Pig Production

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Agricultural Research Council – Animal Production
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1 INTRODUCTION

Pork production has evolved from a backyard operation (keeping a few pigs and feeding them swill on pasture) to intensive units focused on efficient methods of producing pork at a low cost. Commercial pig production is a small industry with a few modern piggeries that use good genetic materials.

In South Africa, there are approximately 400 commercial pork producers and 19 stud breeders. In 2019, the number of pigs was estimated to be 1,454 million, with Limpopo province producing 24 percent of all pork produced in South Africa, followed by North West and Western Cape, which produced 21 percent and 11 percent, respectively (see Figure 1). Pig numbers are estimated to have decreased by 3.79 percent, from 1,453 million in August 2018 to 1,398 million in August 2019. There are 243 commercial farmers registered, with 110,400 sows and 19 stud farmers. Figure 1 depicts the total pig population in South Africa by province in 2019. (DAFF Commodity profile, 2019).

The total number of smallholder farmers is unknown, but it is estimated to be between 1,500 and 3,000; they own an estimated 16,000 or more sows, with an average of five to 50 sow units (Sishuba, 2016).

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Figure 1 Pig production distribution in South Africa.
Source: DAFF Commodity Profiles, 2019.
A successful pig production is dependent on three fundamental factors: breeding, nutrition, and management. The success of a farming enterprise is heavily influenced by the breed / genotype. The breed must be environmentally adaptable and adapted to the current conditions. Pig farmers face new challenges and opportunities as a result of climate change. They must consider the effects of climate change on productivity, businesses, and pig welfare. Pig health and performance (e.g., fertility implications); feed supply security; energy affordability and security; and the ability of buildings to cope with extreme and fluctuating weather that affects the welfare of the pigs are key concerns for the pig farmer.

Climate can have an impact on livestock both directly and indirectly. Air temperature, humidity, wind speed, and other climate factors have direct effects on animal performance, including growth, milk production, and reproduction (Houghton, 2001). Changes in feed resource availability and prices, as well as changes in livestock diseases and pests, are some of the most visible and significant effects of climate change on livestock production (Shields & Orme-Evans, 2015). Climate change is expected to increase the vulnerability of livestock systems while also reinforcing existing factors affecting livestock production systems (Rust & Rust, 2013). Agriculture is both a contributor to and a victim of climate change, as evidenced by carbon dioxide, methane, and nitrous oxide emissions. These gases, in turn, contribute to global warming, with agriculture estimated to contribute 18% to 20%. (Rust & Rust, 2013). Animals in developing countries are more exposed to environmental elements and thus more sensitive to changes in climatic conditions.

With an estimated 450-500 million smallholder farmers constituting 85 percent of the world's farmers, smallholder farmers make up a substantial component of the global farming community. Mostly defined by climate change vulnerability, which is caused by a lack of financial resources, as well as insufficient institutional and technology adoption capabilities (Ume et al., 2018a). The effects of climate change vary slightly (depending on genotypes, location, and other factors), but the most commonly reported issues include a lack of portable water for animals, an increase in disease and pest incidence, a decrease in feed intake and digestibility, and a decrease in feed utilization efficiency, which can be measured in terms of growth and pork quality. (Ume et al., 2018a). Pigs suffering from heat stress will have increased respiration rates and a loss of appetite as a result of rising temperatures caused by climate change. Internal heat production is reduced by the latter. If heat stress persists, pigs begin to drink excessive amounts of water (leading to an increase in electrolyte loss) and collect acids produced by the body (resulting in an acid/base imbalance). In severe circumstances, this might lead to diarrhoea or even death.
2 HOW CLIMATIC CONDITIONS IMPACT PIG PRODUCTION

2.1 IMPACT OF ELEVATED TEMPERATURES ON THE PIG PERFORMANCE

Pigs, like many other animals, have a thermal comfort zone, which is defined as a range of ambient environmental temperatures that are favourable to physiological functioning (Rojas-Downing et al., 2017). Because pigs are sensitive to heat, it's critical to look for strategies to keep them cool during hot weather. Modern pig genotypes produce significantly more heat than their forebears, making them less appropriate for hot regions and opening the door for the use of indigenous genotypes. Brown-Brandl et al. (2003) found that new genetic lines of pigs create roughly 20% more heat than their predecessors in the early 1980s in an assessment of pig heat and moisture production. This tendency is likely to have continued in the years since this study, and heat production could have increased by another 10%.

