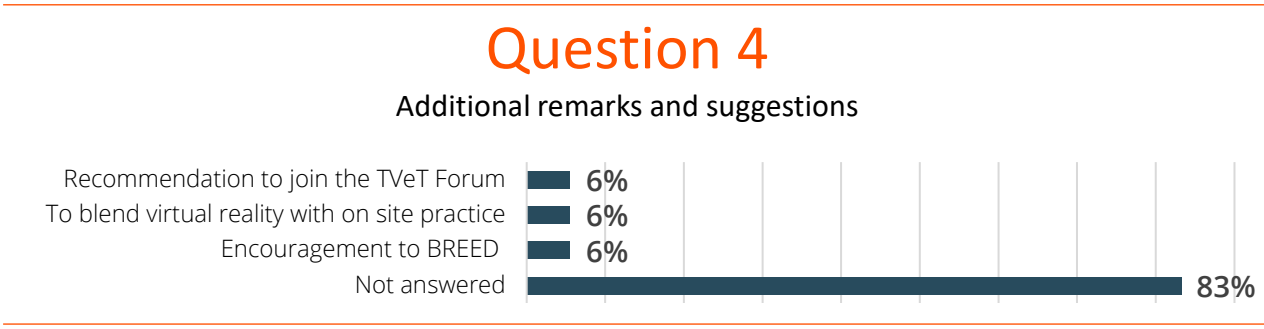


The third question asked the participants to describe their expectations for changes of the training on pig breeding in the medium and long-term.
Five participants did not answer.
One of the participants to the survey believes that there is no need of any change', while another one expresses the opinion that teachers should receive more training support.
Some answers underlined the importance of obtaining more support from multimedia and technology, whilst the majority of the teachers and trainers who participated to the survey believes that a re-programming of the training, practice and internship will have to take place.



Most participants did not provide additional remarks or suggestions in the optional field made available to this purpose.
One of the participants encouraged the BREED project to progress.
Another participant suggested to blend virtual reality with traditional on-site practice and another one recommended the BREED project to join the TVeT forum.

Figure 9. Additional remarks and suggestions



The results of this survey have been analysed and then considered in the creation of the BREED course, especially in the exercises provided and in the support to the teachers and trainers provided by each learning module.

The BREED course

This course is relevant to the alternative pig production system. It is complex and it develops a broad
The BREED course is relevant to the alternative pig production system.
The course supports the development of a broad understanding of pig biology and production, covering subjects such as breeds, breeding and selection, feeding, diseases, herd management, as well as growing and finishing pigs.
This course on free-range pig breeding challenges participants to analyze farms and the environment external to the farms in order to articulate and formulate the new strategy for their future. The questions answered in the course are how new farmers can live from free-range pastured pig farm and how they can realize this.
The course supports the learners to establish or develop a free-range pig farm by helping them to undertake all the actions which are needed.
As additional result, the course will empower participants to improve their attitude towards learning as well as their employability thanks to the new competences they will have acquired at completion of the BREED training.
The course is mostly addressed to students from the Vocational Education and Training (VET) sector, who could undertake the training under guidance of VET teachers or trainers within VET programs or in self-learning methodology.
In addition to VET students, other users could be existing or potential new pig breeders, young people, or unemployed people who may gain necessary competencies for their career and future professional life.
The free online BREED course will also encourage young people to learn using modern technologies and create skills and requirements to facilitate employment.

Educational aspects of the course

In order to enhance the pedagogical approach and the teacher's role, the course includes the following.
• The incorporation of skill and motivation factors that impact/influence the e-learning process with an engaging effect.
• The demonstration of potential asynchronous and flexible educational approaches on the end users.
• The designation with explanatory notes on pedagogical approaches such as the objectivist and the constructivist (both approaches promote distance learning). The former facilitates the transfer of knowledge through presentations and explanations whereas the latter involves the synthesis of a learning environment leading to interactivities in the learning process.
Many and constructive skills serve the project objectives on a more holistic approach such as:
• Targeting the development of creativity where the trainees will be able to connect their experience and knowledge of the creation of novel ideas.
• The promotion, with special emphasis, of the innovative and entrepreneurial mindset to allow trainees have a deeper understanding towards the meaning and adaptation of innovation and entrepreneurship.
• The development of vital attributes such as taking the initiative.

As for the educational process itself, the learner centered approach is asserted in order to encourage the learners' interaction with the content that is explored. This approach has been widely suggested for distance and e-learning courses and trainings by the academic community.

Additionally, other factors that may influence and affect pedagogy ought to be mentioned too (e.g. the instructor competences, the availability of resources etc.). Regarding these kind of factors, the BREED course clearly explains the methodological framework.

› Objectives of the course

The participants will gain knowledge on how to answer many essential questions that a new breeder may have, such as:
- What laws and regulations concerning free-range pig breeding should be followed
- How much land and pasture are necessary to match the number of pigs a breeder plans to have
- What breeds of pigs should be considered and why
- What sort of buildings and equipment would be needed
- What farming techniques should be used
- How should a breeder feed his/her free-range pigs
- How to assure animal welfare of pigs, and why it is important
- How to keep pigs healthy and highly productive
- How to obtain high meat quality
- How to sell pigs' products

› Characteristics of the course

The overall duration of the BREED course is 155 hours and consists of 14 training modules with an estimated duration of 10-15 hours each.
The characteristics and main features of the BREED course rely on the reinforcement of the educational techniques, skills and innovative approaches. The expected impact of the main characteristics of the course are:
• The incorporation of skill and motivation factors that influence the e-learning process with and engaging effect.
• The demonstration of potential asynchronous and flexible educational approaches on the end users
• The provision of educational motivational videos and self-assessment techniques by the end of the course.
The course is freely available online, easily accessible by users worldwide. Since the current COVID-19 pandemic is requesting for the majority of the world population to reduce their outdoor activities as much as possible, the BREED course provides the opportunity to its users to train in distance in a flexible manner. Consequently, the course will help participants to improve their attitude towards learning as well as their employability thanks to the new competences the learners will have acquired by the completion of the BREED training.

› Training topics

The BREED course includes all topics that are necessary to start and operate a sustainable free-range pig breeding, from design of the breeding to distribution of pig meat products.

European, national and regional regulations on free-range pig farming

This module is designed to better understand the overall European rules for free-range pigs. It is important to understand the legal aspects and other frameworks and to compare them between countries, especially when starting a pig breeding and rearing job or business.

