



Food and Agriculture
Organization of the
United Nations



AFRICAN UNION
INTERAFRICAN BUREAU
FOR ANIMAL RESOURCES

REGIONAL STRATEGY FOR THE CONTROL OF AFRICAN SWINE FEVER IN AFRICA



Accra, 2017

REGIONAL STRATEGY FOR THE CONTROL OF AFRICAN SWINE FEVER IN AFRICA

Published by
The Food and Agriculture Organization of the United Nations
and
African Union-Interafrican Bureau for Animal Resources
and
International Livestock Research Institute
Accra, 2017

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ISBN 978-92-5-109384-9 (FAO)

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FOREWORD

The pig sector is central to the livelihood of rural Africa and is strategically important to the continent's food and nutritional security. Together with poultry, it is one of the fastest growing livestock sectors in Africa, and this trend is expected to continue over the coming years. Unfortunately, the expanding pig production sector is facing diverse challenges. Poor genetics, inadequate feeding, health constraints and especially African swine fever and poor husbandry practices are the major challenges to the development of the pig sector in Africa.

The occurrence of African swine fever was reported in almost half of the pig producing countries on the African continent in 2012. This transboundary animal disease poses a serious negative impact on production and productivity and thus affecting national economies and social structures of the pig producing countries. The high economic losses are mainly associated with high mortality (up to 100 per cent) caused by the disease. The outbreaks of African swine fever lead to lose of capacity to re-stock and produce, thus resulting in loss of livelihood of many poor farmers. It also reduces the poor communities' access to high-quality and cheap animal proteins. For these reasons, African swine fever is considered the most serious infectious disease in pigs in Africa.

In recent years, the international community, national authorities, the pig production sector and researchers are engaged in solving sustainably constraints affecting pig production and enhance rural development. Recognizing the challenges and the opportunities that exist, the African Union's Interafrican Bureau for Animal Resources, the Food and Agriculture Organization of the United Nations and the International Livestock Research Institute have been collaborating since March 2013 to develop an Africa-wide strategy for the prevention and control of African swine fever. To this effect, a Taskforce drawn from the three organizations was set up and has worked extensively on the strategy. The draft strategy was refined with inputs gathered from stakeholders of the pig sector during a validation workshop. Hence, the strategy is based on multi-sectorial collaboration and partnerships among farmers, traders, veterinary and animal production services, researchers, civil society organizations and development partners.

The strategy follows three principles; the generation of evidence on the pig sector for a strong knowledge-based approach, an area and sector specific approach to tailor interventions to specific situations and finally a holistic approach to promote a gradual transformation of the less bio-secure, small- scale, scavenging (extensive) production system into a more bio-secure, small- scale, semi-intensive production system.

The strategy is translated into action plan in the short, medium and long- term streams of activities and identified the stakeholders and institutions responsible for each activity. It seeks to bring them together to collectively address the main hindrances of the pig sector in Africa.

It is anticipated that the strategy document will guide the prevention and control of African swine fever efforts in the continent contributing to better trade of pig and pork throughout Africa and beyond and in so doing improve the livelihood and food and nutrition security of producers and other actors.

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ACKNOWLEDGEMENTS

This document has been drafted by the African swine fever taskforce jointly put in place by African Union-Interafrican Bureau for Animal Resources, United Nations Food and Agriculture Organization and International Livestock Research Institute to address ASF control in African continent. The taskforce comprised Dr. Hiver Boussini and Dr. Zelalem Tadesse from AU-IBAR, Professor Cheikh Ly, Dr. Berhanu Bedane, Dr. Daniel Beltran-Alcrudo, Dr. Sam Okuthe, Dr. Bouna Diop from FAO and Dr. Edward Okoth for ILRI.

The taskforce acknowledges the following reviewers for their contributions: World Animal Health Organization; International Atomic Energy Agency; Dr. Yoseph Nyager, Director/Chief veterinary Officer Federal Ministry of Agriculture and Rural Development of Nigeria; Dr. Noelina Nantima, Coordinator of ASF working group for East Africa; Dr. Marisa Arias, *Centro de Investigación en Sanidad Animal*, Spain; Dr Linda Dixon; Pirbright Institute, UK; Professor Mary Louise Penrith, University of Pretoria, South Africa and Dr. Emmanuel Couacy, *Laboratoire Central de Pathologie Animale Bingerville* of Cote d'Ivoire.

Finally, the taskforce was also supported by a consultant Prof. Mary-Louise Penrith from Ondersport Veterinary Institute, Pretoria, South Africa and the final document was consolidated and validated during a consultative workshop by member states.

ABBREVIATIONS AND ACRONYMS

ASF	African swine fever
ASF	African swine fever virus
AU-IBAR	African Union - Interafrican Bureau of Animal Resources
CAR	Central African Republic
CVO	Chief Veterinary Officer
DRC	Democratic Republic of Congo
SSA	Sub-Saharan Africa
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
OIE	World Organisation for Animal Health/Office international des Épizooties
HACCP	Hazard analysis and critical control points
HPAI	Highly Pathogenic Avian Influenza
ILRI	International Livestock Research Institute
PPR	<i>Peste des petits ruminants</i>
REC	Regional Economic Community
TAD	Trans-boundary animal disease
TV	Television
VC	Value chain

EXECUTIVE SUMMARY

African swine fever (ASF) is a devastating viral hemorrhagic fever that can kill up to 100% of domestic pigs, for which there is still no vaccine or treatment. The ability to survive for long periods in uncooked pork endows the virus with a very high capacity for transboundary spread over great distances, demonstrated by its introduction into Europe no less than three times. It is also currently prevalent in most countries in sub-Saharan Africa (SSA) wherever pigs are kept. The last decades have seen exponential growth in the pig sector in SSA but also a striking increase in the number of ASF outbreaks. The two phenomena highly likely to be linked.

Little detailed information on the socio-economic effects of ASF is available, but it can confidently be stated that it has a severely negative effect on household income and food security, contributes to the failure of the pig sector to reach its full potential to increase incomes, generate employment and alleviate poverty, and is a disincentive to investment in the pig sector. Pig keeping is widely practiced by women, pensioners, unemployed youth and other vulnerable sectors of society. It has been found to be particularly helpful in building confidence and providing security to especially women in societies traumatized by war. It has therefore become imperative to develop a strategy to better manage and control and where possible eliminate ASF among domestic pigs in SSA.

The joint strategy has been developed by a task force representing FAO, AU-IBAR and ILRI and validated at a workshop held in Ouagadougou, Burkina Faso, from 10-12 November 2015. It provides the background for a roadmap for progressive control of ASF in SSA. The strategy takes into account the complexities of both the epidemiology of the disease and the diverse and largely disorganized pig sector in the region. Eradication of the virus from the region is not an option owing to the involvement of African wild suids and ticks of the *Ornithodoros moubata* complex. However, while prevention of contact between the natural hosts and vectors and domestic pigs is necessary, virus is spread among domestic pigs mainly by contact with infected pigs and pork. The main focus of the strategy is therefore on preventing outbreaks in domestic pigs by improved organization of the pig sector and identifying and mitigating the risks throughout the pig value chains. In most SSA countries up to 90% of pigs are kept in traditional scavenging systems. There is a need for transformation to enable the implementation of the simple biosecurity measures necessary to protect pigs from ASF. Considerable financial resources will be required to enable pig producers to convert from lower to higher input systems, but the rewards will be reaped in terms of less ASF and generally better health, production and welfare that will lead to greater profitability. Biosecurity should also be enhanced in the commercial sector

and at all levels of the pig value chain. The strategy aims to eliminate risky marketing practices and improve market access for producers in rural as well as in urban/peri-urban areas so that improved biosecurity becomes a real and rewarding investment.

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The strategy will be underpinned by research to improve knowledge of the epidemiology of ASF in SSA and of its socio-economic importance in the region, as well as capacity development to improve surveillance for, diagnosis of and response to ASF at local, national, sub-regional and regional levels. It proposes feasible risk-based solutions for outbreak control that will be specific for systems and areas in line with pro-poor policies. The approach is holistic and includes a wide array of stakeholders who will be asked to make inputs into the strategy, because without their involvement control will not be achieved. Support will be sought from regional, sub-regional and international organizations and networks as well as the private sector.

The expected outputs of the strategy are a better understanding of the drivers of the disease, transformed production systems that enable the application of adequate biosecurity, and improved capacity among all pig value chain actors and veterinary services. Envisaged outcomes would be reduced prevalence and impact of ASF and better performance of the pig and pork value chains.

I. INTRODUCTION

African swine fever (ASF) is one of the most dreaded transboundary swine diseases because it causes high mortality in pigs, it has devastating socio- economic consequences, and has the potential for international spread that can lead to global food insecurity and economic impact. The potential for rapid ASF spread and the associated high mortality rate in infected pigs portends a serious threat to the pig sub-sector in Africa. The population of pigs is unevenly distributed in the continent but represents an important source of food and nutritional security as well as income generation. Opportunities for growth of the pig sector in Africa are hampered by various factors among them ASF, which is of special concern.

Unlike most diseases of livestock, there is still no vaccine or specific treatment for ASF. Therefore prevention and control or eradication of ASF are complex and difficult and require better strategies. Both the veterinary services and the farmers are faced with lack of financial resources and the absence of compensation policies and schemes. The epidemiology of the disease and the genetic and biological characteristics of the virus are sufficiently well documented to enable rational approaches for control to be developed. This knowledge, however, is not evenly distributed throughout the region and needs to be augmented by further research. Worse still, there is lack of intra-regional cooperation towards the control of the disease in Africa. The need for the establishment and implementation of a regional strategy for the prevention and control of ASF in Africa is therefore crucial and urgent.

