

Future of pig production in Romania

Options for governmental policy

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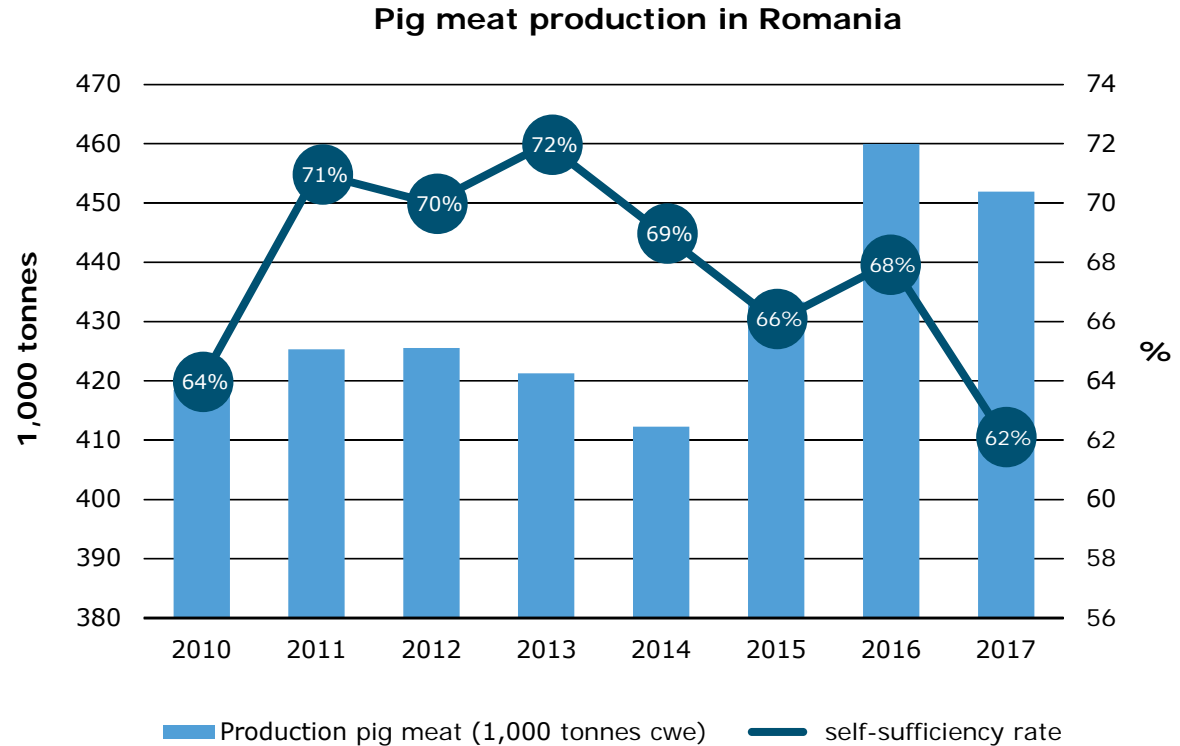
Chapter 1. Pig meat production in Romania

The objective of this chapter is to give a general overview of:

- the pig sector in Romania
- trade of pig meat and live pigs
- the regional distribution of both commercial and backyard pigs
- the most common pig farm types in Romania
- the competitive advantage and cost of production of commercial farms in relation to NW-EU competitors
- **Please note** the information in this chapter reflects the structural situation and potential until 2017 (due to limited statistics), so before the outbreak of African Swine Fever.

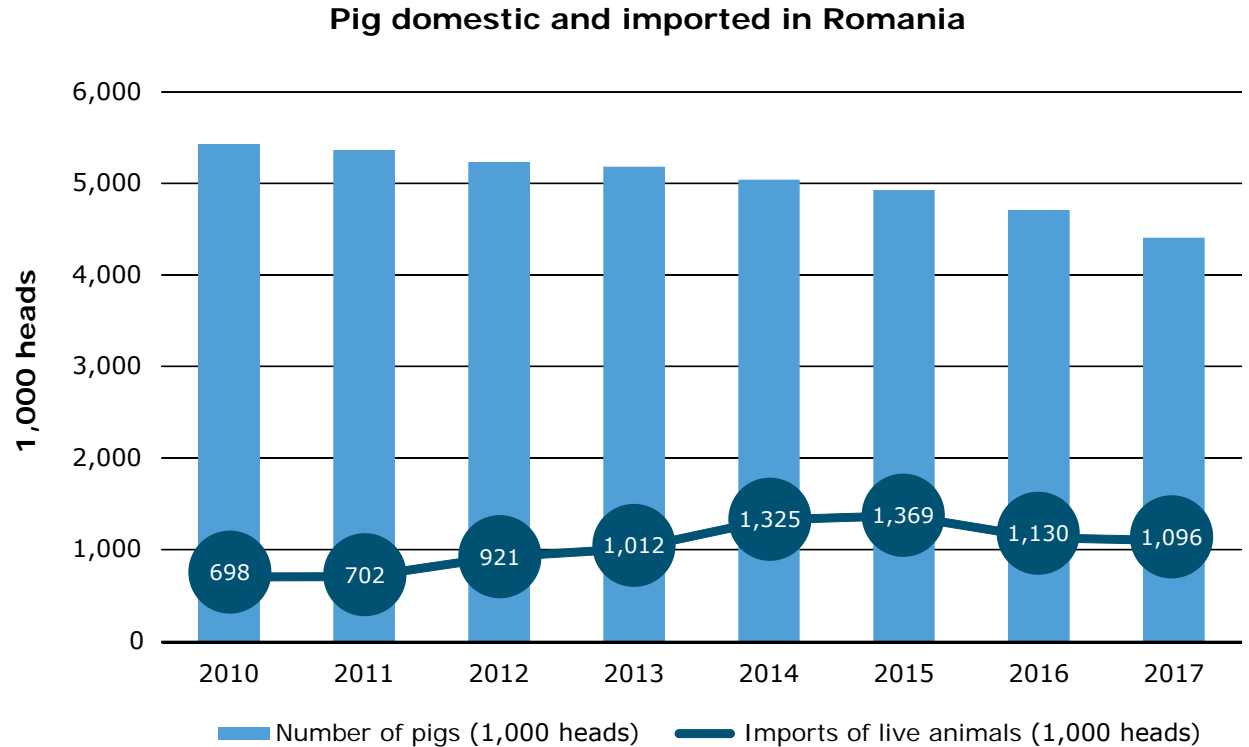
Pig meat production in Romania

- Pig meat production decreased in 2017, to a level of about 450 thousand tonnes
- The self-sufficiency degree of pig meat in Romania dropped to 62% in 2017 due to higher consumption per capita
- Due to ASF, production dropped with 20% in the period 2017-2019



Pigs domestic and imported

- Population of pigs decreased in the past 10 years
- Romania increased its live pig imports (mainly piglets) until 2015, due to a decreasing domestic production.



Commercial farms and backyard holdings* (2016)

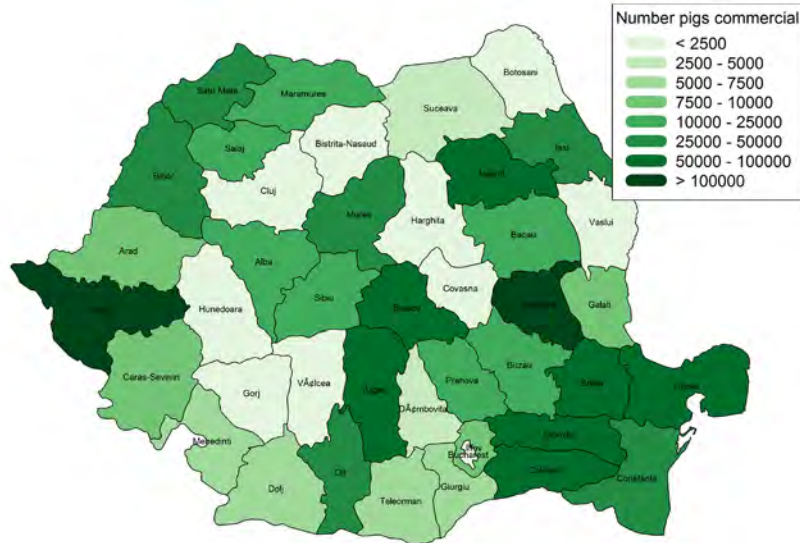
	Total registered holdings	of which holdings with private capital (commercial)	Total holdings without legal status	of which individual holdings (backyards)
number of holdings with pigs	501	229	1,283,083	1,274,734
number of pigs (* 1,000)	1,865	1,804	2,278	2,235
average number of pigs per holding	3,723	7,878	2	2
% of total pigs		44%	56%	55%

Source: Own calculation based on NIS (2017) Farm survey 2016

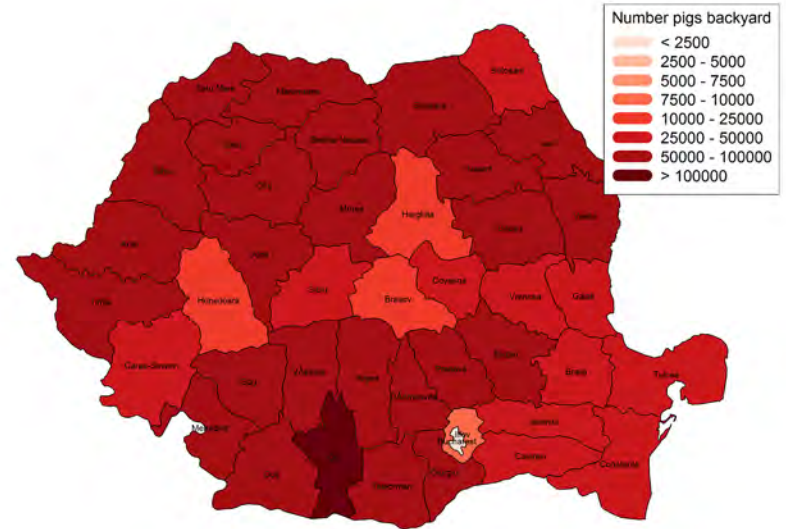
* Registered holding

Regional distribution of pigs in Romania

Number of pigs on commercial farms



Number of pigs in backyards (holdings no status with pigs)



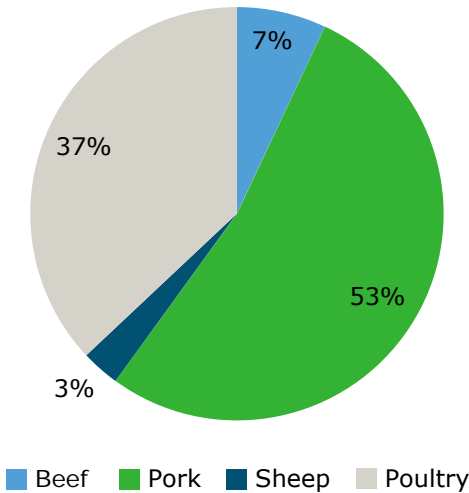
Commercial farms are in areas with also a large number of backyard pigs.

Source: Own illustration based on NIS (2017). Farm survey 2016.

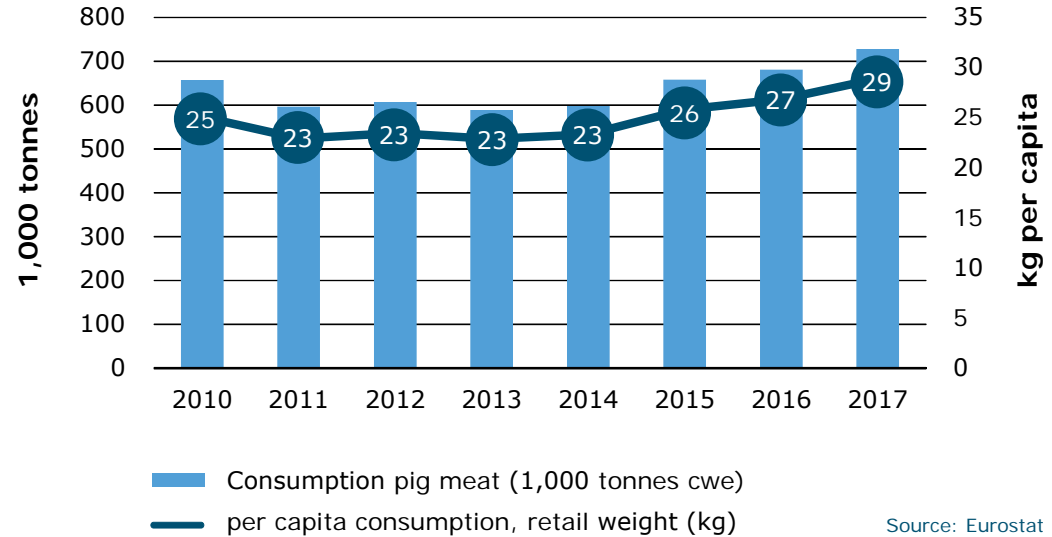
Pig meat consumption in Romania

- In Romania, pig meat comprises 53% of the total meat consumption per person (Source: NIS, 2017)
- According to IAR (2019), in rural areas, around 30% of pig meat consumption originates from backyard holdings

Shares of meat consumed
per person in 2017



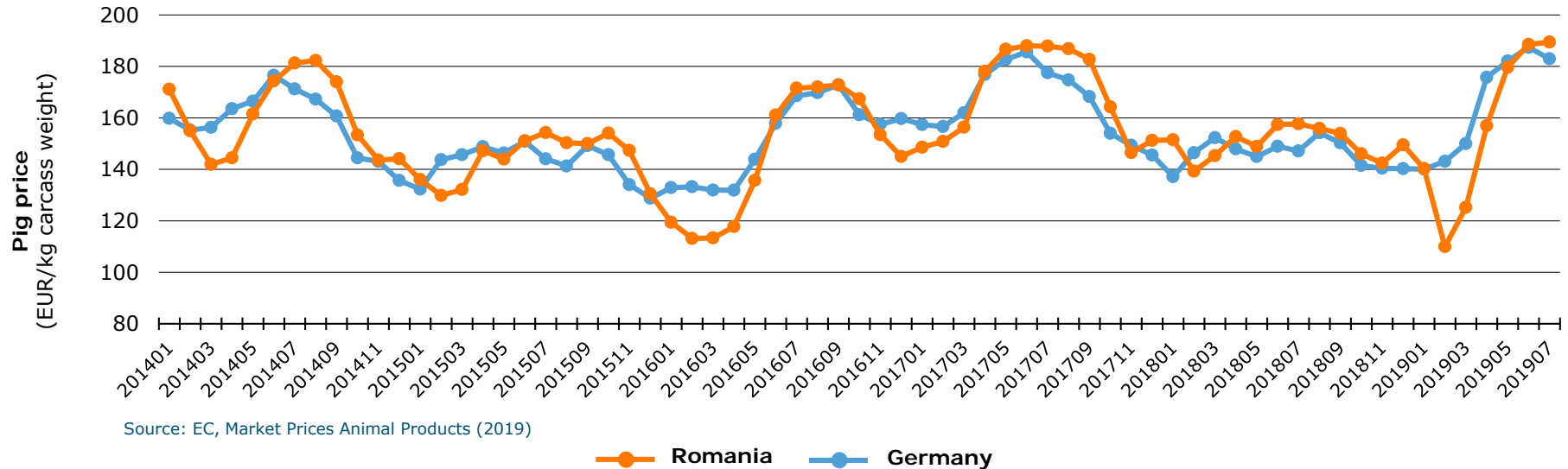
Pig meat consumption in Romania



Source: Eurostat

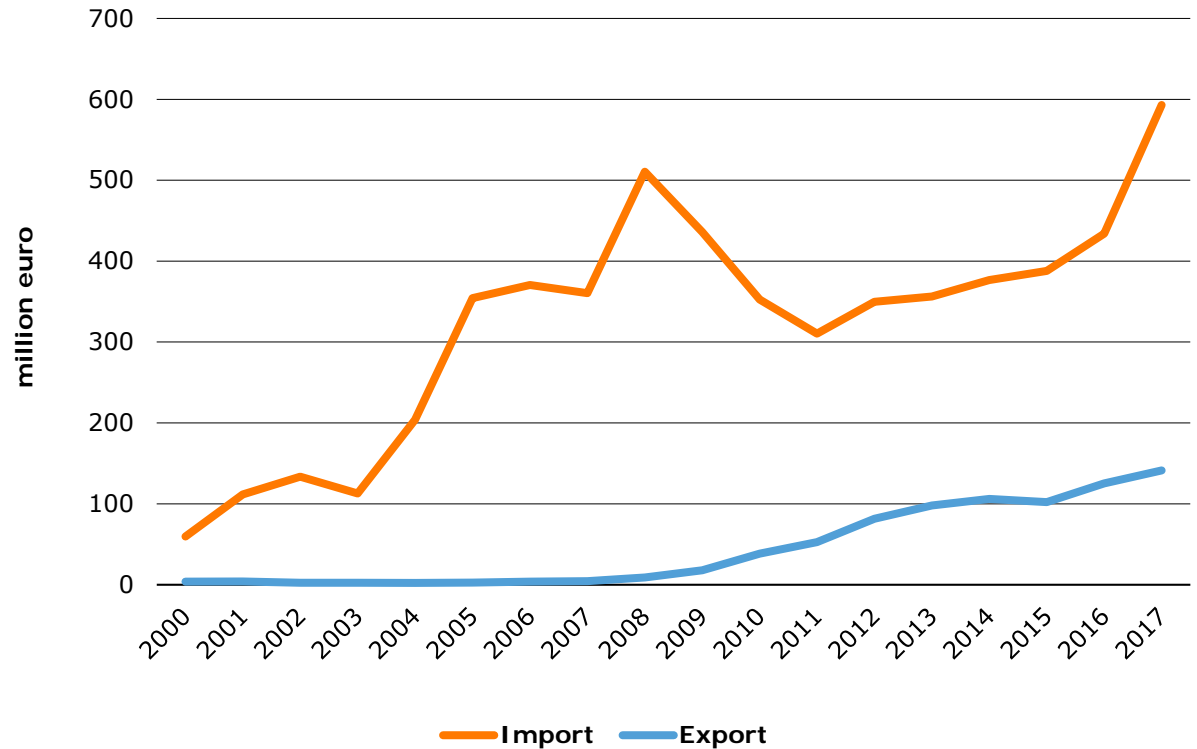
Monthly pig meat price in Romania and Germany

- Market prices for slaughter pigs shows the same pattern in Romania and Germany to a large extent. Prices are also on a comparable level
- The German market is a reference for price setting
- The meat industry typically makes no differentiation in the payment for carcass quality
- No quality assurance systems are in place (like the Dutch IKB system or the German QS system)



Imports and exports of pig meat products

- Import is strongly increasing; in 2017 the total import amounted to 600 thousand tonnes
- Export slightly increased due to:
 - export of by-products to China
 - meat products to Romanians living abroad (source Romanian Meat Association (pers. com.))

