Biosecurity in the pig sector
Issue and options with emphasis on small scale producers

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Defining Biosecurity

- **Biosecurity** refers to those measures that should be taken to minimize the risk of incursion of pathogens into individual production units (**bioexclusion**) and the risk of outward transmission (**biocontainment**) and onward transmission through the production and marketing chain.

- It requires the adoption of a set of attitudes and behaviours by people to reduce risk in all activities.
Main risk factors for disease introduction and spread

- Introduction of animals into holding
- Introduction of vehicles, means of transport
- Introduction of equipment, feed
- Personnel, veterinarians, inseminators, visitors
- Use of common area e.g. pastures
- Presence of wildlife, vectors – insects, rodents, etc
Three basic components of the biosecurity

- **Segregation:** Prevent contamination
  *Most important and effective step. It is the strongest form of biosecurity and where effort should be placed if at all possible.*

- **Cleaning:** Remove contamination
  *If all dirt is removed, there is little left for the virus to be carried by.*

- **Disinfection:** Kill any remaining virus
  *Important but is the least reliable step of biosecurity. It’s effectiveness depends on many factors, in particular the quality of the cleaning process.*
Segregation

The creation and maintenance of barriers to limit the potential opportunities for infected animals and contaminated materials to enter an uninfected site

The barriers should be physical and/or temporal where possible, and procedural where not.

However, such barriers will only be effective when controlled to exclude potentially contaminated items
Biosecurity measures to minimize risk of introduction of pathogen

- Introduction of animals from trusted and certified sources
- Vehicles, means of transport should be properly cleaned and disinfected before entering into pig holding
- Visitors should be discouraged to enter pig holdings
- Personnel, veterinarians, inseminators should be well trained on biosecurity procedures and should not raise pigs at their households
- Fencing preventing contact with wild/feral pigs should be installed on a pig farm
- Appropriate disposal of dead pigs, discarded parts of slaughtered pigs and food waste
Biosecurity measures to minimize risk of introduction of pathogen

- No swill feeding, in case it is not possible at backyard farm: swill should not contain remains of pigs, and should be boiled for 30 minutes and allow to cool before feeding.

- Sharing of equipment between holdings should be avoided.

- Appropriate procedures for cleaning and disinfection have to be placed.

- Appropriate hygienic measures have to be applied by all persons entering into contact with pigs.
Cleaning

Most pathogen contamination on physical objects is contained in faecal material, urine or secretions that adhere to the surface; cleaning will therefore remove most of the contaminating pathogen

• Any materials that must pass through the segregation barrier (in either direction) should be thoroughly cleaned.
• No visible dirt on the surface of materials.
• Soap, water and a brush are adequate for small objects, but a high-pressure washer (of 110 to 130 bar) is needed for large vehicles, such as lorries or tractors.
Disinfection

It should always follow **effective** and **comprehensive cleaning** that has already removed all visible contaminating materials.

If the floor is soil, proper disinfection is not possible but measures to reduce the load of infectious agents can be taken:
- attempt to clean the floor surface as much as possible (e.g., remove faecal matter);
- implement surface disinfection: choose a disinfectant that may be effective in the presence of organic matter;
- leave the pens empty for at least five days before restocking.
Appropriate disinfection for ASF virus

The selection of the disinfectant should take into account:

- the official approval of the authorities;
- the spectrum of activity;
- the efficacy and practicability under farm conditions: e.g. ease of handling, risk of corrosion of equipment, temperature stability;
- safety e.g. for operative staff, the environment;
- other points: costs, risk to store, etc.

Appropriate disinfectants for ASF:

- 2% sodium hydrate
- 2% caustic soda
- Detergents (often alkylbenzenesulfonates) and phenol substitutes
- Sodium or calcium hypochlorite (2-3% available chlorine)
- Iodine compounds
Production systems

Classification of production systems is never perfect
  (but don’t let the perfect be the enemy of the good)

• Focus needs to be on characteristics of relevance
  • Size of the herd
  • Purpose of production
  • Main features of husbandry management

• Take pragmatic approaches for rough classification

• Use (national) sector studies to highlight peculiarities
Production systems

Scavenging pigs
• Basic / traditional production systems
• Mostly subsistence driven
• Free-ranging (year round or partially)

Small scale confined (3 major subgroups)
• Semi intensive backyard
• Small scale intensive
• Multi species integrated
Production systems

Large scale confined
• Increased farm size
• Specialization
• Consolidation and integration of ownership

Large scale outdoor
• Confinement through fencing
• Less investment in infrastructure
## Small-scale confined production: summary of biosecurity measures and potential for uptake (I)

