## BACKGROUND INFORMATION:

RAISING AWARENESS ABOUT AFRICAN SWINE FEVER IN UKRAINE

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Given the media has a critical role in raising risk awareness, this report provides for media representatives an overview of easily-digestible information on African swine fever (ASF), such as symptoms and the modes of transmission, as well as the current situation of ASF in Ukraine and the potential impact for consumers, producers and distributors. The report serves as an aid for the media in the case that there is a necessity for coverage of ASF-related events. It also offers some concrete ways in which the Government and private sector, both individually and together, can implement measures for the prevention and control of the disease. Finally, the report offers information for veterinary officials so that producers have updated contact information of the focal point by Oblast for consultation or in case of suspicion of ASF.

Real-time communications and information provides a greater opportunity for a more informed public, however, it comes with a greater responsibility on the media to provide clear, accurate and timely information. Research has proven the correlation between mass media coverage and consumer behavior. Consumers often make decisions based on partial information. For instance, studies conducted have exhibited a negative correlation between news coverage of animal disease outbreaks and the demand for meat. The reaction of consumers to media coverage on ASF has proven to be linked with irrational consumer behavior – a disease which is not harmful for humans however which is extremely dangerous from a socio-economic point of view. In order to understand the impact of information shared on ASF has on the pork sector, we assessed how processors and consumers react to information in the media based on monthly data by oblast on pork sales from 2013-2015. Our analysis shown that a 1 percent increase in the relative number of Google searches on “African swine fever” or ASF (in Ukrainian and Russian) is correlated with a 0.03 percent decrease in consumer demand.

Such results are a sign of significant vulnerability of consumers to information circulated by the media. In a moment of overall economic depression, this vulnerability and the fact that pork meat remains one of main sources of protein intake for the Ukrainian population in particular in rural areas demonstrate the importance of accurate, effective and transparent reporting and informing. The alternative could mean additional consequences for the pig producers and consumers, in addition to the spread of ASF itself and associated market losses. Apart from the economic losses, food security is a critical consideration from the consumer’s point of view, especially in rural areas.

Thus, it follows that the way in which information is communicated is essential as is having a well-informed public. The industry should be immediately involved in providing high quality and timely information to the media in the event of an outbreak, which will promote a higher rate of reporting of potential instances of ASF. Timely reporting and culling has been proven to be essential in preventing the further spread of ASF: if 50 percent of infected pigs are reported, the death toll will reach almost 96,000. If instead 70 percent of infected pigs are reported, the death toll will only reach around 46,000. Moreover, without timely reporting, total annual losses could reach USD 2.1 billion including the consideration of a probable export restriction.

Despite the extensive efforts by authorities and international organizations to mitigate spread of ASF spread in Ukraine, it has not been enough to eliminate the disease. A tangible and highly efficient Veterinary service as well as functional legal framework is essential to do so. Ukraine has already increased vigilance as it pertains to ASF, with the Ministry of Agricultural Policy and Food dedicating UAH 44.7 million on measures to prevent and eliminate the disease. It has dedicated resources to the appropriate diagnosis of ASF and coordination measures to localize and eliminate ASF outbreaks once reported. In accordance with proper export protocol, Ukraine has also placed affected areas under quarantine and ban on exports. It has also partnered with the European Bank for Reconstruction and Development (EBRD) and the Food and Agriculture Organization of the United Nations (FAO) to allow for the provision of assistance is carrying out such measures.

In 2013, FAO and the European Bank for Reconstruction and Development (EBRD) have coordinated with the private sector through the cooperation with the Association of Pig Producers of Ukraine in order to step up awareness-raising activities in Ukraine and provide recommendations for both possible compartmentalization as well as the development of an ASF-dedicated emergency compensation fund. The key objective of the joint FAO/EBRD project is to mitigate the risks associated with the introduction and spread of ASF in Ukraine and to implement associated action to achieve ASF eradication. The project has promoted a review of the existing regulatory framework, improvement of contingency plans at the national and oblast levels, improving knowledge awareness of local veterinaries through trainings, and raising the awareness of smallholders, small and medium-sized pig farmers on ASF.

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1 The model has only considered Google as it is more representative as there is a larger sample size. Statistics from Yandex were only found for 2015, which offers limited observations, whereas Google has records since January 2013.
A special online information system "STOP - ASF" was created to assist in control of ASF in Ukraine. It is designed to monitor the current situation of ASF in the country in real time, and inform all stakeholders (owners of pig farms, veterinarians, hunters, and the general public) about the spread of disease control measures taken by the state, requirements and restrictions approved by the relevant State emergency anti-epizootic commission, etc. The system is in the process of continuous improvement.

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GLOSSARY

**ASF virus genotype II**: The variant belongs to genotype II, which has been circulating in eastern European countries since the introduction of the African swine fever virus (ASFV) into Georgia in 2007.

**Backyard farms**: Those farms which do not fall in any of the categories of commercial farms.

**Biosafety or biosecurity**: A plan that identifies potential pathways for the introduction and spread of disease in a zone or compartment, and describes the measures which are being or will be applied to mitigate the disease risks, if applicable, in accordance with the recommendations in the Terrestrial Code.

**Case**: An individual animal infected by a pathogenic agent, with or without clinical signs.

**Caucasus**: A region at the border of Europe and Asia, situated between the Black and the Caspian seas. The northern Caucasus is associated with the Russian Federation and the southern Caucasus is associated with Azerbaijan, Armenia, Georgia, Iran and Turkey.

**Classical swine fever**: Classical swine fever (CSF), also known as hog cholera, is a contagious viral disease of pigs, including wild boar. The causative virus is a member of the genus Pestivirus of the family Flaviviridae. There is only one serotype of CSF virus (CSFV).

**Commercial farm**: The production of crops and farm animals for sale, usually with the use of modern technology.

**Compensation**: Payment made directly by a government agency to the owner of an asset. There is generally no insurance policy or insurer involved. There is no written contract between the farmer/producer and the government, but there must be a national compensation policy made enforceable through legislation that says the government must pay, otherwise the government is not obliged to compensate farmers/producers for any of the animals it destroys.

**Culling**: In animal breeding, culling is the process of removing or segregating animals from a breeding stock based on specific criteria. For the purposes of this report, that criteria is infection or exposure to infection of the African swine fever virus.
Detection (ASF): Laboratory confirmed registration of virus or antibodies to it in live pigs, their tissues or pork products.

Direct losses: These stem either from the disease itself, or from sanitary control measures (stamping-out policies). In addition to the loss from the value of animals culled as such, there are culling and disposal costs, which are carried out by the state veterinary services.

Disinfection: The application, after thorough cleansing, of procedures intended to destroy the infectious or parasitic agents of animal diseases; this applies to premises, vehicles and different objects which may have been directly or indirectly contaminated.

Epidemiological unit: A group of animals with a defined epidemiological relationship that share approximately the same likelihood of exposure to a pathogen. This may be because they share a common environment (e.g. animals in a pen), or because of common management practices. Usually, this is a herd or a flock. However, an epidemiological unit may also refer to groups such as animals belonging to residents of a village, or animals sharing a communal animal handling facility. The epidemiological relationship may differ from disease to disease, or even strain to strain of the pathogen.

Epizootic: A disease event in a nonhuman animal population, analogous to an epidemic in humans.

Fomites: Objects or materials which are likely to carry infection, such as clothes, utensils, and furniture.

Indirect losses: Costs include foregone revenues due to denied access to better markets or sub-optimal production methods. It also includes impacts on livestock and product prices and on upstream and downstream activities along the livestock value chain upstream to the producer. Losses due to the impact on tourism and services (and thus disruption to trade flows) are also considered.

Outbreak: The occurrence of one or more cases in an epidemiological unit. A disease outbreak is the occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season.

Pathological material: Samples obtained from live or dead animals, containing or suspected of containing infectious or parasitic agents, to be sent to a laboratory.

Restocking: Replenishing premises with pigs. Depopulated premises should not be restocked for at least 40 days following cleaning and disinfection. Seronegative sentinel swine should be closely monitored for at least six weeks (clinically and serologically) to detect any re-infection.

Reticuloendothelial system: The mononuclear phagocyte system (MPS) (also called Macrophage System) is a part of the immune system that consists of the phagocytic cells located in reticular connective tissue. The cells are primarily monocytes and macrophages, and they accumulate in lymph nodes and the spleen.