Ethology of free range pig farming

This module aims to familiarize students with the basic knowledge about animal behavior, innate and environmental conditions, and its adaptive significance. It helps them to understand the natural behavioral needs and to ensure their fulfillment and acquire their ability to recognize species-specific and pathological natural behaviors and prevent their occurrence.

Aspects related to animal welfare

This module includes definitions, states, principles, indicators, risks of animal welfare, environmental,

economic and social issues, EU and National legislation and policies related to animal welfare, practices to ensure animal welfare and related guiding principles.

Free-range pig farming techniques
This module examines the different outdoor pig farming systems, the animal needs in terms of growth environment, adaptability to different growth conditions, animal welfare; all these aspects will take into account the respect for the environment. This will allow the student to develop a critical approach when choosing the most suitable breeding techniques, related to different production conditions.

Equipment necessary for free-range pig farming
This module examines the different structures and equipment for free-range pig farming, highlighting their characteristics and functional aspects. This will allow the student to develop a critical approach when choosing the most suitable structures and equipment in different production conditions.

Needs and food rationing of animals raised outdoors
This module deals with the nutritional needs of outdoor pig breeding. Meals and availability of food in its natural state, composition of the food ration according to the different categories in pig breeding and rationing methods are taken into consideration.

Health problems of pigs and other threats associated with free-range breeding
This module familiarizes students with the principles of bio-security and the health prevention of a herd of pigs in the free-range system. It will explain them the impact of specific factors of the breeding conditions on animal health and develop their ability to recognize threats and evaluate them as well as prevent/reduce their occurrence.

Stocking density
After illustrating the correct stocking density in conventional and organic breeding, this module examines a case study of a pilot farm with three different stocking density over a four-year period to verify changes in the soil.

Alterations of the soil related to outdoor breeding
This module addresses the issue of soil management in order to analyze the alterations produced by outdoor pig breeding, considering the technical and environmental aspects and proposing the main solutions to be adopted to minimize the impact of breeding.

Nitrogen emitted to the air by outdoor breeding
This module aims to identify nitrogen air emissions pathways, estimate nitrogen air emissions rates, examine factors affecting nitrogen air emissions, identify environmental and health hazards related to nitrogen air emissions, propose nutritional and manure management measures for mitigating nitrogen air emissions.

Quality of the meat deriving from animals raised outdoor
This module addresses the issue of the quality of meat from outdoor farming, starting from different points of view and from different stakeholders. The characteristics of the raw material and its processed products are illustrated, according to the experiences of breeders, processors, chefs, researchers and technicians.

Digital communication tools
This module is designed for the students to learn the importance of information, communication and digital technologies in the business projects, providing practical skills to support business projects. The module focuses on the principles, tools and methods to use digital communications tools. Participants will develop basic skills and knowledge on how to effectively communicate in a graphical, written, or a

verbal form, and learn the approaches to a professional digital and visual communication.

Basic marketing activities
This module describes the basic marketing activities. It is important to understand how marketing works in order to be able to choose the best activities for your business and incorporate them in practical life.

Online sale (features, logistics and delivery)
This module gives the basic information to offer global reach service to potential customers, to create or link to an existing E-commerce site in order to give to customers the possibility to check availability and pricing, as well as place and progress of orders online.

› Delivery method

The BREED course is delivered online and freely accessible to any user, only requiring initial registration. Registration data are managed in full compliance with the GDPR regulation.
At registration, the users are asked to indicate their category group, choosing between the options 'Learner' or 'Teacher/trainer'. According to this specification, the users are directed to the version of the course fulfilling their learning or teaching/training purposes.

The '**Learner**':
- Has access to the course in the self-learning methodology, with the modules of the course ordered according to the pedagogical framework identified by the Consortium team.
- Can progress in the learning from a module to the following one, compulsorily after successful completion of a specific test delivered at the end of each module.
- Can review a module in case on unsuccessful result of the related test;
- At completion of the course, receives a Certificate of Attendance.

The project distributes for free consultation the BREED motivation guide to quality pig breeding, created to foster and support the learners' best possible experience of the BREED course.

The **'Teacher/trainer'**:
- Can access any modules of the course, in online or blended methodology.
- Can propose the tests of the modules online or as printed tests, having also access to the correct answers to the tests.
- Can invite students to undertake the whole course in self-learning methodology.

This Guide is created to assist teachers and trainers to make the best possible use of the BREED course within their VET programs.

› Support to teachers and trainers

The BREED online course can be also used as support to seminars or to a traditional face-to-face course.
In case of a traditional course, it could be useful to interview the participant before the course. During this interview, which can be conducted in different ways (e.g., face-to-face, by phone etc.) the teacher should collect preliminary information about the participant and his/her background to create a standard expectation. The interview will provide input for the training, and it is also possible to check if the course is suitable for the trainee, or the other way around, e.g.,
- is participant able and prepared to implement methods of free-range pig production,
- is participant open-minded,

- is willing to make informed choices,
- is hoping to have some career and wants to get some qualification,
- is ready to be active during the course and ready to interact with the group.

Additionally, it is a way to gather information on which subjects a teacher should concentrate, as the teacher might evaluate to adapt the course to the participant's interests and needs.
The interview may help to draw the attention of the participant on the time required for sessions and assignments and the availability of time the participant has. It is crucial that all participants are present during the training and consider the time needed for homework assignments. Because it is favorable to establish good interaction between the training participants, the optimum group size is about 15-30 persons.
Participants in the training must have clear expectations. This course is focusing on a free-range pig farm organization and management. The aim of this course is that the participant ending of the course is capable of starting himself, or at least that understands how to establish a sustainable, successful business in free-range pig farming. So the training focuses on developing the competences of the current or future farmer (entrepreneur).
It is also essential to have a clear picture of the roles of the facilitator and the participant in the course. The participant should learn and ask questions, and the teacher should be a facilitator and support participants in learning and skills development (e.g., in asking the right questions or showing where information or help are available).
Create trust in the group at the beginning of the course by agreeing that personal statements are not shared with other people outside the group. It is also important to encourage the participants to share any doubts, problems, or questions with the teacher.

› Tips for online teaching and training

The teacher should assure himself a pleasant and quiet room, with the right tools (e.g., beamer, laptop, flip-over, computers, and the Internet connection). If the participants have (good) access to the Internet, they can work at home, and the facilitator has to provide the all instructions on how to use the tools (e.g., password).
The teacher should make a file (folder) with all the paperwork for the participants. It will allow us to hand out questionnaires or home assignments if necessary, after each meeting.