<table>
<thead>
<tr>
<th>Biosecurity measures</th>
<th>Implementable</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segregation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoid introduction of pigs from unknown sources</td>
<td>N</td>
<td>Usually no traceability for movement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of pigs from markets and in villages</td>
</tr>
<tr>
<td>Limit the number of sources of replacement stocks</td>
<td>Y</td>
<td>Requires good communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td>on risks related to purchase from multiple sources</td>
</tr>
<tr>
<td>Use AI instead of moving sows or boars</td>
<td>Y</td>
<td>AI cooperatives can be financially sustainable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in area were small-scale confined production is practiced</td>
</tr>
<tr>
<td>Quarantine (isolation) for newly purchased animals</td>
<td>Y</td>
<td>Infrastructure for quarantine periods can be built</td>
</tr>
<tr>
<td>Full fencing around and closed entrance to farm area</td>
<td>Y/N</td>
<td>Possible in some farms but difficult in densely populated villages</td>
</tr>
<tr>
<td>Appropriate distance between farms</td>
<td>N</td>
<td>Most pig housing is inside villages with high animal density</td>
</tr>
<tr>
<td>Install nets against birds</td>
<td>Y</td>
<td>Pigs are housed, so screens can be built</td>
</tr>
<tr>
<td>Create loading area/bay at farm</td>
<td>Y</td>
<td>Dedicated housing can allow for specific loading</td>
</tr>
<tr>
<td>Strict control of entrance/exit</td>
<td>Y/N</td>
<td>Structure and protocols</td>
</tr>
<tr>
<td>Specific clothing and footwear for use at the farm</td>
<td>Y</td>
<td>Separate pig housing allows sanitary protocols to be implemented</td>
</tr>
<tr>
<td>Shower with change of clothing and footwear</td>
<td>N</td>
<td>Infrastructure generally does not make shower practical</td>
</tr>
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## Small-scale confined production: summary of biosecurity measures and potential for uptake (II)

<table>
<thead>
<tr>
<th>Biosecurity measures</th>
<th>Implementable</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Segregation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusion of wild pigs and rodents</td>
<td>Y/N</td>
<td>No contact with wild pigs is possible, but rodents are more difficult to exclude</td>
</tr>
<tr>
<td>Permanent housing of pigs</td>
<td>Y</td>
<td>Pigs are indoors where access can be controlled</td>
</tr>
<tr>
<td>Ban the keeping of pigs at workers' homes</td>
<td>Y/N</td>
<td>Possible where there is no tradition of pig keeping</td>
</tr>
<tr>
<td>Keep animal species separate</td>
<td>Y/N</td>
<td>Possible where there is no mixed farming system</td>
</tr>
<tr>
<td>Herd management: all-in-all-out system by compartment</td>
<td>Y/N</td>
<td>Depends on the size of the farm and the cash availability for purchase of pigs in groups</td>
</tr>
<tr>
<td>Fallow period between batches</td>
<td>Y/N</td>
<td>Achievable in batch flow systems, but very difficult on breeding farms</td>
</tr>
<tr>
<td>Parasite control (including ticks)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Manure management (composting, spreading)</td>
<td>Y</td>
<td>With correct incentives, protocols for appropriate manure management can be promoted</td>
</tr>
<tr>
<td><strong>Cleaning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-pressure washer</td>
<td>N</td>
<td>Usually not available to small-scale farmers</td>
</tr>
<tr>
<td>Low-pressure washer</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Cleaning of vehicles</td>
<td>Y</td>
<td>Protocols can be established, but will be a new activity for many farms, and may require incentives and encouragement</td>
</tr>
<tr>
<td>Cleaning of premises</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footwear cleaning station</td>
<td>Y</td>
<td>Easy to set up</td>
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</table>
## Small-scale confined production: summary of biosecurity measures and potential for uptake (III)

<table>
<thead>
<tr>
<th>Biosecurity measures</th>
<th>Implementable</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td><strong>Disinfection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disinfection of vehicles</td>
<td>Y/N</td>
<td>Protocols can be established, but will be a new activity for many farms, and may require incentives and encouragement</td>
</tr>
<tr>
<td>Disinfection of premises</td>
<td>Y/N</td>
<td></td>
</tr>
<tr>
<td>Footwear disinfection station</td>
<td>Y</td>
<td>Easy to set up</td>
</tr>
<tr>
<td><strong>Other accompanying pre-emptive measures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaccination</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Traceability: knowledge of identity of supplied herd</td>
<td>Y</td>
<td>Incentives for record keeping can provide data for traceability of identity of supplied herd</td>
</tr>
<tr>
<td>Transparency: knowledge of health status of supplier herd</td>
<td>Y/N</td>
<td>Depends on availability and quality of veterinary services</td>
</tr>
</tbody>
</table>

Biosecurity issues and good practices

On-farm risks related to biosecurity measures

• There is **no one-size-fits-all** recipes for effective biosecurity plans
• Scavenging pig production on the “low biosecurity” end with limited options
• Most basic measures can be applied in small scale confined production
The „low biosecurity“ systems