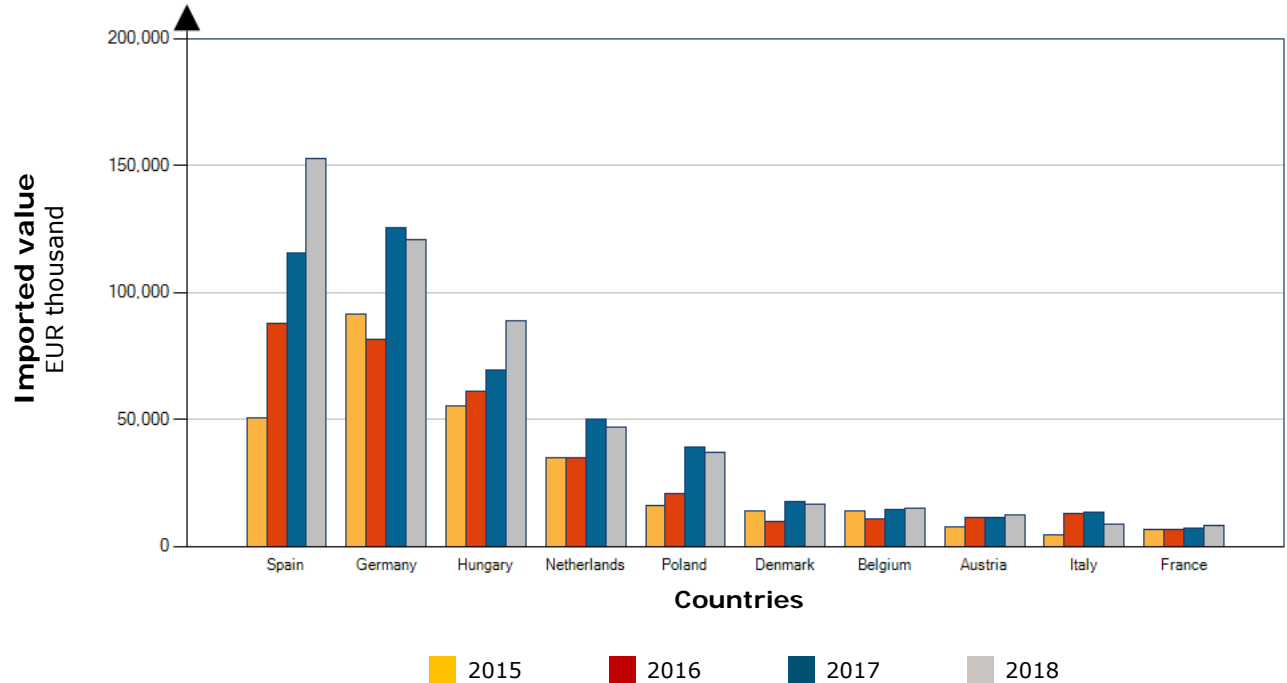


Source: Eurostat

Import of pig meat products

- Over 50% of imported pig meat originates from Germany and Spain
- Imports from Spain, Hungary and Poland are growing

List of supplying markets for a product imported by Romania
Product: 0203 Meat of swine, fresh, chilled or frozen



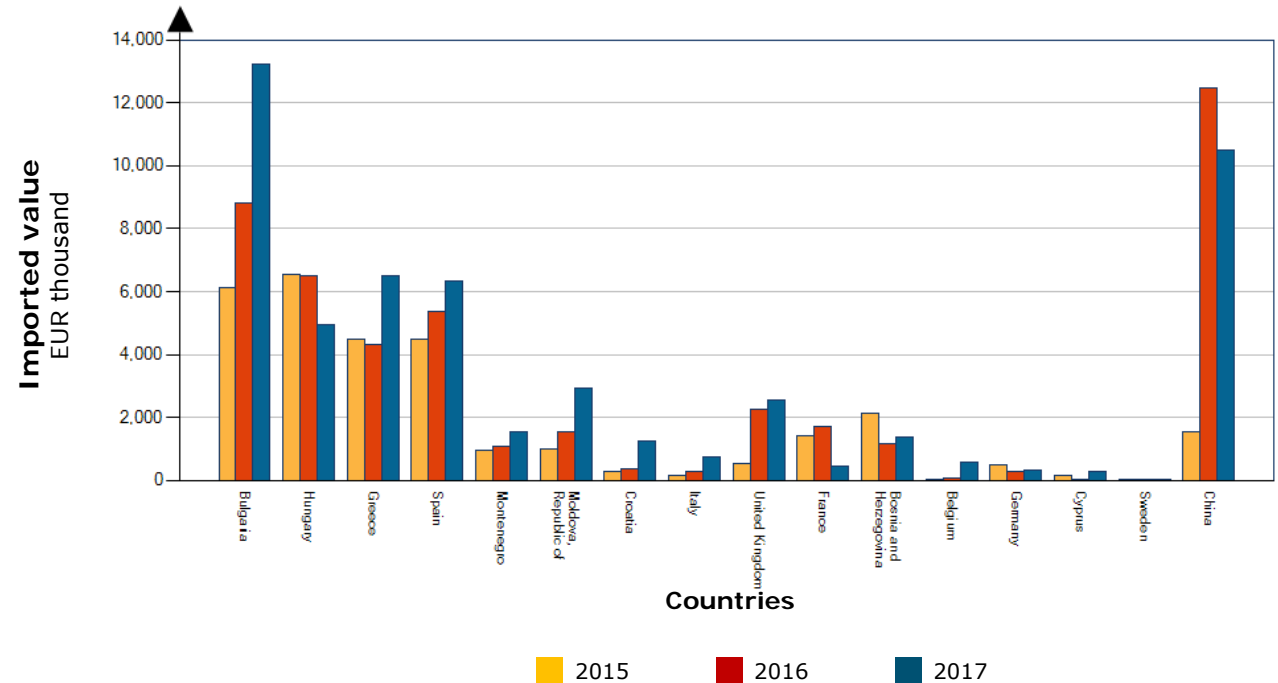
Source: Trademap.org, based on Eurostat

Export of pig meat products

- Initiatives to open Asian market
- Exports to European destinations are mainly to Romanian expats
- Export volumes are very limited, compared to imports
- Since 2017 export seriously hampered due to outbreaks of ASF

List of importing markets for a product exported by Romania

Product: 0203 Meat of swine, fresh, chilled or frozen



Source: Trademap.org, based on Eurostat
Romanian Meat Association (pers.com.)

Key points on production, import and export

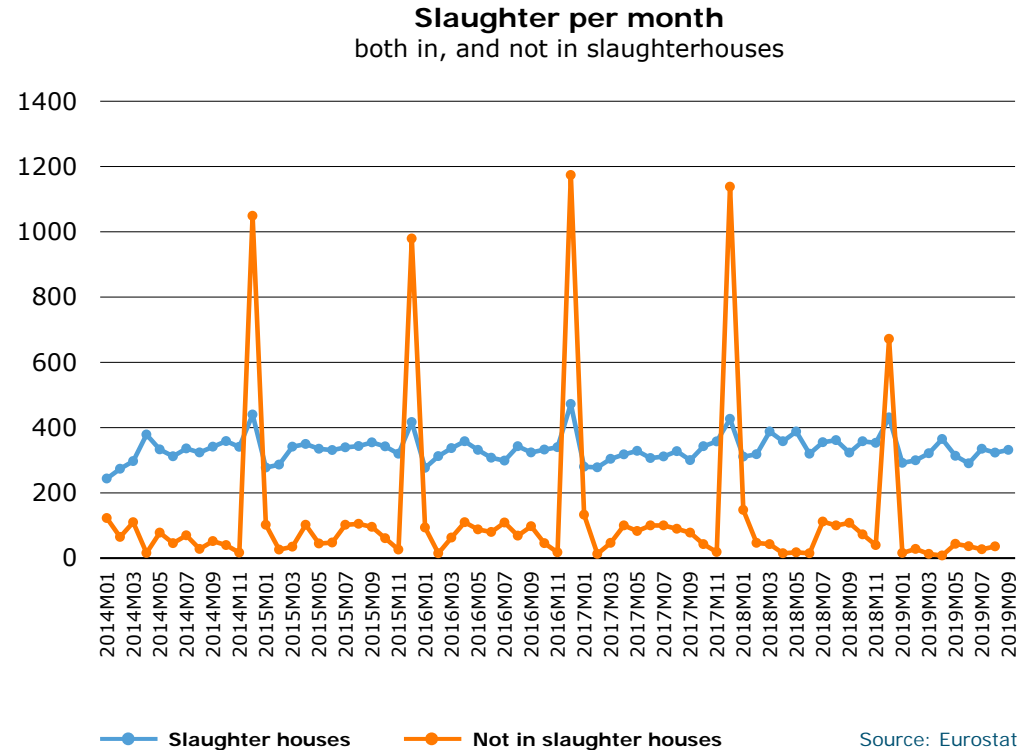
- 229 commercial farms that keep 45% of total pigs
- 2.23 million backyard holdings, keeping 55% of total pigs
- Importance of backyard as source of production, socio-economic benefits and traditional heritage. Likely to stay in the medium term.
- Dependency on import of piglets
- Financial incentives to increase piglet production, mainly on large farms (>2,000 sows)
- Substantial deficit of Romanian produced pork in Romanian market (+/- 60% self-sufficiency rate) (2017), due to the ongoing outbreaks of ASF the self-sufficiency rate in 2019-2020 is likely to be even larger

Characteristics of commercial farms

- Large farms on multiple locations
 - Farrowing and finishing is found both on a single location, and on separate locations
- Besides farrow-to-finish farms also specialised finishing farms depending on imported piglets
- Full or partly vertically integrated (own feed processing and some also slaughtering and sales)
- Large part of feed ingredients home-grown
- Governmental support for farm development, especially for piglet production and for animal welfare and environmental measures.
- Both Romanian and foreign investors and expertise
- Since ASF threat in Romania: high level of biosecurity
- Substantial amount of regulation on e.g. environment, animal health, hygiene implemented and enforced

Characteristics of backyard holdings

- Farm size varies (up to 150 pigs, typically 1-5 animals)
- Large number of farms (in 2012 approx. 1.3 million registered holdings)
 - Officially registered and non-registered
 - Roughly 55% of total number of pigs in Romania
- Tradition (Christmas pig) (about half of the total slaughterings in the month of December, see graph)
- Additional source of income
- Valorisation of household left-overs and corn received as rent for land
- Inconclusive and not well monitored regulation
- Poor biosecurity
- Source of piglets varies (both domestic and import)
- Substantial political relevance due to large numbers of holdings



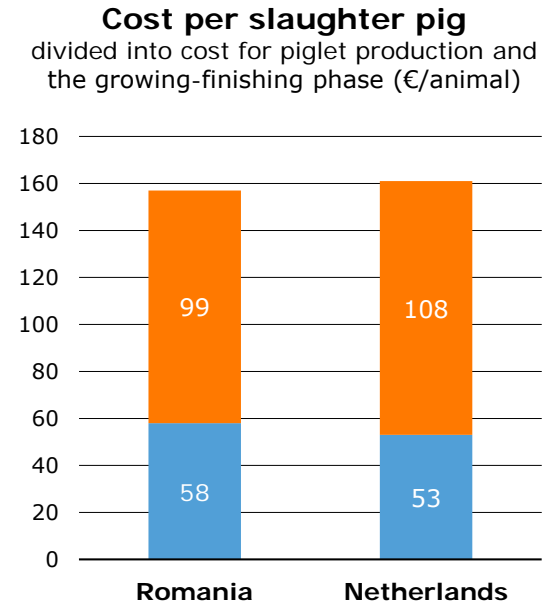
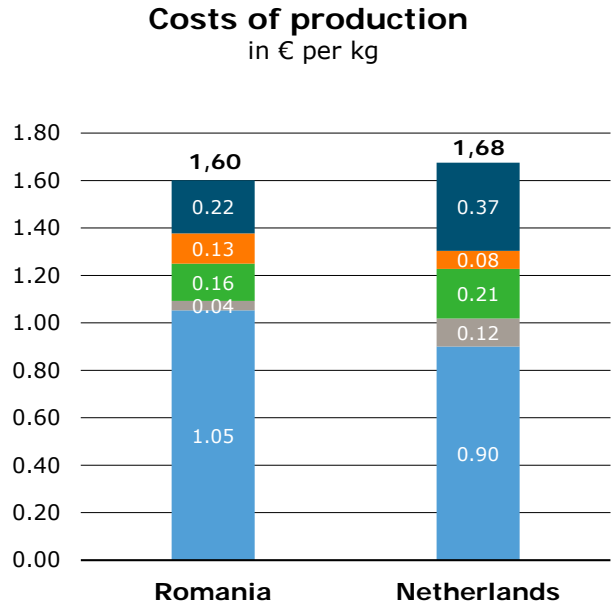
Competitive performance pig sector: Romania ↔ NW-EU

Characteristic	NW-EU		Romania			
			Commercial	Backyard		
1. Human factor	0/+	Family farm, craftsmanship	0	Limited availability of qualified labour	--	No labour costs
2. Farm hardware	+	Variable	++	Optimal farm design and scale of production	--	Rudimentary
3. Cooperation among farmers	+	Cooperative activities and information exchange among entrepreneurs.	--	Limited	--	Not applicable
4. External inputs and influences	+	Higher availability and quality of veterinarians, breeding and AI, advisors and knowledge institutes. Cheaper and easy access to capital	0	Vertical integration related to inputs and production	-	Low level of inputs
5. Supply chain	+	Added value market concepts and willingness to cooperate Product valorisation related to export orientation	-	No quality differentiation Integration between production and slaughtering and processing is limited	-	Special product Direct sales
6. Society and government	-	Due to environmental and animal welfare issues society less favourable	0	Support by the society and the government.	0	Substantial political relevance due to large number of voters

Based on: Hoste, 2017

Cost of pig production in Romania and the Netherlands

- The cost of professional pig production in Romania (€1.60 per kg of hot carcass weight) is slightly lower than in the Netherlands (€1.68/kg), due to lower labour and housing costs, and lower miscellaneous costs such as manure.
- Piglet production is more expensive in Romania than in the Netherlands, which however is more than compensated by lower costs in the growing-finishing phase.
- Costs are assessed according to the InterPIG approach (see Hoste, in press), based on year 2018



- Feed costs
- Housing costs
- Miscellaneous costs
- Labour costs
- Capital costs
- piglet
- grow-finish

Source: Own analysis

Key points on pig production

- A clear distinction between professional, commercial pig production, and backyard farming, in numbers, scale of production, biosecurity approach, feed basis and competitive performance
- The competitive performance differs strongly between Northwest European and Romanian commercial farms, among others by the scale of production and degree of industrialisation
- Piglet production is more expensive in Romania than in the Netherlands, which however is more than compensated by lower costs in the growing-finishing phase

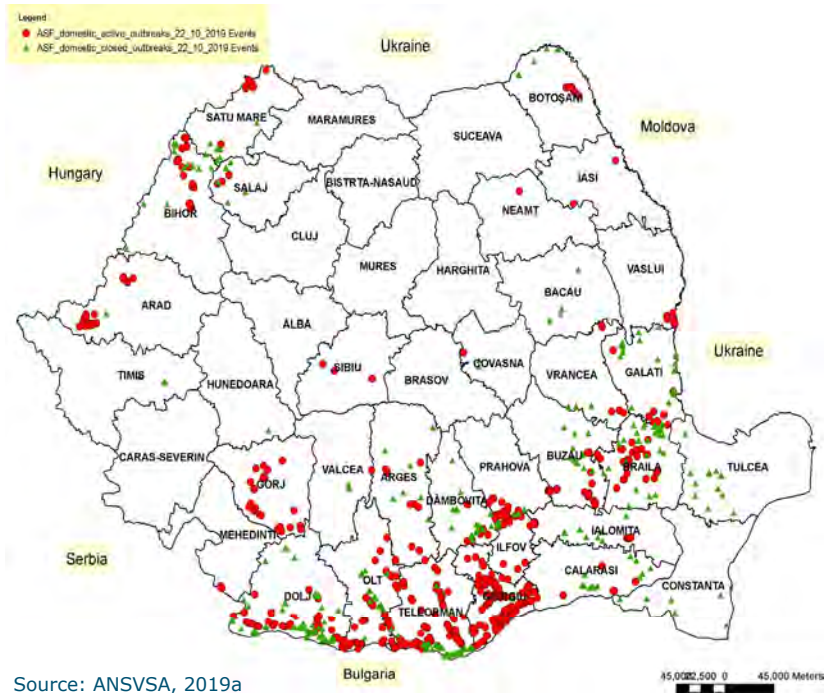
Chapter 2. African Swine Fever in Romania