When organizing a course at school or in a meeting room, it should be payid attention to having enough computers with the Internet connection available for the participants. The best situation is to ensure one equipment per participant.

If the group of participants is diverse and geographically dispersed, some adjustments might be required. The teacher might decide to conduct an e-learning course in English for all learners, followed by some virtual classes in the local language. The course can be implemented by people with different levels of knowledge which must be taken into account. Novice learners have an imperfect understanding of a course concept and approach tasks mechanistically. They need support and control. Advanced beginners have a common understanding of concepts. They see the course as a series of steps and activities. Advanced beginners are more independent so that they can complete simple tasks without supervision. Competent learners can understand the context of the course. They may complete work independently to an acceptable level. Proficient learners have a deeper understanding and can see actions holistically. They can achieve a high standard at all times.
Expert learners have a profound and holistic understanding of the course concept. They can deal with routine matters 'intuitively' to go beyond existing interpretations. They consistently achieve excellence.
In situations with limited Internet connections, a teacher may prepare a sequence of pictures replacing video sequence if the video is accompanied by written or oral comments (audio narration).

The teacher may select activities e.g., case studies or other homework assignments, to the participant's interests and needs achieving the same goals.

The teacher who will use the online BREED course within his/her training program, would have to bear in mind that the trainees might not have a pre-existing knowledge about the topic, so it would be advisable to approach every new theme using simple terms and starting from the basics of the topic, so as to gradually introduce more difficult concepts and definitions. At the beginning of each training topic, the teacher could explain the related learning outcomes and the expectations in terms of knowledges, skills and competences with the aim of making the students completely aware of the tasks. Another important aspect that a teacher should consider is to make the concepts clearer and easier to understand. This will require that the teacher should constantly highlight the connection between theory and practice by giving practical and realistic examples of what a concept means in the reality of a farm or of a business activity. Moreover, it is important to encourage the trainees to continue the course, throughout the lessons, to clarify that all the concepts delivered have an applicative aspect and are worth to be studied.

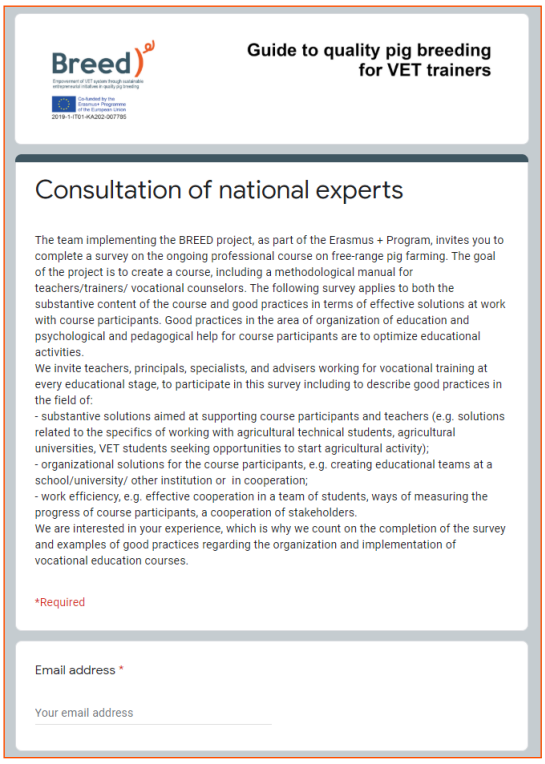
The BREED toolkit provides the teacher with contents and materials organized by modules. Each module proposes didactical tips on the approach to the different topics, such as, for instance:

- Show your students as many pictures as you can, relevant to the topic dealt with in each module
- Highlight positive and negative aspects of each practice related to outdoor pig breeding
- Put in evidence the best management choices, related to different environmental conditions
- Encourage the trainees to guess what the most suitable structures and breeding conditions regarding their own farming management and business plan are
- Pay close attention to the sustainability aspects of each breeding practices

Annexes

› Online questionnaire for experts from the project countries

1/3



Guide to quality pig breeding for VET trainers

Consultation of national experts

The team implementing the BREED project, as part of the Erasmus + Program, invites you to complete a survey on the ongoing professional course on free-range pig farming. The goal of the project is to create a course, including a methodological manual for teachers/trainers/ vocational counselors. The following survey applies to both the substantive content of the course and good practices in terms of effective solutions at work with course participants. Good practices in the area of organization of education and psychological and pedagogical help for course participants are to optimize educational activities.
We invite teachers, principals, specialists, and advisers working for vocational training at every educational stage, to participate in this survey including to describe good practices in the field of:
- substantive solutions aimed at supporting course participants and teachers (e.g. solutions related to the specifics of working with agricultural technical students, agricultural universities, VET students seeking opportunities to start agricultural activity);
- organizational solutions for the course participants, e.g. creating educational teams at a school/university/ other institution or in cooperation;
- work efficiency, e.g. effective cooperation in a team of students, ways of measuring the progress of course participants, a cooperation of stakeholders.
We are interested in your experience, which is why we count on the completion of the survey and examples of good practices regarding the organization and implementation of vocational education courses.

*Required

Email address *

Your email address

1) In your opinion, what should be the media best suited to illustrate the following topics of the course?(multiple choices are possible) *
Should the topic be mostly illustrated by:

	Photo	Movie	Audio	Animation	Text
1.1. European, national and regional regulations on free-range pig farming	☐	☐	☐	☐	☐
1.2. Changes in soil associated with free-range pig farming	☐	☐	☐	☐	☐
1.3. Production and effect of nitrogen in free range pig farming	☐	☐	☐	☐	☐
1.4. Equipment necessary for free-range pig farming (karmis, fences, shelter, etc.)	☐	☐	☐	☐	☐
1.5. Free-range pig farming techniques	☐	☐	☐	☐	☐
1.6. Feeding and needs of pigs in free-range pig farming	☐	☐	☐	☐	☐
1.7. Aspects related to animal welfare	☐	☐	☐	☐	☐
1.8. Ethology of free range pig farming	☐	☐	☐	☐	☐
1.9. Health problems of pigs and other threats associated with free-range breeding	☐	☐	☐	☐	☐
1.10 Stocking density of pigs in free-range farming	☐	☐	☐	☐	☐
1.11. Quality of meat from free-range pigs	☐	☐	☐	☐	☐
1.12 Basic marketing activities (promotion and advertising on the Internet)	☐	☐	☐	☐	☐
1.13. Digital communication tools (using Wi-Fi, mobile applications, mobile payment technologies, using social media)	☐	☐	☐	☐	☐
1.14. Online sales of products (e.g., specifics, rules, security).	☐	☐	☐	☐	☐