Sweating and panting, two of the most significant techniques for maintaining body temperature and forming an inbuilt evaporative cooling system, are used by most animals to transfer internal heat to the outside of the body. Pigs, on the other hand, do not sweat and have small lungs. Pigs are prone to heat stress due to these physiological restrictions and their comparatively substantial subcutaneous fat. When pigs are exposed to heat stress, they exhibit two distinct symptoms: increased respiratory rate and loss of appetite. Internal heat production is reduced by the latter. If heat stress persists, pigs begin to drink excessive amounts of water (leading to an increase in electrolyte loss) and collect acids produced by the body (resulting in an acid/base imbalance). In severe circumstances, this might lead to diarrhoea or even death.

According to Pearce et al. (2013), exposure to 35°C for 24 hours harmed the gut defense function and raised plasma endotoxin levels. The scientists explained that when pigs are subjected to heat stress (even for as little as two to six hours), their intestinal defense systems are greatly weakened, allowing harmful bacteria to enter the body more easily. As a result, if sanitary conditions are poor, heat stress can lead to secondary infection.

Adult pigs can survive in temperatures ranging from 15°C to 30°C. Heat stress is more common in larger (frame size) pigs, and the decline in growth performance is greater than in smaller pigs. Exotic high-performance pigs are now even less suited to hot conditions.

At what temperature and humidity do pigs get heat stressed?

Heat stress is exacerbated by ambient temperature (as well as humidity). Pigs can get heat stress at significantly lower temperatures when the humidity is high, depending on their age, breed, housing, and flooring. A heat stress index chart shown in Figure 2 was developed by Iowa State University and can be used as a decision tool for implementing management techniques to mitigate heat stress (Linden, 2014). The graph illustrates that a 30 percent average humidity combined with temperatures above 28°C has a substantial impact on the intestinal health and performance of grower-finisher pigs. Breeding herds have a decreased temperature tolerance.
Figure 2  Heat index chart combines the effects of both temperature and relative humidity to provide classification as alert, danger and emergency zones for growers finisher pigs for heat stress management. 
*Source: Linden, 2014.*

Environmental factors affecting lactating sows and the piglets

- Fluctuating farrowing house temperatures.
- Failure to determine the best farrowing house temperature
- Draughty creep areas, low creep areas temperatures
- Draughts on the sow
- Poor water supply

2.2 IMPORTANCE OF TEMPERATURE REGULATION IN THE FARROWING HOUSE

i. The sow requires a temperature range of 10 to 22 °C for optimal feed intake, sufficient milk production, and healthy physical condition.
   - When sows are exposed to very high temperatures for an extended period of time, their appetite is harmed, and milk production is diminished
   - Similarly, if sows are exposed to persistently low temperatures, they will convert feed to heat production rather than milk production, resulting in piglets with poor weight gain and low weaning weights

ii. Piglets in the farrowing pen should be kept at a temperature between 27°C and 32°C. However, newborn piglets require a temperature range of 32°C to 37°C.
   - Colder temperatures will reduce piglets' resistance to disease. Piglets kept at 21°C are five times more likely to suffer from severe diarrhoea than those kept at 35°C
   - "Cold" piglets require more feed than "warm" piglets; however, they consume less feed.
2.3 METHODS OF REGULATING TEMPERATURE IN THE FARROWING HOUSE

a. Ventilation
   • Ventilation is essential in all pig houses because it removes moisture and odours in the winter and heat in the summer. Adequate air exchange capacity and distribution are critical. Draughts must be kept to a minimum for small pigs.
   • Different ventilation methods are available (see Figure 3):
     o Mechanical ones include using fans to blow air out of the building or fans to blow air into the building.
     o The natural ones involve lowering and closing gaps in the walls with curtains. To reduce draughts and heat loss during cold weather, curtains should be opened from the top down and closed on the sides with an overlap.