Focus on things we would consider “good farming practices”

• The premises: keep as clean as possible

• The healthy animal: safe feed (swill must be boiled); vaccinate if possible and necessary (e.g. CSF); confine as much as possible

• The sick animal: don’t slaughter; don’t trade; keep enclosed!
  Highlight public health aspect – beyond ASF

• The dead animal: dispose properly (burry; burn;…) – provide place for proper disposal
The „low biosecurity“ systems
basic measures

• Establish an area with cleanable solid surface in front of the entrance to the stable
• Establish washing facility's (hands and boots) just inside the entrance door
• For a bigger production a hygiene gate will be appropriate
• Keep your stable boots inside in the stable
• Don´t bring your working clothes outside the stable unless for washing
• Wash your hands when you enter and leave the stable
• Train farmers or your staff in your biosecurity procedures
The „low biosecurity“ systems
basic measures

Demand hygiene requirements from visitors

Practice good pest control, mice and rats can carry diseases

React if you find mammal bones in the feed for your swine, might be leftovers from a sick animal

Not to high animal density is also a good prevention against disease

Quarantine facilities for new stock

Traceability system for animals as well as for transport to and from the farm

Don’t transport fresh meat from animals slaughtered on the farm to family or friends.
Working towards animal confinement

Promoting animal confinement

• Housing and feeding are crucial points – locally acceptable options must be elaborated

• Short time confinement in “times of crisis” – can housing and feed be provided by farmers for some weeks / a month?

• Compartmentalization of animal populations for strategic disease control and protection of distinct populations
Biosecurity measures for service providers

…moving along the production chain

Awareness of all stakeholders—all being part of a system

- Artificial insemination centres and boar keepers
- Brokers and transporters
- Slaughterhouses
- Live-animal markets and exhibitions

It includes people who maybe “never see a live pig” (butchers; consumers)
Challenges in the implementation

• Social and economic factors
  • Type of production usually defined by social / cultural background
  • Behavior change not easy to achieve
  • Consider why people do things certain ways
  • Consider costs of biosecurity
  • Show benefits and set incentives

• Sharing of responsibilities needed
  • Public sector – private sector

• Institutionalized support
  • Animal health systems
  • Veterinary authorities
Challenges in the implementation

• **Education / extension services**
  - Continuing service for farmers
  - Addressing main concerns of stakeholders (might not be the disease we try to address: CSF, PED, etc)

• **Communication**
  - Form a common basis
  - Get the most buy-in by all stakeholders
  - Streamline messages

• **Database on pig production sector distribution and other relevant information**
  - Geographical location: density, biosecurity level, etc
  - Roads
  - Markets, insemination stations, abattoirs, etc
Towards implementation
What FAO is doing

• TCP/UKR/3402  *Capacity development in early detection and response to African Swine Fever in Ukraine*

• TCP/BYE/3401  *Emergency assistance to control the African Swine Fever outbreak in Belarus*
  ✓ technical guidance on immediate response -outbreak control measures
  ✓ assistance in development technically sound control programme
  ✓ laboratory diagnostic support
  ✓ decision support systems (GIS)
  ✓ revise/update surveillance protocols
  ✓ awareness of farmers

**EBRD/FAO  African Swine Fever: Risk Awareness Raising and Risk Mitigation in Ukraine**
  ✓ improving contingency plans at national and Kyiv and Poltava regions levels
  ✓ improving the knowledge and awareness of local vets; and
  ✓ raising the awareness of smallholders, small and medium-sized pig farmers on ASF
Towards implementation

What FAO is doing

- **ASFORCE**- European Commission (EC) Research Consortium under the Seventh Framework Programme (FP7) on a targeted research effort on African swine fever

  - 5 themes:
    - Theme 1 - Coordination and management
    - Theme 2 - Prevention, control & eradication models
    - Theme 3 - Pig-wild boar-argasidae interactions
    - Theme 4 - Development of vaccines and diagnostics
    - Theme 5 - Training and knowledge transfer

- FAO participates in themes 2, 3 and 5, mainly on the implementation of field activities in Eastern Europe and the Caucasus, plus mapping of host populations, and studies on wild boar movements
**Towards implementation**

*What does this mean for country XYZ?*

**First steps**
Do we have the baseline information we need to work at this level?

- Stocktaking regarding:
  - The producers
  - The animals
  - Other participants along the production chain
  - How products move geographically
  - The services in place

Backyard density + farms

Wild boars density
Towards implementation

Elements of the system:

1. Description and User Help
2. The epidemiological situation with ASF in Ukraine and neighboring countries
3. The number and placement of pigs (4 levels)
4. The risks of entering the country ACHS
5. Risk factors common in Ukraine
6. Module support decisions on disease control
7. Module monitoring the disease of pigs
8. Notification of suspicion of ASF in Ukraine
9. Module update
10. Additional and reference materials (manuals, publications, etc.)
11. GIS data for battery life (based on the Program "Earth")

“STOP ASF” - Ukrainian online decision support GIS

Google translate from Ukrainian!
Towards implementation

First steps
Do we have the baseline information we need to work at this level?