2/3

2) In your opinion, to what extent these area of pig practices are important for free-range pig farming? *
(only 1 choice per area is possible)

	Very Important	Important	Neutral	Low Importance	Not important at all
2.1. Reducing mortality	○	○	○	○	○
2.2. Early warning of diseases and production	○	○	○	○	○
2.3. Optimal vaccination strategies	○	○	○	○	○
2.4. Tail biting	○	○	○	○	○
2.5. Enrichement materials	○	○	○	○	○
2.6. Feed efficiency	○	○	○	○	○
2.7. Castration	○	○	○	○	○
2.8. Increase gilts and sows performance	○	○	○	○	○
2.9. Caring for the environment	○	○	○	○	○
2.10 Biosecurity	○	○	○	○	○
2.11. Data collection and support decision making	○	○	○	○	○

3) Do you know any good practices in free-range pig farming? If yes, please describe them shortly and add a source of knowledge about the practice (e.g. links) *

Choose

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4) In your opinion, to what extent these methodical areas are important for learning outcomes? *
(only 1 choice per area is possible)

	Very Important	Important	Neutral	Low Importance	Not important at all
Well planned logistic aspects of the course	○	○	○	○	○
Clear course design (training schedule and structure)	○	○	○	○	○
Clear goals of the course	○	○	○	○	○
Well explained learning strategy	○	○	○	○	○
Effective evaluation system regarding the initial level of knowledge of the participants	○	○	○	○	○
Effective assessment system in terms of the level of knowledge of participants after the training	○	○	○	○	○
Well designed participant self-assessment tools allowing to check progress in gaining knowledge during the course (tests, etc.)	○	○	○	○	○
Well designed and diverse educational materials (sharing, presentation, etc.)	○	○	○	○	○
Good interaction among participants	○	○	○	○	○
Caring for the environment	○	○	○	○	○
Good iInteraction between the trainer and participants	○	○	○	○	○
Clear technical requirements for using the course	○	○	○	○	○
Tips concerning the recruitment of potential participants (who and how to recruit)	○	○	○	○	○
Caring for the environment	○	○	○	○	○
Good iInteraction between the trainer and participants	○	○	○	○	○
Clear technical requirements for using the course	○	○	○	○	○
Tips concerning the recruitment of potential participants (who and how to recruit)	○	○	○	○	○
Ensuring the attractiveness of the course	○	○	○	○	○
Prepared dictionary with more important terms concerning the course	○	○	○	○	○

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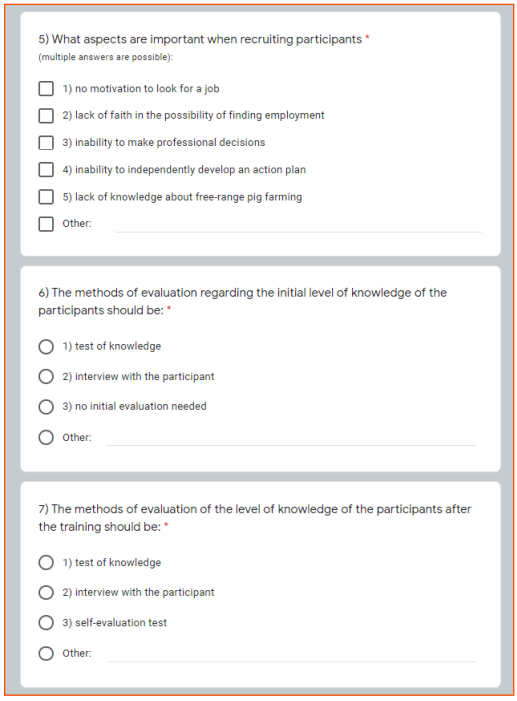
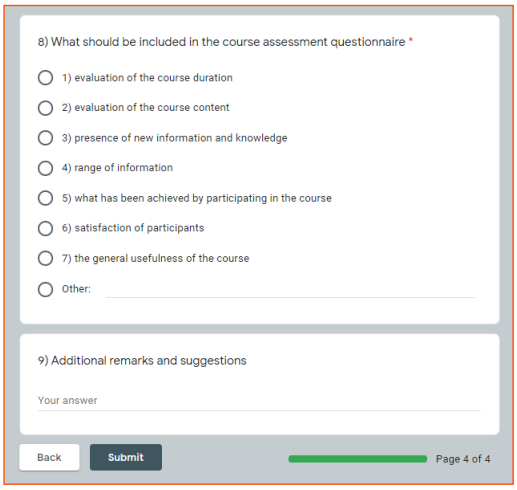

5) What aspects are important when recruiting participants *
(multiple answers are possible):
1) no motivation to look for a job
2) lack of faith in the possibility of finding employment
3) inability to make professional decisions
4) inability to independently develop an action plan
5) lack of knowledge about free-range pig farming
Other:
6) The methods of evaluation regarding the initial level of knowledge of the participants should be: *
1) test of knowledge
2) interview with the participant
3) no initial evaluation needed
Other:
7) The methods of evaluation of the level of knowledge of the participants after the training should be: *
1) test of knowledge
2) interview with the participant
3) self-evaluation test
Other:


8) What should be included in the course assessment questionnaire *
1) evaluation of the course duration
2) evaluation of the course content
3) presence of new information and knowledge
4) range of information
5) what has been achieved by participating in the course
6) satisfaction of participants
7) the general usefulness of the course
Other:
9) Additional remarks and suggestions
Your answer
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Submit
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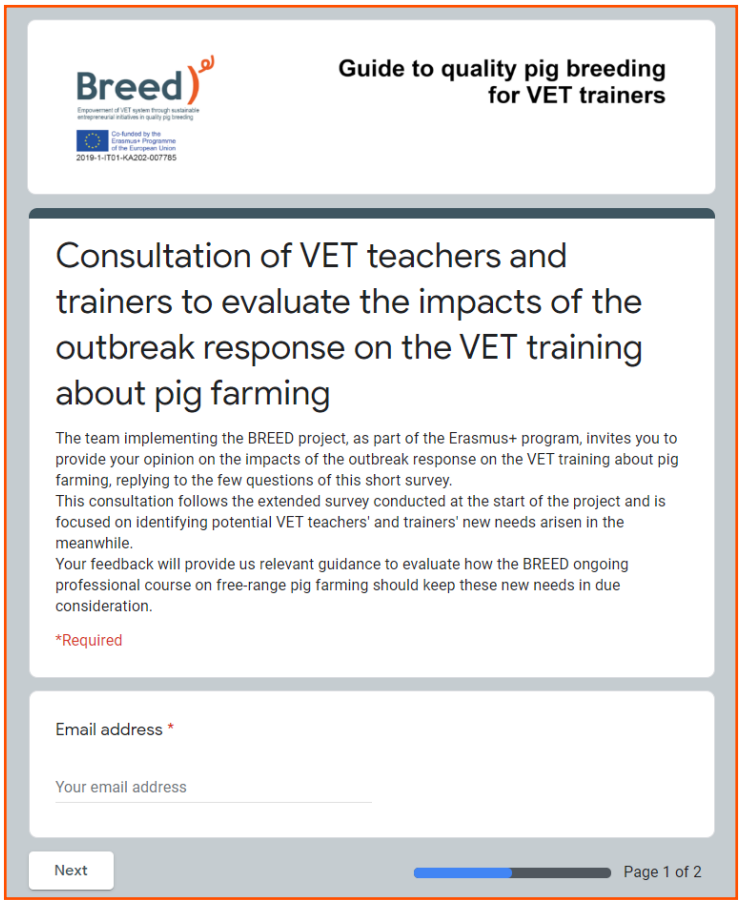
› Online questionnaire for VET trainers and teachers



Guide to quality pig breeding for VET trainers

Consultation of VET teachers and trainers to evaluate the impacts of the outbreak response on the VET training about pig farming

The team implementing the BREED project, as part of the Erasmus+ program, invites you to provide your opinion on the impacts of the outbreak response on the VET training about pig farming, replying to the few questions of this short survey.
This consultation follows the extended survey conducted at the start of the project and is focused on identifying potential VET teachers' and trainers' new needs arisen in the meanwhile.
Your feedback will provide us relevant guidance to evaluate how the BREED ongoing professional course on free-range pig farming should keep these new needs in due consideration.

*Required

Email address *

Your email address

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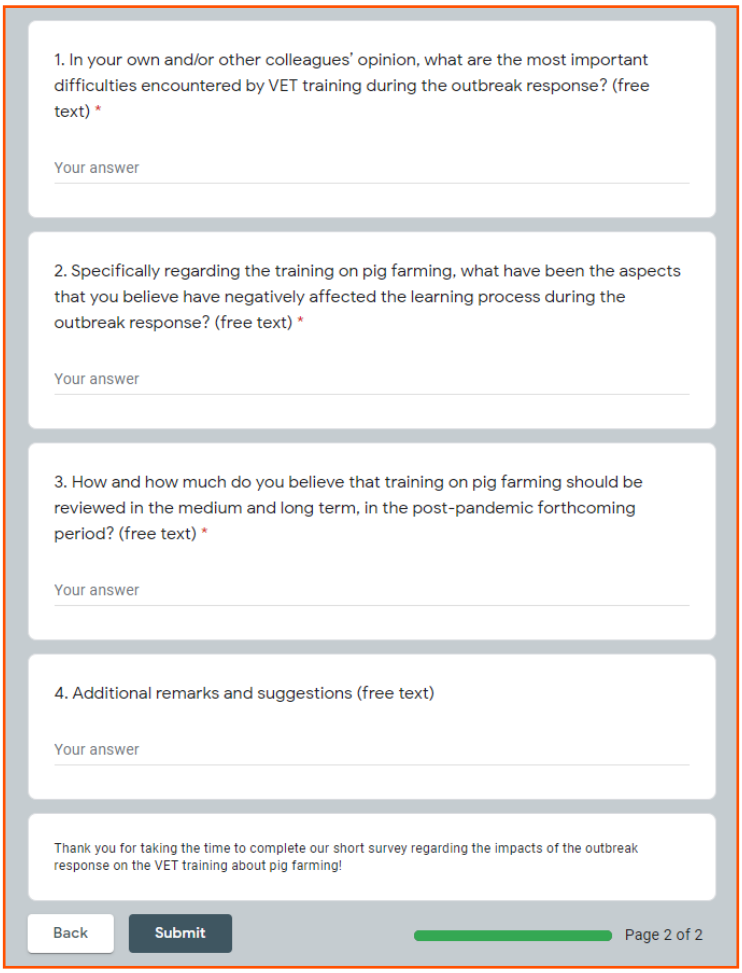

1. In your own and/or other colleagues' opinion, what are the most important difficulties encountered by VET training during the outbreak response? (free text) *

Your answer

2. Specifically regarding the training on pig farming, what have been the aspects that you believe have negatively affected the learning process during the outbreak response? (free text) *

Your answer

3. How and how much do you believe that training on pig farming should be reviewed in the medium and long term, in the post-pandemic forthcoming period? (free text) *

Your answer

4. Additional remarks and suggestions (free text)

Your answer

Thank you for taking the time to complete our short survey regarding the impacts of the outbreak response on the VET training about pig farming!

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› Good practices in free-range pig farming questionnaire for VET trainers and teachers