b. Summer Cooling
   • Summer cooling necessitates significantly more air movement than winter cooling. During periods of extreme heat, the ventilation system could be supplemented with a fan blowing over the sows.
   • Evaporative cooling is effective, and drip irrigation nozzles are used to drip water on the sow’s shoulder to provide cooling.
   • Mitigation for extensive/outdoor pig production systems involves wallowing in the mud, which can reduce body temperature by up to 2°C. Pigs wallow for 1.2 percent longer when the temperature rises by one degree (Olczak et al., 2015).

Figure 4 depicts the effect of ambient temperature on the growth performance of various pig classes.

Figure 3 Thermal (heat) exchange between a pig and its surroundings with prediction of different cooling strategies as they relate to heat exchange.
Source: Mayorga et al., 2018.
Average daily gain begins to decrease when heavier pigs are exposed to temperatures above 23°C, while average daily gain begins to decrease when lightest pigs are exposed to temperatures above 27°C. This shows the various optimal conditions and tolerance levels for the various pig classes.

Figure 5 depicts critical temperatures for pigs of various body weights; this data can be used as a guide for temperature control in different sheds holding pigs of varied ages. The index shows that higher temperatures have a curvilinear effect on ADG and ADFI, with the effect being more pronounced in heavier pigs. The crucial observation is that pig production performance is significantly affected as climatic circumstances change, particularly as temperature rises.
2.4 INTERVENTIONS FOR ELEVATED TEMPERATURE

Recommended management tools to reduce heat stress

To effectively control and manage internal temperature and reduce energy waste, it is beneficial to improve building insulation to reduce heat loss and limit the effect of environmental temperature. In addition, a ventilation control system and approved creep grates were installed in the farrowing house in accordance with the welfare code to regulate the environment of the piglets and sows. Improving the design and management of wallows and shaded areas, investing in water storage facilities, employing less intensive rearing techniques and using less fatty food in animal feed, and efficient manure management (Ume et al., 2018b).

Feeding pigs concentrated feeds in finely ground or pelleted rations could be one strategy for minimising greenhouse gas (GHG) emissions.

The use of feed additives such as nitric, fumarate, and sulfate (Ume et al., 2018a) as well as genetic selection aims at increasing pig productivity by increasing feed intake in order to maintain energy sources associated with growth.

- When there is a heat wave, increase ventilation and airflow and check that the cooling system is in good working order (for example, spray cooling), and spraying of roofs (of pig houses) is advised
- Construction of pig houses with either curtains or a ventilation system to allow temperature manipulation in order to adjust the temperature to meet the needs of breeding pigs and piglets
- Designing the piggery to accommodate temperature fluctuations, such as locating it where it will be cooler in the summer and insulating the house (for both the roof and side walls especially where corrugated iron is used)
- Reduce stocking density if possible, to allow air to flow between the pigs
- Use hardy breeds that can withstand higher temperatures when raising pigs outside. These pigs should have access to shade and shelter as well
- Keep the temperature of the drinking water as low as possible (around 10°C is ideal but difficult to achieve)
- Feeding should be avoided between 10:00 a.m. and 4:00 p.m. (the hottest period of the day)
- Electrolytes and antioxidants can be supplemented through the water supply.
- Increase dietary energy density
- Excess non-essential amino acids and fiber should be avoided (minimising intestinal fermentation and therefore heat production)
- Increase the availability of antioxidants such as vitamin E and betaine through the diet

2.5 IMPACT OF WATER SCARCITY ON PIG PRODUCTION

Water is the most critical nutrient for pig development because it is required in the biggest quantity. Water is necessary for pigs for a variety of reasons, including:

- Metabolism;
- Adjustment of body temperature;
- Movement of nutrients into the body tissues;
- Removal of metabolic waste;
- Production of milk;
- For growth and reproduction;
• The maintenance of mineral homeostasis;
• The excretion of the end products of metabolism (particularly urea);
• The achievement of satiety (gut fill); and
• Satisfaction of behavioural needs.