Stamping-out policy: Carrying out under the authority of the Veterinary Authority, on confirmation of a disease, the killing of the animals which are affected and those suspected of being affected in the herd and, where appropriate, those in other herds which have been exposed to infection by direct animal to animal contact, or by indirect contact of a kind likely to cause the transmission of the causal pathogen. All susceptible animals, vaccinated or unvaccinated, on an infected premises should be killed and their carcasses destroyed by burning or burial, or by any other method which will eliminate the spread of infection through the carcasses or products of the animals killed.

STOP ASF: A special online information system created to assist in control of ASF in Ukraine. It monitors the current situation of ASF in real time, and inform all stakeholders (owners of pig farms, veterinarians, hunters, and the general public) with information relevant to the spread of the disease.

Swill feeding: Swill feeding is the traditional name for the feeding of food scraps to pigs.

Sus scrofa: The wild boar (Sus scrofa), also known as the wild swine or Eurasian wild pig is a suid.

Quarantine: A state, period, or place of isolation in which animals that have arrived from elsewhere or been exposed to infectious or contagious disease are placed.

Zoning: The process of defining a zone around and including suspected or infected establishments, taking into account the epidemiological factors and results of investigations, where control measures to prevent the spread of the infection are applied.
ACRONYMS AND ABBREVIATIONS

ASF  African swine fever
ASFV  African swine fever virus
FAO  Food and Agriculture Organization of the United Nations
FMD  Foot-and-mouth disease
MoF  Ministry of Finance of Ukraine
MoA  Ministry of Agricultural Policy and Food of Ukraine
OIE  The World Organisation for Animal Health
IFPRI  International Food Policy Research Institute
USDA  United States Department of Agriculture
EBRD  European Bank for Reconstruction and Development
ASF is a viral disease with the potential for a devastating impact on the pig industry. While ASF does not pose a direct threat to human health, it can impact livelihoods, food security, nutrition and incomes in a variety of ways. The disease is transmitted through direct and indirect contacts, ingestion of contaminated feedstuffs and by certain tick vector species. The main route of spread is through the pork marketing chain that brings inexpensive and contaminated pork and pork products from infected areas. Subsequent swill feeding and improper disposal of carcasses exposes susceptible pig populations. The fact that the African swine fever virus (ASFV) remains infective over weeks up to months in tissues and pork products allows its persistence in the environment and in refrigerated and frozen meat and meat products. And, once ASF has been introduced into a territory, the disease is nearly impossible to eradicate.

Since its introduction to the Caucasus in 2007, ASF has had severe effect on swine production in the region. In 2012, an ASF outbreak was reported on 30 July in Komyshevatska, Ukraine on the coast of the Black Sea, which is 150km from the border with the Russian Federation. In January 2014, ASF was again detected in Ukraine both in wild boar and domestic pigs. From late-2014 onwards (after successful eradication of two previous ASF incursions in 2012 and early 2014, in Zaporizhzhya and Lugansk Oblasts respectively), the epidemiological situation in Ukraine has significantly deteriorated implying high risk of further uncontrolled spread of the disease. Eventually, the disease reached the northern border of Ukraine and penetrated Chernihiv (first detected in wild boar) and parts of the Kiev and Sumy oblasts, where it seems to have become endemic in domestic pigs. Most recently single cases of ASF in domestic pigs were detected in Mykolai and Odessa oblasts suggesting rapid spread towards major pig production areas in Ukraine, most likely through the movement of contaminated pork from endemic areas. All the oblasts where outbreaks took place in 2015-2016 years include: Kyiv, Kharkiv, Vinnytsia, Volyn, Cherkassy, Chernihiv, Rivne, Chernivtsi, Khmelnytsk, Kirovograd, Jytomyr, Sumy, Poltava, Mykolai, Odessa oblasts. One of the most devastating outbreaks in Ukraine occurred in August 2015 on a 60 000 head pig farm, Agricultural Complex "Kalyta", in the Kiev oblast in Ukraine. Direct losses alone were estimated at UAH 200 million and indirect losses were valued at more than UAH 100 million. Losses to the surrounding neighborhoods could reach as high as UAH 150 000 for households and UAH 500 000 for entities.

For Ukraine, the spread of the disease has the potential to negatively impact markets, reduce the attractiveness of the pig production sector for investors and be placed under international trade restrictions and/or quarantine for the affected oblast. This does not reflect the social losses and losses of households in the 3km zone around the outbreak, which should not be underestimated. Household losses are incurred due to restrictions on the transport and to sale of pork. In the case of Kalyta, the impact on the surrounding villages is expected to be significantly higher due to its scale (household losses are assessed to be low due to inefficiencies inherent in breeding pigs near one of its biggest national producers). In Ukraine, the extensive pork production sector represents an important source of meat for the rural population – representing 36 percent of total meat in the Ukrainian diet – and often generates valuable cash income. Ukrainian rural households earned about UAH 1.72 billion annually from pig production and, as of 2015, roughly half of the pig population was accounted for by backyard pig farms in Ukraine.

No vaccine or drugs are available to prevent ASF infection. Therefore, it is particularly important that ASF free areas are maintained free by preventing the introduction of the disease. All control and eradication measures applicable are based on classical disease control methods. These measures must be combined with strict quarantine and biosecurity measures in domestic pig holdings and animal movement control. Additionally, while as of 2014 about 61 percent of pig farms, excluding backyard holdings, have a medium biosecurity level, complying with the majority of biosecurity standards, 10-16 percent of holdings have either low or nonexistent biosecurity. Given such a high predominance of smallholders and the challenges in adopting high biosecurity measures, the spread of ASF in the country already has serious socio-economic consequences, and the impact is likely to grow if the disease is not properly controlled in the near future.

The Government and the private sector, including commercial and backyard holdings, should be active in prevention and control measures, including surveillance, epidemiological investigation, tracing of pigs and stamping out in infected holdings. Outbreaks of ASF have been effectively controlled in some countries by stamping out measures, through swift and thorough culling and disposal of all infected and in-contact pigs, and through the implementation of strict movement bans of swine and their products. These measures should be supplemented with biosecurity measures in domestic pig holdings. Such measures are difficult to implement without well-equipped veterinary services, properly trained personnel and sufficient and timely access to funds – for operations and compensation to the pig owners – and the awareness of households and farmers on the importance of reporting as well as measures to prevent and control the disease.

Compensation plays a particularly important role in motivating timely reporting. Without the proper legal framework and implementation measures in place for compensation, farmers might otherwise have incentive to sell still healthy-looking pigs to
reduce the potential financial losses when they are facing problems with ASF on their farm. Compensation provides a safety net for farmers against economic losses and therefore reduces the disincentives for reporting and is the responsibility of the government to provide appropriate compensation when private assets of citizens are destroyed for the public good.

Cost-sharing schemes between the government and affected sectors have been implemented in some countries as a way to deal with the costs associated with livestock epidemics, including proper funding to allow for timely compensation of farmers. Our analysis shows that investment in a compensation fund for farmers who have been implicated in the spread of ASF enables the prevention of a number of probable losses. The potential savings for Ukraine could be as high as USD 59.7 million in direct costs, USD 150.5 million of both direct and indirect costs and nearly USD 2.7 billion in total losses, including the consideration of a probable export restriction.

**ORIGINS OF THE DISEASE AND CURRENT SITUATION IN NEIGHBORING COUNTRIES**

According to its geographical origin, ASF is an endemic disease of African suids, which has repeatedly been brought into several countries of Europe and Southern America over the last century. The eradication of ASF in some countries lasted for decades and required expensive financial and human resources. It should be noted that all previous epizootics of ASF (including the USSR) were caused by ASF virus genotype I, which has a lower mortality rate than genotype II that is currently present in Ukraine and Eastern Europe. Therefore, the current situation of ASF in Eastern Europe is, to some extent, unprecedented from the epizootic point of view and therefore very challenging, especially given a growing involvement of wild boar into the transmission cycle of ASF in 2012-2015.