Reducing mortality

18 experts indicated: 19 different practices

1. Many studies suggest that birth weight is a major factor influencing piglets mortality. Pigs with low birth weight are usually weaker and succumb more easily to hunger, chill and crushing by the sow. There is a negative relationship between birth weight and litter size. This means that the larger the litter size, the higher the risk that the birth weight will be low and that piglets therefore will be less robust. from the website; https://www.pigprogress.net/Sows/Articles/2014/6/Project-Reduce-piglet-mortality-in-organic-pig-production-1543157W/
The proper environment for birthing is also important (use a hut easy to monitor the births by farmer and easy to help the sow when she has any problem.)
Use the new genetic technologies such as genomic selection which can effectively change the existing sows genetic material and sows selection could be much more effective .
2. Set up a suitable environment for farrowing sows
3. Set up a suitable area for weaning
4. Improvement of health status as an effect of preventive vaccinations
5. Use of UV lamps in piglets under sow
6. Comfortable facilities during critical winter and summer periods
7. Follow specific courses
8. "Approximately seven days before farrowing, move pregnant sows to a paddock that has clean, warm and draught-free farrowing accommodation with ventilation for the sows in hot weather (i.e. shutters high in the walls of the farrowing huts) and sufficient bedding to keep piglets warm. To avoid overlaying of piglets and, hence, reduce piglet mortality, guard rails are recommended on the walls of farrowing huts (225 mm above the floor and 300 mm from the walls). from; https://www.daf.qld.gov.au/business-priorities/agriculture/animals/pigs/piggery-management/production-performance/Free-range
9. Decontamination of the paddocks
10. Careful selection of the farrowing hut (nest area), isolation of the hut bottom from cold / wet soil, the use of a litter
11. Birth assistance and food supplement for piglets
12. Presence of anti-crushing bar
13. Right evaluation of animal health problems
14. https://www.3tres3.com.pt/
15. Protective enclosures against predators. Huts against bad weather.
16. Vaccine prophylaxis
17. https://www.ciwf.org.uk/media/5492194/gap_pig_book_full.pdf
18. Take care of milk production by sows - right watering and feeding sows. Sufficient and quality nutrition, strict rules of cleanliness, thermal comfort, early manure removal, clean food and water suppliers, sufficient vaccination, control of health condition, isolation of sick animals, pest control
19. Right farm management care of conditions and cleanliness at farrowing places, meeting space requirements

Early warning of diseases and production

16 experts indicated: 17 different practices (including one practice indicated by three experts)

1. Monitoring by drones or movements monitoring by sensors or cameras e.g. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5110645/
2. Daily observation of behaviour
3. Lindgren K., Bochcchio D., Hegelund L., Leeb C., Mejer H., Roepstorff A., Sundrum A., 2014: Animal health and welfare in production systems for organic fattenig pigs. Organic Agriculture 4, 135-147.
4. https://www.3tres3.com.pt/

5. Use of Sensors
6. Image analysis
7. Disease recognition through the use of sensors
8. Systematic monitoring of the health of animals and growth performance
9. Feed consumption monitoring
10. Following specific courses
11. Constant herd monitoring
12. Swine Erysipelas
13. Stabulogenic vaccines
14. Continuous monitoring of production performance (e.g. use of mobile scales)
15. Following the health monitoring plan with blood sample
16. Use of precision livestock farming techniques
17. Use of sensors and cameras

Optimal vaccination strategies

14 experts indicated: 13 practices (including one practice indicated by three experts)
1. The example of a vaccine protocol was described in: https://www.aavmc.org/data/files/case-study/brucella%20-%20livestock%20case%20scenario.pdf
and it was vaccinating gilts at 5 months and boosting 4 weeks later. Sows are vaccinated approximately every 6 months prior to breeding. There have been no new additions to the herd since the 20 gilts/sows and 2 boars were acquired. The herd is free of the virus that causes Porcine Reproduction and Respiratory Syndrome (PRRS). All sows, the two boars, and finishing hogs appear healthy.
2. Lindgren K., Bochcchio D., Hegelund L., Leeb C., Mejer H., Roepstorff A., Sundrum A., 2014: Animal health and welfare in production systems for organic fattening pigs. Organic Agriculture 4, 135-147.
3. Follow the national vaccination plan
4. The productivity growth can be increased by improving the living conditions of animals and the implementation of preventive measures (e.g. vaccination programs, treatments with phototherapeutics) that reduce mortality rates (especially during the winter months). from: Papatsiros, Vassilis. (2011). Impact of animal health management on organic pig farming in Greece. Biotechnology in Animal Husbandry. 27. 115-125. 10.2298/BAH1101115P.
5. Apply vaccinations in early stage of life against common illness
6. Vermin control (they are not vaccinations)
7. Use efficient vaccines (monitor vaccine efficiency)
8. https://www.3tres3.com.pt/
9. Vaccine protocol in relation to the epidemiology of the territory
10. https://www.ciwf.org.uk/media/5492194/gap_pig_book_full.pdf
11. Vaccination is one of the best and simplest methods we have of managing disease in our free range pig herd. Vaccinating the herd can prevent some important diseases that have the potential to affect the productivity of your animals or even cause death (e.g. Erysipela) Source: https://www.proof.net.au/Vaccination-for-Pigs
12. Most farms vaccinate against parvovirus and erysipelas, some also against E. colThe use of the homeopathic substances having less than 1/10000 active ingredient is possible (Finnland)
13. Traceability in vaccination procedures

Tail biting

8 experts indicated: 9 practices
1. No tail cut
2. http://www.classyfarm.it/wp-content/uploads/sites/4/2019/07/ClassyFarm-Guida-Inserimento-Taglio-Coda-V-1.4.pdf
3. Management for decreasing tail biting. A comfortable environment reduces aggressive behaviour
4. Tail biting in a free range environment is rarely a problem. If it does occur pig management should

be investigated rather than resorting to an unnecessary surgical procedure. If tail docking is practiced, the Model Code of Practice for the Welfare of Animals – Pigs states that it should be carried out before pigs are 7 days of age. from https://www.proof.net.au/Tail-docking-&-teeth-clipping-free-range-pigs
5. Avoid competition between animals
6. https://www.ciwf.org.uk/media/5492194/gap_pig_book_full.pdf
7. Preventive measures to avoid tail bites
8. Partial tail cut, only by a vet and only after tail bites are present. Best before the 7th day after birth
9. Following specific courses

Enrichment materials

8 experts indicated: 6 practices (3 practices indicated by three experts)
1. https://www.3tres3.com.pt/
2. Assure access to sufficient amount of materials such as
litter, haystacks, wood, sawdust, mushroom compost, peat or a mixture thereof, which do not endanger their health
3. http://www.classyfarm.it/wp-content/uploads/sites/4/2019/09/Manuale-SUINO-GRASSO-2018-LP-rev.3.pdf
4. Give to pigs straw, twigs, jute bags for sows before farrowing
5. Arrange the systematic distribution of surrogate material
6. Plant trees on the area with free ranged pigs from: https://slideplayer.com/slide/13035380/