The objective of this chapter is to give:

- A general overview of the African Swine Fever situation in Romania
- An overview of measures applied to control the outbreak
- An estimation of economic consequences of movement bans
- An evaluation of options to limit the risk of outbreaks

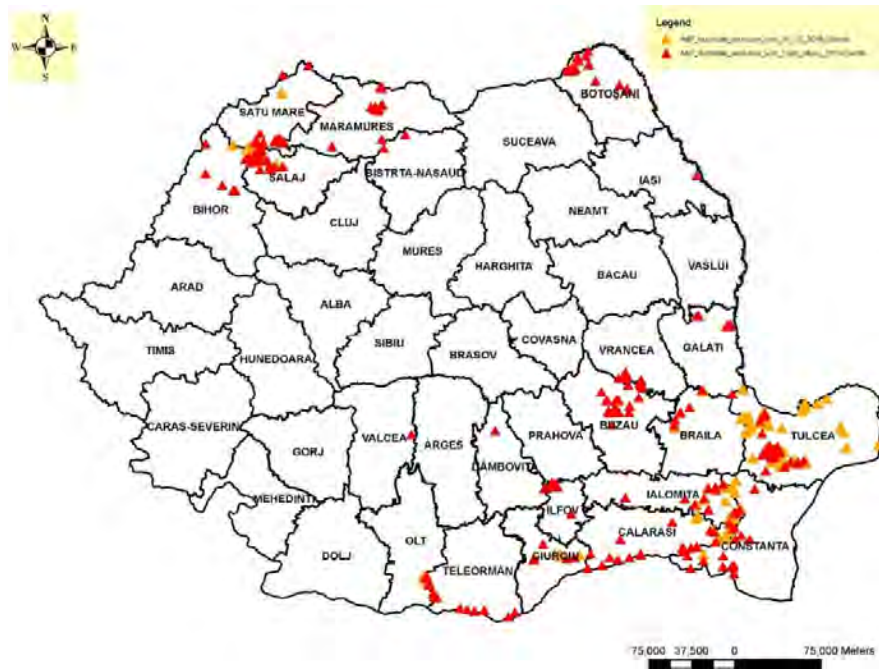
African swine fever (ASF) situation 2019 (as per 22.10.2019)

Outbreaks among domestic pigs, 2017-2019



Source: ANSVSA, 2019a

Outbreaks among wild boars, 2017-2019



ASF situation (as per 3 December 2019)

- Widespread occurrence in eastern Europe (and Asia)
- Continuing outbreaks. Situation as per 3 December 2019:
 - 762 outbreaks in 264 places in 28 counties (of which 12 foci, 4 foci commercial farms and the holding type A).
 - The first recorded presence of the ASF virus in Romania was on 31 July 2017
 - 540,216 pigs were killed since they were affected by ASF and
 - there are 2,357 cases (infected premises) among pigs and 2,126 cases among wild boars.
 - 13,684 owners have been compensated, the total payment being 330 M RON.

Source: ANSVSA press release, 3 December 2019)

of outbreaks of ASF in Europe in 2019 (until 1-12-2019)

	Date of last outbreak	No of outbreaks
A.S.F.		
BULGARIA	23/10/2019	41
ITALY	25/01/2019	1
LATVIA	05/07/2019	1
LITHUANIA	11/10/2019	19
POLAND	11/10/2019	48
REPUBLIC OF SERB	11/09/2019	18
ROMANIA	30/11/2019	1662
SLOVAKIA	19/08/2019	11
UKRAINE	18/11/2019	41
Total :		1842
A.S.F. in wild boar		
BELGIUM	13/11/2019	481
BULGARIA	25/11/2019	116
ESTONIA	27/11/2019	77
HUNGARY	25/11/2019	1384
ITALY	26/11/2019	41
LATVIA	29/11/2019	342
LITHUANIA	29/11/2019	435
POLAND	29/11/2019	2091
ROMANIA	29/11/2019	609
SLOVAKIA	21/11/2019	18
UKRAINE	04/11/2019	11
Total :		5605

Source: ADNS 06-12-2019

EU measures applied to control ASF

- The overarching piece of legislation providing the tool for the control of African swine fever in the EU is Council Directive 2002/60/EC of 27 June 2002.
- Main elements are:
 - On infected holdings all pigs are killed and potentially infected materials destroyed
 - Establishment of protection (3 km) and surveillance zones (10 km) around infected farms with a movement ban and inspection of farms for 40 days after last infected holding is cleaned and disinfected.
 - In case animals from the farms in the surveillance zone are moved to the slaughterhouse, animals should be kept separate and meat should be heat treated and canned.

Additional measures applied by the Romanian authorities to control ASF in Romania

- Destroyed animals are compensated above market value (+ 1 to 2 RON/kg)
 - In case non-registered pigs are found during culling activities these are also culled and compensated (to avoid illegal movement).
- Based upon the local situation it can be decided that in infected villages all or part of the present pigs should be destroyed. Decision is taken by local decision makers (limited influence from central government).
- Regulation for additional hygienic measures for commercial farms and backyard holdings implemented (NSVFSA order 20/195/2018).

ASF in Romania: findings of the European Commission

- The vast majority of the outbreaks of ASF occurred in holdings keeping one or two pigs. 136 outbreaks occurred on non-commercial holdings keeping between 21 and 100 pigs and 15 outbreaks occurred on non-commercial holdings keeping more than 100 pigs

Source: DG Sante 2018-6700; Presentation National Sanitary Veterinary and Food Safety Authority Romania, June 2019

- High levels of non-compliance with Union pig identification, registration and movement notification requirements and hygiene on **non-commercial holdings** have been reported in several audit reports.

Source: DG Sante 2018-6700

Measures applied to control ASF

- During outbreak of end of 2018 substantial number of animals were illegally moved or slaughtered
- Commercial farms implemented very strict biosecurity measures to avoid introduction of the infection on their establishments
- The movement bans due to the establishment of protection (3 km) and surveillance zones (10 km) around infected premises has substantial impact on commercial farms (especially animal welfare problems on sow farms)
- Slaughtering of pigs originating from surveillance zones has been applied once. However, the inability to find customers for the canned food impacted the feasibility of this option
- Requests for derogation by means of compartmentalisation of commercial farms was not approved by EU

Economic consequences of movement ban

Additional measures taken by the farms with:

Direct impact on production:

- To reduce number of sows with 30% and the number of inseminated sows
- Due to increased infectious pressure and increased drug use and mortality, increased feed conversion ratio and reduced average daily gain

Effect on management of the farm

- Modified pens for raising piglets, raising piglets in maternity pens,
- Raising biosecurity measures, additional costs with protective equipment, increased biological sampling and laboratory analysis

Other effects

- Inability to comply with contracts
- The inability to comply with the commitment under Measure 14 -Animal Welfare from NRDP 2014-2020 by overpopulation in case of restrictions imposed by ASF evolution
- Loss of employees, high labour force fluctuation, supplementing the farm staff
- Loss of supplier confidence due to late or delayed payments, the negative influence on the cash flow, delays in bank rates, payments to the state budget and other payments

Analysis: Short survey among commercial farms on economic effects of movement bans. Outcomes are based on 7 respondents and therefore only indicative.

	# farms	Average	Min	Max
number of movement bans since 2017	7	2.29	1	4
duration of the movement ban (days)	7	65	15	166
number of animals killed due to overpopulation	2	3,300	2,500	4,100
piglets killed	3	700	300	1,100
sows aborted	3	86	48	150
number of pigs sold at lower value due to overweight	4	7,594	1,200	21,000

Economic losses due to movement bans for ASF

- Given the ongoing outbreaks of ASF in Romania commercial farms are affected by movement bans. Both continuing outbreaks and resulting movement bans have a strong negative economic impact on the continuity of these farms.
- Multiple farmers reported that since 2017 they were affected multiple times by movement bans, some of which lasted almost half a year.
 - Total losses were on average about €250 per sow per affected farm:
 - Due to production losses: Per average sow the average losses were €63 but varied between €12 and €156 per sow (average RON 299; minimum 56, maximum 747).
 - Farmers also reported substantial additional costs and losses that were estimated at €190 on average, but varied among farms from €60 and €440 (average RON 920, minimum 285 and maximum 2,100) per sow.
 - Besides direct economic effects also other effects were reported that have a direct impact on the livelihood of the farm (e.g. loss of employees, loss of supplier confidence).

Options to limit the effect of ASF on Romanian commercial pig production

- The high number of outbreaks of ASF in backyard pig production seriously hampers the commercial pig production in Romania. Farms need to take extra hygienic measures to limit the risk of introduction of ASF on their farms and commercial farms are regularly confronted with movement bans in case of the detection of ASF on backyard establishments within the vicinity of their production location. Also, possibilities to export pork products are severely affected.
- Eliminating ASF infection and avoiding the spread of the disease is and should be the core of the strategy both of Romanian Competent Authorities as well as the Romanian pig sector. OIE and EU regulation are very explicit with respect to the minimum set of measures to be taken by national authorities to eradicate the disease. In Romania, given the large number of outbreaks additional measures need to be considered both to prevent the introduction of ASF into farms as well as to allow an effective eradication in case of introduction into an area.
- In the following section several of these options are described and qualitatively assessed.
- Producing of backyard pigs in small amounts (< 5 animals per year) is part of Romanian tradition (X-mas pig). Most likely in due time this production will decrease. However, eliminating backyard production in all of Romania in the short run is not seen as a feasible option by most of the consulted stakeholders.

Options to limit the effect of ASF on Romanian commercial pig production

- Compliance with current regulation by both commercial and backyard holdings is key to successful prevention and eradication of ASF. Currently Competent authorities have due to various reasons difficulties to enforce regulations. Identification and regulation, basic hygienic measures are vital parts of strategies for successful eradication. As indicated by the Romanian Veterinary Authorities substantial number of deficiencies when inspecting non-professional holdings are observed (about 20% of the inspected holdings do not comply)
- Among found deficiencies
 - Non-compliance with identification and registration rules (unidentified pigs over 60 days, National Data Base not updated, undeclared home slaughter, keeping ear tags after home slaughter, etc.)
 - Commercial activities without documents
 - Non-compliance with national biosecurity requirements (feeding with household waste, lack of disinfecting footwear, lack of work equipment, etc.) (source https://ec.europa.eu/food/sites/food/files/animals/docs/reg-com_ahw_20190708_asf_rou.pdf)

Options to reduce the risk of introduction into a commercial farm or region

During our fact-finding mission to Romania several options were mentioned to reduce the risk of commercial farms to become infected or minimise the impact in case commercial farms are confronted with movement bans. These options will be briefly discussed. The following aspects will be used to describe these options:

- Impact on the risk of introduction of ASF on commercial farms
- Feasibility to implement
- Economic impact
- Additional regulation needed
- Impact on future option for the development of the pig sector

The following options are being assessed:

1. Improved biosecurity at farm level
2. Removal of all backyard production around commercial farms
3. Collaboration between commercial farms and backyard holdings
4. Zoning and compartmentalisation
5. Establishing farrow-to-finish farms on one location
6. Implementing hygienic measures for hunters

Option 1: Improved biosecurity at farm level

Short description:

Improved biosecurity involves not only the establishment of an enabling infrastructure but particularly maintaining awareness by all involved in pig production.

Aspects which are used for the assessment:

- *Impact on the risk of introduction of ASF on commercial farms*
Given the most of important routes of infection animals and excreta of infected animals, implementing stringent hygienic measures can substantially reduce the risk of introduction on a farm.
- *Feasibility to implement*
Changes in infrastructure to allow an adequate barrier between inside and outside can be costly, however the most important challenge is to maintain awareness amongst everybody involved over a prolonged period.
- *Socio-Economic impact*
Implementing these measures will have a negative effect on the production costs.
- *Additional regulation needed*
Current regulation demands for a basic level of biosecurity, farmers can decide to implement additional measures.
- *Impact on development opportunities for the pig sector*
In the short run, due to the increased cost, improved biosecurity has a negative effect on the margins, however maintaining high levels of biosecurity has a positive effect on animal health resulting in better performance of the animals due to reduced production costs.

Option 2: Removal of all backyard production around commercial farms

Short description

- Removal of all pigs from backyard holdings can occur:
 - in a designated area in non-infected areas
 - around either commercial farms or around ASF infected premises.
- This removal can be permanent or during a limited time e.g. during an outbreak of ASF)
- Currently in case of an ASF outbreak local authorities can decide to remove all pigs from backyard holdings in a designated area. If and how this is to be done is decided by the local authorities.
- Within the ministry of Agriculture plans for a pilot to remove all pigs from backyard holdings in a number of counties is in preparation. Details of the plan were not shared during the meeting. Timeframe for introduction, as well as the choice for a voluntary or compulsory scheme are all aspects that need to be included in the plans.

Aspects which are used for the assessment:

- *Impact on the risk of introduction of ASF on commercial farms*
In case of an outbreak of ASF: removing of all pigs in the area around infected holdings has the advantage that undetected infected animals on these farms are removed and cannot contribute to an ongoing spread of the infection. The duration that the area is confronted with movement bans is limited (since no new cases in domestic pigs can appear). Farmers are allowed to restock after the control measures have been lifted. Preventive removal of pigs from backyard holdings: the risk of introduction and spread of infection is reduced.

Option 2: Removal of all backyard production around commercial farms

Aspects which are used for the assessment:

- *Feasibility to implement*
During an outbreak the preventive cull of pigs on backyard holdings can be part of the implemented control measures. Pigs are compensated at market prices. However, the removal of pigs from backyard holdings in non-infected areas and preventing restocking is challenging.
- *Socio-Economic impact*
Owners of pigs in backyard holdings need to be compensated. When temporal removal is foreseen as in an outbreak of ASF the situation differs from the permanent stopping of production at backyard holdings. Whether this is reflected in compensation paid to the pig owners is unclear.
- *Additional regulation needed*
In case of ASF outbreaks current regulation allows for the preventive culling of pigs. It is unclear whether current legislation allows for the removal of pigs from an area permanently.
- *Impact on development opportunities for the pig sector*
Preventive removal of pigs from backyard holdings as a requirement for the establishment of new commercial farms adds an additional constraint. It will take time and effort to convince owners of backyard holdings to give up pig production and create a pig free area. The amount of opposition against these plans is unclear.

Option 3: Collaboration between commercial farms and backyard

Short description:

Introduction of potentially infected animals into an area is an important risk factor. Owners of backyard holdings regularly buy piglets. Introduction of animals from unknown origin increases the risk of introduction of ASF. Collaboration between commercial farms and owners of backyard holdings can limit the risk of introduction of ASF in an area. In case piglets originate from commercial farms in the area and owners can benefit from feed supply and/or veterinary and extension services, the number of 'dangerous contacts' decreases.

Aspects which are used for the assessment:

- *Impact on the risk of introduction of ASF on commercial farms*
Every dangerous contact avoided reduces the risk of introduction of ASF in an area. Even if not all owners of backyard holdings participate the risk of introduction reduces.
- *Feasibility to implement*
The feasibility of this option is determined to a large extent on the goodwill that owners of commercial farms have amongst the owners of backyard holdings. Another factor is the willingness of these owners to comply with the requirements to successfully participate in these initiatives. Non-compliance and risky behaviour can substantially reduce the impact of these initiatives.
- *Socio-economic impact*
Owners of backyard holdings can benefit for such initiatives due to access to improved technology and healthier piglets.
- *Additional regulation needed*
Since this in principle is a voluntary system no additional regulation is needed.
- *Impact on development opportunities for the pig sector*
A reduced risk of being confronted with movement bans benefits both commercial farms and backyard holdings.

Option 4: Regionalisation and compartmentalisation

Short description

The regionalisation strategy in accordance with EU Regulation 616/2009. consists in creating defining an animal subpopulation defined primarily on a geographical basis (using natural, artificial or legal boundaries). Compartmentalisation consists in defining healthy compartments/value chains under high level of biosecurity monitoring. Export form EU recognised regions or compartments to other EU member states is possible.

Aspects which are used for the assessment:

- *Impact on the risk of introduction of ASF on commercial farms*
In case contacts between infected and free regions and compartments is ensured the risk of introduction is reduced. Illegal movement of domestic pigs and pig products and the possible spread by wild boar are still potential infection routes.
- *Feasibility to implement*
Given the already widespread occurrence of ASF in the major pig producing areas, the benefits of this options are limited.
- *Economic impact*
The ability to export might have economic benefits for those farms that are able to export due to receiving higher prices for their products (meat but also by-products)
- *Additional regulation needed*
Free regions and compartments need to be recognised by the EU. Initial requests the Romanian government were unsuccessful
- *Impact on development opportunities for the pig sector*
- *Impact on future option for the development of the pig sector*
Limited, only beneficiary for those value chains that are able to export to profitable markets.

Option 5: Establishing farrow to finish farms on one location

Short description

A farrow to finish operation on one location enables the farmer to cope with the restrictions in case of a movement ban for a longer time due to outbreaks of ASF than in case of separate locations for farrowing and finishing.

Aspects which are used for the assessment:

- *Impact on the risk of introduction of ASF on commercial farms*
In this case more and different contacts will occur than in separate farrowing and finishing farms. There is less risk of virus transmission through animal transport. The most optimal situation in this perspective is when farms have their own breeding activities and artificial insemination provisions.
- *Feasibility to implement*
Establish new farms: not so much difference compared to separate locations. Converting existing breeding farms: although accompanied by a loss of invested capital changing a farrowing farm into a farrow to finish farm is relatively easy. Changing a finishing farm into a farrow to finish farm involves substantial investments. Another option can be to build additional finishing capacity on breeding farms.
- *Socio-economic impact*
Specialized farrowing farms limit the need for importing piglets. In case of farrow to finish the need to import piglets is not affected.
- *Additional regulation needed*
No
- *Impact on development opportunities for the pig sector*
Closing the gap between domestic production and domestic consumption takes more time in case of converting breeding farms into farrow to finish farms and no additional capacity is created.