A strategy is proposed in this document for progressive action against ASF and a framework for this action to be triggered by enhanced collaboration and partnership between farmers, veterinary and animal production services, researchers, African governments, civil society and development partners, taking into account the need for policies to be pro-poor and to ensure inclusion of women, given their prominent role in pig farming.

2. THE PIG SECTOR

The pig population in Africa is unevenly distributed, but it represents an important source of food and nutritional security as well as income generation, thus a source of livelihood. The African pig population is concentrated in sub-Saharan Africa (SSA), where it is estimated to be 35.6 million heads (FAOSTAT 2013 figures) with regional distribution of 40.3, 5.1, 35.6 and 19.7 per cent in Western, Southern, Eastern and Central Africa, respectively. The pig population is negligible in Northern Africa due to religious and cultural considerations. During the last decade (2001 to 2011), the pig population in SSA has been growing annually at a rate of seven, six and four percent in Southern, Eastern and West African regions, respectively. The FAOSTAT statistics for 2013 indicate that 1.3 million tons of pig meat was produced, with the main producers being Nigeria, South Africa, Mozambique and Uganda.

2.1 Production systems

Various studies have been undertaken by the Food and Agriculture Organization of the United Nations (FAO) on the pig sector in SSA. The most common pig production systems observed are:

- **Small-scale scavenging pig production (extensive system)** – This production system is present both in urban and rural areas. The small-scale scavenging pig production system is the simplest, with minimal investment in housing and inputs. Pigs under this system scavenge in the street, garbage dumps, neighboring land, river banks and/or forests around villages. This system has been documented to result in risk of exposure of pigs to diseases including ASF. These systems are also characterized by an almost complete absence of compliance with animal health regulations. Production is used mostly for household consumption, but also as source of cash for household or for farm expenditures. Productivity is low and financial risks are also very low. It is estimated that most of the pork produced in SSA emanates from this production system. Within the scavenging systems pigs may be permanently free-range or they may be seasonally confined to protect crops or at night to prevent theft and predation. Sows may be tethered while boars and young pigs range freely and sows with litters may be confined to protect the piglets. On the other hand, in both this and the next system pens may retain adults but allow piglets to exit and scavenge.
- **Small-scale confined pig production (semi-intensive system)** - The small-scale confined pig production system involves keeping pigs in shelters with various degrees of sophistication that include simple pens made with local materials to more

modern housing and provision of feed (leaves, crop residues, agricultural by-products or industrial or homemade feed). The producers in this system raise pigs for both subsistence and commercial reasons. Swill feeding is very common as well as the use of agro-industrial by-products (e.g. oil cakes,) which are easily found in urban and peri-urban areas. Small-scale production is carried out mainly by households, largely managed by women in small family units with different levels of investment in housing, feeding and health. The commercial motivations are high in this semi-intensified production system and the disease risks are equally high. As with the small-scale scavenging pig production systems, there are no official pig population and disease impact figures and compliance with animal health rules and regulations is low. The system also supplies rural- rural, rural-urban and urban-urban market value chains.

- **Large-scale confined pig production (intensive system)** – Large-scale commercial pig producing enterprises are not common in SSA countries, with a few exceptions. However, a few of these can be found mainly in peri- urban and urban areas of major cities where demand for pork and pork products is high. Large-scale outdoor pig production is generally absent but on some large commercial farms dry sows are maintained in large outdoor camps and moved indoors shortly before farrowing.

2.2 Pig/pork value chains

The pig/pork value chains are dominated by direct transactions between producers and livestock traders. These traders resell live animals to others who mostly supply butchers, pork processors, supermarkets, butcheries and cooked pork sellers in restaurants and streets. The pig sector is largely dominated by the private sector. Development actions, when they exist at government level, are more often related to disease control and genetic improvement through government owned centers or programs.

As pigs are among the few animals converting agro-industrial by-products and household waste into quality animal protein, pig production has been an attractive venture to an increasing number of smallholders in Africa. The short cycle, prolificacy, ability to survive on wide range of feed, and high carcass yield compared to ruminants are all comparative advantages of pig production. It contributes to food and nutritional security of many households and their sources of income particularly for women. Consumption of roasted or grilled pork is becoming popular in many African countries such as Burkina Faso, Uganda and Cameroon through specialized urban restaurants. Pork is cheaper than meat from ruminants. These factors have contributed

to the current fast growth in the number of actors in the pig value chain and thus a growth in the pig sector that is estimated at between five to 10 per cent annually due to increasing pork consumption, especially in urban areas.

2.3 Pig sector growth

The development of pig sector depends on the ability of stakeholders to participate in the solutions that address the main constraints to pig production and marketing. Constraints in pig production are interrelated and need an integrated approach that combines health, genetics, feeds, husbandry practices and organization at producers' and policy levels. In order to meet the demand for protein by the growing human population in Africa, short cycle species production is essential. Statistics over the last decades show that the pig sector has immense growth potential and the current actors in the sector need to be proactive in ensuring that the potential will be realized.

The most common breeds of pigs are pure breeds and crosses that are well adapted in Africa and that are characterized by small size (adult around 50 kg), poor growth and performance, sturdy, and small litter size. The crosses are adapted to difficult husbandry conditions, and have the ability to thrive on low quality feed such as crop residues, household wastes and grass. In order to maximize the performance of these pigs it is vital to improve their feed using locally available products of higher protein and energy contents to allow for faster growth and improved carcass quality. Well-adapted animals should also be selected for breeding programs tailored for improved productivity.

For a successful pig industry, it is critical to; 1) develop the capacity of producers' organizations in pig production, husbandry and health; 2) promote technical and managerial skills among individual producers; and 3) promote multi-stakeholder partnerships at local, district, county, regional/provincial and national levels. All these actions require a pro-poor policy of assisting pig producers to improve production, management, secure their outputs and strengthen their position within the value chains. Producers' knowledge on the key biosecurity measures should be enhanced to safeguard against major infectious diseases that include ASF. The ultimate aim is to embrace appropriate, low key and cheap technologies that are effective and efficient in improving biosecurity especially for the small-scale free ranging pigs. Lack of incentives for investment in pig farming has constrained the industry notably among the resource poor farmers. It is therefore a priority for key stakeholders to support investment to improve farmers' livelihoods that results in improved food security too.

The African continent is plagued by major infectious animal diseases affecting livestock development. The development of the pig sector is also inhibited by diseases, in addition to food deficiency and low performing production systems. Furthermore, worms and ecto-parasites as well as bacterial and viral diseases cause lower productivity of pigs. Public health concerns, in particular cysticercosis caused by the pig tapeworm *Taenia solium*, also reduce access of pig products to more profitable markets. Therefore, addressing animal health constraints to the sector, especially the prevention and control of ASF, is considered to be a major priority.

3. AFRICAN SWINE FEVER STATUS IN AFRICA

3.1 Historical background and current trends

ASF is ranked first as cause of disease-related pig mortality, with epidemics characterized by a high case fatality rate, often up to 100 percent. The causative agent, African swine fever virus (ASFV), is highly stable and contagious with ability to spread over long distances and therefore threatens the pig industry globally. The disease was first diagnosed in Kenya in 1910 and reported in 1921 as a disease that was different from classical swine fever (hog cholera) but also manifested as an acute haemorrhagic fever, causing mortality approaching 100 per cent in domestic pigs. Reports of what proved to be the same disease emanated from South Africa in 1928, Malawi in 1931 and Angola in 1932. Following these early descriptions, ASF was reported in most East and Southern African countries, where the virus is recognized to have been present in wildlife hosts for a very long time. In Central Africa, introductions into São Tomé e Príncipe in 1979 and Cameroon in 1982 were officially reported; it was rather rapidly eradicated in São Tomé e Príncipe but continues to be reported in Cameroon. In West Africa, ASF was diagnosed in Senegal for the first time in 1959 and regular reports of outbreaks were submitted to the OIE from at least 1980.

Although there were anecdotal accounts of ASF in Cabo Verde and Guinea Bissau from the same period and an unconfirmed report of ASF in Nigeria in 1977, Senegal remained the only West African country reporting ASF to OIE until 1996, when Côte d'Ivoire reported its first outbreak. The following decades saw an upsurge in the number of countries newly infected (Benin and Togo in 1997, Nigeria in 1998, Ghana in 1999 and Burkina Faso in 2003). It was also introduced into the Indian Ocean islands of Madagascar (1998) and Mauritius (2007). It has by now been reported in most SSA countries where pigs are kept. The most recent report of new ASF infection emanated from Ethiopia in 2012, where pig production is a relatively new activity.

In 1957 it was introduced into Portugal, probably from Angola, and rapidly eradicated, but a second introduction occurred in 1960, with spread in Europe and across the Atlantic to the Caribbean and Brazil, from where it was eradicated after varying lengths of time, with the exception of the Mediterranean Italian island of Sardinia, where it remains endemic. Also, since 2007, after an introduction into Georgia, probably via galley waste, the disease has spread through the Caucasus region, Russia and some countries in Eastern Europe, where it is still present and causing much concern. The official monthly disease report data submitted to AU-IBAR in the past several years reveals that ASF is an endemic disease in four of the five regions of Africa, namely West, Central, East and Southern Africa.

The number of countries reporting ASF has been increasing every year, expanding its geographical focus to almost all of SSA. In 2008, 18 countries reported the presence of ASF. The number increased during subsequent years to 19 countries in 2009, 21 in 2010, 23 in 2011 and 25 in 2012. By 2013, the OIE WAHIS database indicated that 22 countries in SSA regularly report ASF, four more countries have reported incursions since 2005, and three more have experienced one or more outbreaks prior to 2005, two of which have the sylvatic cycle in warthogs. Another country has reported outbreaks to AU- IBAR but not to OIE, one country is known to have experienced outbreaks but does not report to OIE and the status of two more countries is regarded as doubtful. This means that 31 SSA countries have at some time experienced ASF and this number might be as high as 33. This additional evidence underlines the importance of the disease and the need for concrete and concerted action to reduce the impact and stop further spread in the continent and beyond its borders. Only three African countries eradicated ASF after a single introduction.