Feed efficiency

16 experts indicated: 16 different practices
1. A 33 % reduction in concentrate -> daily gain was reduced 20-24 % and feed conversion ratio improved with 9-14 % in the experiment described at https://orgprints.org/24635/7/24635.pdf
2. Periodic weight check
3. In accordance to the literature feed intake is higher as a result of greater living needs (movements and body heating) in: Früh B., Bochicchi D., Edwards S., Hegelund L., Leeb C., Sundrum A., werne S., Wilberg S., Prunier A., 2014: description of organic pig production in Europe. Organic Agriculture 4, 83-92.
4. https://www.3tres3.com.pt/
5. Total feed efficiency calculator depending on life and reproduction stage, slaughter weight and sale weight
6. Reduction of factors that cause food losses
7. Periodic weight control
8. Follow specific courses
9. Use of pigs of different local breeds are considered to be most suitable for outdoor growing. Sather et al. (1997) and Hoffman et al. (2003) indicated that outdoor-reared pigs had a slower growth rate than confinement-reared pigs but Stern et al. (2003) reported that pigs reared outdoors grew at a similar or faster rate than indoors. The conclusion is taht with the use of right breeds and right practices it is possible to get the same results as in barns. Remigijus Juska , Violeta Juskiene & Raimondas Leikus (2013) The influence of a free-range housing system on pig growth, carcass composition and meat quality, Journal of Applied Animal Research, 41:1, 39-47, DOI: 10.1080/09712119.2012.738215. Free range sows are more active than indoor sows so it is very important to keep feed efficiency on the right level. Additionally outdoor pigs have a higher parasite burden, which increases the nutrient requirement for maintenance and reduces their feed utilization efficiency. Frequent rotation is required although most farmers are keeping their pigs for a longer period before rotating. The concept of using pasture species to minimise nematode infections in grazing pigs looks promising. from: Miao, Z.H. & Glatz, P. & Ru, Yingjun. (2004). Review of Production, Husbandry and Sustainability of Free-range Pig Production Systems. Asian-Australasian Journal of

Animal Sciences. 17. 10.5713/ajas.2004.1615.
10. Direct foraging in the range area is suggested as a way to improve the nutrient efficiency at farm level and to support a more natural behavior of the pig.
11. Adjustment of the ration to climatic conditions
12 It is important to evaluate fodder energy
13. Correct feeding in all breeding stages
14. Rationed feeding in long troughs for sows in gestation
15. Provide sufficient number of watering points (drinkers)
16. Provide special facilities for the distribution of feed. Taking into account nutritional requirements in relation to genetic type and growth potential

Castration

6 experts indicated: 4 practices (including one practice indicated by three experts)
1. Castration with anesthesia: Früh B., Bochicchi D., Edwards S., Hegelund L., Leeb C., Sundrum A., werne S., Wilberg S., Prunier A., 2014: description of organic pig production in Europe. Organic Agriculture 4, 83-92.
2. Castration only by a vet, best before the 7th day after birth, using an anesthetic as well as prolonged use of painkillers.
3. Hormonal castration (inhibitor of testosterone and its metabolites) - It needs more injections but prevents surgical castration
4. https://ec.europa.eu/eip/agriculture/en/find-connect/projects/icasb%C3%ADsaro-protocolos-de-imunocastra%C3%A7%C3%A3o-para

Increase gilts and sows performance

16 experts indicated: 13 practices (including one practice indicated by three experts)
1. Good animal welfare can be good for productivity. For example:
• giving growing pigs enough space increases their growth rates,
• pigs weaned later often grow better,
• changing system to enriched free-range or deep litter systems reduce cannibalism and tail-biting,
• training people to make them understand better pigs needs and improve people's attitudes towards animals increases productivity: https://www.ciwf.org.uk/media/5492194/gap_pig_book_full.pdf
2. Provide right feeding with energy, minerals, protein and vitamin; well balanced food increase gilts and sows performance
3. Proper selection of pig breeds / lines (conservative breeds): Röös E., Mie A., Wivstad M. Salomon E., Johansson B., Gunnarsson S., Wallenbeck A., Hoffmann R., Nilsson U., Sundberg C., Watson C. A., 2018: Risk and opportunities of increasing yield in organic farming a review. Agronomy for sustainable development 38, 14, 1-21.
4. https://www.3tres3.com.pt/
5. Provide well balanced feed for pigs
6. Follow specific courses
7. The growth performance of the pigs was improved when the ambient temperature was consistently hot or consistently cold. Park, Hannah & OH, Sang-Hyon. (2016). Seasonal variation in growth of Berkshire pigs in alternative production systems. Asian-Australasian Journal of Animal Sciences. 30. 10.5713/ajas.16.0587.
8. Provide right nests for sows and gilts
9. Provide right feeding and stimulation by the boar
10. Provide adequate shelters against cold and hot
11. https://www.ciwf.org.uk/media/5492194/gap_pig_book_full.pdf
12. Prepare adequate food plans and appropriate weaning periods
13. Pigs must be provided with dry and draught-free but adequately ventilated shelters. Pigs must be provided with the means to minimise the effects of adverse weather, including the effects of heat and

cold stress source: https://www.nzpork.co.nz/assets/pdfs/best_practice_free_range_pork_production.pdf

Caring for the environment

15 experts indicated: 19 practices (including one practice indicated by three experts)

1. Pasture management that includes paddock rotations and spreading of manure are vital. Manure built up and run off must be prevented. A carefully planned system can actually be of benefit to the land enabling you to grow crops and grasses fertilized by your pigs. Set stocking of pigs will cause problems not only to the land, but to the health of the herd. cited from: https://www.proof.net.au/starting_a_free_range_pig_farm
2. It is necessary to manage the number of units per hectare, providing for alternate occupation of spaces, and respect for distances from waterways
3. Control of the number of pigs/hectare
4. https://www.3tres3.com.pt/
5. Right manure management
6. Apply emissions control
7. One of the key concerns from the public for free-range pig production system is their impact on the environment. In the past, the pigs were held in the same paddock at a high stocking rate, which resulted in damage to the vegetation, nutrient loading in the soil, nitrate leaching and gas emission. To avoid this, outdoor pigs should be integrated in the cropping pasture system, the stock should be mobile and stocking rate related to the amount of feed given to the animals. from Miao, Z.H. & Glatz, P. & Ru, Yingjun. (2004). Review of Production, Husbandry and Sustainability of Free-range Pig Production Systems. Asian-Australasian Journal of Animal Sciences. 17. 10.5713/ajas.2004.1615.
8. It is possible to have growing-finishing pigs on free-range without increasing N leaching compared to the current practice. The alternative system of direct feeding with lucerne, grass-clover and Jerusalem artichokes showed the lowest carbon footprint with 3.12 CO_2 eq kg−1 live weight pig compared to the current Danish pasture based system with 3.69 kg CO_2 eq kg−1 live weight pig. Due to positive impact on soil carbon sequestration, the second alternative system based on grass-clover showed a similar carbon foot print compared to current practice with 3.68 kg CO_2 eq kg−1 live weight pig. It is concluded that in practice there is room for development of organic pig production systems where direct foraging plays a central role. from; https://www.mdpi.com/2304-8158/4/4/622
9. Apply rotation program
10. Periodically land restoration
11. Periodically rotate sectors (also for vermin control) - Good water availability in summer to guarantee mud wallows)
12. https://www.3tres3.com.pt/
13. Adequate stocking density on the land
14. Rotation of the land intended for breeding
15. It is important to avoid polluting the groundwater or changing the environment
16. Rotation of fences and feeding areas and watering
17. Agronomic practice for the cultivation of turf
18. Appropriate rotation by fences
19. https://www.ciwf.org.uk/media/5492194/gap_pig_book_full.pdf