From 2007-2015, the ASF II genotype spread rapidly in Eastern Europe, starting with Georgia and Armenia in the Caucasus (2007-2008), then through the southern and central parts of the Russian Federation (2008-2011) in Ukraine and Belarus (2012-2013), and later in Poland, the Baltic States and was reintroduced into Ukraine (2014-2015). The unprecedented scale and pace of its geographical distribution, resulted in a massive number of affected and/or preventively slaughtered domestic pigs, involvement of different kinds of pigs (ranging from backyard to highly bio secure commercial farms, and in some countries also the European wild boar populations) – making ASF one of the biggest veterinary problems for the region.

**WHAT IS THE CURRENT SITUATION IN UKRAINE?**

**Figure 1: The situation with the spread of ASF in Ukraine, 2012 – February, 2016**

Source: FAO.

Note: The background shows the density of backyard pigs (density ranges by color) and location of commercial pig farms (black dots). Red dots stand for outbreaks in domestic pigs, blue dots are cases in wild boar. Please see Annex 6 for maps on the density of the backyard pig and wild boar population in Ukraine.

So far there are limited cases of registration of ASF in wild boar in Kyiv, Rivne, Zhytomyr and Sumy oblasts, which are so far not clearly suggestive of an endemic status of the disease in wild boar. However, the current situation in Ukraine should be regarded as very serious even without considering the possible involvement of wild animals. As of November 2015, the spread of the disease continues, including new detections in Odessa and Mykolayiv oblasts, which are quite far away from the endemic area in
northern Ukraine. Getting ASF under control in Ukraine would likely take years, if not decades, and will require radical changes to the perception of biosecurity threats and disease prevention measures by all categories of pig farmers.

WHY IS ASF DIFFICULT TO CONTROL AND ERADICATE (ESPECIALLY IN UKRAINE)?

First and foremost, there is no vaccination for ASF. The transmission cycle of ASF (please see Annex 1) in this part of Ukraine does not differ from what is observed in the Russian Federation. The extensive pig production sector (backyard farms), where outbreaks are extremely difficult to prevent, monitor, and take adequate measures for their localization, plays a fundamental role in sustaining disease endemicity and its gradual expansion to new areas. Similar to other affected countries, the situation in Ukraine is further complicated by involvement of the wild boar population, whose higher abundance in the north (especially in the exclusion zone of the Chernobyl NPP) could favor development of an independent sylvatic ASF transmission cycle as has already happened in Poland and the Baltic States. The spread of ASF is difficult to control also due to the density of backyard pigs which poses also a serious socio-economic question in a moment of economic depression.

WHAT IS THE IMPACT OF ASF?

Previous analyses of the economic impacts of swine disease, in particular, have pointed to the deleterious effects of an outbreak on specific economies. Meuwissen, et al estimated the financial consequences for the 1997 – 1998 outbreak of Classical Swine Fever in the Netherlands at USD 2.3 billion, with consequential losses for farmers and related industries reached USD 423 million and USD 596 million respectively. Estimated economic losses due to the spread of ASF in the Russian Federation were USD 1 billion, with over 600,000 pig having died or been culled between 2007 to mid-2012. ASF is listed as a particularly dangerous (quarantine) animal disease as well as an infectious and parasitic animal disease, which was approved by the OIE in 2015.

The negative impact of ASF may include losses of the particular producer where an outbreak occurred, losses in the protected area (3-20 km), losses of surveillance zone (more than 20 km) and national losses. The market participants most impacted are: producers, consumers, the state budget and society in general. Losses in the protected area are mostly caused by restrictions in transportation and necessity to allocate resources to communication with the relevant areas, monitor any developments and the, quarantine zone, in addition to various activities to control ASF spread.

Currently, ASF is on the list of OIE as a particularly dangerous (quarantine) infectious disease. The reasons for that are the following:

- high mortality and contagiousness, which forces destroying animals, equipment that cannot be disinfected (wooden, etc.) and feed products that could be potentially in contact with infected animals. The situation is further complicated by the absence of a vaccine;
- high damage that is caused to the pig sector and includes direct and indirect losses. Apart from the loss of total pig population, producers may incur losses from the quarantine zone when they are not able to renew their production or to transport any product of the pig sector. Significant costs are associated with the state and local budgets, which ensure expenditures on the compensation, disinfection, veterinarian work, tests kits, wild boars culling, and otherwise. However, what is even more important and significant is indirect losses, which could implicate producers, consumers, distributors and others. Indirect losses include losses of feed producers, export restrictions (even if they are temporary, a significant drop of internal prices may occur, some share of products may be lost due to extended storage time, and storage itself may be a cost to producers), a loss in consumers’ willingness to buy pork. Another extremely important indirect loss is the destruction of breeding pigs that could potentially offer an additional revenue source (we indirectly lose all the unborn piglets).

The socio-economic effect is critically important particularly for Ukraine. Apart from pork being part of Ukraine’s national identity, the pig sector plays an extremely important role in ensuring higher quality of life in rural areas. For a big part of the poorest population, breeding pigs is a source of income, providing some financial resources and meat to improve their diet. Thus, the deterioration of the pig sector may lead to a decrease in national food security level.

For instance, the most dangerous outbreak in Ukraine occurred in August 2015 on a 60,000 head pig farm, Agricultural Complex "Kalyta", in the Kiev oblast in Ukraine. Direct losses alone were estimated at UAH 200 million. Indirect losses included the following: more than UAH 100 million due to lost unborn piglets for only one year (according to the number of culled breeding pigs); potential loss of value added if Kalyta could process and sell pork was valued at upwards of UAH 150 million. Losses in the surrounding 3-km radius, or the protected area, were not significant as it might have been otherwise given that it makes little sense to breed pigs near such a big producer (moreover, we could expect that most of living there people were involved in Kalyta production in one way or another). As a result, only 57 pigs were kept at households in the village Kalyta itself and around 200 were bred by entities in the nearby village of Omelianov. As a result, depending on the whether the residents decided to
consume and preserve meat themselves, illegally transport it, or sell to their neighbors, their losses could reach as high as UAH 150,000 for households and UAH 500,000 for entities.

THE UKRAINIAN PIG SECTOR AT A GLANCE

In 2015, the pig population in Ukraine was almost 7.4 million heads, almost half accounted for by backyard holdings, producing up to 5 percent of national agriculture value added. Figure 2 below shows the distribution of the pig population between households and agricultural enterprises between 2010 and 2016.

Figure 2: Distribution of pig population in Ukraine, 2010-2016

Source: State Statistics Service of Ukraine.

There has been a steady increase in the proportion of commercial pig production in Ukraine over the last 7 years, while the number of backyard pigs had a decreasing trend during this period. Generally the pig sector production remains relatively stable despite any crisis with only slight decrease in 2015. But what does pork mean for each separate market participant?

WHAT IS PORK TO UKrainIAN CULTURE?

Pork, particularly salo, plays an extremely important role in Ukrainian economy, culture and cuisine. While Ukrainians are neither the only population to consume salo nor the largest consumer of pork per capita, it is the only country that regards salo as a symbol on equal terms with a hymn or coat of arms. It is widely mentioned in Ukrainian folk songs, proverbs and legends. Historically, the significance of this product was in light of its high caloric value and its ability to be preserved for a long period of time.

Salo is often referred to as the food of misery and wealth. On the one hand, it is one of the cheapest products in the pork sector, which has been consumed by people from low-income households for centuries. People with a low average income often obtain calories from cheap products and salo plays an important role in providing energy for a low price. At the same time, in contrast, salo of high-quality exists in Ukraine (with a strict list of required characteristics), for which prices can reach that of meat products or even exceed it.

The pork sector is also significant for Ukrainian culture and its development in particular. There are a number of various annual festivals, fairs and conferences devoted to pork and specifically to salo. There is even a museum of salo in Lviv, Ukraine, where the biggest heart made of salo is exhibited with a café situated on the territory of the museum. Furthermore, the institute of pig breeding (devoted to investigations of pigs' particularities in veterinary, selection and breeding) was founded in Poltava, where one of the monuments to breeding pig and piglets was built. In Ukraine, the breed *Myrgorodska* was selected as producing the best salo, which is believed to be the standard.

All the aforementioned facts highlight the importance of the pork sector for Ukraine. In the event of pigs lost due to various factors, including the further spread of ASF, it is not only potential economic losses that the country would face, but also
essential cultural and moral losses, which would impact the entire population, especially rural areas. Moreover, it would be a significant trauma for Ukrainians, most of which associate salo with its national identity, both in terms of psychological shock and reduced food security level.