Two are small island nations (São Tomé e Príncipe and Mauritius) and the other, Côte d'Ivoire, eradicated the 1996 introduction but experienced a re- introduction of ASF in 2014.

3.2 Epidemiology of ASF

The transmission and maintenance of African swine fever virus (ASFV) can occur in sylvatic and/or in domestic cycles. Depending on the presence or absence of wild suids and arthropod vectors and the type of pig production system, the epidemiology varies substantially across the continent. The role of wild suids in the epidemiology of the disease is well described for warthogs in East and Southern Africa, but information is scarce for other African regions and for other African wild pig species, e.g. bushpigs, for which the results of a limited number of studies are largely inconclusive. In West Africa, the existence of a sylvatic cycle has never been demonstrated, but single apparently incidental infections in a warthog and a Red River hog in Nigeria are widely regarded as the result of spill over from domestic pigs, and investigations in the endemic area in Senegal suggested that neither warthogs nor *Ornithodoros* ticks are involved in ASFV maintenance or transmission. The epidemiology and dynamics of ASF and the role of wildlife in its spread are not yet fully understood in Africa and a better understanding of ASF transmission dynamics involving wild pigs and ticks is needed. However, understanding and improving the ways in which pigs are produced and marketed is of much greater urgency in terms of managing ASF.

The virus can jump from one cycle to another, i.e. from wild suids and ticks to domestic pigs. However, ASF outbreaks in domestic pigs do not commonly have a wildlife involvement, and the epidemic spreads between domestic pigs through the movement of infected live animals, pork and other pig products. It has been shown that biosecurity lapses in the pig value chain (production, transportation, marketing and processing, etc.) rank as the priority risk factors for the outbreaks of ASF and its sustenance in Africa. Studies published by the FAO in 2012 on the pig sectors in three SSA countries revealed serious weaknesses that included lack of biosecurity on farms but, even more importantly, fundamentally disorganized and insecure marketing systems offering little incentive to producers to invest in improving pig production and favoring the spread of diseases. They also revealed a consistent lack of adequate facilities for slaughtering pigs under hygienic conditions. Proximity to a slaughter facility has been identified as a high risk for ASF in more than one study and in more than one country, and the lack of proper slaughter facilities not only poses a risk of ASF but is also a serious veterinary public health and animal welfare issue. Marketing chains involving more than one country are well known to exist, and some of this information has been published. The human role in the epidemiology of the disease in pigs is therefore far more important than that of wildlife. Moreover, the ever-increasing movement of people across borders, potentially bringing infected pork products and in some cases, live pigs further complicates and increases the risk of transboundary spread.

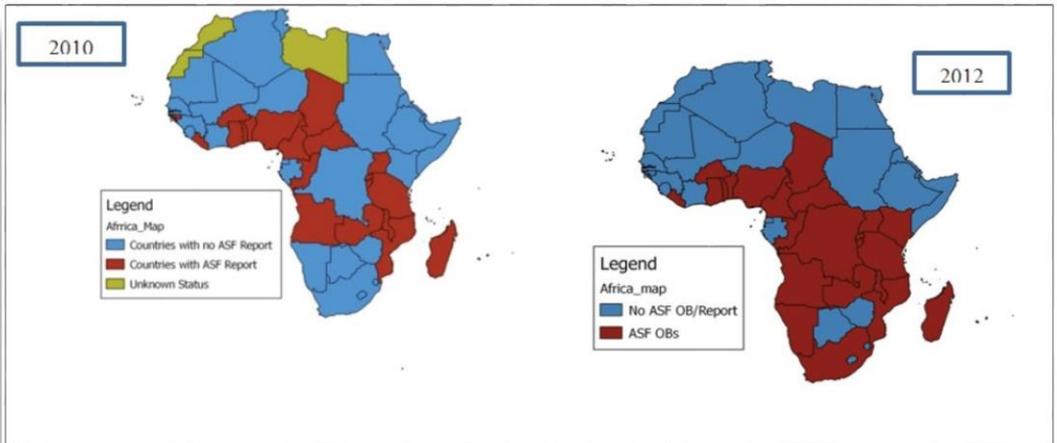
3.3 Socio-economic impact

ASF has a severe socio-economic impact and implications for nutrition and food security, both in areas where it is newly introduced and where it is endemic. The high impact is most apparent in countries with a significant commercial pig industry but this does not mean that smallholder pig farmers are in any way spared. In Africa, ASF has devastating effects on both the commercial and subsistence pig production sectors, but the greatest losses are usually inflicted on the poorer pig producers who are less likely to implement effective prevention (i.e. biosecurity) and control strategies. The consequences of ASF include major economic losses throughout the pig value chain and considerable social effects such as loss of employment for farm workers and loss of income for farmers. Pig production is an important source of high quality and cheap dietary protein in many countries, particularly for poor communities, and the income generated is used to access a variety of dietary requirements. The farmers often lack financial resources to restart production following outbreaks in the absence of compensation schemes and recovery plans.

Socio-economic effects of ASF

- Loss of livelihoods and increased poverty
- Withdrawal of children from education system
- Decreased availability of affordable high quality protein
- Closure of businesses in the pig value chain (agents, butchers, suppliers, retailers of pork)
- Loss of social status due to poverty
- Disruption of cultural practices requiring pigs
- Financial insecurity and inability to meet emergency costs
- Women, children and the elderly most vulnerable

Outbreaks of ASF in the recent past have resulted in losses of between 30 to 50 per cent of the pig populations in a number of countries. In some cases, the entire village pig populations are wiped out either by ASF-related deaths or stamping out measures.



N.B: Highlighting a country in red does not necessarily mean that the whole country was affected by ASF during the reporting period.

Figure I: Geographical Distribution of ASF in Africa in 2010 and 2012

4. VISION, OBJECTIVES, AND EXPECTED OUTPUT OF THE STRATEGY FOR THE CONTROL OF ASF IN AFRICA

The strategy is formulated to provide a shared vision of an African continent where ASF no longer impedes sustainable pig production and rural development or threatens livelihoods. This will contribute to food and nutrition security, poverty alleviation, wealth creation and economic growth in Africa (Figure 2).

This shared vision allows a consistent, cohesive and coordinated plan focusing on the overall goal to reduce the impact of ASF on the pig sector in Africa, and thereby i) promote viable pig production and ii) improve the livelihood of all pig/pork value chain actors, especially the poor, through improved productivity, increased incomes and enhanced access to improved nutrition.

The two specific objectives of the strategy in Africa are: i) to control ASF in infected countries and ii) to prevent the introduction of ASF into non-infected countries.

The regional strategy should guide programs and projects in order to achieve the following outputs:

- Create a better understanding of epidemiology and socio-economic drivers for ASF status, spread, prevention and control;
- Raise awareness and encourage reporting of ASF by farmers, traders, butchers and other pig sector stakeholders;
- Strengthen capacity of farmers to produce healthy pigs by providing access to information and training;
- Strengthen capacities of veterinary services in disease detection, diagnosis, surveillance, management, emergency and response/contingency
- Planning and risk analysis;
- Reduce ASF incidence and impact;
- Improve performance and biosafety of pig and pork value chains.

5. APPROACH AND COMPONENTS OF THE REGIONAL STRATEGY

5.1 Strategic approach

The strategy is guided by three founding principles in terms of its approach:

Knowledge-based: Controlling ASF should be based on current epidemiological and socio-economic knowledge experiences and evidence that informs optimal preparedness to reduce disease incidence and prevent spread of ASF, recognizing that eradication is currently not possible in the African context.

Scenario/area-specific: Responding to ASF entails i) addressing country- specific and sector-specific epidemiological scenarios and technical options for its prevention and control; ii) developing regional and national capacities to monitor the scenarios, implement and maintain these technical options; iii) providing sustainable, technically sound and socially equitable support for ASF control.

Holistic approach: Considering that the predominant pig production system defines how the disease is transmitted and spread, the strategy promotes **gradual transformation** from the less bio-secure small-scale scavenging production system into a more bio-secure small-scale semi-intensive production system. The strategy also promotes **biosecurity** in intensive production systems in addition to the semi-intensive systems. The strategy also promotes **integration** of traditional veterinary approaches with animal production (e.g. genetics, feed, husbandry, market chains, etc.) as well as other “less traditional” disciplines that look into socio- economics and environment, among others. The strategy also involves a **multi-stakeholder partnerships approach** for its implementation.