Biosecurity

15 experts indicated: 23 practices (including one practice indicated by three experts)

1. Wild animal control
2. https://www.3tres3.com.pt/
3. Food quality and safety control
4. Avoid contact with other species
5. Management of diseases and control of endemic diseases

6. Keeping potentially infected animals and materials away
7. Strict rules of cleanliness, disinfection
8. Wildlife control
9. Use of the guidelines of Emilia-Romagna
10. Follow specific courses
11. Outdoor pigs have a higher parasite burden. Parasite infections in free-range pigs put at risk the image of free-range pork meat as a clean and safe product. Diseases can be controlled to a certain degree by grazing management. Frequent rotation is required although most farmers are keeping their pigs for a longer period before rotating. The concept of using pasture species to minimize nematode infections in grazing pigs looks promising. Plants that can be grown locally and used as part of the normal feeding regime are most likely to be acceptable to farmers, particularly organic farmers. from Miao, Z.H. & Glatz, P. & Ru, Yingjun. (2004). Review of Production, Husbandry and Sustainability of Free-range Pig Production Systems. Asian-Australasian Journal of Animal Sciences. 17. 10.5713/ajas.2004.1615.
12. Land and paddocks decontamination
13. There is a great alert for the presence of PSA in eastern Europe and Belgium - Avoid contact with wild boars (very difficult) and never give food leftovers
14. Farm protection with anti-wild boar fences
15. It is important to avoid contact with wildlife
16. Use of fences in electro-welded mesh, internal and external, double mesh for containing wild boars
17. Provide double perimeter fence (fixed and electrified
18. Provide filter areas for means of transport and personnel
19. Land rotation. Protection against wild animals.
20. Breeding on slopes and drainage to prevent build-up of deletion
21. https://www.ciwf.org.uk/media/5492194/gap_pig_book_full.pdf
22. Staff will ensure that dead pigs are removed daily and disposed through industry
23. Composting or in offal pits. source: https://www.nzpork.co.nz/assets/pdfs/best_practice_free_range_pork_production.p

Data collection and support decision making

12 experts indicated: 8 practices (including one practice indicated by three experts)
1. Monitoring zootechnical parameters
2. https://www.3tres3.com.pt/
3. Monitoring of feed consumption and animal weight
4. Detectors which find some issues
5. Recording dates of births, the age of the sows and bred pigs (expensive software)
6. Apply the same practices as intensive breeding
7. Standardization of data collection and half-year analysis
8. Develop and use specific management software

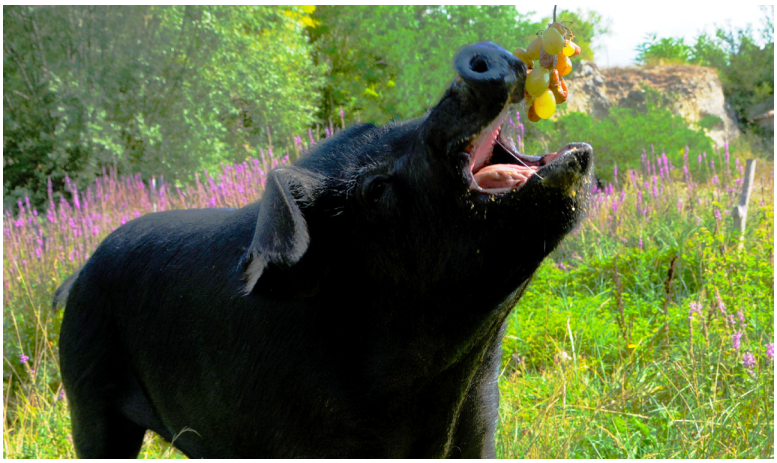
Other

4 experts indicated: 4 practices
1. Use of the right breeds: It may be more appropriate to use traditional and more local breeds that are better adapted. In the UK for example, traditional breeds such as Gloucester Old Spot, Berkshire, Saddleback and Tamworth are tougher/stronger pigs, more suited to outdoor conditions and more resistant to disease. They have smaller litters and generally make better mothers. The Duroc breed also has some of these qualities and is widely used in crosses for extensive systems. Local breeds may be more adapted to the prevailing climatic conditions. In cold climates, the Mangalica pigs from Hungary have thick fur coats making them more suited to the outdoor winter conditions. Many traditional breeds retain the darker pigmentation of their ancestors, helping to protect against sunburn in hotter climates. This includes the Spanish Iberian pig, the Sicilian Black and a range of traditional

African breeds. These breeds are also suited to a semi-feral existence, foraging for food in pasture and woodland. The meat of slow-growing traditional breeds can also often be sold at a premium price based on its flavour, quality and fatty-acid composition (see Pig Case Studies from Hungary, Spain & Ivory Coast). Publication available at https://www.ciwf.org.uk/media/5492194/gap_pig_book_full.pdf
Outdoor sows require their toe nails trimmed when outdoors to prevent them from having long toe nails that cause lameness (trimming sow toe nails is nearly a lost art). Outdoor sows may consume poisonous plants or sharp object: in the publication of McGlone, John. (2013). The Future of Pork Production in the World: Towards Sustainable, Welfare-Positive Systems. Animals. 3. 401-415. 10.3390/ani3020401.
2. Good practices are described at: https://www.friland.com/media/2154/friland-free-range-code-of-practice-december-2019-final.pdf
3. Adequately insulated structures for weaning and adequate for the birth
4. Good practices from: https://www.nzpork.co.nz/assets/pdfs/best_practice_free_range_pork_production.pdf

Breed

Empowerment of VET system through sustainable entrepreneurial initiatives in quality pig breeding



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