WHAT IS PORK TO THE UKRAINIAN CONSUMER?

Consumers are one of the most important market participants (in terms of social effect) whose diet quality largely depends on available on the market meat. At the same time, pork is an essential product of daily consumption for an average Ukrainian. As seen in Figure 3, pork formed around 36 percent of total meat consumed by one person in 2016, with an amount of 18.1 kg per year. In Ukraine, pork is second only to poultry, which is cheaper for consumers and produced in higher qualities due to the fact that it is more easily produced with low production costs and is less time-consuming.

Figure 3: Meat consumption per capita, %

Source: State Statistics Service of Ukraine.

Pork meat and salo in particular provide a significant share of energy in an average diet. Moreover, due to the Ukrainian crisis and currency crash that occurred, real incomes are decreasing due to high inflation and an increase in prices for import dependent products. As a result, consumers pay less attention to quality and desired characteristics of the purchased product. Instead, prices have become a crucial factor for the population.

The primary difference between rural and urban areas is evident in the consumption structure. The share of meat consumed is remarkably higher for big cities, while the opposite situation exists for salo, which is shown in Figure 4 below. This can be explained by two possible reasons. The first potential reason could be the lower level of income in villages due to the lack of access to highly paid jobs. Obviously, salo (a relatively cheap and a high-calorie product) would be consumed in higher quantities. The second reason could be a higher level of commitment to traditional practices, which is specific to rural areas and small villages.

Figure 4: The share of calorie intake formed by pork meat and salo, 2015
This share is the highest among all kinds of meat, compared to a bit more than 1 percent for beef and around 5 percent for poultry (mostly due to its lower energy intensity). There is a higher share of total energy consumption only when comparing pork to bread and other grain products, various kinds of oil and sugar (including confectionery, honey etc.). The product that has the least share in energy consumption is fish products (35 kcal daily). The aforementioned structure helps us to conclude that pork forms the highest share of energy consumed, among other products to allow for a diversified diet.

Source: Estimated based on Ukrstat data.

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**WHAT IS PORK TO THE UKRAINIAN PRODUCER?**

_Pork is remarkably important for Ukrainian producers, both for farmers and households._ As seen in **Figure 5**, it constitutes 33 percent of national meat production and has been stable for the last few years. Poultry is the only product that exceeds its production volume. In terms of total national production, pig sector is valued at more than 5 percent of total gross agriculture value added annually.

**Figure 5: Structure of meat production, 2015**

Source: State Statistics Service of Ukraine.
WHAT IS PORK FOR COMMERCIAL FARMS?

The pork sector provides an opportunity for farmers to invest in one of the least risky areas of higher value-added production and to obtain relatively high level of profitability on the livestock market. As evident in Figure 6, as compared to other livestock products, pork proves to have the highest level of profitability. Low profitability of poultry is due to the fact that most producers prefer to process poultry on their own facilities rather than selling meat. At the same time if we compare beef, sheep and pork sectors, the last one is the most profitable due to the numerous specifics of this sector. In particular, simplicity in feeding products choice, peculiar for pig production, enables basing diet on the cheap feeding grain. Another reason is a quicker turnover as pigs gain necessary weight quickly comparing to beef. Besides, it is more effective to create big enterprises for pig production with low costs, which significantly influences the overall sector profitability.

**Figure 6: Profitability of key meat sectors, percent**

![Graph showing profitability of key meat sectors](image)

Source: State Statistics Service of Ukraine.

WHAT IS PORK FOR HOUSEHOLD PRODUCERS?

In Ukraine, there are presently around 4.9 million rural households, out of which around 46 percent breed pigs (around 0.63 pigs per rural household). The number of pigs raised per household differs, however, in most cases it varies between 1 and 2 heads, as can be seen in Figure 7. Pig sector helps to sustain a higher level of income for the rural population. Moreover, it improves their diet directly through consumption of meat products produced themselves.

**Figure 7: Distribution of rural households based on the number of pigs bred**

![Graph showing distribution of rural households](image)

Source: State Statistics Service of Ukraine.
The pig sector generates almost UAH 2 billion of additional income annually for the rural population (on average UAH 1173 per rural household when considering all households, not just those with pig holdings). As shown in Figure 7, the average income obtained from selling pigs is lower than that of cattle, due to the fact that the price per head is significantly higher for cattle as compared to pigs and hogs.

Figure 8: Income of an average rural household breeding appropriate livestock obtained from meat sold in 2014

Thus, the average rural pig-breeding household earns up to UAH 1663 from pork sold, which constitutes around 6.41 percent of the average annual income of a rural household.

What is pork to the Ukrainian distributor?

Another important market player on pork market is the distributor. The significance of pork for this group is highly dependent on the attitude of final consumers on the product, which was previously proved to be quite positive. However, the potential for distributors to obtain high revenues is restricted due to the decrease in purchasing power of the average consumer. For example, the volume of pork sold in 2014 has remarkably decreased (by nearly 20 percent) compared to 2013. And in 2015, the price tendency has changed due to lower market demand. Nevertheless, comparing pork to most of other kinds of meat, the rate of such decline is the lowest, and as such, among livestock products pork still remains one of the most favorable for distributors. It is one of the cheapest meat products, which makes it more affordable for the population and helps to prevent the market from a sharp decline during the crisis. The cheapest among livestock prices is salo, which proves it to be a popular choice especially for the rural population and, thus, more stable product for distributors.

Pork has a significant place in the retail of agricultural products, as shown by sales of agricultural products presented in Figure 9. Higher value-added products were analyzed for an understanding of the level of development of agriculture enterprises and (in some cases) vertical integration. Ukraine has the most powerful potential in pig sector, poultry, milk and oil sector, especially in terms of the world market. Thus, in case of reduced production in the pig sector, it could be substituted by these other products, primarily poultry given that it requires for similar feed resources that are available in Ukraine.

Figure 9: Agriculture products sales structure
WHAT IS ASF?

Below provides a brief overview of the characteristics of the disease:

- **Mortality and morbidity:** High, often reaching 100 percent mortality for severe forms of the disease
- **Susceptible Species:** In Ukraine they are all varieties of domestic pigs and wild boar
- **Direct horizontal transmission:** Contact of healthy pigs with infective secretions and excretions of infected animals, primarily through the orinasal route
- **Indirect transmission:** feeding on contaminated pork products (most often through swill feeding), fomites (including premises, vehicles, implements, clothes, tools etc. that were in contact with infective material
- **Clinical signs:** Loss of appetite, high fever (>41.5 °C), nervous disorders, sudden death without little manifestation, but often quite inconspicuous
- **Pathology:** in typical cases widespread hemorrhages, hemorrhagic lymph nodes, enlarged and congested spleen, but sometimes none of these.
- **Persistence in the Environment:** Highly stable and temperature resistant (requires heat-inactivation at 56°C/70 minutes or 60°C/20 minutes). Can survive in the wide range of pH (3.6 - 11.5). At low temperatures remains infective for months
- **Animal Products and By-Products:** Extremely long-lived in blood, feces, and tissues and in uncooked pork and pork products, particularly when chilled or frozen.
- **Public health risk**: ASF is not a human health threat.

**SYMPTOMS: HOW CAN ASF BE SPOTTED?**

The incubation period is short (2-12 days) and is accompanied by fever (40-42 °C) for 48 hours before the manifestation of clinical signs (in contrast to classical swine fever) and has no other symptoms in this period. Most of the sick animals at this time seem perfectly healthy and do not refuse food. Clinical signs occur with falling temperatures: animals exhibit signs of weakness (staggering gait, refusal to feed, signs of thirst), get in groups, signs of heart failure appear, cyanosis (cyanosis) of the skin and extensive hemorrhages (hemorrhages in the skin and internal organs).

Pregnant sows tend have a miscarriage, regardless of the pregnancy term for 5-8 days after infection or 1-3 after a fever. In the fetus, membranes and the skin of fetus, often hemorrhage is registered. Death of sick animals occurs due to heart failure (pulmonary edema due to hemorrhagic diathesis) and is typically 7-10 days from the manifestation of the first clinical signs of the disease. Mortality has been assessed at almost 100 percent.