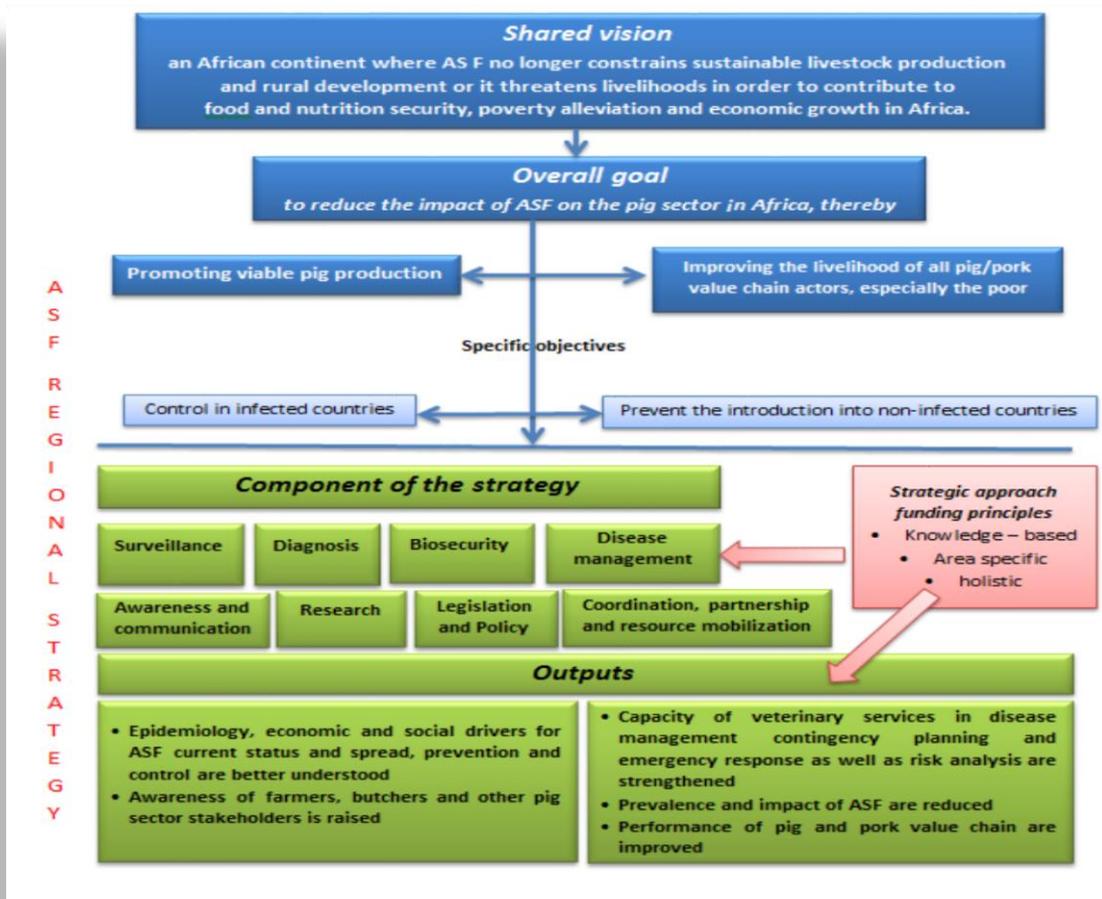


Figure 2: The regional strategy for the control of ASF in Africa

5.2 Components of the regional strategy

The different components of the regional strategy can be grouped within the three founding principles/pillars just described as follows:

i) Providing knowledge base

- Collecting, collating, updating and analysis the existing information relevant to epidemiology, surveillance and control;
- Surveillance to provide current information about the ASF situation in the region;

- Increasing capacity for field and laboratory diagnosis through training and information sharing and improving/optimizing diagnostic capacity in laboratories in the region;
 - Research
 - ✓ Financial and socio-economic impact studies;
 - ✓ Risk analysis;
 - ✓ Household and value chain analysis; identification of critical control points and mitigation measures;
 - ✓ Molecular epidemiology;
 - ✓ Diagnostics and vaccine development research;
 - ✓ Social network studies;
 - ✓ Mathematical modeling of the disease epidemiology;
 - ✓ Risk mapping.
- ii) Developing area-specific and system-specific plans for preventing/managing ASF**
- Fostering development and organization of the pig sector;
 - Biosecurity for different types of production systems;
 - Awareness and communication;
 - Appropriate outbreak management for different systems and socio-economic scenarios.
- iii) Holistic transformation of the pig sector to improve livelihoods and manage diseases**
- Harmonization of policy and legislation;
 - Creation of an enabling environment to support safe, sustainable pig production;
 - Coordination, coherence building, partnership and resource mobilization.
- iv) Developing pig sector and African swine fever knowledge base**

Current knowledge on epidemiology and control

A large amount of published information on pig production as well as on African swine fever in some countries and regions of SSA is available. However, studies for the generation of quantitative data on pig husbandry, marketing systems and associated

constraints for production and income generation are lacking for a number specific epidemiological units and countries. This includes the most important disease of pigs in the region, African swine fever. The strategy will promote the use of biosciences capacity for diagnosis and epidemiological surveillance within the continent and a consortium linking epidemiological research, state of the art diagnostics, mathematical modeling to better understand the epidemiology of the disease, studies on the economics of production and control and social networks studies to generate the data and make the information available for practical application. Evidence-based recommendations for disease mitigation generated will be used at national and regional economic communities (REC) and their dedicated technical institutions' level to develop implementable policies for the control of ASF. This process will promote capacity development of staff working in national systems to ensure sustainability of surveillance and control in individual states.

Surveillance

Disease monitoring and surveillance are key elements in the management of transboundary animal diseases (TADs), including ASF. For both the routine or passive surveillance system and real time confirmation of disease to be efficient and effective, the system must be organized to include all possible stakeholders from the producers, extension services and traders all the way to the national veterinary services and also involve research, academic and training institutions. Organizing such all-inclusive networks would enable capturing and sharing of all relevant data and information among actors and thus enhance quantity and quality of data for informed decision making.

Epidemio-surveillance networks at regional and national level have been established in SSA. These networks, currently at various functionality and efficiency levels, should be strengthened by amplifying existing synergies and creating new synergies with other projects and programmes that have the same aims (e.g. OFFLU). The WHO Global Outbreak Alert and Response Network (GOARN) provides a useful model as well as the epidemio-surveillance networks established for high-risk animal diseases in developing countries. Functional networks such as the East African Working Group on ASF and the SADC Epidemiology Sub-committee of the LTC can be used as models.

To guide the establishment of national active surveillance systems for ASF, Member States (MS) need to develop strategies based on the existing FAO and OIE guidelines that address surveillance in domestic pigs, wild suids and vectors.

Furthermore, designing risk-based surveillance systems taking into account risk factors for ASF occurrence and transmission will maximize the efficiency, efficacy and cost-effectiveness of the system as well as ensuring sustainability of the gains of the exercise. Surveillance for ASF should be integrated into general surveillance for animal diseases by official veterinary services, but sector-specific activities should also be undertaken by the pig sector actors.

In most parts of Africa, the epidemio-surveillance systems are weak mainly due to a lack of resources (funds, personnel and infrastructure). Information about diseases is mainly generated through continuous and community-based surveillance as described in the OIE Terrestrial Animal Health Code. This type of surveillance across the continent is seriously constrained by under- and delayed reporting, mainly due to the lack of incentive, i.e. absence of an adequate compensation policy for income lost through quarantine and sales bans and sometimes culling of pigs. Moreover, there is often inadequate or no response or feedback to disease reports. On the other hand, active surveillance systems and socio-economic studies that would normally generate quality data and comprehensive information for an in-depth understanding on the epidemiology of diseases and their impacts are mostly restricted to donor- funded projects due to resource constraints. Ultimately, it all comes down to a lack of resources that usually leads to failure in sustaining systems and institutions established and this will need to be addressed through resource mobilization at country level and partnerships with the private sector.

African swine fever diagnosis

Laboratory diagnosis is an essential component of animal disease surveillance systems. In most African countries, however, facilities for diagnostic testing for ASF are not readily available. For an effective epidemiological surveillance system, ideally all national laboratories in Africa should have access to all key diagnostic tests including serology, molecular diagnostics, virus isolation, and histopathology. However, since equipping all national laboratories to that level and maintaining capacity in the absence of outbreaks may not be possible or cost-effective, alternatively, national laboratories not capable of performing certain confirmatory tests should establish collaborations with others and/ or regional laboratories so that samples are promptly sent for diagnosis. To ensure the sustainability of this process, existing designated regional and sub-regional laboratories across Africa should be encouraged and, if need be, assisted to strengthen their capacities and capabilities. To improve the capacity of diagnostic laboratories, training of laboratory staff is of paramount importance in addition to introduction of new diagnostic

technologies, techniques, standards and quality control. Twinning with regional and global reference laboratories should also be encouraged and effected with the view to developing and enhancing capacities of sub-regional reference laboratories in all regions of Africa. Strengthening laboratory diagnostic capacities would enhance early detection, accurate case classification as well as support structured disease surveys and risk analyses. This is a fundamental prerequisite to developing rational control and prevention strategies against ASF and other animal diseases. Furthermore, networking of diagnostic laboratories is needed to forecast the source and evolution of disease outbreaks and to monitor effectiveness of disease-control campaigns. Major challenges are the logistics, regulatory requirements and costs of moving samples between laboratories, and the costs of maintaining capacity (including reagents) to perform assays that may not be frequently performed.

Field syndromic diagnosis is a prerequisite to laboratory diagnosis because it directs the decision to conduct a laboratory investigation. For this purpose, it is paramount to train field officers, including extension officers and farmers, to recognize the signs of the disease and take appropriate samples for laboratory testing. Training material should be highly visual and durable (e.g. a laminated sheet illustrating main clinical signs). Field diagnosis should be supported by a penside test to detect ASFV antigen or DNA, since there are a number of differential diagnoses for ASF.

Research

Anthropologic, economic, social and behavioral researches need to be integrated with epidemiological and biological studies to better understand the pig sector, value chains and underlying socio-economic motivations and factors that determine how ASF is transmitted and spread in domestic pig populations. This will allow the design of more feasible and better accepted prevention and control tools. A comprehensive analysis of the role of social interactions in the transmission of ASFV is also required using social network studies. In addition, the socio-economic impacts of the disease and disease control measures, especially on poor smallholder farmers, need to be assessed.

More research is also needed on alternative feeds (what grows or can be grown, how to better to utilize by-products or to render kitchen-waste/food scraps microbiologically safe), as well as identification of materials locally available for constructing low cost but pig proof housing. Also needed is knowledge of pig genetics and epigenetics to support formulation of a balanced production systems, productivity, health and feeding.