Option 6: Implementing hygienic measures for hunters

Short description

Reducing the density of wild boar is an often-applied measure to reduce the risk of transmission of ASF in wild boar. In case potentially infected animals are taken out of the forest the risk of introduction in domestic pigs is evident. Control measures to reduce this risk is testing animals on location and keep them on site until the results of the tests are available. An approach to be found successful in the Baltics is to have slaughter places including cooling facilities in the forest areas which enable hygienic slaughtering, safely process slaughter by-products, taking of samples for testing and cool-store the animals until test results are available.

Aspects which are used for the assessment:

- *Impact on the risk of introduction of ASF on commercial farms.*
Applying these measures reduces the risk of introduction into domestic pigs since only tested wild boar is brought into villages.
- *Feasibility to implement*
Cooperation with hunting organisation is needed, the logistics of samples to be send to competent authorities should be ensured.
- *Socio-economic impact*
Cost for establishing these places should be covered either by government or hunting associations.
- *Additional regulation needed*
Yes, to make the testing and controlled movement obligatory.
- *Impact on development opportunities for the pig sector*
In case less outbreaks of ASF occur the losses for the sector decreases and as such contribute to the competitiveness of the sector.
- More information on African swine fever in wild boar can be found here: <http://www.fao.org/3/ca5987en/CA5987EN.pdf>

Evaluation of options to limit ASF introduction on commercial farms

Options	Risk of introduction of ASF	Feasibility to implement	Socio-economic impact	Additional regulation	Future options
<p>Improved biosecurity at farm level Improved biosecurity involves not only the establishment of an enabling infrastructure but particularly maintaining awareness by all involved in pig production.</p>	Reduced	Possible	Costly	No	Not affected
<p>Removal of all backyard production around commercial farms</p> <ul style="list-style-type: none"> in a designated area in non-infected areas around either commercial farms or around ASF infected premises <p>This removal can be permanent or during a limited time e.g. during an outbreak of ASF</p>	Strongly reduced	Difficult	Costly	Yes	limits
<p>Collaboration between commercial farms and backyard holdings Piglets on backyard farms originate from commercial farms in the area and owners can benefit from feed supply and/or veterinary and extension services → the number of “dangerous contacts” decreases.</p>	Reduced	Easy	Not affected	No	Not affected
<p>Regionalisation and compartmentalisation Regionalisation: Defining an animal subpopulation on a geographical basis (using natural, artificial or legal boundaries). Compartmentalisation: defining healthy compartments/value chains under high level of biosecurity monitoring.</p>	Reduced	Possible	Free regions trade	Yes	Not affected
<p>Establishing farrow to finish farms on one location</p>	Reduced	Possible	Costly	No	Not affected
<p>Implementing hygienic measures for hunters</p>	Reduced	Difficult	Limited	Yes	Not affected

Conclusion on selected options to limit ASF introduction

- The 6 options all have an impact on the risk of introduction of ASF on farms, but to different extents
- All presented options have positive and negative elements. Defining **the right mixture of options** to reduce the frequency of outbreaks and limit the impact of these outbreaks is a challenge.
 - All stakeholders have and should take their own responsibility
 - Easy to implement measures should be implemented and enforced although establishing collaboration with surrounding back yard farms might be challenging
 - To get insight into the most cost-effective mix of options additional (epidemiological and economic) evaluations are needed

Chapter 3. National potential of the pig meat sector

The objective of this chapter is to give:

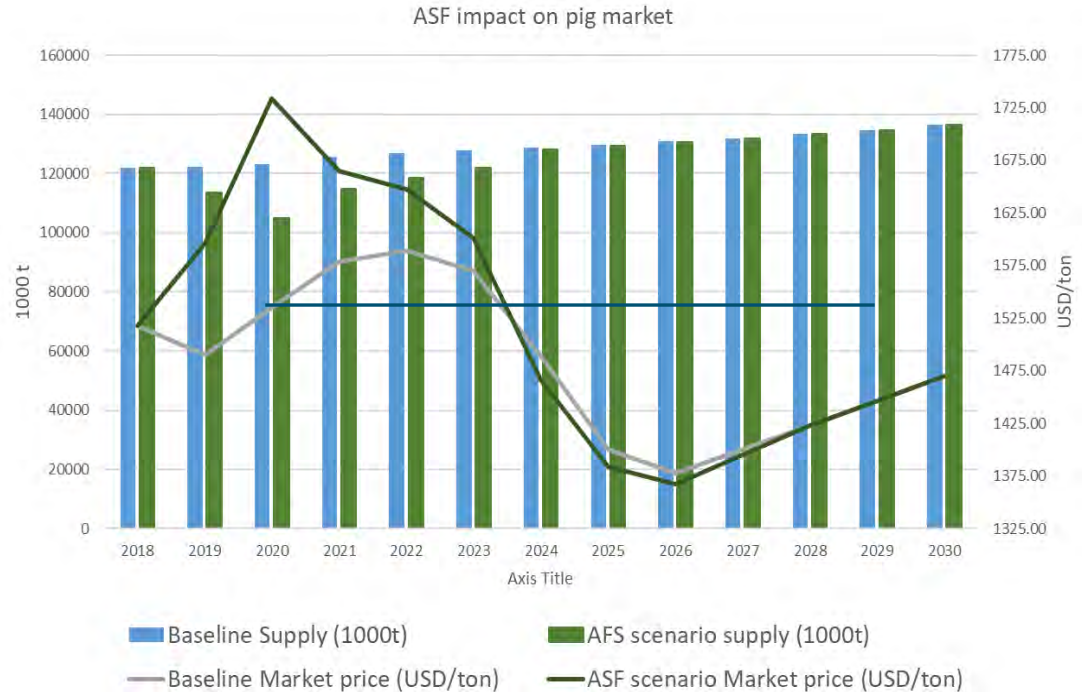
- an assessment of the consequence of the worldwide ASF outbreak on the Romanian market
- **Please note:** the particular effects of ASF in Romania are not captured in this analysis. This would require a separate modelling exercise. Therefore we first quantitatively analysed the effect of ASF on global supply and prices and consequently qualitatively assess consequences for the Romanian pig sector.

Market Outlook 2030 (without and with ASF global impact)

- Simulation model AGMEMOD is used to derive 2030 projections for 2 Scenarios:
 - Baseline (without global impact of ASF)
 - Alternative (with global impact of ASF)
 - More information on AGMEMOD model: <https://agmemod.eu/>
- A Equilibrium Displacement Model is used to derive pig meat price at the EU border as it is changed due ASF outbreaks in mainly Asia (China and other Asian countries)
- Description and Graphs are enclosed in Annex to Chapter 4
- Data source is EUROSTAT which does not include unregistered backyard production

Expected world market price and world supply developments (2018-2030)

- As a consequence of ASF, world market prices are expected to be around 7.1% and 12.9% above the baseline level in 2019 and 2020.
- This price difference will be narrowing over the following years, with prices eventually coming back to baseline levels by 2028.
- With regard to global supply, considerable decreases are expected in 2019 and 2020 (-7.1% and -14.7% respectively). These declines will be followed by some recovery that will bring supply close to baseline levels by 2024.



The impact of global ASF outbreaks on global supply and prices

- Given the extreme drop in supply of pig meat, model calculations are merely estimates, as we still apply common assumptions on e.g. price and demand reactions on supply drop out. Substitution processes and induced preference shifts in the consumer side, as well as new technology pushes at the producer side are not well-captured in the used modelling tools
- China has been severely affected by ASF; ASF has also been detected in other Asian regions and Europe
- The EDM simulation reveals that world market prices are expected to be around 7.1% and 12.9% above the baseline level in 2019 and 2020. This price difference will be narrowing over the coming years, with prices eventually coming back to baseline levels by 2028
- The simulation suggests that considerable decreases in global supply (consumption) are expected in 2019 and 2020 (-10.2% and -20.9% respectively). The subsequent recovery will bring global supply (consumption) close to baseline levels by 2027 (still around -0.3% below the baseline)
- In the EU, as a response to the increase in world pig meat prices, production of pig meat will be positively affected. Consumption will be negatively affected.

Limited effect of global ASF situation on Romanian pig (meat) prices

The expected impact of the increased world market prices for pig meat is rather limited for Romania compared to countries like the Netherlands, due to differences in market integration and associated price transmission:

- Netherlands is highly integrated into the world market; this also holds for other member states such as DK, DE, ES, PL
- Romania is a net importer, and due to ASF situation, not allowed to export to typical world market export destinations (like China), and so poorly integrated into world and EU markets. Additionally, price development is influenced (cushioned) by production and sales of pig meat of non-industrial producers.
- This results in various lags in the price structure, causing a dampening effect of world market price shocks

Given the limited effect of ASF worldwide on Romanian prices, also the effect on domestic production and consumption will be limited

Consequences of ASF specifically for Romania

- Given the fact that ASF is widespread in Romania, the country cannot export to third markets like China, and not benefit from the global price upswing.
- The increased gap in self-sufficiency has to be filled by import. However import is at a high price level, but volumes are limitedly available.
- Because domestic prices are higher too, the economic disadvantage of transport bans and eradications will be higher.

Chapter 4. Regional potential for pig production

The objective of this chapter is to give:

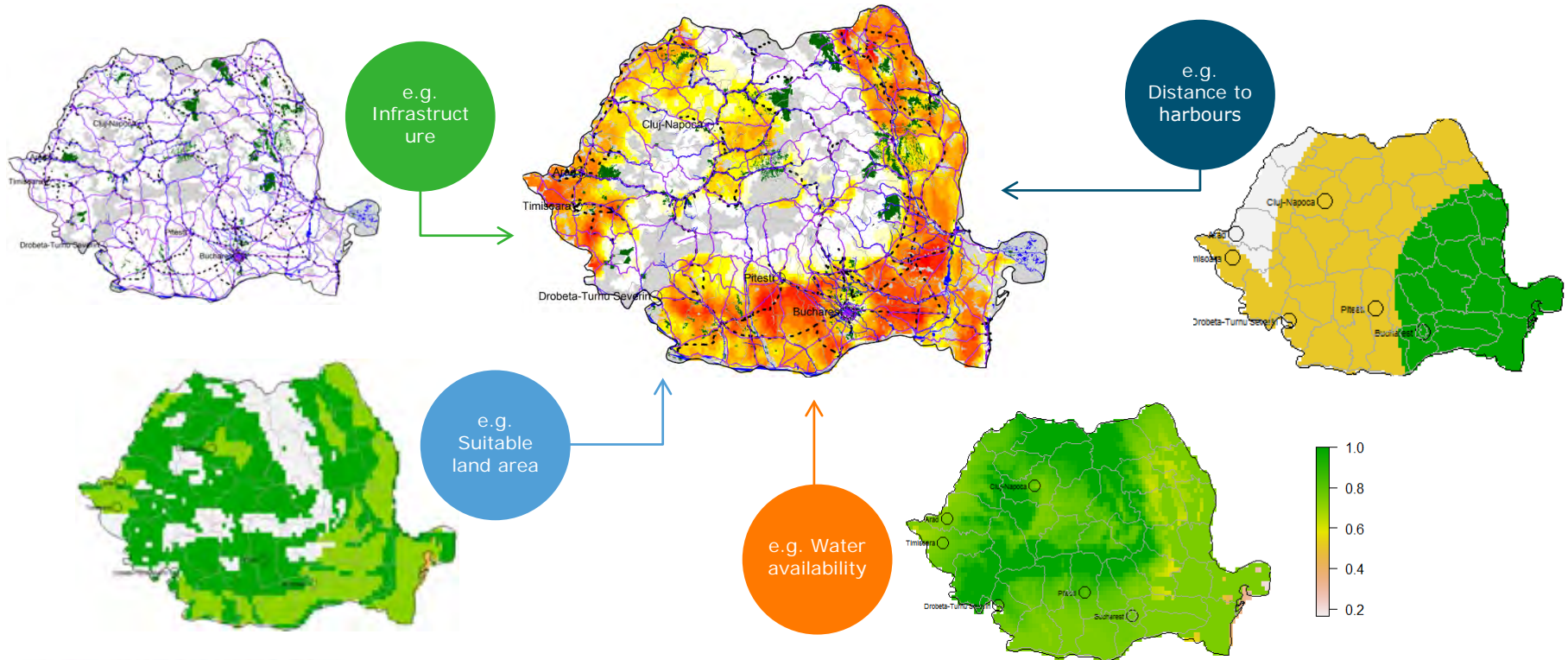
- an indication which areas in Romania are most suitable for the development of pig production
- a description of the possibilities both for commercial farms and backyard holdings

Short introduction

- The Tool **Global Detector GIS** is used for this analysis (see annex to Chapter 5 for more results)
- This tool combines a large amount of data at grid-level (10x10km) to estimate the suitability of regions for the production of pigs.
- Data at both grid-level and expert knowledge are combined and weighted to produce maps that take into account:
 - Factors for suitable fodder crop production and pig production (e.g. climate, suitable land area, water availability)
 - Factors for suitable pig production (e.g. infrastructure, distance to harbours and consumers)
 - Minimal, optimal or maximum values
 - Expert knowledge
 - Weighting of each factor on its contribution to the end result
- Results vary depending on the model settings and the weights given to each factor
- The model settings have been calibrated by an expert on pig production



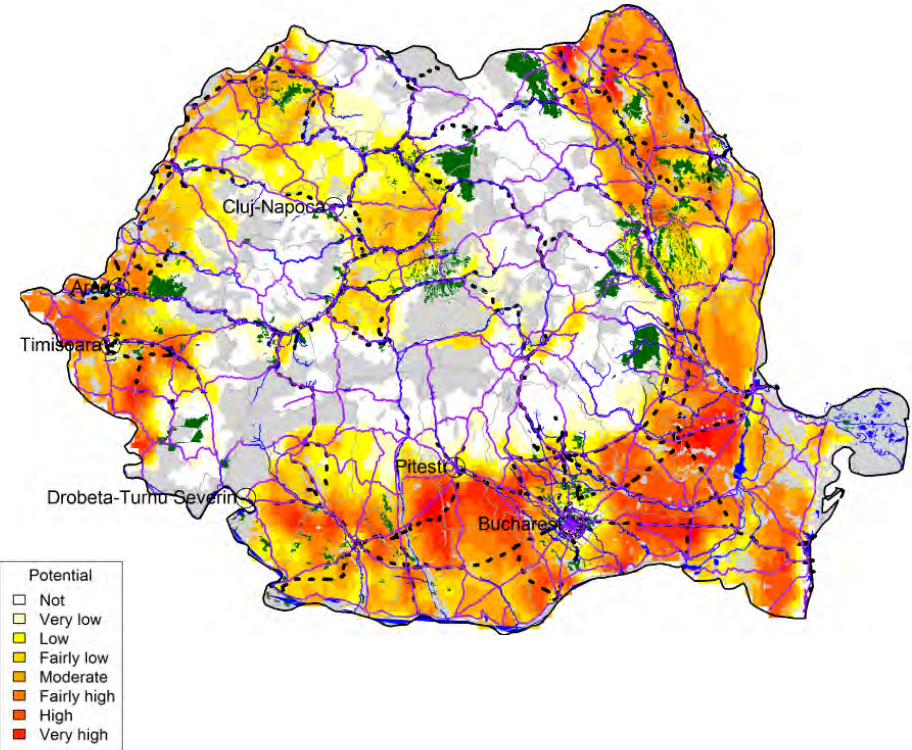
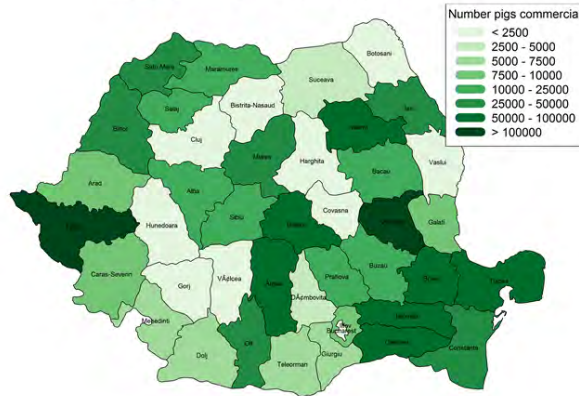
Regional analysis will cross-evaluate suitability of climate, resource availability, markets, population, income...



Potential for commercial pig production

- Estimation is based on the combination of 25 indicators from Global-Detector
- South Romania commercial farming less constrained by high temperatures and relative lower water availability, favoured by availability of labour and good transport possibilities by roads (for feed and meat)
- In the Northeast of Romania there are fewer pigs, but the model shows a potential for this region.