**Given continuing spread of ASF in Ukraine, any anomalies in behavior, fever or signs of a disease (not to mention death) should be considered as a likely outbreak of ASF and a veterinary specialist should be immediately notified.** Signs of the disease, the number of affected or dead animals can be extremely varied depending on the routes of infection and other circumstances and does not always correspond to the typical (as described in the old veterinary text books) course of the disease.

A positive or negative diagnosis of the ASF virus always requires a laboratory test. ASF samples may be taken only by qualified personnel, taking into account all the circumstances of the incident. **Treatment of animals or any attempts of a farmer to evade these requirements will only worsen the situation and will contribute to the further spread of infection, which can also qualify as a crime.**

**WHAT DOES BIOSECURITY MEAN AND WHAT MEASURES CAN BE TAKEN?**

Ukrainian commercial pig production sector (about 3.5 thousand resisted farms) is comprised of a large variety of farms ranging from smallholder (actually an extended backyard holding) to high biosecurity high tech commercial holdings. For more information regarding population density as well as distribution of pig holdings and commercial farms, please see the Annexes. A recent evaluation of the farm biosecurity standards (2014) based on 22 criteria showed that most holdings (60.7 percent) comply with the majority of requirements (medium biosecurity level). Please see Figure 10 below. Twenty three percent of holdings meet essentially all standards (high biosecurity). The remaining 10-16 percent of farms have either low or nonexistent biosecurity.

**Figure 10: Classification of Ukrainian pig farms (%) based on biosecurity standards**

<table>
<thead>
<tr>
<th>Biosecurity Level</th>
<th>Percentage</th>
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<tbody>
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<td>None</td>
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<tr>
<td>Unknown</td>
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<tr>
<td>Low</td>
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<tr>
<td>High</td>
<td>23</td>
</tr>
<tr>
<td>Medium</td>
<td>60.7</td>
</tr>
</tbody>
</table>

Source: Authors’ compilation.

The following are biosecurity measures that can be taken:
- Only feed pigs with thermally processed food. But even with the heat treatment, it is important to prevent the entry of farm and feeding mud, food waste and other sources of a potentially dangerous virus.
- Do not buy live pigs, feed and raw materials in ASF-infected areas, refrain from purchasing pigs and feed of dubious origin without relevant documents and certificates.
- Refuse to travel to the oblasts and countries where the presence of the ASF pathogen has been confirmed (primarily exclude formally declared quarantine zones) or there is a high risk of spreading, and enforce this policy for all farm staff.
- Limit (or exert a total ban on) visits to farm territories by persons who do not work in the company and do not have necessity or jurisdiction. In any case require strict compliance with established rules and farm constraints.
- To reduce the risk, if possible and approved by the owner, ensure that pigs are not kept within a radius of 3-5 km around the farm.
- Ensure full double fence, strengthen measures to prevent access to the farm (especially to areas where food is prepared or stored) any domestic or wild animals, including birds.
- Prohibit the possession of wild or domestic animals, including poultry in the territory of pig farms. The only exception is guard dogs which must be registered and have the appropriate mark in their vaccination passport against rabies and other diseases. They must also reside exclusively on the farm.
- Entry into the territory by vehicle is not possible without following disinfection requirements at the disinfection barriers. Before passing a bathroom, the car must be washed by pressurized water to remove dirt because it could impede the disinfectants ability to successfully kill the parasite.
- Entrance of the personnel in the industrial zone of pig farms is permitted only through veterinary and sanitary allowance and entry of transport – always passing though the disinfection unit. In veterinary and sanitary allowance the following is noted: start of working professionals, visiting persons to whom it was allowed (veterinarians, inspectors, and consultants), movement and disinfection of transport, preparation of disinfectants and disinfection barriers refueling, washing and disinfection and inspection.
- Upon entering the isolation room, there is a place for disinfection. On the inside of the door when entering, disinfection rugs are filled with sawdust or other porous material moistened by disinfectant solvent.
- For animal needs, a service a group of responsible people should be fixed and should have a medical examination in accordance with applicable regulations and are familiar with the rules and limitations of biological safety.
- All staff should be provided with clothing and footwear (at least two sets per worker). Machinery, equipment, clothing, footwear and other items should be marked and fixed by the district. Transferring these items from one district to the other is prohibited without prior decontamination.
- Farm workers should be prohibited to keep pigs in private households and be provided with the proper incentives to follow this rule (through contracts, subscriptions, inspection, maintenance pig products, etc.).
- Organize a centralized food for staff directly on the farm to completely eliminate the use of any other food brought with them to the workplace.
- Washing and disinfecting clothing should also be organized centrally and completely exclude the possibility that workers do it themselves at home.
- Clearly define and mark "dirty" and "clean" areas in the enterprise. Do not allow workers to wear the same clothes and shoes as they cross the boundaries of these zones.
- To ensure the technical process in the industrial zone special internal business traffic should be provided. Check out of the transport from sector is carried out only in exceptional circumstances (e.g. repairs), and in such cases require careful washing and disinfection.
- Also at the farm, the distribution and labeling "clean" (delivery of feed, animals) and "dirty" (removal of manure, dead animals, slaughtering waste) vehicles is carried out in order to exclude their crossing.
- Loading of animals should be done by the ramps placed on the line of farm demarcation, without allowing the entry of vehicles in the area. Check the degree of cleaning and disinfection of vehicles that comes to the plant or farm.
- Animals that should be slaughtered are transported to slaughter and sanitary items (slaughter floor) by special transport, which prevents the leak of biological material.
- While importing or exporting feed, waste, or additional materials to farms, the driver should not be allowed to exit the vehicle onto the farm.
- The farm and premises where animals are kept should be kept clean and regular disinfection should be carried out. Take measures to have a permanent stock of antiviral disinfectants.

### HOW DOES ASF SPREAD? CAN RAISING RISK AWARENESS HELP?

The modes of transmission of ASF are various, and as such, it is pertinent that producers are aware of how a potential outbreak could occur in order to prevent future outbreaks of ASF. Raising awareness of all involved stakeholders is key to prevention. Transmission most often occurs in the following ways:
- Historical data from the Russian Federation show that in most cases (97 percent), the primary source of outbreaks of ASF at farms are through contaminated pig products, which is fed to pigs through swill feeding. Slaughtered (dead bodies, blood, flesh, fat, skin, bones, internal organs, etc.) are able to contribute to the rapid spread of the disease.
- The secondary source of outbreaks were most often associated with the use of contaminated vehicles, direct contact with pigs of different farms, or visits from infected farm workers.
- The slaughter and distribution of crude meat from ASF-infected pigs is another important mechanism that ensures the continuity of the epizootic cycle of the disease and its spread to new areas.
- It is also possible to transmit the ASF infection during treatment or vaccination of animals without changing or sterilizing needles.
- The role of aerosol transmission of the pathogen can only be small and occurs at short distances.

It should be noted that the ways of spreading the ASF virus on farms often remains unclear, especially when it comes to local distribution (secondary outbreak) of disease. Therefore, possible precautions should be as global as possible and take into account the previous experience, expert advice, and the current epizootic situation in the country — as well as specific risk factors in your oblast or in the immediate vicinity of the farm.

**DOES TIMELY REPORTING IMPACT DISEASE SPREAD AND DEATHS?**

**Disease deaths can be enormously reduced by improving the reporting rate and reaction rapidity.** According to statistics, farms recorded 28 percent of all outbreaks (with 20 percent on large pig farm and 8 percent on small farms). It should be understood that not all outbreaks of ASF are properly reported to the competent services of the country and the statistics given above reflect only the detected cases (which, in fact, would always be more – we can expect detected case to form only 10-30% of all cases). Obviously, timely detection positively affects the process of the ASF elimination as allows restricting possibilities of any contact between infected and healthy pigs.

In order to assess the expected number of pigs lost due to ASF, an epidemiological model was developed. A few scenarios were simulated based on three basic parameters: transmission rate (that characterizes probability of infection), share of households reporting disease cases and time required for a case eradication. Compensation fund implementation solely, without any additional measures, leads to the increased share of households reporting pig disease to appropriate service. However, as it can be seen in the table, representing possibility to stop ASF spread under various parameters values, efficient veterinarian service for timely case eradication is necessary to stop the disease spread.