The complex epidemiology of ASF requires a better understanding to enable the identification of risk factors and critical control points in the pig value chains for targeting effective prevention and control measures in specific ecosystems. Molecular characterization of ASFV isolates in the recent past has contributed to strengthening surveillance and provided insight into the geographic origin of infections and their spread (whether linked to a domestic or a sylvatic cycle, whether spatially and temporally separate outbreaks are related, and possible origin of introductions into new areas), but requires a well-structured and systematic approach for it to add value to control strategies and the future development of effective vaccines. Validation of improved diagnostic methods to detect low rates of transmission and asymptomatic/carrier infections is required. Most urgently, a penside test that will detect ASFV DNA should be developed and its use promoted in order to confirm outbreaks in the early stages before the appearance of antibodies. The role of certain wild suids and ticks in the disease epidemiology, if any, needs to be better understood and characterized, along with their current geographical distribution. Capacity to detect antibodies to *Ornithodoros* salivary antigens should be established as this is the most reliable and cost-effective method to determine tick presence in specific ecosystems and its involvement in ASF transmission.

As demonstrated for many diseases, having an efficient vaccine against ASFV will be invaluable in controlling the disease and reducing global spread. Hence, there is need for continuous research to develop effective vaccines and design efficient delivery mechanisms tailored to address the needs and realities of Africa.

Developing specific plans for preventing and managing ASF

Prevention of ASF is the most crucial element of any strategy for management, since it eliminates the losses due to morbidity and mortality as well as the costs of outbreak control. Its success depends on risk mitigation throughout the value chain, which will involve various actors from the producer to the retailer. These must be given the necessary information that will enable them to discharge this responsibility efficiently and effectively.

Pig sector organization and development

Constraints such as animal diseases, scarce feed resources and poor performance of markets and services affect pork market access and thus result in unsustainable pig value chains. The strategy will promote mapping of market opportunities for

pork and investigation of the multiple factors preventing pig producers from exploiting pig production positively. The outputs will be used to develop and implement sets of integrated packages for pig production and market access for specific production systems, resource profiles and market settings. The strategy will also promote organization of producer associations, trader networks and infrastructure including slaughter facilities at various levels. The establishment of a regional pig sector platform would facilitate full participation in the implementation of the strategy by all pig value chain actors.

Biosecurity

Biosecurity remains the most crucial aspect in the control of ASF. For it to be effective, good practices of improved husbandry and disease prevention need to be advocated through a participatory process. Moreover, adequate biosecurity will help to prevent not just ASF, but all other swine diseases and thereby promote pig production and welfare. To ensure compliance with the required level of biosecurity, it will be critical to develop realistic, cost-effective and sustainable measures through a continuous dialogue and consensus with the stakeholders who have to ultimately implement them on-farm.

The technical and financial capacity of stakeholders to implement biosecurity is a key issue to consider in order to allow changes in behaviors and practices at production and marketing levels and to facilitate application of biosecurity measures in rural communities. These do not need to be elaborate or very expensive, e.g. cheap locally available materials for housing can be identified and plans for secure, simple housing using those materials be made available and demonstrated. This should be coupled with microcredit systems that can be a sustainable solution to ease farmers' access to financial resources needed for these changes. Capacity in terms of human, technical, organizational and financial resources at both national and regional levels will be mobilized based on better awareness of stakeholders (stakeholder analysis) through participatory methodologies and communication strategies adapted to the sub-regional and local circumstances.

The design of recommended husbandry and biosecurity practices has to be based on a deep understanding of the pig sector and its value chains, particularly those of backyard pigs. Furthermore, the entry point to effectively deliver the principles of basic on farm biosecurity, particularly in backyard and smallholder units should be through improving husbandry practices that eventually will lead to improved production and biosecurity. Nevertheless, best practices and farmers'

awareness on biosecurity issues should be applied along the entire value chain including the application of Hazard Analysis and Critical Control Points (HACCP) in the slaughterhouses and on waste management procedures.

At farm level, a comprehensive approach should be adopted for the enhancement of farming practices, specifically on management and hygienic practices in the piggeries, housing, feeding and breeding. This approach should aim at raising awareness of producers on health risks of sub-standard practices and non-application of biosecurity measures.

Pig farmers field schools (PFS), study groups or *groupements de defense sanitaire* using household and village level ASF risk assessment and mitigation methods could be a useful approach to promote biosecurity measures at production level by combining commercial and village producers. This will help in sharing experiences among farmers and progressively change scavenging systems into confined systems.

Finally, the concept of compartmentalization of highly biosecure commercial farms should be considered so that safe trade from compartments can continue even in the face of outbreaks in the area and the deaths or destruction of larger pig herds can be avoided. The principle has been successfully applied within the region including in the South African control zone where strict separation between domestic and wild pig populations is essential. As a result, accredited compartments have been able to continue providing pork for export in the region during outbreaks of foot and mouth disease and ASF.

Awareness and communication

In Africa, awareness and communication for the control and eradication of TADs are challenging in many ways, with ASF being a classical example. The weakpoints include inadequate risk communication among value-chain actors; lack of communication strategy on ASF, cultural and religious sensitivities and biases, lack of readily available information packages for dissemination, low recognition of the disease, as well as inadequate knowledge about the disease among animal health workers. There is a real danger of creating ability to recognize the disease that, in the absence of a real appreciation of how the disease spreads, can result in panic clandestine selling of potentially infected pigs.

An effective, organized public awareness campaign is probably the most important aid in preventing and controlling ASF and must be an intrinsic part of a strategy in

every country at all times, be it at risk or already infected. Countries' specific characteristics determine the type of campaign that will succeed best, but certain basic rules apply to all countries. The involvement of public/community opinion leaders is essential for any awareness campaign to succeed and will be helpful throughout the sector transformation process.

Strengthening communication is an integral part in the management of ASF. This should be undertaken through the direct and continuous involvement and consultation with all stakeholders in order to facilitate sharing of information and opinions on an equal stage, while finding out what kind of information is needed. This involvement should also consider the wide range of pig production and marketing systems and the rapidly expanding and transnational trade in pork and pork products. Core areas should be identified and supported by communication, advocacy, education, extension and social mobilization interventions. This should be done by promoting reporting to veterinary authorities, establishing and promoting biosecurity as professional and social rules along the value chain, promoting community based surveillance and reporting and advocacy to ensure greater interaction and coordination amongst all stakeholders both at private and public levels. Enhancing communication and information sharing efforts will also include the sustainable adoption of up to date technology on reporting and database management at the country, regional and global levels. Where possible, the principle of farmer-to-farmer extension should be applied, as nobody enjoys greater credibility than a successful fellow farmer.

Experience has shown that when providing information on ASF, pig farmers accept it better if it is combined with general information about pig diseases and their management. They get ASF into their herds sporadically, sometimes rarely or never, but their pigs are producing badly because of mange, worms and coccidiosis as well as malnutrition, and they need advice on how to manage these constraints or they will not be interested in the message about ASF. Moreover, ASF messages provide an opportunity to inform the pig owners about the importance of other diseases, in particular zoonotic diseases, e.g. *Taenia solium*, and vice versa.

Politicians who make the policies and decisions are very important targets for awareness creation about ASF. Getting commitment from politicians is recognized as important but how to do this is often not as clear. Attendance by politicians at events involving pig farmers is important, but providing well illustrated 1-3 page policy briefs can also be helpful. The strategy needs to emphasize communication with policy- and decision-makers as part of the awareness and communication strategy.

Outbreak management

Management of ASF outbreaks in endemic and newly infected areas is the biggest challenge due to the lack of feasible and cost-effective control measures for many situations in the African context. As there is no vaccine against ASF, the traditional available control tools include increased awareness, cleaning and disinfection procedures, movement control, quarantine, destruction of infected and exposed animals (stamping out), and trade bans on import of pigs and pork from infected countries/areas. As funds for compensation are not commonly available in African countries, even those that have a policy of compensation, the strategy will promote an array of actions. These will include stamping out where possible, or some form of modified stamping out, to significantly reduce the impacts of ASF through limiting its spread as well as reducing its prevalence and incidence in infected areas. In addition, it will promote measures to prevent incursion of ASF into new areas and ASF free countries. However, the application of stamping out as the main preferred control tool depends on the availability of funds for compensation (or alternative forms of compensation, e.g. in kind) or insurance schemes in both endemic and newly infected countries. Applying stamping out in the absence of an adequate, fair and timely compensation policy and sufficient funds to implement it will promote underreporting and further spread of the disease through uncontrolled movements, and should therefore be avoided. It also depends on other circumstances such as accessibility of the pigs, availability of suitable disposal sites and capacity to maintain a high level of security at those sites, as well as how widespread the disease is.

Prompt notification of disease occurrences is an important ingredient for early warning and rapid response mechanisms. Early reporting of disease events by producers and other value-chain actors should trigger a swift response from veterinary services to contain and eventually eliminate disease agents and outbreaks. Therefore, timely reporting to the authorities through the right channels should be strongly encouraged and promoted through awareness campaigns by selecting a range of communication tools and strategies most appropriate for each setting, e.g. manuals, trainings, posters, radio and TV advertisements, leaflets and other promotional materials. Such campaigns should focus on the advantages of early reporting and should explain what will happen in response to the report, which preferably has been agreed upon with value chain actors before it is needed. For the early warning to be effective though,

reporting has to be supported with a prompt response by field veterinarians/animal health officers in terms of sample collection, outbreak investigation and the enforcement of control measures, namely quarantine and movement control.

In the event of disease detection, movement control, quarantine, stamping-out, proper carcass disposal as well as cleaning and disinfection will be applied in all situations where this is feasible. Whenever a case of ASF is confirmed in an epidemiological unit, the veterinary authorities should swiftly apply movement restrictions on the infected herd to stop further spread of the disease. Furthermore, it is strongly recommended that animals in the infected epidemiological unit be slaughtered and destroyed followed by disposal of carcasses and cleaning and disinfection of all contaminated premises and materials. The strategy will promote adoption of policies to compensate farmers for the destroyed animals in order to ensure the sustainability of the control programme. Clearly this approach is most suitable for commercial farming operations where the number of pigs is known and the pigs are easily accessible.