Number of pigs on commercial farms

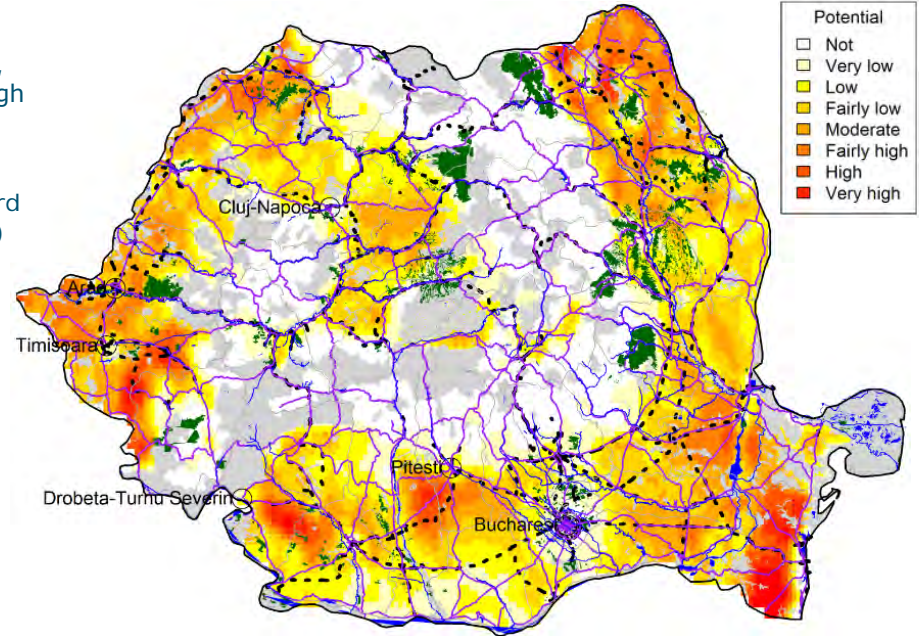
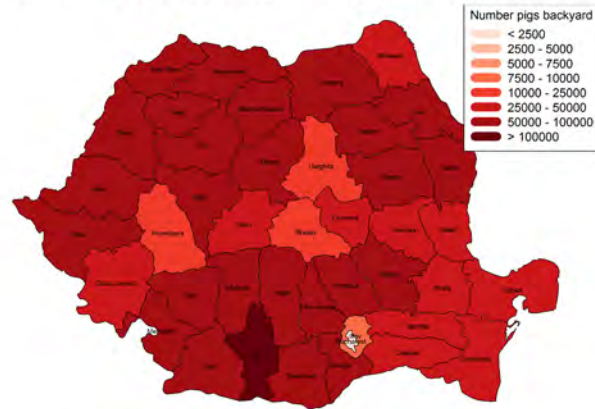


Potential for backyard pig production

Most important differences:

- Backyard production is more constrained by climatic conditions, especially the southern part of the country has unfavourable high temperatures in the summer
- Although pig production closer to cities is less constrained than commercial farming, rural areas are more attractive for backyard farming (for example most South-Eastern part and North-West)

Number of pigs on backyards (holdings no status with pigs)



Key points on regional potential for pig production

- The regions most suitable for commercial pig production overlap to a large extent the regions optimal for backyard production
- The regions identified by Global detector overlap to a large extent the current regions of pig production (both commercial and backyard)

Chapter 5. Conclusions and Recommendations

The objective of this chapter is to conclude and give recommendations for the stakeholders in the Romanian pig sector for:

- the potential of commercial pig production
- the control of ASF in Romania

The potential of commercial pig production

- Commercial farms contribute to the national economy by providing pig meat, offering employment and paying taxes.
 - Their cost of production is a bit lower than in e.g. the Netherlands, although piglet production is less profitable.
 - Commercial farms are typically vertically integrated, at least to some extent, and they invest heavily in biosecurity measures.
- The current period of high global prices of pig meat offers possibilities for the development of the Romania pig sector:
 - Domestic pig meat consumption per capita is expected to stabilise, although there are still opportunities for domestic production expansion since the country is not self-sufficient and relies heavily on imported production.
 - The market potential and regional characteristics allow for a further competitive development of the commercial sector.
 - Effects of the ASF situation is that current prices are high, however commercial farms can be regularly confronted with expensive/ extended movement bans.

The potential for backyard production

- Backyard production is a cultural heritage and a socio-economic backbone for rural families with low incomes.
 - They are a source of production, and as they are a large number of holdings (2.2 million),
 - They have a substantial political relevance.
 - We estimate that backyard farming is likely to stay in the medium term (few decades).
- Identification and registration, and implementation and enforcement of regulation of holdings is limited
- The extent to which the commercial market is affected by the backyard production is unclear.

Conclusions regarding ASF in Romania

- ASF has a dramatic impact on the pig industry in Romania and poses a serious threat for the survival of pig production in Romania.
 - The ongoing outbreaks and spread of ASF mainly in backyard holdings leading to movement bans, pose a continuous threat for the viability of the commercial pig sector
- At backyard farms, the way of keeping pigs pose a large risk for the spreading of ASF
 - This is shown by the large number of outbreaks among domestic pigs (by far the largest in Eastern Europe) and feral pigs
 - The biosecurity approach on these holdings is typically very poor
 - Control of ASF on backyard holdings is hampered by the fact that identification and registration of animals, as well as registration of those holdings is limited
- The high number of backyard farms, in combination with the ASF being endemic in the wild boar population, presents a big challenge for both industry and government. Breaking the infection cycle of wild boar to back yard with its impact on commercial farms (potential infection and movement bans) is of pivotal importance.

Recommendations for the development of the pig sector in Romania

- Define a clear, and active policy towards the future development of pig production in Romania, supported by stakeholders.
- A further development of commercial production is recommended:
 - As a way forward towards a more cost-effective pig production
 - To close the gap in self-sufficiency of pig meat in Romania
- Define an approach for backyard farming: To get insight into the socio-economic impact of backyard farming compared to commercial farming in Romania further research is needed. Aspects like contribution to welfare, efficient use of resources, and ensuring food security should be included in this evaluation.

Recommendations regarding ASF control

- For a successful control of ASF, additional national measures are needed that focus on the risk posed by backyard production.
- Implementing and enforcing EU measures especially in backyard holdings are key for the control of future outbreaks. The Romanian government should strongly improve both the registration of holdings and animals, and the biosecurity awareness and approach on backyard farms.
- In order to effectively enforce regulation, human capacity needs to be enlarged substantially
- An analysis of different options to reduce spreading of ASF in Romania shows that collaboration between commercial and backyard farms would be an interesting option to reduce the risk of further spreading of ASF. This is even more important, as a transport ban is out of the control of commercial farmers; solutions should be found jointly with other players in the vicinity. We recommend to further elaborate the presented options.
- Collaboration between the private commercial sector and competent authorities is vital for an effective containment of the disease. A shared sense of urgency, political will, additional funding and collaboration between the private sector and the government are needed to implement a strategy to limit the impact of ASF for the Romanian pig industry for the years to come.
- To further elaborate a control strategy for ASF, as economic losses are huge, not only for individual farmers, but also on national level. The import dependency for pig meat has risen and is likely to further rise, as long as ASF is not under control.

General recommendations

- Substantial investment to support a viable farming structure are needed. This includes:
 - Data collection on agricultural production in general and pig production.
 - Data on Identification and Registration and movement data as well as data on the potential of pig production on the economy and food security are urgently needed to improve decision making
 - Veterinary infrastructure and enforcement of competent authorities.
 - This is needed to be able to control and enforce regulation on the large number of (mainly backyard) holdings

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2020-008



Annex 1. Pig market outlook

October 2019

I. Introduction

- The purpose of this document is to present the main findings of two different sets of projections that have been produced by means of the AGMEMOD model. **The first set of projections (Section II) refers to the baseline scenario, for which non-BUA (business-as-usual) elements are not incorporated.** Therefore, the potential impact of the current global African Swine Fever (ASF) outbreak or any policies that are not already implemented have not been taken into account for this set of results. However, it takes into account that the Romania pig sector has been hit by ASF disease causing multiple outbreaks from 2017 until now.
- **The second set of projections (Section III) focuses on assessing the potential effects of the ASF outbreak on the developments on global pig production.** Further details on the methodology and the assumptions adopted for this scenario are provided in Section III.1, while the results are described in Section III.2.

African Swine Fever

African swine fever (ASF) is amongst the most important swine diseases given its severe impact with extremely high mortality rates in domestic swine and no vaccines or treatment currently available to control its spread.

The Romanian pig sector has been hit by the ASF disease since 2017, especially in the east part of the country. According to the FAO there have been 1,129 outbreaks in domestic pigs with 363,151 affected pigs, of which 298,562 in commercial farms and 64,589 from backyards). Also more than 900 outbreaks in wild boars have been identified. The number of closed outbreaks is 78 (76 in backyards and 2 in commercial holdings).

Since 2018 numerous outbreaks of ASF were observed around the world, which created a significant disturbance of the world pig meat market. The ASF outbreaks outside the EU are expected to reduce global pig meat output for 2019 and onward. Especially China, the largest producer, has been severely affected (reported August 2018). In the meantime, the disease has also been detected in other countries in Asia and Europe.

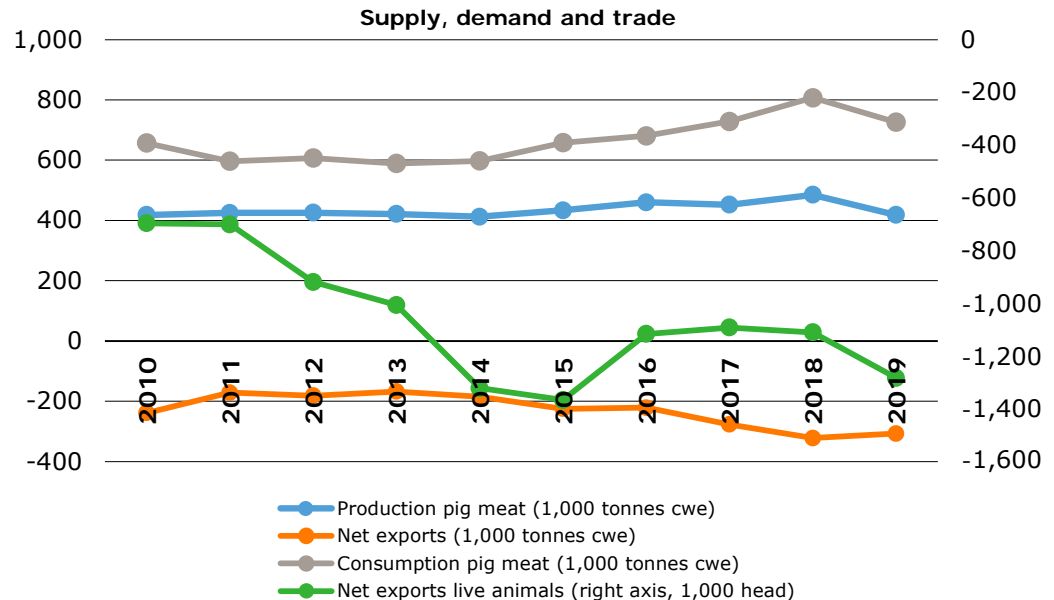
II. Historical evolution and (baseline) prospects for the Romanian sector

II.1. Important characteristics

- The Romanian pig sector comprises a limited number of large scale commercial farms and more than 1.6 million pig holdings, hosting in total more than 4 million pigs (319.8 thousands sows) in 2018.
- The Romanian pig sector faces structural problems such as poor pig performance and lack of efficiency, which eventually lead to higher production costs.
- Other problems that the development of the sector encounters are poor infrastructure and production chains that are barely organised.
- The sector benefits from low feed and animal-housing costs.
- Romania is self-sufficient in feed crops such as wheat, maize, barley and sunflower. However, the country remains an importer of other feed crops such as soya.

Source: EU and national statistics (2019 is estimated)

Figure 1. Recent development of supply, demand and net trade (2010-2019)

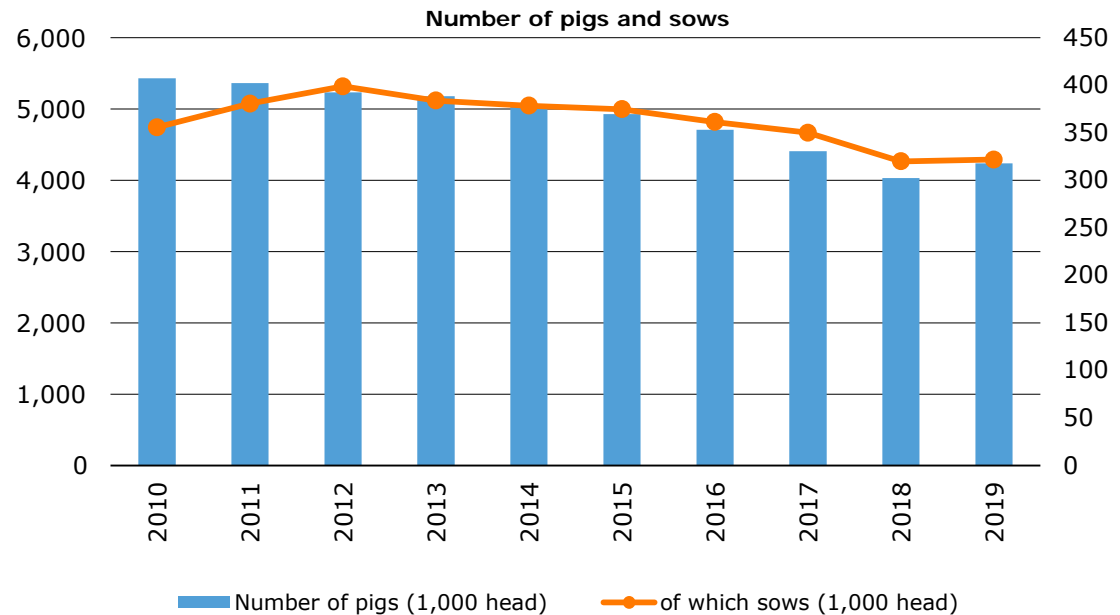


II. Historical evolution and (baseline) prospects for the Romanian sector

Summary:

Over the period 2010-2019, the Romanian pig sector has been steadily growing, producing 485 thousand tonnes of pig meat carcass weight equivalent in 2018. For the coming years, production could be stable at the 2019 level, depending on the role played by the authorities in order to manage the spread of the ASF, as well as the capacity for recovery of the sector. Regarding consumption, a stable trend has been reported for most of the period, with some declines in 2018. Looking at international trade, Romania has been a net importer over the last decade. This pattern of limited net exports of pig meat and no live animal exports can be expected to continue after 2019 due to animal health concerns, whereas imports could still be possible.

Figure 2. Recent development of the pig herd (2010-2019)



Source: EU and national statistics (2019 is estimated)

II. Historical evolution and (baseline) prospects for the Romanian sector

Summary:

Regarding the pig herd, both the number of growing-finishing pigs and sows have been slightly declining over the period 2010-2019. Nevertheless, this decline was stronger in 2018. The Romanian pig herd is expected to remain more or less at current levels for the coming years, given that there will be no worsening of the country's disease status.

II.2. Historical macro-economic conditions

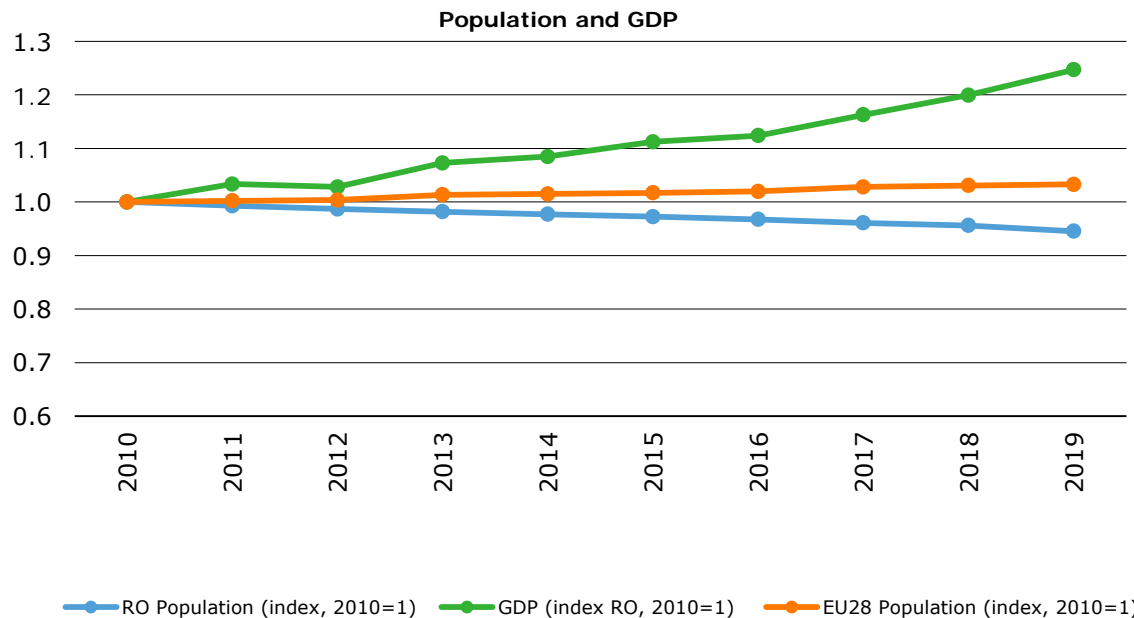
- In the past, the development for the pig sector in Romania has been linked to a slightly declining human population and growing GDP. Both trends are a plausible scenario for the coming years.
- At EU-28 level, human population has been fairly stable.
- Although meat consumption in Romania was increasing in the recent past, it is expected to remain slightly below the EU-28 level in the near future.

II. Historical evolution and (baseline) prospects for the Romanian sector

Summary:

Population for the EU-28 has been quite stable over the period 2010-2019. In the case of Romania, some decline in population has been registered over the last decade. This development is expected to continue in the coming years. In terms of GDP, the present outlook relies on the assumption that GDP will follow an upward trend.