<table>
<thead>
<tr>
<th>Share of households reporting</th>
<th>1 day for liquidation</th>
<th>1.5 day for liquidation</th>
<th>2 days for liquidation</th>
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<tbody>
<tr>
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<td>Impossible</td>
<td>Impossible</td>
<td>Impossible</td>
</tr>
<tr>
<td>Constant transmission rate</td>
<td>Impossible</td>
<td>Impossible</td>
<td>Impossible</td>
</tr>
<tr>
<td>Increased transmission rate</td>
<td>Impossible</td>
<td>Impossible</td>
<td>Impossible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Share of households reporting</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased transmission rate</td>
<td>Probably</td>
</tr>
<tr>
<td>Constant transmission rate</td>
<td>Impossible</td>
</tr>
<tr>
<td>Increased transmission rate</td>
<td>Impossible</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Share of households reporting</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased transmission rate</td>
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<tr>
<td>Constant transmission rate</td>
<td>Possible</td>
</tr>
<tr>
<td>Increased transmission rate</td>
<td>Probably</td>
</tr>
</tbody>
</table>

Three basic scenarios were considered: (1) no additional measures, equivalent to the current situation; (2) implemented compensation fund; (3) and the implementation of a complete set of prevention measures.

The first scenario simulates losses when no real compensation fund is functioning: thus, only 30 percent of households report disease cases to the appropriate authorities. The time required for the case eradication under this scenario is 2 days; and the transmission rate is equal to that estimated based on historical data (0.82).

The second scenario includes the establishment of a well-functioning compensation fund, which leads to an increased share of reporting households, up to 90 percent of “infected” households, under the assumption of stability of other parameters.
Finally, the third scenario assesses losses under the conditions of effective implementation of the complete set of anti-epizootic measures. In addition to the increased reporting share up to 95 percent of households, it implies improved household biosecurity that leads to a decreased probability of infection by 10 percent and a restricted timeframe for eradication measures to a maximum of 1 day.

**Figure 11: Annual losses due to ASF in Ukraine**

Source: Author’s calculations.

**Figure 11** above shows the difference between three scenarios, which represent the effect of timely reporting and eradication. It should be highlighted that it is impossible to stop ASF spread under the first two scenarios: it stops only after all the pigs are destroyed. Compensation helps to reduce the shock for pig breeders and to simplify control of the disease spread, rather than to eradicate the infection in general. Thus, reduced losses are explained exclusively by disease cost distributed for a longer period and discounting effect. According to the obtained results, it was proven that an increased rate of reporting decreases the pigs lost due to ASF. This is explained by the removal of infected pigs and, thus, decreasing the time for contact and potential infection of healthy pigs by those that are already infected. As a result, less contaminated meat appears on the market. With an increased rate of reporting its efficiency is decreased because of the assumption that if contaminated meat happens to be sold on the market, it cannot be excluded, thus, can potentially infect new pigs.

However, only under the assumption of efficient implementation of complete set of measures (including compensation fund, veterinarian service, veterinarian police, timely reaction etc.) does it become possible to stop the spread of infection and significantly reduce losses.

Losses for each scenario were assessed, which included direct losses of pig producers and government (e.g. the value of animals culled, disposal costs, disinfection costs, and others) and indirect costs, for all the chains of pork production, mainly including lower than expected revenues due to the loss of potential future piglets from dead breeding sows and from meat that could be processed and provide an added value. **Without timely reporting, motivated by compensation, total losses could reach up to UAH 36 billion, not taking into the consideration of a probable export restriction. At the same time, this sum drops to less than UAH 600 million in an optimistic scenario which considers the development of a compensation fund.**

Owners need to be aware that biosecurity measures for pig farms are intended not only for the protection of their own livestock, but also to prevent the diversion of pathogens from the affected farms (in case of outbreak of any disease) and thereby also prevent creating a biological threat to other farms.

**THE IMPORTANCE OF PREVENTION AND CONTROL**

No vaccines or drugs are available to prevent or treat ASF infection. Therefore, it is particularly important that ASF-free areas are maintained free through strict prevention and control measures. The most important resource in the prevention of ASF or other livestock diseases is the informed animal owner or manager. Pig owners at all levels of production must be able to recognize ASF and know what to do when they suspect it. This can only be achieved by intensive training of farmers, using media that are easily understood and highly visual and that will serve as a constant reminder of the disease and its importance.
WHAT ARE THE RESPONSIBILITIES OF HOUSEHOLDS AND FARMS BY LAW?

In Ukraine, the prevention and control of ASF are regulated by special instructions and relevant action plans at district and oblast levels. According to the current legislation of Ukraine, pig owners and veterinary professionals that harbor information about cases of ASF can be subject to administrative and even criminal liability, depending on the severity of the crime and its consequences. Additionally, any violation of the rules of quarantine and other veterinary and sanitary regulations related to fighting ASF leads to the criminal and/or administrative liability of the guilty party in the manner foreseen by the applicable law.

WHAT CAN THE GOVERNMENT DO?

There are a number of prevention and control strategies, which the Government can undertake in order to address the spread of ASF, which are fully described in Annex 10, and include the following:

- **Monitoring**: sustained active disease surveillance
- **Import quarantine policy**: safe importation of domestic and wild pigs, pork and pork products, pig semen, embryos and ova and other products incorporating pig tissues, such as pharmaceuticals.
- **Swill feeding controls**: ban or controls on swill feeding.
- **Compartmentalization and/or zoning**: Compartmentalization is based mainly on functional separation by biosecurity measures, whereas zoning is based mainly on geographical separation. Relevant animal subpopulations should be clearly defined, recognizable and traceable, and should be epidemiologically separated from other subpopulations.
- **Stamping out and disposal**: All infected and in-contact pigs must be humanely slaughtered.
- **Compensation**: Compensation is key to encourage early reporting.
- **Cleaning and disinfection**: The cleaning of organic matter from sheds, equipment, vehicles, etc. is an important step before disinfection. Vehicles and personnel (shoes, clothing and equipment) should be disinfected on entering and leaving farms.
- **Sentinel animals and restocking**: Depopulated premises should not be restocked for at least 40 days following cleaning and disinfection.
- **ASF in Wild Boar**: Minimize contact between wild and domestic pigs, preferably through double fencing of piggeries, population management of wild pigs in areas where domestic pigs are held (ban on supplementary feeding, selective hunting, increased hunting quotas), and immediate disposal of carcasses, entrails or other discarded body parts to prevent consumption by other pigs or other scavengers.

WHAT CAN FARMS AND PIG OWNERS DO?

In case of suspicion of ASF, it shall be immediately reported to the Chief State Inspector of Veterinary Medicine. In Ukraine, the prevention and control of ASF are regulated by special instructions and relevant action plans at district and oblast levels. According to the current legislation of Ukraine, pig owners and veterinary professionals that harbor information about cases of ASF can be subject to administrative and even criminal liability, depending on the severity of the crime and its consequences. Additionally, any violation of the rules of quarantine and other veterinary and sanitary regulations related to fighting ASF leads to the criminal and/or administrative liability of the guilty party in the manner foreseen by the applicable law.

In case of suspicion of ASF, it shall be immediately reported to the Chief State Inspector of Veterinary Medicine of the district and must take the following measures: (i) isolate sick and suspected on disease pigs in the same premises in which they were located; (ii) stop the slaughter and sale of animals of all kinds (including poultry) and products of their slaughtering (meat, fat, skin, wool, feathers, etc.), (iii) prohibit the departure and entry onto their territory of any type of transport or farm workers without appropriate sanitization.

In the holdings, towns, districts, oblasts where the quarantine has been imposed it is prohibited to: (i) import/export of all animal species, including poultry, products and raw materials of animal origin, (ii) import/export of plant products, feeds, and other products, (iii) organize agricultural fairs and exhibitions (auctions) and related social activities.

The movement of people and suburban passenger transport through the quarantine area is to be defined by the local state emergency anti-epizootic committee fighting ASF.

It is prohibited for post offices in an unsafe ASF district to accept parcels with products and raw materials of animal origin.