Because application of some of these measures seems to be impractical in many African countries and situations due to lack of funds for compensation or their timely release, or where there are multiple foci of disease or free-ranging pigs in difficult terrain, in the absence of other alternatives, the strategy will strongly advocate for adoption of innovative modified forms of stamping-out and disposal in order to realize meaningful reduction in the impact of the disease. The progressive transformation of breeding systems to more controllable systems (from free-ranging to more and more confined systems) should form an additional measure where disease facts may have made the community more receptive to awareness creation activities.

The responsibility of managing disease through the implementation of appropriate disease control measures lies with the Chief Veterinary Officers (CVO) based on the global, regional and country strategies. However, the involvement and cooperation of all the actors in the pig sector is essential.

Pig sector transformation

Legislation and policy

The various pig sub-sectors, the complex value chains, the socio-economic impacts, the different epidemiological cycles, etc. translate into numerous policy

challenges related to ASF prevention and control, which need to be reviewed and linked to existing strategies for animal disease prevention and control.

A major challenge is that in many SSA countries livestock is either tagged to have a minor role or is not even included in agricultural policies, so that no or very limited funds are available for livestock development. At a higher level, the Comprehensive African Agriculture Development Program (CAADP) has initially omitted the livestock component, which means that the livestock sector is excluded from strategy meetings. This has later been corrected at continental level but has probably not been reflected in the national compacts. National livestock authorities need to ensure inclusion of livestock in national policy. This should be supported by raising the matter in forums like CAADP and lobbying by livestock sector associations. In many countries the pig sector is small and receives correspondingly little attention from the public livestock sector, yet it possesses a higher potential for reducing food and nutrition insecurity and poverty than many other sectors where immense national resources are invested. Livestock sector actors need to unite in order to obtain a voice in policy and legislation.

The main regulatory constraints to ASF control in Africa include poor enforcement of rules and regulations, obsolete legal framework and lack of a compensation scheme. Poor enforcement is often because the legal system is cumbersome and overloaded, so priority is not given to prosecution of breaches of animal disease control regulations and the costs involved are considered too high to be worth the effort. Review of the legislation should include ways in which clear breaches of the law can be dealt with rapidly and easily. In addition, the communication strategy should also include clear explanations of why the law should not be broken and the consequences of breaking it. An overarching problem in many SSA countries is that the early 90s wrong policies of pseudo-privatization and recent decentralization of veterinary services has resulted in loss of the clear chain of command from the Director of Veterinary Services to local level, as recommended by OIE. Addressing this problem is beyond the scope of this strategy but has been taken into account and should be raised in appropriate forums.

As there is no vaccine or treatment so far available for the control of ASF, stamping out with compensation and strict sanitary measures (biosecurity) remain as the main outbreak control options available. Therefore, the strategy advocates for inclusion of an effective compensation scheme in country disease policies and legislation. Care must be taken not to include fixed amounts because of the changes

in currency values that can be expected over time. The scheme should also be flexible so as to allow compensation to consist of nucleus replacement breeding stock, as many producers prefer this. Other innovations such as insurance schemes and interest-free loans to affected farmers should also be explored. To this effect, the strategy will promote the review and enforcement of the existing legislations and policies on disease control including across national borders and call upon the commitment and political will of national and regional authorities. It will also promote the formulation, harmonization and implementation of policies and legislations where they do not exist. Policy and legislation to support animal welfare, pig farm registration and animal identification and traceability should also be reviewed and updated to include pigs and where lacking, should be developed.

Creation of an enabling environment to support safe, sustainable pig production

The success of disease control programmes depends on the environment in which they are implemented. Various studies have revealed that up to 90% of the pigs produced in Africa are raised in the informal sector of the industry, which is characterized by a high degree of disorganization throughout the value chains. The sector has immense potential to contribute significantly to food security, improved nutrition and poverty alleviation, but its development is constrained by lack of financial support, weak marketing strategies and consequently lack of incentives to improve production and health of the pigs. Lack of appropriate infrastructure for the hygienic slaughter of pigs poses threats to public health and is prejudicial to animal welfare. Diseases like ASF flourish in this environment and unless the situation can be addressed any efforts to control them will be doomed to failure. The strategy will therefore prioritize reforms in the pig sector that will result in better organization, sanitary standards and profitability in all parts of the sector.

Organization of the pig sector requires reliable information on the numbers and distribution of pigs. This is facilitated by an identification and traceability system applied at least at herd level. The strategy therefore recommends implementation of identification and traceability with immediate effect in the commercial sector and to be phased in throughout the sector over a period of up to five years.

Coordination, partnership and resource mobilization

The lessons learned from Rinderpest eradication and the fights against highly pathogenic avian influenza (HPAI) have underscored the importance of regional approaches and partnerships among national, regional and continental stakeholders for effective management of TADs. Due to their cross-border implication, TADs require the coordination or at least cohesion of prevention and control actions among Member States, including the timely sharing of information. Thus, there is a genuine need for designing animal health programs within the framework of a regional perspective to effectively control animal diseases. Collaboration and partnerships with initiatives to control other diseases, in particular zoonosis, in the region would have very beneficial synergic effects and could be helpful in obtaining political support. Other partnerships to consider would be with organizations and government entities concerned with improving health through enhanced protein intake, especially for young children.

To effectively respond to the current ASF threat, the national, regional and international communities have to step up their efforts through an agreed upon coordinated approach and financing framework. Coordination is one of the most important effective response tools for ASF control and should be sustained as a critical mechanism to ensure synergy of contributions by multiple actors. When coordination becomes too challenging, at least actors should agree in building coherence in their interventions to avoid contradictions, duplications and promotion of bad practices. A successful collaborative partnership for coordinated ASF control should involve coherent planning for resource mobilization and implementation of programs by stakeholders at national, continental and global level as being championed by AU-IBAR and FAO in jointly developing this ASF Control strategy. This partnership shall broaden its coverage by bringing in additional relevant actors for coordinated and synergistic implementation of ASF control. Joint efforts should be made at international, regional and national levels to obtain deeper and sustainable political support for ASF control in conjunction with other TADs and zoonosis. Regional development and harmonization of effective ASF interventions to ensure coherence of actions and applied tools and awareness among the general public and policy makers are needed for effective and efficient ASF control. An institutional arrangement for coordinated financial and technical support is also critical for effective implementation of the control strategy. Finally, involvement of the private sector in implementation of the strategy including provision of resources and active participation in the evolution of the strategy are essential if success is to be achieved.

6. CONCLUSIONS

This regional strategy needs to be translated into concrete actions, especially at the level of the pig owners and the veterinary services. It is therefore essential to develop an action plan that will launch, foster, sustain, coordinate and streamline interventions and actions undertaken by the stakeholders who will validate and endorse it. An action plan will be a means to articulate possible short, medium and long term streams of actions but also to assign them among the key stakeholders that ought to be engaged in the prevention and control of ASF in Africa. Although the formulation of a regional strategy is a fundamental prerequisite, it needs to be accompanied by an action plan that will embed detailed programs and projects to achieve the outputs listed.

Hence, a second document developed is an action plan for the prevention and control of ASF in Africa guided by the regional strategy described above.

Both the regional strategy and the action plan are to be considered dynamic documents that will evolve through inputs from stakeholders, pilot projects and external evaluation.

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8. ACTION PLAN FOR THE EFFECTIVE IMPLEMENTATION OF THE REGIONAL STRATEGY FOR ASF CONTROL IN AFRICA

Objectives of the Strategy

1. To control ASF in infected countries;
2. To prevent the introduction of ASF into non-infected countries

Expected outputs of the strategy with activities proposed to achieve them

- Create a better understanding of epidemiology and socio-economic drivers for ASF status, spread, prevention and control;
 - ✓ Build a knowledge database (Year 1)
 - ✓ Identify and fill gaps in knowledge base through research (Years 1 and 2-4)
 - ✓ Disseminate information as appropriate (Years 1-4)
- Raise awareness and encourage reporting of ASF by farmers, traders, butchers and other pig sector stakeholders;
 - ✓ Training in Participatory Surveillance and Community-Based Reporting (Year 1)
 - ✓ Training in taking samples using FTA cards and submitting them to laboratories (Year 1)
- Strengthen capacity of farmers to produce healthy pigs by providing access to information and training;
 - Training in pig management (biosecurity, nutrition, breeding, management, marketing) (Years 1-3)
 - Research for low cost pig housing and low cost feeds and forages (Years 1-4)
 - Legislation and knowledge of law (Years 1-4)
- Strengthen capacities of veterinary services in disease detection, diagnosis, surveillance, management, emergency preparedness and response/ contingency planning and risk analysis;
 - ✓ Laboratory capacity (Years 1-3)
 - ✓ Field capacity (Year 1)
 - ✓ Surveillance network with PR, CBR, value chain actors (Years 1-4)
 - ✓ Preparedness planning (Years 1-2)
 - ✓ Contingency planning and simulation exercises (Years 1-3)

- ✓ Risk analysis and HACCP systems (Years 1-3)
- ✓ Emergency funding for managing outbreaks (Year 1, to be sustained in permanent funds)
- ✓ Policy and legislation (Years 1-4)
- ✓ Training in biosecurity (laboratories, field investigation) including auditing of biosecurity systems (Years 1-3)
- Reduce ASF incidence and impact;
 - ✓ Enhanced prevention and risk mitigation along value chain (Years 1-3 and sustained)
 - ✓ Minimising adverse effects of outbreaks and control measures (Years 1-4)
 - ✓ Improve performance and biosafety of pig and pork value chains
 - ✓ Value chain identification and analysis (Years 1-2)
 - ✓ Economic analysis (Year 1)
 - ✓ Training of value chain actors (Years 1-3)

Programme Management (over-arching activities, to be initiated as soon as possible)

1. Set up a unit within AU-IBAR for ongoing project management and coordination.
2. Identify and appoint appropriate entities for periodic external monitoring and evaluation of the programme.
3. Identify and appoint national focal points for ASF (all countries where ASF is endemic either in wildlife or in domestic pigs or both or otherwise at high risk for ASF).
4. Identify and appoint national focal points for pig production, improvement and biosecurity (all SSA countries with pigs where this will be acceptable; otherwise to be undertaken by ASF focal point).
5. Upgrade or establish data management systems for information gathered at national level.