• Stocktaking regarding:
  • The situation in neighboring countries
  • Raising awareness of farmers, service providers, hunters, and other stakeholders on the risk and risk mitigation
Towards implementation

Setting priorities

Priorities according to production systems of main interest
  • Special attention to scavenging and small scale production systems
  • Focus on regions with co-existence of different production intensification levels
  • Reconsider if one farm = one epidemiological unit – work at village level

Priority on realistic measures
  • Animal and product movements
  • Cleaning rather than disinfection (you can’t disinfect something that is visibly dirty)!
  • Work towards reduced free-ranging (at least during outbreaks)
# Biosecurity of pig farms

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>TOTAL</th>
<th>% of the total susceptible in each sector</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>domestic (LB+HB)</td>
<td>domestic (LB)</td>
<td>domestic (HB)</td>
<td>Wild Boar</td>
<td></td>
</tr>
<tr>
<td>GEORGIA*</td>
<td>176,100</td>
<td>97.2</td>
<td>97.2</td>
<td>0.0</td>
<td>2.84</td>
<td></td>
</tr>
<tr>
<td>ARMENIA*</td>
<td>113,688</td>
<td>99.1</td>
<td>84.9</td>
<td>14.2</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>MOLDOVA</td>
<td>342,000</td>
<td>98.5</td>
<td>83.3</td>
<td>26.9</td>
<td>1.46</td>
<td></td>
</tr>
<tr>
<td>KAZAKHSTAN</td>
<td>1,343,864</td>
<td>98.7</td>
<td>83.0</td>
<td>15.6</td>
<td>1.31</td>
<td></td>
</tr>
<tr>
<td>UKRAINE*</td>
<td>8,183,482</td>
<td>99.4</td>
<td>56.1</td>
<td>43.3</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>LATVIA</td>
<td>820,286</td>
<td>91.8</td>
<td>54.5</td>
<td>37.3</td>
<td>8.19</td>
<td></td>
</tr>
<tr>
<td>RUSSIA*</td>
<td>17,640,570</td>
<td>97.7</td>
<td><strong>37.6</strong></td>
<td>60.1</td>
<td>2.29</td>
<td></td>
</tr>
<tr>
<td>LITHUANIA</td>
<td>1,010,681</td>
<td>94.6</td>
<td>27.2</td>
<td>67.4</td>
<td>5.40</td>
<td></td>
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<tr>
<td>BELARUS</td>
<td>3,910,900</td>
<td>98.2</td>
<td>25.5</td>
<td>72.7</td>
<td>1.77</td>
<td></td>
</tr>
<tr>
<td>ESTONIA</td>
<td>392,385</td>
<td>94.2</td>
<td><strong>8.8</strong></td>
<td>85.4</td>
<td>5.77</td>
<td></td>
</tr>
<tr>
<td>FINLAND</td>
<td>1,448,440</td>
<td>100.0</td>
<td><strong>0.4</strong></td>
<td>99.6</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>TOTAL / avr %</td>
<td>35,382,396</td>
<td>98.0</td>
<td><strong>41.4</strong></td>
<td>56.7</td>
<td>1.97</td>
<td></td>
</tr>
</tbody>
</table>
If endemic, ASF tends to invade HB pig production

Higher biosecurity sector gets progressively involved into the ASF transmission cycle. The trend continued into 2012-2015. What it means?

Concerns and implications for ASF in Eastern Europe

• Occurrence of **ASF in the backyard sector** (which is the epidemiological reservoir !) is underestimated.

• Further evidence for this comes from most recent detections of **ASF in the raw and processed products** of Russian and Belorussian companies and progressive geographical spread in the RF.

• Commercial pig production in Eastern Europe is (and likely to be for long) under a **continuous threat of ASF**.

• Strict biosecurity is therefore a vital prerequisite for development of sustainable commercial pig production that will on the long run phase out backyard pig breeding.
Concerns and implications for ASF in Eastern Europe

HOWEVER!

Backyard sector will not disappear overnight

Photo credit: Jenny Litchfield
Still back to basic common sense will never go out of fashion

Clean boots

Clean bucket and brush
Still back to basic

Disinfection

Necessary equipment
And more awareness
Paper on good practices for biosecurity

Issues and options in developing and transition countries

- Not a manual
- Not a guideline

A document meant to build a common ground for context specific approaches
Thank you for the attention