Figure 3. Developments for GDP and population (2010-2019)



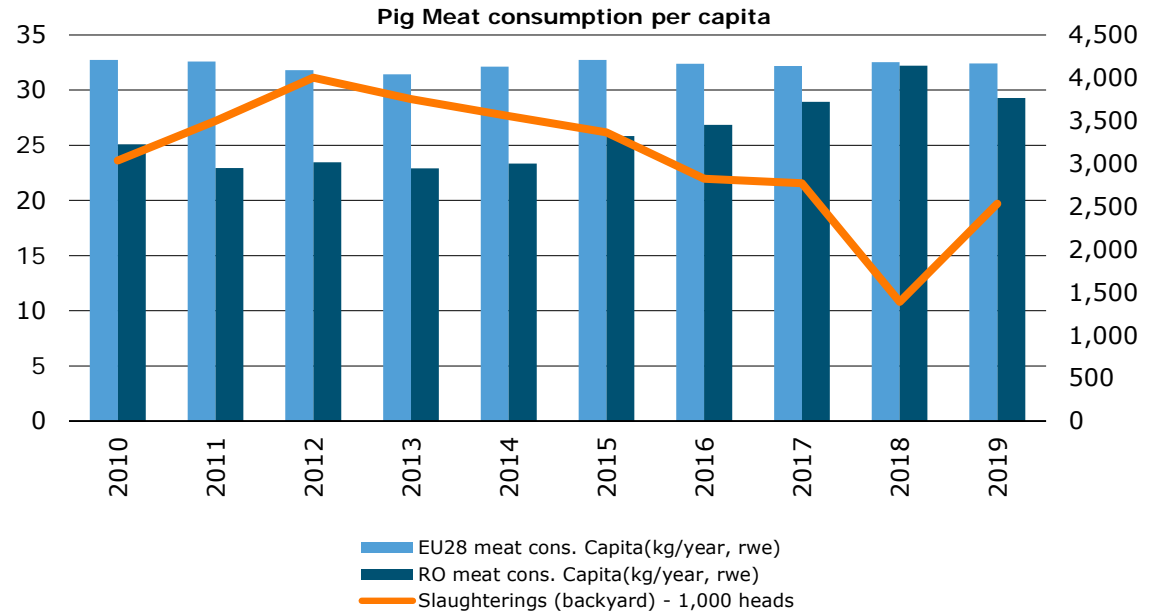
Source: EU and national statistics (2019 is estimated)

II. Historical evolution and (baseline) prospects for the Romanian sector

Summary:

Pig meat consumption per capita has exhibited positive rates of growth over the period 2014-2019, reaching the average EU-28 level in 2018 of around 32kg/year. An estimate of 'backyard' production is also reported in Figure 4. The number of backyard slaughterings in 2018 shows a low due to a temporary low number of sows in that year. From 2019 onwards, consumption per capita of pig meat is expected to stabilise.

Figure 4. Recent developments for pig meat consumption per capita (2010-2019)



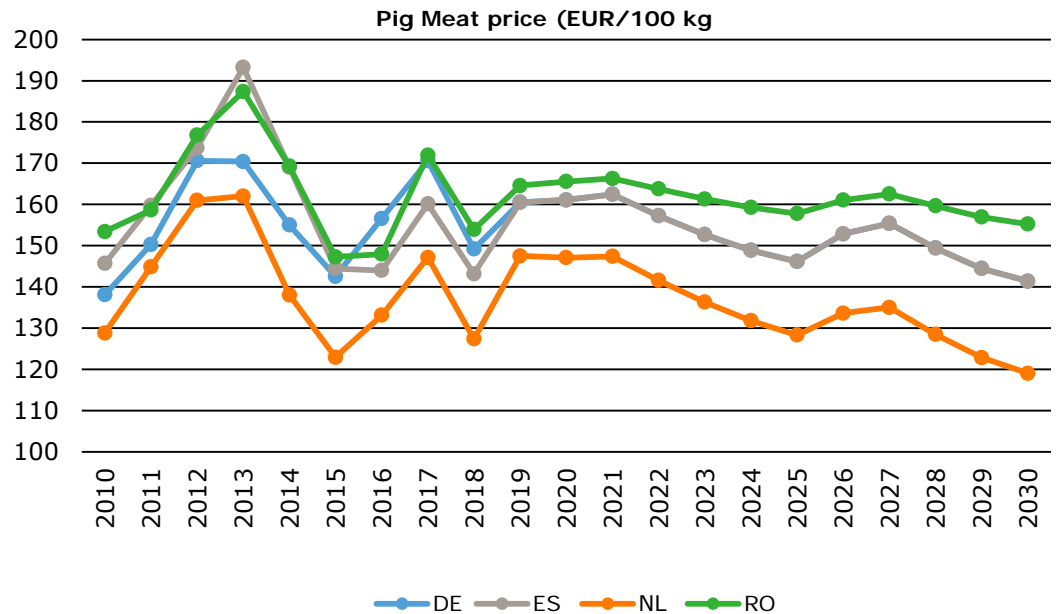
Source: EU and national statistics (2019 is estimated)

II. Historical evolution and (baseline) prospects for the Romanian sector

II.3. Prospects for the Romanian market

- EU-28 net exports are expected to grow by 2.2% per annum (2015-2030). Main export countries for EU pig meat are China, Japan, South Korea, Russia (although import ban is in place), Ukraine and Belarus.
- EU imports from third countries to EU-28 are (still) almost zero due to border levies (import taxes) and non-compliance in issues like traceability.
- Within the EU-28, pig meat prices in Romania are projected to remain above the expected levels of some key players in the sector (Germany, Spain and the Netherlands).

Figure 5. Expected price developments (2010-2030)



II. Historical evolution and (baseline) prospects for the Romanian sector

Summary:

In the case of the 'BUA' situation, Romanian prices (RO) are expected to follow a similar trend to prices in key players such as Spain (ES), the Netherlands (NL) and Germany (DE). In general terms, pig meat prices are expected to slightly increase until 2021 and slowly decline in the period to 2030. Nevertheless, prices in Romania will remain high compared to other key countries in the EU, being around EUR 155/100kg by 2030. Outside the EU, declining prices in the US will negatively affect the competitiveness of the European production in the international market. Since Romania relies notably on imports of pig meat, 'non-EU' factors that do not lead to price increases within the EU will not impose considerable pressure on the country when meeting domestic consumption.

II.4. Conclusions

Summary and interpretation of key findings:

Although at present prices are high due to the global ASF crisis, for the long run (>5 years onward), the Romanian pig sector faces a period of declining prices, in line with the dynamic of prices in international markets. At EU level, the market is about to be saturated, which intensifies competition and increases the sensitivity and risks related to developments (demand, price, competitors) in the world market for pig meat. Domestic pig meat consumption per capita is expected to stabilise, although there are still opportunities for domestic expansion since the country is not self-sufficient and relies heavily on imported production.

III. ASF scenario

III.1. General comments

Background:

The baseline results as presented above assume business as usual (BAU) and do not yet include the impact of the numerous outbreaks of ASF around the world in 2018, of which the impacts now become more visible. The **ASF outbreaks are expected to reduce global pig meat output for 2019 and onward**. Especially China, the largest producer, has been severely affected (reported August 2018). In the meantime, the disease has also been detected in other countries in Asia and Europe. This section presents an assessment of the medium-term impact of the ASF disease on global pork production and demand, as well as a potential market recovery pathway.

Methodology:

The modelling of this ASF scenario has involved two different tasks. First, in order to calculate the potential prices that could drive the market after the ASF outbreak, an equilibrium displacement model (EDM) was developed. This model covers the global market for pig meat and includes an explicit representation of broad regions like EU and East Asia¹. This model was fed with shocks on regionally differentiated changes in supply and demand for pig meat due to the ASF outbreak². Second, a run of the AGMEMOD model using as scenario input the set of World market prices that were calculated by means of the EDM was carried out. Note that in the scenario analysis presented below, it is assumed that there is no change in the current ASF disease status in any of the analysed EU Member States.

¹ The EDM model has been parameterized using information derived from large scale models such as AGLINK-COSIMO and AGMEMOD. The synthetic elasticity estimates used account for an increasing responsiveness to prices over time, while short-run demands and supplies are rather inelastic.

² The negative shocks to supply mainly take place in the East Asia region, with their magnitudes in 2019 being -5% (Q1), -5% (Q2), -25%(Q3), -30% (Q4) and -35% (2020), after which a recovery process started. The shocks on supply and demand for the different countries/regions considered were based on expert information, with one of the experts having made a recent visiting tour through the East-Asia region.

III. ASF scenario

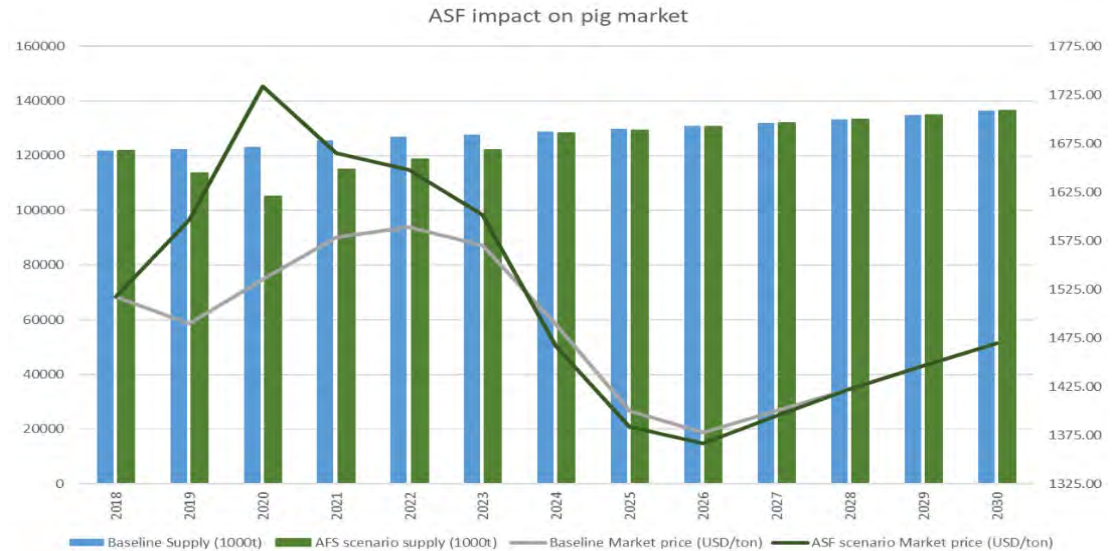
III.2. Results

Summary:

In the ASF case, the simulation reveals that world market prices are expected to be around 7.1% and 12.9% above the baseline level in 2019 and 2020. This price difference will be narrowing over the coming years, with prices eventually coming back to baseline levels by 2028. With regard to global supply (being equal to global demand), considerable decreases are expected in 2019 and 2020 (-7.1% and -14.7% respectively). These declines will be followed by some recovery that will bring supply, and therefore demand, close to baseline levels by 2024 (still around -0.4% below the baseline).³

³ Figures 7-10 only report results for the projected period since there is no difference between the baseline and scenario results for the historical period (prior to 2018).

Figure 6. Expected global market developments further to an ASF outbreak (2018-2030)

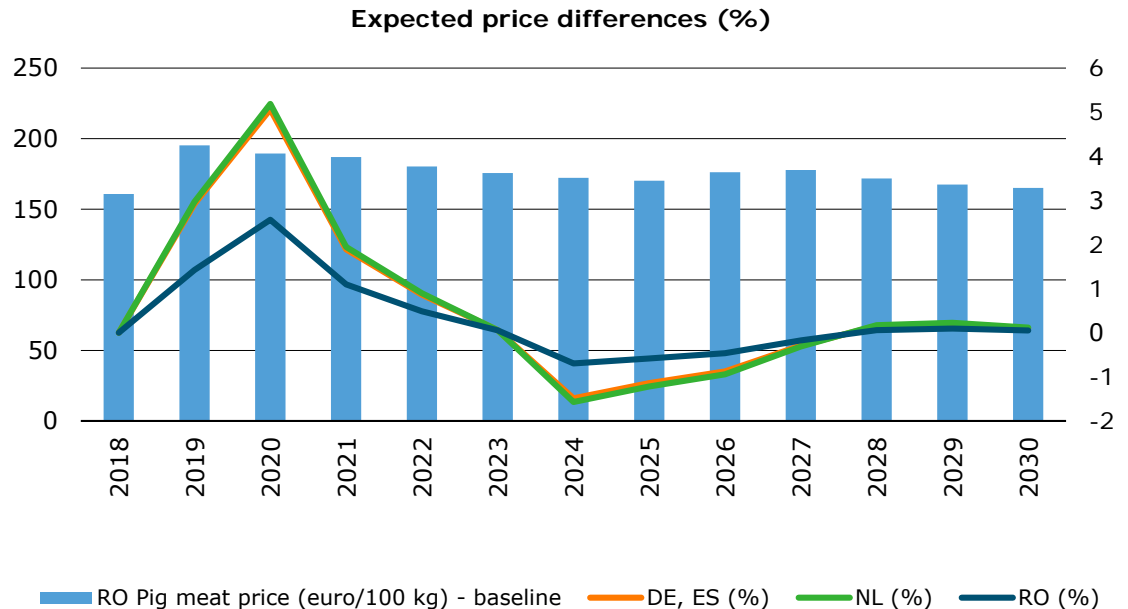


III. ASF scenario

Summary:

The expected impact on Romania of the increased world market prices for pig meat is limited compared to countries like Germany, Spain and the Netherlands. The reason for the limited impact is that the price shocks are limited (in any year no more than 5% deviation of the previous baseline). This is due to the imperfect price transmissions between the world market price for pig meat and the EU pig meat key price, as well as that of the EU key price to the Romanian pig meat price (about 50% of the change in the German pig meat price is passed on to Romania). The Romania price structure further includes certain lags, which cause the shock to move out a bit, which again causes a dampening effect.

Figure 7. Prices further to an ASF outbreak in the global market (2018-2030) compared to the expectation of no ASF in South-East Asia

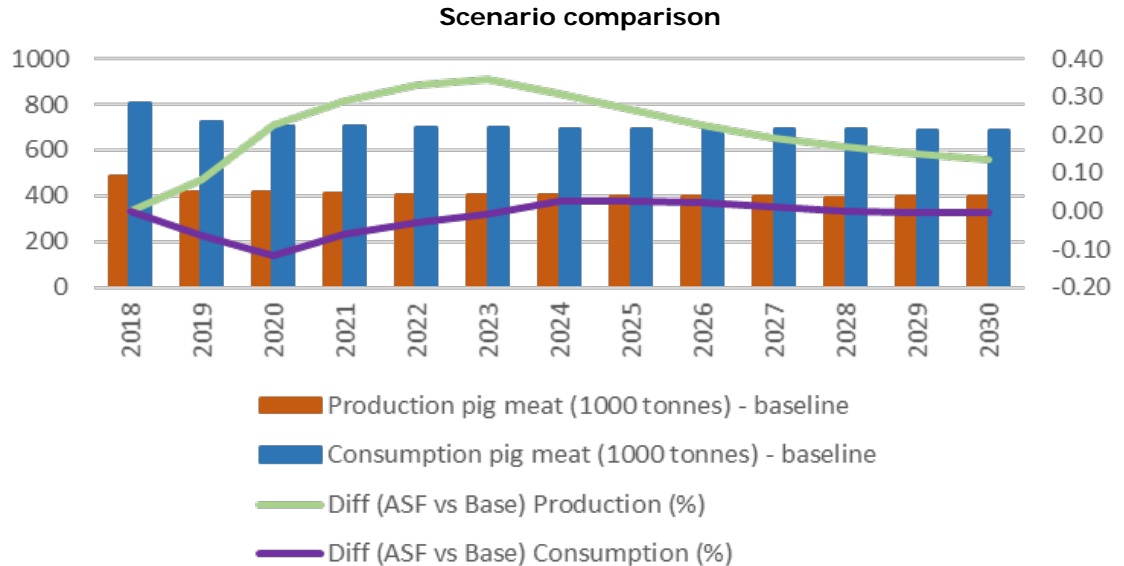


III. ASF scenario

Summary:

As a result of the temporary increased world market prices, the supply in Romania of pig stock and pig meat production almost remains at the same level. Consumption slightly declines due to the bit higher prices. Net imports marginally decline. This is all as we would expect it to happen.

Figure 8. Expected market developments in Romania further to an ASF outbreak in the global market for pig production (2018-2030)

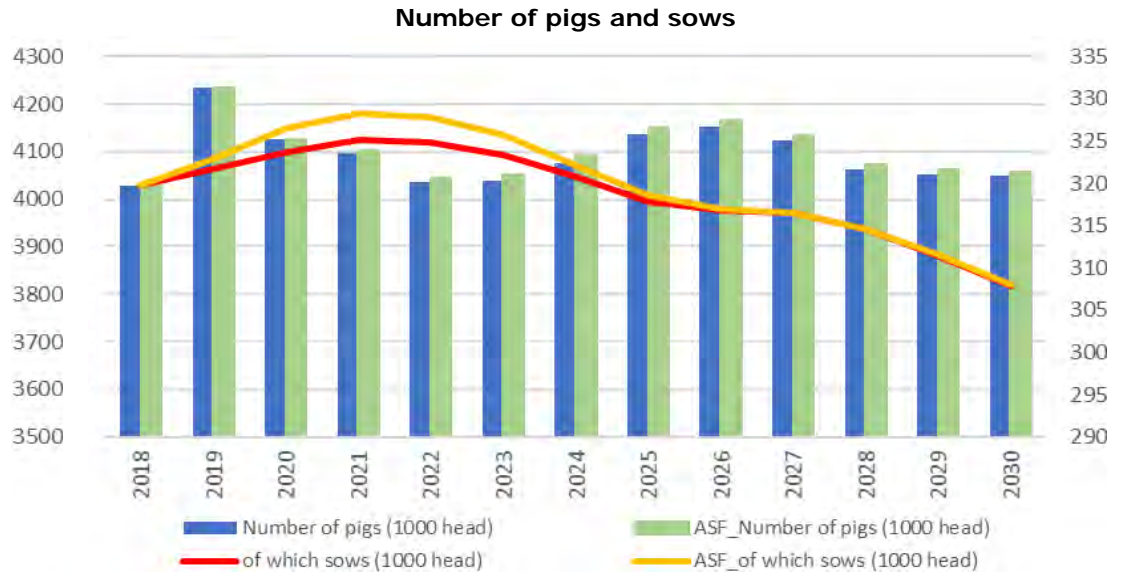


III. ASF scenario

Summary:

Further to the expected higher prices in the market, the Romanian pig (and sows) number of pigs is expected to increase in the coming years due to the ASF outbreak in Asia. The differences between the BUA and the ASF situation are larger in the period ending in 2024. The reader should keep in mind that the particular effects of AFS (including policy measures) in Romania are not captured in this analysis since they would require a separate modelling exercise.