Actions

1. Immediate and emergency actions
2. Short term actions
3. Mid-term, enabling actions
4. Long term, structural actions

Summary of Actions

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term (Year 4 completion)	Long term
Improving the pig sector	<p>Knowledge database</p> <ol style="list-style-type: none"> 1. Perform a literature review of existing recent publications on various aspects of pig production in SSA countries (production, management, health, profitability, socio-economics and marketing) 2. Obtain the best possible information on pig numbers and number of pig farmers per country 3. Obtain information on pig production in each country, provide descriptions and map the distribution of commercial, small-holder semi-intensive and traditional pig farming systems 4. Obtain information on pig value chains: how and where pigs are produced, marketed and slaughtered (on farm, local butcher or market, live markets, roadside, slaughter slabs or abattoirs, retail outlets and export) 5. Obtain and collate information on support services available for pig farmers (government and private sector services; breeding stock, extension services, veterinary services, training and information) 6. Obtain information on in-country research relating to pig health and production 7. Determine the level of and mechanisms for communicating relevant research results to pig farmers 8. Obtain a database of projects/programmes aimed at improving pig production or health that have been undertaken in SSA during the last three decades and evaluate the progress achieved and the sustainability of the efforts made 	<p>Knowledge database</p> <ol style="list-style-type: none"> 1. Collect, analyze and compare existing policies and legislation affecting ASF and the pig industry including slaughter of pigs and marketing of pork 2. Collect information on pig producer or organizations in all SSA countries where pigs are produced 3. Collect information on any existing financial support for pig farmers to build or upgrade facilities for keeping pigs (loan capital) 	<p>Knowledge database</p> <p>Maintain and update existing databases</p>	<p>Knowledge data-base</p> <p>Maintain and update existing data-bases</p>

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term (Year 4 completion)	Long term
	<p>9. Obtain information on availability, constituents and prices of commercial rations for pigs in SSA and of safe alternative feeds in the form of agricultural and industrial waste- and by-products and forages (i.e. feeds that will not contain pork)</p> <p>10. Collect information and pictures and develop a database of low-cost pig-proof housing types suitable for use in countries with different climate types in SSA</p> <p>11. Obtain information on water requirements for different breeds of pigs and on delivery systems suitable for areas without piped water</p> <p>12. Obtain and collate information on the availability of health service provision and the level of health care afforded to pigs in the countries of the region</p> <p>13. Obtain information of feeds and feeding technologies adopted by farmers (ex. silage and other feeds e.g. using sweet potato)</p>			
	<p>Research</p> <p>1. Analyze available literature and identify research gaps relating to pig health, breeding, pig nutrition, production and pig housing in the tropics and subtropics</p>	<p>Research</p> <p>1. Develop and submit proposals and undertake research on local feed sources according to gaps identified</p> <p>2. Develop and submit proposals and undertake research on pig value chains in SSA countries including cross-border value chains</p> <p>3. Identify and analyze different types of pig value chains</p> <p>4. Perform pilot studies in selected countries where value chains have been identified and evaluated in terms of risk to validate the value chain risk mitigation approach</p>	<p>Research</p> <p>1. Develop linkages amongst researchers in the region in order to develop collaborative projects for investigating common ASF problems</p> <p>2. Develop an information system for researchers to identify suitable funding opportunities</p>	<p>Research</p> <p>Ensure as far as possible an enabling environment for pig production research in academic and research institutes</p>

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term (Year 4 completion)	Long term
	<p>Biosecurity</p> <ol style="list-style-type: none"> Evaluate and improve on the existing biosecurity protocols for pig farming systems Develop biosecurity plans for different levels of pig production (system and country- specific) Assess knowledge Attitude and Practices of value chain actors on ASF and biosecurity Assess capacities and incentives of value chain actors for adopting biosecurity protocols 	<p>Biosecurity</p> <ol style="list-style-type: none"> Develop training courses and training materials for implementation of biosecurity measures on different levels of pig farms Develop training courses and training materials for implementation of biosecurity measures from the farm gate to the abattoir Undertake pilot projects in SSA countries to implement and evaluate biosecurity plans in different farming systems 	<p>Biosecurity</p> <p>Identify sources of microfinance and other resources for pig farmers wanting to upgrade their facilities to improve biosecurity.</p>	<p>Biosecurity</p> <p>Propose/establish infrastructure projects for waste disposal and conversion e.g. by ponding, composting, conversion to biogas</p>
	<p>Awareness, communication, information</p> <ol style="list-style-type: none"> Evaluate and consolidate existing training opportunities and material for communicating information about pig production and health Develop holistic 'health packages' for pig producers Evaluate different models of message dissemination and communication to value chain actors 	<p>Awareness, communication, information</p> <ol style="list-style-type: none"> Develop and implement an awareness programme throughout the region Develop and deliver training of trainers courses for pig value chain actors throughout the region Link into existing systems or install available systems for dissemination of market information via internet and cell phones to stabilize pig value chains 	<p>Awareness, communication, information</p> <ol style="list-style-type: none"> Encourage and assist producer organizations to provide information and training on disease prevention through biosecurity (example of INTER- PORCI in CIV) Study groups/ <i>groupements de defense sanitaire</i> formed to focus on prevention of ASF and surveillance for ASF and disseminate information to pig farmers in their areas 	<p>Awareness, communication, information</p> <p>Knowledge banks exist at national, sub-regional and regional level where pig value chain actors can obtain information on pig health and production</p>

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term (Year 4 completion)	Long term
	<p>Development and organization</p> <ol style="list-style-type: none"> 1. Perform SWOT analyses at country level on the existing organization of the pig sector and make appropriate recommendations according to the findings 2. Consult with stakeholders in the pig sector to identify the most appropriate or desirable associations e.g. study groups, fora, producer associations or producer organizations 	<p>Development and organization</p> <ol style="list-style-type: none"> 1. Review legislation that may hamper the formation of associations of pig value chain actors 2. Strengthen extension services to pig farmers (pig sector is often neglected) 3. Initiate and promote Pig Multi-stakeholder platforms at country and sub-regional levels 	<p>Development and organization</p> <p>Legislation and policy to support pig sector developed and in place in all countries</p>	<p>Development and organization</p> <ol style="list-style-type: none"> 1. Strategies in place for sustainability of the pig sector and of pig sector organizations 2. Infrastructure projects proposed or in process for establishment of pig-breeding centres for better genetics, feed factories, slaughter labs and abattoirs, and where necessary improving roads, water supplies and electricity supplies to serve wider areas

	<p>Harmonization of policy and legislation</p> <ol style="list-style-type: none"> 1. Evaluate national policy in terms of the pig sector and encourage countries to develop policies where these are absent 2. Review legislation at national level pertinent to the pig sector including meat safety and animal welfare regulations 	<p>Harmonization of policy and legislation</p> <ol style="list-style-type: none"> 1. Facilitate participation of stakeholders in the pig sector in policy making 2. Provide legal support if necessary to assist in closing gaps in legislation relating to the pig sector 3. Ensure that legislation exists for registration of pig farms and at least herd level identification of pigs 4. Ensure that adequate legislation exists for the hygienic and humane slaughter of pigs 	<p>Harmonization of policy and legislation</p> <p>Framework of policy and legislation in place to support safe and profitable pig farming and marketing</p>	<p>Harmonization of policy and legislation</p> <p>Harmonization of legislation to remove obstacles to trade in pigs and pig products</p>
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Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term (Year 4 completion)	Long term
	<p>Coordination, partnership and resource mobilization</p> <p>Propose and evaluate mechanisms for collaboration between industry and relevant government departments (e.g. animal health forum)</p>	<p>Coordination, partnership and resource mobilization</p> <p>Promote linkages amongst producer organizations and participation in regional producer organizations e.g. SACAU for SADC countries</p>	<p>Coordination, partnership and resource mobilization</p> <p>Public-private partnerships in place to support pig value chains</p>	<p>Co ordination, partnership and resource mobilization</p>
Disease management	<p>Knowledge database</p> <ol style="list-style-type: none"> 1. Make Information from OIE WAHIS and AU-IBAR Yearbooks since 2005 available as Excel sheets 2. Analyze information and categorize countries in terms of status and risk 3. Determine reliability of information that appears in only one of the two sources and correct as necessary in database 4. Perform a literature review of existing publications on ASF in SSA region 5. Make an inventory of the institutions and facilities in each country offering a veterinary diagnostic service 6. Determine the capacity of each to provide ASF diagnosis including the tests used and the number of samples tested per year for ASF (questionnaire) 	<p>Knowledge database</p> <ol style="list-style-type: none"> 1. Update information from OIE WAHIS continuously as immediate notifications and country reports become available 2. Update Information from AU-IBAR as new Yearbook becomes available 	<p>Knowledge database Maintain and update existing databases</p>	<p>Knowledge data- base Maintain and update existing databases</p>