Any violation of the rules of quarantine and other veterinary and sanitary regulations related to fighting ASF leads to the criminal and/or administrative liability of the guilty party in the manner foreseen by the applicable law. The Criminal Codex (251) indicates that a violation of veterinarian rules that leads to epizootic spread or other severe consequences is punished by
penalty in amount ranging from UAH 1700 to 3400 to the ban to conduct certain activities for 5 years or imprisoning for 3 to 5 years. According to the Administrative Codex (107), the violation of quarantine rules results in penalty from UAH 34 to 170 for population and UAH 153 to 340 for the officials.iii

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**WHAT SHOULD FARMS AND PIG OWNERS FORBID ON THE PREMISES?**

Taking the following measures will significantly reduce the risk of ASF outbreaks and other diseases of pigs on the farm:

- using food that contains (or may contain) even trace amounts of crude by-products from wild or domestic pigs, regardless of certainty about their safety;
- using food (or use the litter) that are imported to the farm and may be contaminated with secretions and excreta of sick animals (wild or domestic) directly from the fields (corn for feed, green mass, straw, etc.) or from other farms, regardless of whether ASF has been confirmed or not;
- introducing livestock to the farm that comes from farms located in areas where there have been outbreaks of ASF and the rest of the country without proper documentation and preventive quarantine; and
- the use of transport, equipment, persons visiting farms, which could have been in contact with ill (died) domestic or wild pigs, an infected farm or places that could be visited by ill (dead) wild boars (in the forest while hunting, picking mushrooms, berries, nuts, etc., or in the fields of grain or corn, etc.).

However, any formal rules and restrictions cannot guarantee success, excluding the human factor, which is very often the weakest link in the bio-economy organization. It is therefore necessary to take measures so that personnel have the necessary training to comply with biosecurity regulations.

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**WHAT PREVENTION MEASURES ARE FARMS AND PIG OWNERS ARE STRONGLY SUGGESTED TO FOLLOW?**

- Farmers should educate themselves on the early warning signs. Contain pigs within pig sties with controlled entry/exit points
- Do not allow visitors in without changing their boots and clothes
- Have a boot bath to wash and disinfect boots regularly
- Swill should not contain remains of pigs, and should be boiled for 30 minutes and allow to cool before feeding

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**WHAT CONTROL MEASURES ARE FARMS AND PIG OWNERS ARE STRONGLY SUGGESTED TO FOLLOW?**

- No movement of pigs or any products of pig origin should be allowed from farms that are infected or suspected to be
- All infected and in-contact pigs must be humanely slaughtered. Carcasses, animal products and bedding must be burnt or buried deeply on site.
- Vehicles, clothes and equipment should be disinfected on entering and leaving farms
- Farms should not be restocked for at least 40 days following above procedures. Sentinel pigs should be used for at least 6 weeks while being monitored clinically and serologically

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**WHAT CAN THE MEDIA, GOVERNMENT AND THE PRIVATE SECTOR DO TOGETHER?**

Early detection of ASF outbreaks is crucial for effective surveillance and response, which are dependent on awareness of the need for reporting, an efficient system for communicating reports of outbreaks, facilities that have the capacity to test for ASF, and properly-trained and responsive personnel. Poor or delayed reporting stems from a variety of factors, including a lack of tangible benefits to farmers, lack of knowledge, or the lack of capacity to enforce regulations. The most important resource in the prevention of ASF is having farmers and animal owners informed and motivated to report potential outbreaks — which is where the role of the media comes in. Thus, being able to detect early warning signs of the disease is vital to mitigating the rate of spread of ASF and can be achieved through capacity building activities, such as intensive training of farmers, or having the media communicate in an effective and easily understandable way.

Without an economic incentive, however, when confronted with the consequences that are associated with an outbreak, farmers will slaughter the infected animals (and sell the meat) or illegally dispose of the carcasses rather than reporting these
outbreaks to the national authorities. In order to prevent such action, the Government and private sector could work together to develop a joint compensation scheme, which could then be explained by the media. The potential savings with the successful implementation of a compensation scheme has been estimated as high as USD 2.7 billion in total losses, including a consideration for probable export restrictions.

### WHO SHOULD BE CONTACTED IN CASE OF ASF SUSPICION?

<table>
<thead>
<tr>
<th>Oblast</th>
<th>Телефон/Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cherkasy</td>
<td>(0432) 570301, 670236</td>
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<tr>
<td>Chernihiv</td>
<td>(0332) 246367</td>
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<tr>
<td>Chernivtsi</td>
<td>(0562) 7708322</td>
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<tr>
<td>Dnipropetrovsk</td>
<td>(0629) 512041</td>
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<tr>
<td>Donetsk</td>
<td>(0412) 34-24-31</td>
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<tr>
<td>Ivano-Frankivsk</td>
<td>(0312) 672403, 673319</td>
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<tr>
<td>Kharkiv</td>
<td>(0612) 390152, 390721</td>
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<tr>
<td>Kherson</td>
<td>(0342) 511389, 511395</td>
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<tr>
<td>Khmelnytskyi</td>
<td>(044) 4063813, 4060937</td>
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<tr>
<td>Kiev</td>
<td>(044) 4865486</td>
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<tr>
<td>Kirovohrad</td>
<td>(0522) 246336, 247725</td>
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<tr>
<td>Luhansk</td>
<td>(06452) 53440</td>
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<tr>
<td>Lviv</td>
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</tr>
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<td>(0472) 630527, 630962</td>
</tr>
<tr>
<td>Zhytomyr</td>
<td>(0372) 518073</td>
</tr>
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</table>
RESOURCES AND FURTHER READING


EMPRES. http://www.fao.org/ag/empres.html


ASForce, http://asforce.org/


ASF is a viral disease with the potential for a devastating impact on the pig industry and smallholder sector. The disease is caused by double-stranded DNA virus that belongs to genus ASFIVIRUS and family ASFARVIRIDAE. ASF virus replicates primarily in cells of the reticulo-endothelial system, and consequently blood, lymph node, spleen, liver and tonsil are the preferred specimens for laboratory examination. There are several different genotypes of ASF in the world, however the one found in Ukraine (genotype II) has mortality rate close to 100 percent in pigs of all ages and breed (including European Wild Boar) are affected.

ASF virus infects cells of the immune system and triggers production of huge amount of specific antibodies, which unfortunately are not able to fully neutralize the pathogen. This is one of the main reasons why an effective vaccine against it is currently cannot be developed. ASF is quite easily transmitted from sick to healthy animals, aided by extraordinary stability of the virus in the environment.

It should be underlined that, in Ukraine, only domestic and wild pigs (both belonging to species “Sus scrofa”) can be affected by ASF. All other animals are not susceptible to the virus. The ASF virus is not transmitted to humans and there are no associated health risks for humans. Currently, 22 ASF virus genotypes have been identified, but most of them do not exist beyond Africa. In 2012-2015, ASF virus genotype II was found in Ukraine, the last 8 years has been widely spread, from the Caucasus, through the European part of Russia to Belarus, Ukraine, the Baltic States and Poland. High mortality from the virus was and still remains to be a characteristic feature of the disease. And pig farms owners and veterinary professionals should clearly understand that ASF is an incurable disease that causes the death of pigs of all breeds, sexes and age groups. Antibiotics or previous vaccination against other diseases (e.g. Classical Swine Fever), do not affect its fatal course.

Figure A1: The cycle of ASF and epizootic transmission chains to ensure the spread of disease
The ASF virus is extremely resistant to a wide range of temperatures (please see **Annex 2**) and acid-alkaline reaction mediums (pH 4.10 unlimited, limited at pH 3.1-13.4, see Annex 3). The virus can be maintained up to ten weeks in the meat from sick animals, up to 155 days in smoked sausage and ham, more than 3 months in manure and 4-8 months in the soil (*left*). It even remains viable under adverse environmental conditions such as drying and rotting. Cooling (especially freezing) - preserves the virus. By warming it up for one hour – to a temperature of over 50 °C – the pathogen is killed (*right*).