Figure 9. Expected number of pigs present in Romania further to an ASF outbreak in the global market (2018-2030)



Annex 2. Farm competitive position

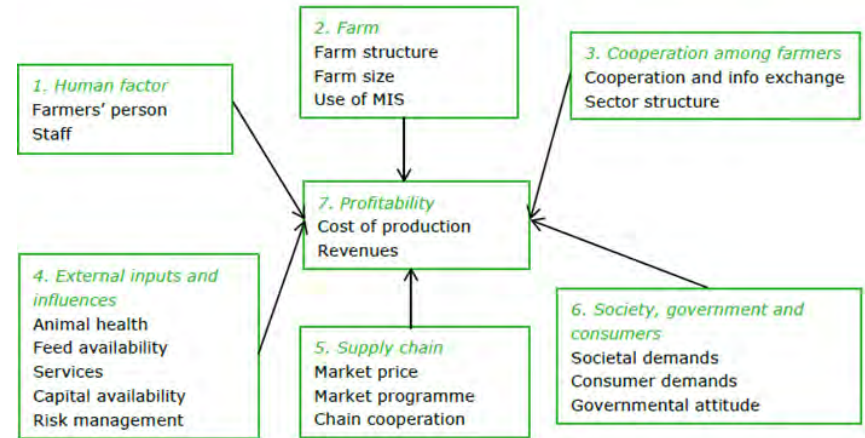
Assessment of the competitive position of pig production in Romania compared to the Netherlands

Competition in pig production is influenced by many factors. To evaluate the competitive position of the pig production in a country, Porter's (1990) model on the competitive advantage of nations was adapted (Hoste, 2017). This adapted model shows seven clusters of success factors (Figure 1)

Each cluster of success factors has been elaborated into a number of parameters, which were assessed on being low or negative, versus high or positive. Per country typical farm systems have been defined, and with these farm systems in mind the parameters have been scored. The assessment has been performed for a) a commercial integrated farm in Romania, including own feed supply and contracts to the meat industry, b) a backyard farm in Romania, and c) a commercial family farm in the Netherlands, representing the competitive position in Northwest Europe. The assessment was performed by local experts in the Netherlands and Romania.

First, both commercial farms are compared on competitive advantages and disadvantages, followed by an appraisal of the backyard system.

Figure 1: Conceptual model on competitive factors in pig production
Source: Hoste (2017).



Assessment of the competitive position of pig production in Romania compared to the Netherlands

The Human factor (1) is the strongest on the family farm in NW Europe, especially due to the entrepreneurial spirit; availability of workers and their salary however are weaker points. The Farm hardware factor (2) scores better on the Romanian commercial farm, due to more optimal farm design and scale of production. The Cooperation among farmers (3) is far stronger in NW Europe than in Romania, which is reflected by cooperative activities and information exchange among entrepreneurs.

The External inputs and influences' factor (4) scores higher in NW Europe than in Romania, due to a higher availability and quality of veterinarians, breeding and AI services, advisors and knowledge institutes. Also investment capital is cheaper and better accessible in NW Europe than in Romania. Risk management on the other hand is better shaped in vertical integrations than in loosely coupled supply chains like in NW Europe. More or less equal is the feed availability, and services for construction and transport.

The Supply chain (5) is assessed to perform better in NW Europe than in Romania, as added value market concepts and willingness to cooperate in the supply is deemed better; what's more, the export orientation in NW Europe leads to improved product valorisation.

The Romanian agricultural sector enjoys a more positive External factor (6), with stronger support from society and the government, and its preparedness to financially support.

The Profitability factor (7) scores higher in Romania than in NW Europe, mainly due to higher market prices. This more than compensates for the lower zootechnical performance.

Positive points for the Romanian backyard farm are non-priced own labour. The farm is designed for subsistent meat production and therefore is robust regarding market developments. Capital availability does not play a role, nor availability of e.g. veterinary services or feed prices. The market price level is higher than for commercial producers and the farmers face a rather positive approach from consumers and government .

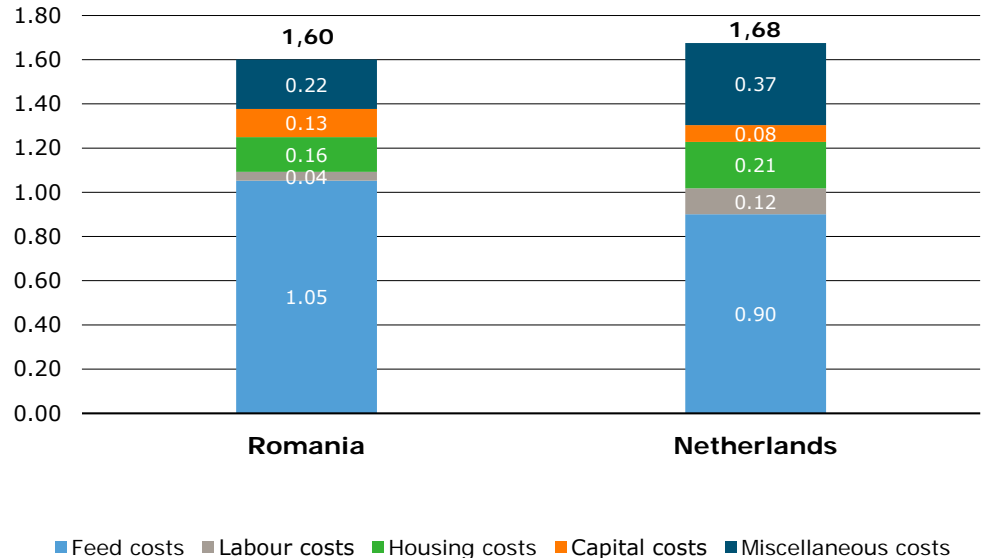
Assessment of the competitive position of pig production in Romania compared to the Netherlands

Profitability is influenced by the cost of pig production. A cost calculation has been made using data from Biggenprijzenschema (WLR, 2019) for the Netherlands and an interview with Mr. Adrian Balaban for Romania, for the year 2018 (Figure 2).

The cost of professional pig production in Romania (€1.60) is slightly lower than in the Netherlands (€1.68), due to lower labour and housing costs, and lower miscellaneous costs such as for manure. Feed costs and capital costs are lower in the Netherlands. These costs reflect a farrow-to-finish farm.

If costs are broken down into piglet production and growing-finishing, it is shown that piglet production is more expensive in Romania (€58) than in the Netherlands (€53), which is more than compensated by lower costs in the growing-finishing stage: €99 in Romania, versus €108 in the Netherlands for the weight increase from 25 to 120 kg.

Figure 2. Assessment of pig cost of production and split into cost factors (€/kg carcass weight)



Annex 3. Regional analysis

Short introduction

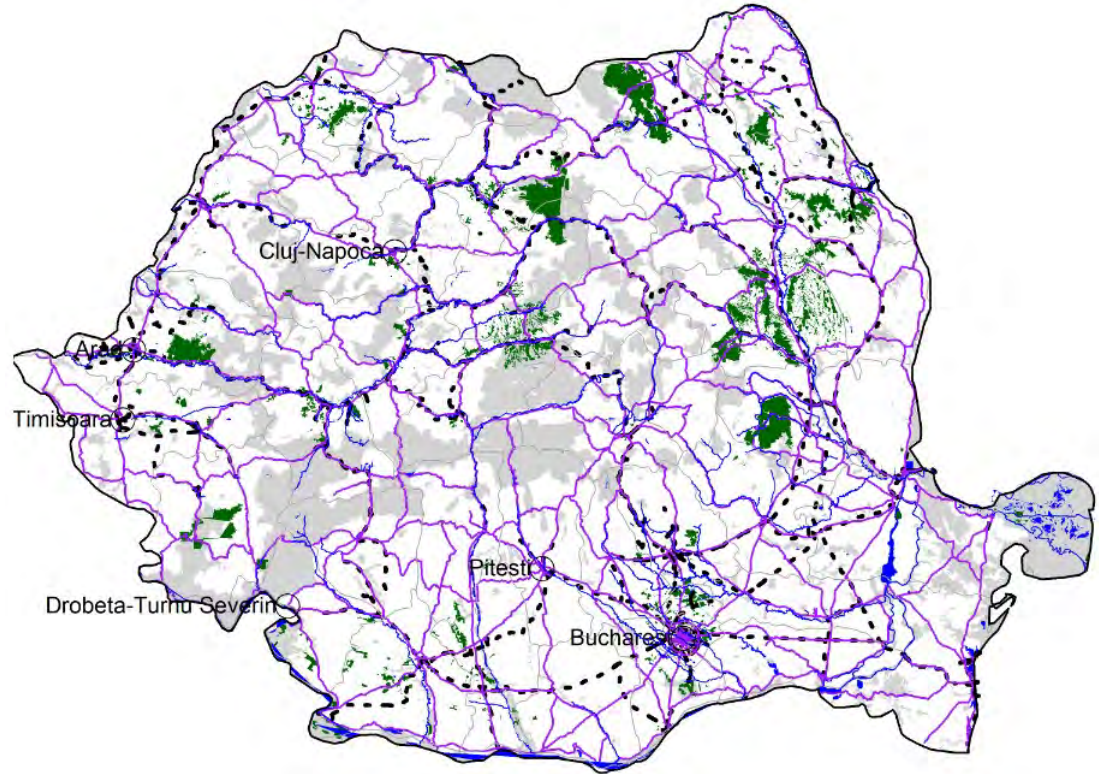
The Tool **Global Detector GIS** is used for this analysis:

- This tool combines a large amount of data at grid-level (10x10km) to estimate the suitability of regions for the production of specific fodder crops.
- Data at both grid-level and experts knowledge are combined and weighted to produce maps.
 - Choose factors for suitable fodder crop production (e.g. suitable land area, water availability)
 - Chose factors for suitable pig production (e.g. infrastructure, distance to harbours)
 - Set minimal, optimal or maximum values
 - Visually validate with expert knowledge
 - Adapt weighting of each factor on its contribution to the end result
- Results vary depending on the model settings and the weights given to each factor.
- The model settings have been calibrated by an expert on pig production.

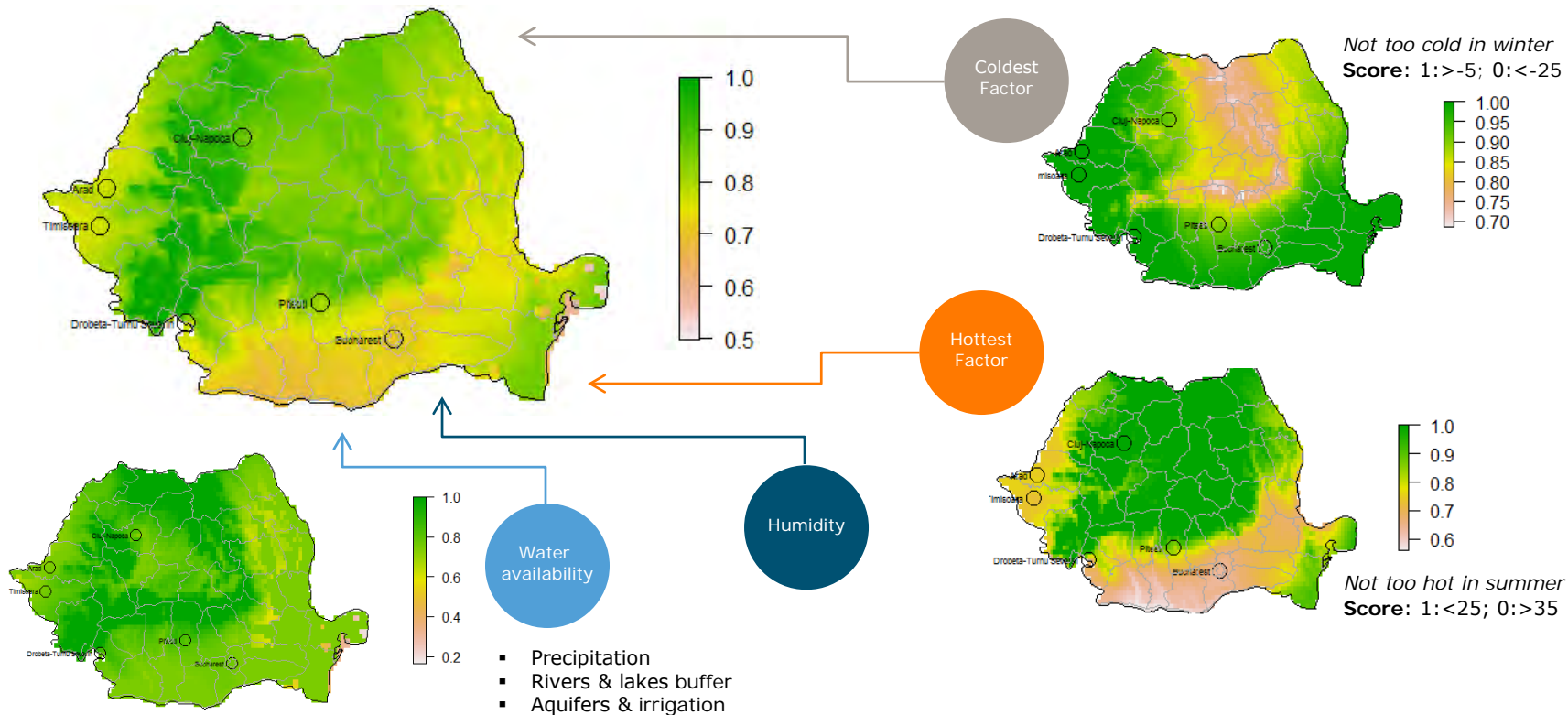


Romania base map

- Names and circles: largest cities
- Blue: lakes, rivers and natural water
- Purple: roads
- Dotted Black: railways
- Dark Green: forests
- Dark Green: protected areas residential (grey)
- Grey: district borders



1. Aspect Climate & Water available



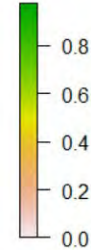
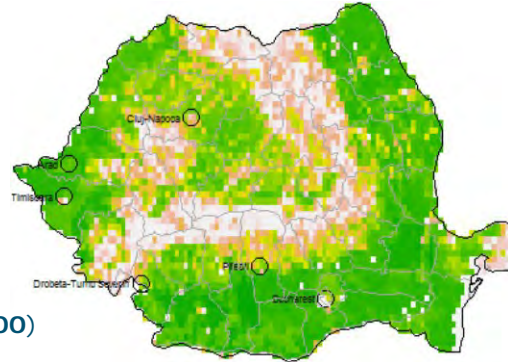
1. Aspect Climate & Water available

- Requirements for temperature are for commercial pig farming. For example, a minimum winter temperature above -5 is not constrained (score=1) while a lowest temperature below -25 is very unfavourable.
- The water availability (required for local production of feed crops e.g. maize, sunflower and soya) is composed of listed indicators.
- A precipitation between 700 and 1100 is considered optimal (i.e. no constrain), below 250 is very unfavourable unless water from other sources are available (proximity of rivers and lakes, presence of aquifers or irrigation). Humidity is assumed to be optimal between 75 and 90%, since this assumption is not very strong the weight and influence of humidity is low. Both temperature factors and water availability have equal weight.
- For the aspect "Land characteristics and use" the listed indicators are used. Some indicators are excluding (e.g. lakes) and some indicators constrain depending on their values. For example croplands are not constrained above 25% of the grid area but become increasingly (linear) constrained at lower percentages. For maize area the threshold is 2000 ha (about 25%), locations without maize are limited constrained (because of other crops). Presence of croplands is considered important (high weight). Regarding soil, each gridcell (~10x10km) has only one category (e.g. clay). No constrains are considered for clay, sand and loam.