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term (Year 4 completion)	Long term
	<p>Surveillance</p> <ol style="list-style-type: none"> Determine, based on disease reporting, the existence and effectiveness of surveillance and reporting in each of the countries Determine in collaboration with the veterinary authorities what the constraints are for effective passive surveillance Determine who the potential actors are in a surveillance network for ASF Establish a system of rapid reporting by farmers as devised for HPAI reporting by FAO (Participatory Surveillance and Community-based Reporting Systems) in ASF hotspots 	<p>Surveillance</p> <ol style="list-style-type: none"> Develop in collaboration with the veterinary authorities of each country a practical and feasible plan for surveillance to detect the presence of outbreaks of clinical ASF Upgrade and improve existing surveillance systems 	<p>Surveillance</p> <ol style="list-style-type: none"> Set up or strengthen surveillance networks and reporting mechanisms in all relevant SSA countries including Participatory Surveillance and Community-based Reporting for ASF Develop training programmes and information material for Participatory Surveillance/Community-based Reporting System 	<p>Surveillance</p> <p>Ongoing activity</p>
	<p>Diagnosis</p> <p>Laboratory visits to each of the facilities that offers diagnosis of ASF or animal diseases in High Risk Countries to determine:</p> <ol style="list-style-type: none"> Whether there are any infrastructural problems that hamper service provision (inconsistent water or electricity supply or poor maintenance of buildings and equipment) Whether there are any biosecurity threats posed by their handling of ASF samples including how the samples are transmitted from the field to the laboratory and how they are stored or disposed of The feasibility of installing capacity to diagnose ASF based on the safety and quality of service that the facility would be capable of rendering in terms of infrastructure and skilled personnel Review of available pesticide diagnostic tests for pig 	<p>Diagnosis</p> <ol style="list-style-type: none"> Laboratory visits to each of the facilities that offers diagnosis of ASF or animal diseases in Medium and Low Risk Countries to determine: Whether there are any infrastructural problems that hamper service provision (inconsistent water or electricity supply or poor maintenance of buildings and equipment) Whether there are any biosecurity threats posed by their handling of ASF samples including how the samples are transmitted from the field to the laboratory and how they are stored or disposed off 	<p>Diagnosis</p> <ol style="list-style-type: none"> Develop plans and budgets for improving diagnostic capacity in SSA veterinary laboratories through increasing capacity of individual laboratories where feasible and through linkages with other sub-regional and regional laboratories Installation of appropriate additional diagnostic capacity for ASF 	<p>Diagnosis</p> <ol style="list-style-type: none"> Laboratory maintenance plans operational Accreditation of tests and laboratories 'Twinning' with highly rated laboratories

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term (Year 4 completion)	Long term
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		<p>3. The feasibility of installing capacity to diagnose ASF based on the safety and quality of service that the facility would be capable of rendering in terms of infrastructure and skilled personnel</p>	<p>3. Identify and strengthen linkages between with designated reference laboratories outside the region</p> <p>4. Introduce quality assurance systems for the ASF tests performed in cases where they do not already exist</p> <p>5. Long-term plans in place to ensure sustainability of veterinary diagnostic laboratories (training of staff, maintenance and servicing of equipment including calibration, assured water and power supplies)</p>	
	<p>Research</p> <p>1. Identify major focus areas for research relevant to diagnosis and control of ASF in terms of disease epidemiology</p>	<p>Research</p> <p>1. Continue/complete ongoing funded research projects and publish the results</p> <p>2. Develop proposals for focus areas already identified e.g. Maintenance and transmission of ASF virus by Ornithodoros moubata complex ticks involved in a domestic cycle; ASF at the wild- life interface; cross- border pig trade in relation to ASF hotspots</p>	<p>Research</p> <p>1. Develop linkages amongst researchers in the region in order to develop collaborative projects for investigating common ASF problems</p> <p>2. Develop an information system for re- searchers to identify suitable funding opportunities</p>	<p>Research</p> <p>Ensure as far as possible an enabling environment for ASF research in academic and research institutes</p>

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term Year 4 completion)	Long term
	<p>Biosecurity</p> <ol style="list-style-type: none"> Evaluate OIE TAHC Chapter 4.3 and South African protocol for ASF-free pig compartments for applicability to commercial farms throughout the region Collate information on identified factors that negatively or positively influence risk of having ASF out- break on pig farm and develop ASF-specific biosecurity measures to mitigate risks 	<p>Biosecurity</p> <ol style="list-style-type: none"> Perform risk assessment of selected value chains to identify ASF-related hazards and develop HACCP- based approaches to mitigate the risks and provide auditable systems for ensuring absence of ASF Undertake pilot projects to evaluate implementation of HAC- CP to prevent ASF in selected value chains in High Risk Countries 	<p>Biosecurity</p> <ol style="list-style-type: none"> Ensure that all necessary legislation is in place to support the implementation of biosecurity throughout the value chain Ensure that all necessary legislation is in place to support the implementation of biosecurity in 	<p>Biosecurity</p>
	<p>Awareness, communication and information</p> <ol style="list-style-type: none"> Analyze and consolidate existing methods and material for creating awareness and providing information about ASF for all pig value chain actors Develop an awareness creation plan for the region 	<p>Awareness, communication and information</p> <ol style="list-style-type: none"> Deliver information and training through appropriate tools and channels in all SSA countries where pigs are farmed Promote and support the implementation of biosecurity measures for prevention of ASF at all levels of pig value chains 	<p>Awareness, communication and information</p> <ol style="list-style-type: none"> Develop policy briefs to support the ASF management strategy at the level of policy- and decision-makers Identify institutions and organizations that can sustainably provide training services Training materials available and trainers trained at all levels (veterinarians, animal health technicians, extension officers, community- based animal health workers, farmer-to- farmer extension volunteers) 	<p>Awareness, communication and information</p> <p>Establish knowledge banks at national, sub-region- al and regional level where animal health practitioners, extension officers and value chain actors can obtain updated in- formation on pig health and on important diseases</p>

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term (Year 4 completion)	Long term
	<p>Outbreak management and recovery</p> <ol style="list-style-type: none"> 1. Contingency plans and SOPs drawn up in all countries 2. Channels of communication with pig value chain actors exist and can be used promptly 3. Ensure that stock-piles of materials (protective clothing, sampling equipment, disinfectants) are available for emergency use 4. Field staff trained in taking and submitting appropriate samples for ASF 5. Field staff trained in biosecurity measures to prevent spread of ASF through outbreak investigation 	<p>Outbreak management and recovery</p> <ol style="list-style-type: none"> 1. Perform simulation exercises in all countries to test contingency plans 2. Update contingency plans and SOPs as necessary or indicated by simulation exercises 3. Identify suitable sources of pigs for placement of sentinels and re-stocking after an outbreak 	<p>Outbreak management and recovery</p> <ol style="list-style-type: none"> 1. All necessary legislation in place 2. Organize stakeholder meetings with pig value chain actors to obtain their inputs and identify their roles in preventing outbreaks of animal diseases including ASF and in managing an outbreak if it happens 3. National, sub-regional and regional contingency plans developed and in place 4. Practicality of contingency plans assured through simulation exercises that test ability to deploy resources and linkages with other agencies e.g. security forces, public works department 5. Availability of emergency funds for out- break control as set out in the contingency plan assured through prior arrangements with the Fiscus (Treasury, Ministry of Finance etc.) 	<p>Outbreak management and re-covery</p>

Main focus area	Immediate (Year 1 completion)	Short term (Years 1 – 3)	Mid-term Year 4 completion)	Long term
	<p>Harmonization of policy and legislation</p> <ol style="list-style-type: none"> 1. Review national legislation on disease control pertinent to ASF and identify any gaps that may exist 2. Review any legislation and/or agreements between states relevant to cross-border animal movement control and disease control in conjunction with OIE recommendations 	<p>Harmonization of policy and legislation</p> <ol style="list-style-type: none"> 1. Provide legal support if necessary to assist in closing gaps in legislation relating to control of ASF 2. Facilitate harmonization of veterinary certification in terms of ASF 3. Facilitate harmonization of border inspection and controls to 	<p>Harmonization of policy and legislation</p> <ol style="list-style-type: none"> 1. Provide legal support if necessary to assist in closing gaps in legislation relating to control of ASF 2. Facilitate harmonization of veterinary certification in terms of ASF 3. Facilitate harmonization of border inspection and controls to prevent introduction of ASF 4. Institute/modernize movement control methodology 	<p>Harmonization of policy and legislation</p> <p>Ensure a legal framework that supports safe regional trade in pigs and pork products</p>
	<p>Coordination, partnership and resource mobilization</p> <ol style="list-style-type: none"> 1. Conduct at least internal evaluation of veterinary service performance through the OIE PVS tool in countries where this has not already been done, prioritizing High Risk Countries 2. Ensure that a rapid release mechanism exists for emergency funds for outbreak control 3. Identify programmes and projects for improving pig production, controlling zoonotic diseases, alleviating poverty, increasing food security and protein nutrition etc. to establish partnerships and synergies and generate re- sources 	<p>Coordination, partnership and resource mobilization</p> <ol style="list-style-type: none"> 1. Strengthen veterinary services when feasible through filling vacancies, improving conditions and salaries where necessary, ensuring refresher training and continuing professional development opportunities 2. Continue to conduct at least internal evaluation of veterinary service performance through the OIE PVS tool (remaining countries) 3. Strengthen interaction with stakeholders in the pig value chain 	<p>Coordination, partnership and resource mobilization</p> <ol style="list-style-type: none"> 1. Create public-private partnerships to improve pig marketing access and opportunities and strengthen pig value chains 2. Investigate ways to strengthen regional trade e.g. COMESA 'green certificate' approach for pig products 	<p>Coordination, partnership and resource mobilization</p> <p>Collaboration with authorities responsible for food safety to ensure adequate slaughter facilities for pigs and assist in mobilising resources for upgrading/putting in place infrastructure</p>



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Organization of the
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ISBN 978-92-5-109384-9



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I6053E/1/02.17