**ANNEX 3: RESISTANCE OF ASF TO PHYSICAL AND CHEMICAL ACTION**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Highly resistant to low temperatures. Heat inactivated by 56°C/7 minutes; 60°C/20 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>Deactivated by pH &lt;3.9 or &gt;11.5 in serum-free medium. Serum increases the resistance of the virus, e.g. at pH 13.4 – resistance lasts up to 21 hours without serum, and 7 days with serum.</td>
</tr>
<tr>
<td>Chemicals/Disinfectants</td>
<td>Susceptible to ether and chloroform. Inactivated by 8/1000 sodium hydroxide (30 minutes), hypochlorite – 2.3% chlorine (30 minutes), 3/1000 formalin (30 minutes), 3% ortho-phenylphenol (30 minutes) and iodine compounds.</td>
</tr>
<tr>
<td>Survival</td>
<td>Remains viable for long periods in blood, feces and tissues; especially infected, uncooked or undercooked pork products. Can multiply in vectors (<em>Ornithodoros</em> sp.).</td>
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</table>

<table>
<thead>
<tr>
<th>Region</th>
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<th>Public Sector (thousands)</th>
<th>Private Sector (thousands)</th>
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Distribution of pig population in Ukraine

Source: State Statistics Service of Ukraine.
## ANNEX 5: GROUPINGS OF AGRICULTURAL ENTERPRISES BY NUMBER OF PIGS, JANUARY 2016

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<thead>
<tr>
<th></th>
<th>no more than 99 heads</th>
<th>100 – 199 heads</th>
<th>200 – 299 heads</th>
<th>300 – 399 heads</th>
<th>400 – 499 heads</th>
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<td>% to total</td>
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<td>% to total</td>
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<td>7</td>
<td>7.1</td>
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<td>8.1</td>
</tr>
</tbody>
</table>

Source: State Statistics Service of Ukraine.
ANNEX 6: DISTRIBUTION AND DENSITY OF PIG POPULATION IN UKRAINE BY TYPE

Figure A6.1: Density of total pig population in Ukraine (2014) shown at district level resolution

Source: Authors’ compilation.

Figure A6.2: Distribution of commercial pig farms in Ukraine, 2014

Source: Authors’ compilation.
ANNEX 7: GOVERNMENT EXPENDITURES ON DISEASE CONTROL MEASURES

According to the state budget, approved as of 2015, the following structure of funds devoted for epizootic measures and for participating in the World Organisation for Animal Health is presented on the graph.

**Figure A7.1: The structure of government expenditures on disease control measures, 2015**

![Graph showing the structure of government expenditures on disease control measures, 2015]

- **Antiepizootic measures, thousand UAH**
  - Consumption expenditures
  - Salary payments
  - Public utilities and energy resources
  - Development expenditures

Source: Verkhovna Rada.

However, according to the order of 30 July 2015 № 789-p of The Cabinet of Ministers of Ukraine, “On certain reallocation of government expenditure to the Ministry of Agriculture and Food in 2015” increase funding the program 2802020 "Disease control measures and participation in OIE" by UAH 44 733 200.

ANNEX 8: SYMPTOMS OF AFRICAN SWINE FEVER

- **Weakness, paralysis of hind limbs, staggering gait**
- **Diarrhea with blood, often constipation**
- **Uncurved tail**
- **High temperature**
- **Infected animal usually lies, sluggishly gets up on its feet, gets tired easily**
- **Hemorrhages on the skin on the inner thighs, abdomen, and/or neck**
- **Rapid difficult breathing, cough**
- **Thirst**
- **Vomiting**
- **Bloody discharge from the nose and eyes, mucous membranes of eyes red and inflamed**

Source: Author’s compilation.
According to the below figure it can be seen that pork and particularly salo, which is highly energy-containing, have the lowest prices (except for cheap poultry). It explains the importance of pork for Ukrainian consumer that still remains to be significant, despite a slight drop in 2014.

**Figure A9.1: Meat prices by product type, October 2016**

Source: State Statistics Service of Ukraine.

In viewing the monthly dynamics for pig prices separately for households and farms, it can be seen that they were rather stable in the first period (until March 2014), after which a stable growth began.

**Figure A9.2: Meat prices in UAH/kg, 2013 – 2016**

Source: State Statistics Service of Ukraine.
There are a number of prevention and control strategies, which the Government can undertake in order to address the spread of ASF including the following:

- **Monitoring**: sustained active disease surveillance supplementing passive monitoring, based on close coordination between pig owners, field and laboratory/epidemiology veterinary services, using participatory questionnaires, serological surveys and abattoir monitoring to supplement field searches for clinical disease.

- **Import quarantine policy**: The OIE Terrestrial Animal Health Code (2012 edition, Sections 2 and 5; http://www.oie.int/international-standard-setting/terrestrial-code/access-online/) provides guidelines for the safe importation of domestic and wild pigs, pork and pork products, pig semen, embryos and ova and other products incorporating pig tissues, such as pharmaceuticals. Attention should be paid to providing adequate regulatory and quarantine services to intercept foodstuffs and other risk materials.

- **Swill feeding controls**: Swill feeding with food scraps, which may contain imported animal products, is a very important means by which ASF may be introduced into a country. Consideration should therefore be given to placing a ban on swill feeding or at least implementing controls that will make it safe.

- **Compartmentalization and/or zoning**: If the disease is endemic in only part of a country and it is possible to establish diseased and disease-free zones and enforce tight controls on the movement of pigs and products between zones, then zoning is an important component towards progressive elimination or eradication efforts. Compartmentalization is based mainly on functional separation by biosecurity measures, whereas zoning is based mainly on geographical separation. Relevant animal subpopulations should be clearly defined, recognizable and traceable, and should be epidemiologically separated from other subpopulations.

- **Stamping out and disposal**: All infected and in-contact pigs must be humanely slaughtered. Culling or “stamping out” is often rejected by pig owners when there is no compensation programme in place, and this may contribute to dissemination of the disease through uncontrolled or illegal movement of diseased animals. The carcasses of destroyed pigs must be disposed of in a safe manner after stamping out is completed. Carcasses must be burnt or buried deeply, on-site if possible. This may prevent consumption by feral pigs, scavenging animals, or carcasses dragged away from the disposal site. The disposal of very large numbers of pigs in a short time presents environmental and logistic problems. More information on onsite slaughter and disposal procedures is available in the FAO Manual on procedures for disease eradication by stamping out (http://www.fao.org/DOCREP/004/Y0660E/Y0660E00.HTM).

- **Compensation**: Compensation is key to encourage early reporting. The lack of adequate compensation for culled animals (in terms of timing and quantity), may lead to outbreaks not being reported, and to emergency slaughter by farmers either for their own consumption, for sale at local markets, or inappropriate disposal of the carcasses in areas accessible to other domestic, feral or wild swine.

- **Cleaning and disinfection**: The cleaning of organic matter from sheds, equipment, vehicles, etc. is an important step before disinfection. Vehicles and personnel (shoes, clothing and equipment) should be disinfected on entering and leaving farms. The proven disinfectants are detergents, hypochlorite, alkalis and glutaraldehyde. It is important to ensure that the use of disinfectants meets regulatory requirements, as some of these disinfectants may have residual effects or prove damaging to the environment.

- **Sentinel animals and restocking**: Depopulated premises should not be restocked for at least 40 days following cleaning and disinfection. Seronegative sentinel swine should be closely monitored for at least six weeks (clinically and extended diagnostic testing outside the 3km radius) to detect any re-infection.

- **ASF in Wild Boar**: If ASF enters wild boar population it becomes is much more difficult to control and eliminate the disease. Accordingly, the strategy should be to minimize contact between wild and domestic pigs, preferably through double fencing of piggeries, population management of wild pigs in areas where domestic pigs are held (ban on supplementary feeding, selective hunting, increased hunting quotas), and immediate disposal of carcasses, entrails or other discarded body parts to prevent consumption by other pigs or other scavengers. Hunters have to be educated as for the risks of disease and follow basic biosecurity measures. In the ASF endemic areas carcasses of hunted wild boar have to be tested for the presence of virus before consumption. Infected carcasses have to be handed in the same manner as those of domestic pigs (e.g. safely destroyed).

---

1 FAO 2014

OIE data.

For the Ukrainian version: Кримінальний кодекс (ст.251) вказує, що порушення ветеринарних правил, що ведуть до епізоотичного поширення або інших серйозних наслідків, несе за собою відповідальність у вигляді штрафу у розмірі 100-200 неоподаткованих мінімумів (1700-3400 грн), заборони ведення окремих видів діяльності та позбавлення волі на 3-5 років. Кримінальний кодекс (ст.107) зазначає, що порушення правил карантину призводить до відповідальності у вигляді штрафу у розмірі 2-10 неоподаткованих мінімумів (34-170 грн) або 9-20 неоподаткованих мінімумів (153-340 грн) для посадових осіб.