2 Aspect Land characteristics & use

Indicators (green is best suited)

- No desert (not relevant for ROU)
- No lakes
- No forest
- No rainforest (not relevant for ROU)
- Not too high (1: <1000; 0>2000)
- Not too steep
- Not dominated by rocks
- Not too dense PP/km2 (1: <500; 0>2500)
- No protected areas
- Availability cropland (high weight)
- Presence maizeland
- Suitability soil

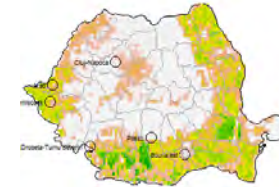


Suitability soil

- www.nrcs.usda.gov
- White=moderate [e.g. peat]
- Green=good [clay, sand, loam]

maizeArea

NoLakes



NoForest

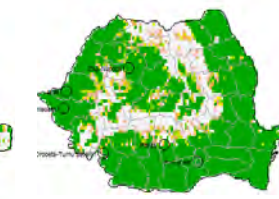
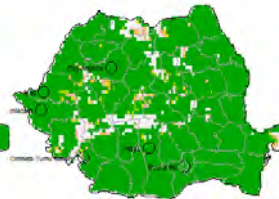
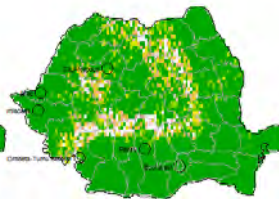
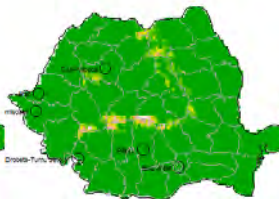
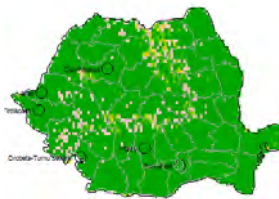
NotTooHigh

NotTooSteep

NotTooDensePopulation

NoProtectedAreas

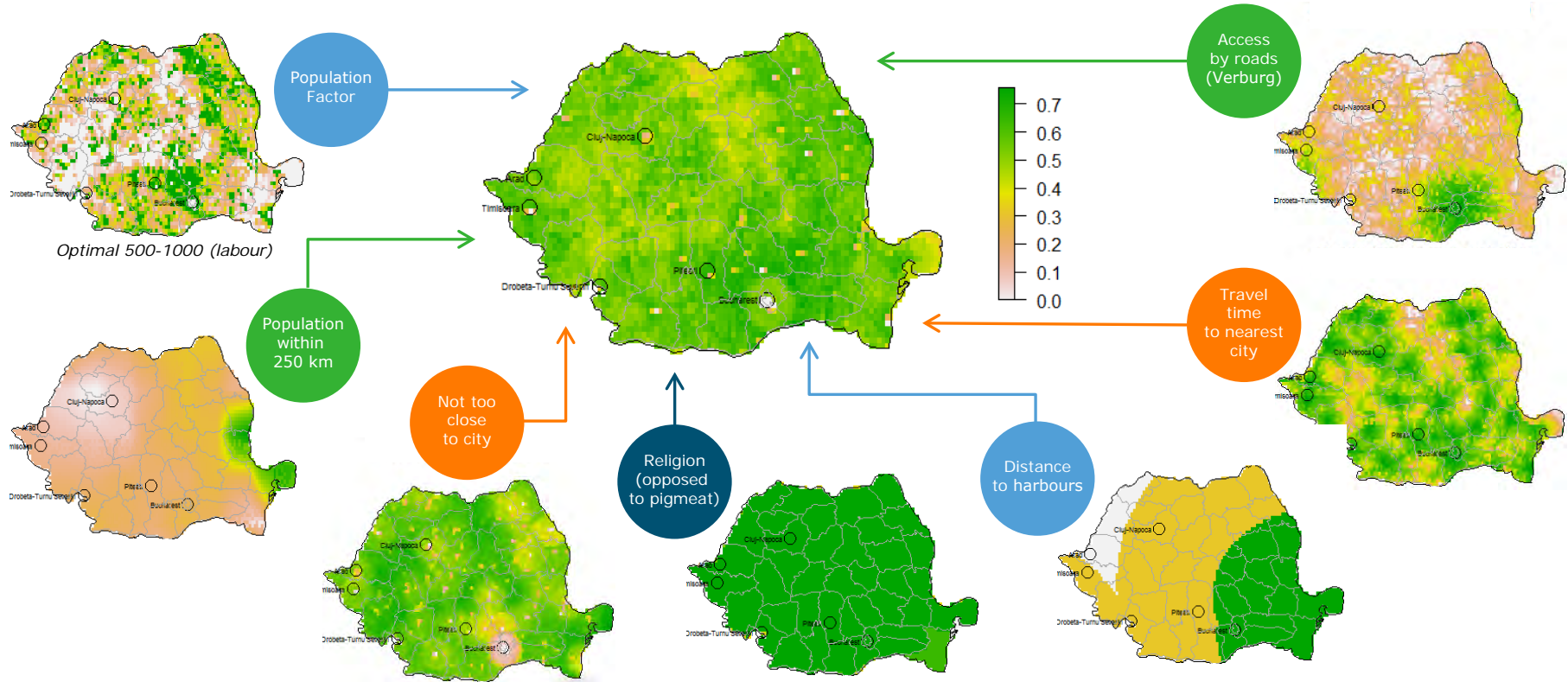
AvailableCroplands



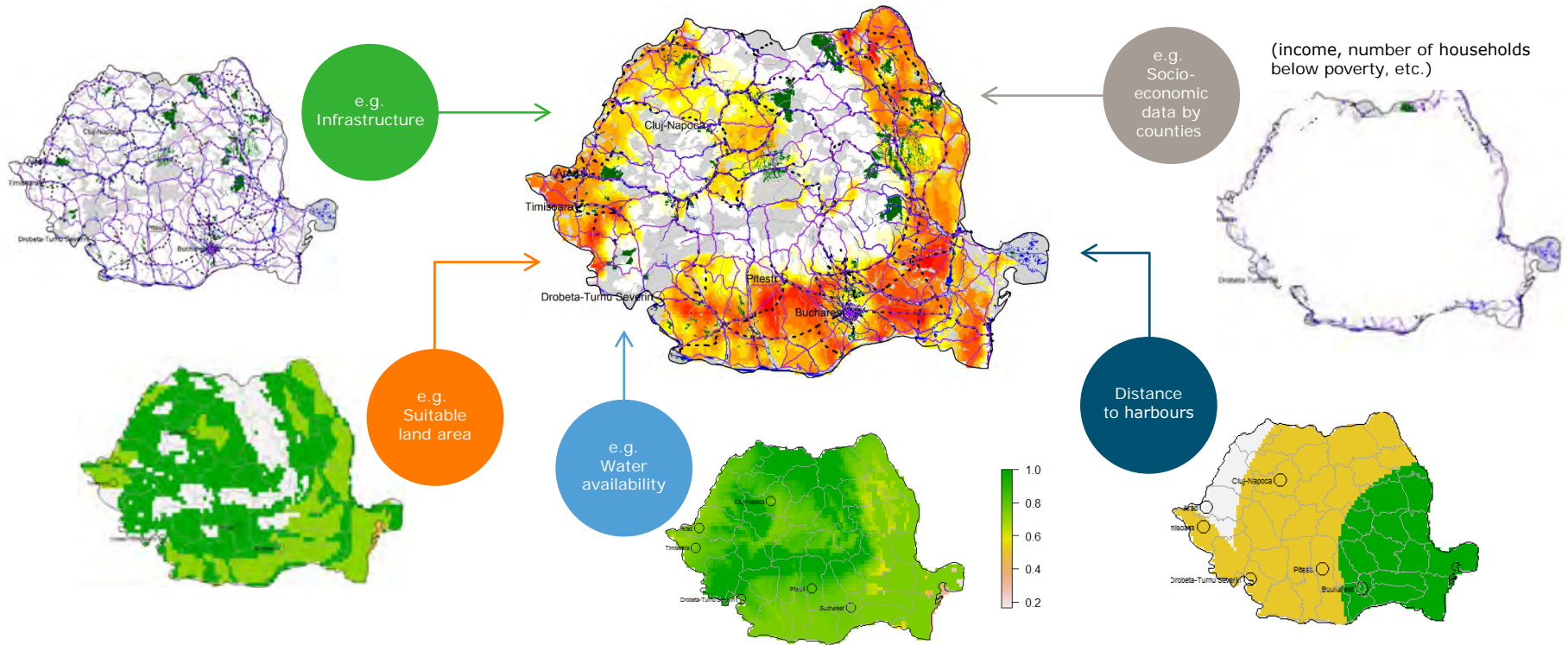
2. Aspect Land characteristics & use

- The aspect “Infrastructure, markets and population” consists of 7 indicators for commercial pig farming (for backyard farming the population factor (labour), harbours and population within 250 km are not relevant).
- A population density between 500 and 1000 PP/km² is not constraint, there is enough labour and not too dense populated. Commercial pig farming should not be too close to cities, although locations with lower travel time to the nearest cities are preferred.
- The aspect religion is negligible for Romania, only in the very South East a minor effect. The indicators “Distance to harbours” and “Population within 250 km” are only interesting for commercial farming, these are excluded for backyard potential.
- The three aspects are combined with a higher weight for the aspect “Land characteristics and use”

3. Aspect Infra, markets, population



Regional analysis will cross evaluate suitability of climate, resource availability, markets, population, income...

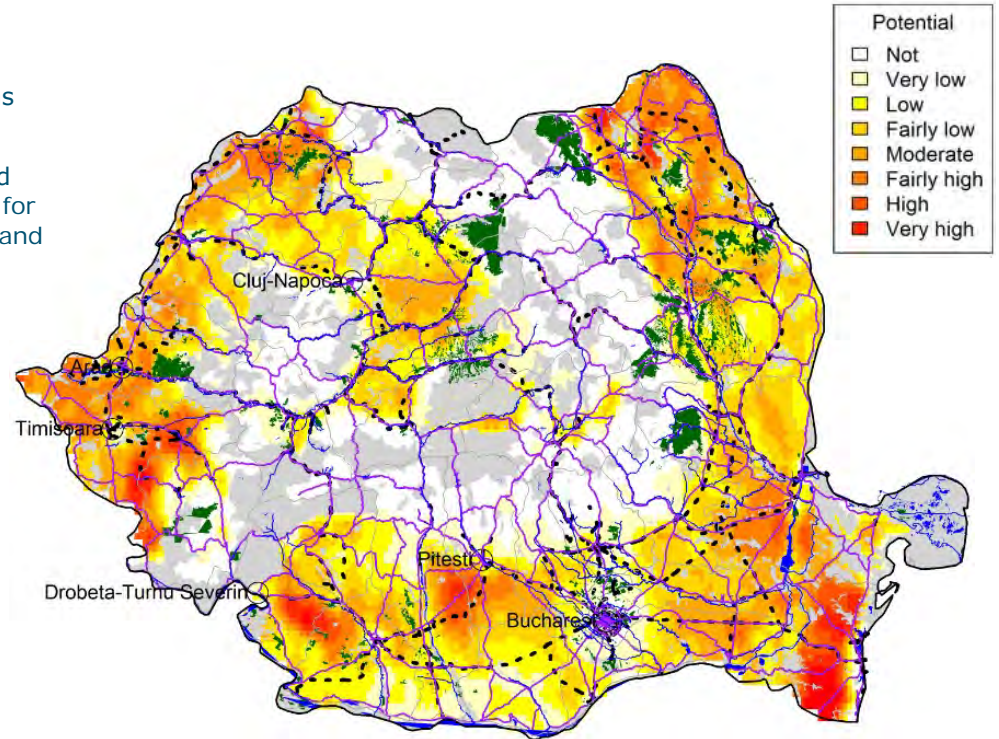
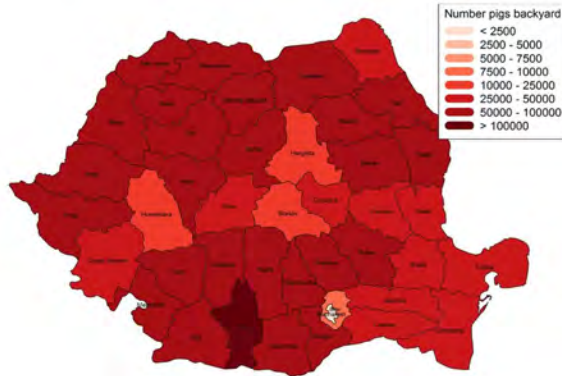


Potential Pig Production (Backyard holdings)

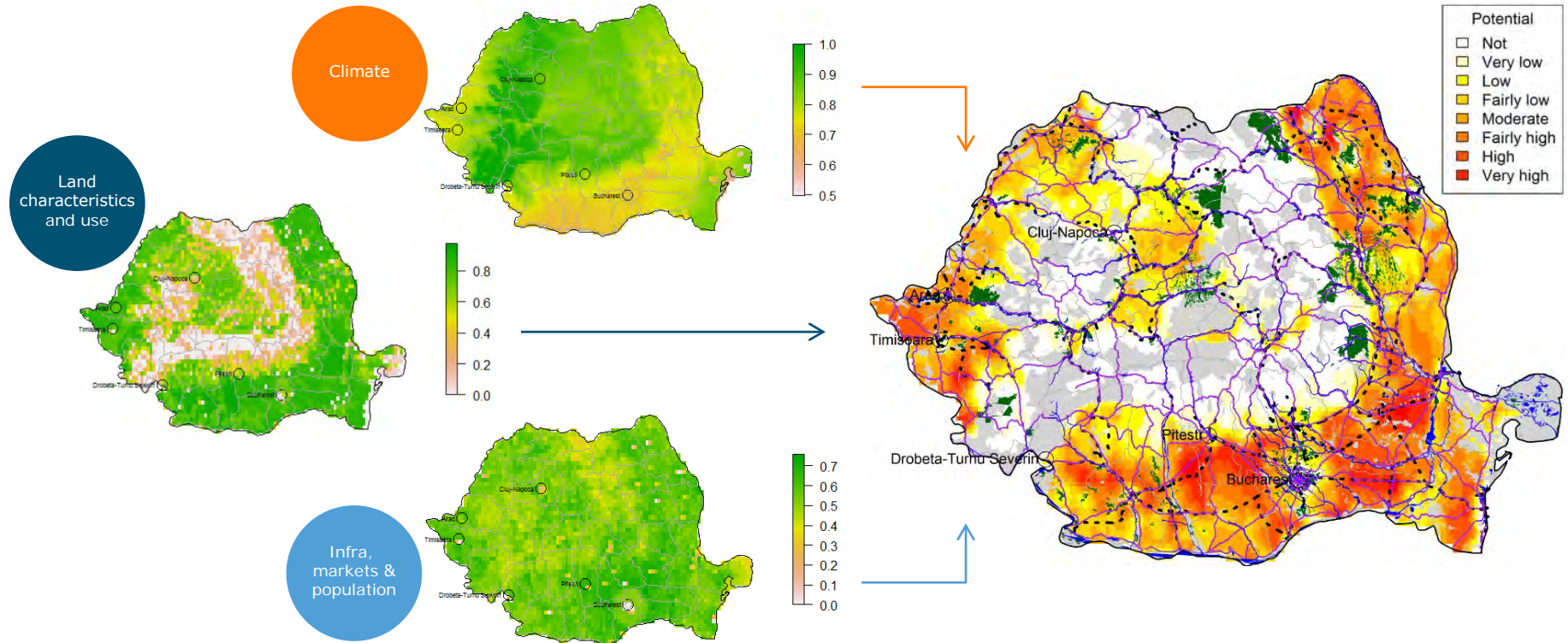
Most important differences:

- Backyard production is more constrained by climatic conditions, especially the southern part of the country has unfavourable high temperatures in the summer
- Although pig production closer to cities is less constrained than commercial farming, rural areas are more attractive for backyard farming (for example most South-Eastern part and North-West)

Number of pigs in backyards
(holdings no status with pigs)



Potential Pig Farming (commercial)



Commercial vs backyard (difference)

In general:

- Commercial pig farming is less sensitive to temperature (see difference of ranges) and water availability
- Good infrastructure to the (global) markets is important for commercial while backyard depend more on travel time to local markets

Indicator	Commercial	Backyard	Comment difference
Lowest temp	Range -5 - -25	Range 0 - 15	Commercial production is less sensitive to temperature Low temperature is more constraint for backyard
Highest temp	Range 25 - 35	Range 25-30	In the South too high for backyard!
Water availability		Higher weight	Backyard more dependent on local grown crops (e.g. maize, sunflower, soya)
Not too high	R. 1000 - 2000	R. 1500 - 2500	Comm. transport possibilities important
Dense population	R. 500 - 2500	R. 500 - 4000	Less constraint backyard, closer to cities
Proximity harbour	Low weight	Not relevant	For commercial import feed, export meat
People < 250km	Low weight	Not relevant	For backyard only local/own consumption
People for labour	R. 500 - 1000	Not relevant	For backyard rural areas more favourable
Travel time cities	Also access roads	Very important	For backyard sell local markets
Access by roads		Not, travel time	For backyard travel time used instead

Annex 4. Mission programme

Programme of the visit 21-23 August 2019

Project:

Future options for pig production in Romania: Research to propose options for governmental policy. Project in assignment of Romanian Pork Association (APCPR)

Dr. Ron Bergevoet DVM, mobile + 31 653803612, email: ron.bergevoet@wur.nl

- Arrival airport Bucharest: Wednesday **21 aug 00:35** (from Amsterdam)
- Departure airport Bucharest (to Amsterdam): **18:05 Friday 23 Aug**

Wednesday, 21 August

9:00 Transfer from hotel to APCPR headquarters

10:00 Meeting with APCPR

Informal meeting at the headquarters of the association with the executive director of APCPR

12:00 Lunch meeting NL Embassy

Lunch meeting with Arie Veldhuizen and Anda Popescu, NL Embassy.

13:30 Transfer to Urziceni, Ialomița

Visit to commercial farm in North-East Bucharest, area of Urziceni, Ialomița, Romania.

15:00 - 17:00 Visiting the farm FATROM

Visit. Conversation with Adrian Balaban.

Programme of the visit 21-23 August 2019

17:00 - 19:00 Joining the meeting of the farm co-operative.

Regular monthly meeting of owners and managers to discuss phytosanitary issues on the farms.

19:30 Transfer to Bucharest

Return to Bucharest by 20:30.

Thursday, August 22

8:30 Meeting The Romanian Meat Association

The meeting is with the Executive Director Dana TANASE, DVM (and former director @ Ro Vet Authority).

11:00 Meeting at the Ministry of Agriculture and Regional Development

The meeting with the qualified representatives

Persons joining: Arie Veldhuizen, Anda Popescu (NL Embassy)

14:00 Meeting at the Institute of Agricultural Economics

Institute of Agricultural Economics (Institutul de Economie Agrara al Academiei Romane)

Meeting with: Iuliana Ionel (TBC), Cecilia Alexandri, Director (TBC)

19:00: dinner in Bucharest (Adrian Balaban, etc.)

Meeting with a pig farmer/manager

Programme of the visit 21-23 August 2019

Friday, August 23

9:30 meeting with ANSVSA- National Sanitary Veterinary and Food Safety Authority
(Autoritatea Națională Sanitară Veterinară și pentru Siguranța Alimentelor)

11:00 Meeting with A.C.E.B.O.P.
A.C.E.B.O.P. – Association of Bovine, Ovine and Swine Farmers and Exporters
Meeting with the president: Mrs. Mary PANĂ