Water makes up 80% of the empty body weight of a newborn pig and roughly 53% of the empty body weight of a market pig. An animal can lose almost all of its fat and more than half of its protein and still live, yet losing a tenth of its water causes death. Temperature, feedstuffs, stage of production, and health all influence the amount of water required by the pig on a daily basis.

Grow-finish and gestating pigs need the most water in the late afternoon of a 24-hour period, but breastfeeding females use water more regularly throughout the day. Pigs’ daily water requirements range from 1.9 liters per pig per day for newly weaned pigs to more than 5.7 liters per pig per day for grow-finish pigs using nipple drinkers. Water needs for breeding pigs range from 15 liters per day for gestating females to 23 liters per day for lactating swine. Water availability promotes feed intake, and daily drinking water usage can be used to predict swine health over time.

Municipal piped water, bore holes, ponds, reservoirs, canals, ditches, streams, and rivers are all examples of water sources. Pigs require high-quality water for drinking and cleaning the pig house on a daily basis. Ground water accessed via boreholes is generally of high quality, whereas surface water sources such as streams, springs, and dams are unprotected. Unless treated, water from these unprotected sources is unsafe to drink.

### Table 1 Water requirements of pigs (litres day⁻¹).

<table>
<thead>
<tr>
<th>Class of Pig</th>
<th>Litres pig⁻¹ day⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursery pigs (up to 30 kg BW)</td>
<td>0.7-1</td>
</tr>
<tr>
<td>Grower pigs (30 to 50 kg BW)</td>
<td>5-10</td>
</tr>
<tr>
<td>Finishing pigs (50 to 125 kg BW)</td>
<td>12-15</td>
</tr>
<tr>
<td>Pregnant sows</td>
<td>10-18</td>
</tr>
<tr>
<td>Lactating sows</td>
<td>18-23</td>
</tr>
<tr>
<td>Boars</td>
<td>10-15</td>
</tr>
</tbody>
</table>
3 MANURE MANAGEMENT

Because manure production is unavoidable in a pig production enterprise, it provides a potential component for reducing a pig enterprise's carbon footprint. The majority of greenhouse gases and ammonia (an indirect source of greenhouse gas emissions) emitted by pig production systems come from pig housing and slurry storage (Van der Peet-Schwering et al., 1999). These emissions can be reduced by doing the following:

- Lowering the urea and ammonia concentrations in the slurry
- Lowering the slurry's temperature
- Reducing the surface area of the emitting source
- Reducing the pH of the slurry

To reduce emissions, various housing techniques have been developed. A combination of housing and feeding measures appears to be the most promising for achieving a significant reduction in emissions at a low cost (Van der Peet-Schwering et al., 1999). The adaptation and installation of an anaerobic digester to capture GHGs, control manure odors, and generate renewable energy. Animal waste biogas is widely used as a renewable biofuel source. This energy source is regarded as inexpensive and clean, and it is also known to produce a residue with a high fertiliser value for crop production (Thien Tu et al., 2012).
4 PEST AND DISEASE MANAGEMENT

4.1 INTRODUCTION

This module is intended to serve as a reference for extension officers working with small-scale and subsistence farmers. In South Africa, there is a growing need to produce pork in a climate-friendly manner. South Africa consumes 200 000 tons of pork per year, but we only produce 182 000. (Robinson, 2021). This indicates that there is a sizable market for expanding pork production. Climate-smart pest and disease management for pigs is a major focus of this section.

Temperature rises have resulted in the spread of disease vectors to previously inaccessible areas (WHO, 2021). Increased temperatures have also resulted in more heat stress in animals, which has resulted in an increase in metabolic diseases in these animals (Ross et al, 2015). Flooding has also increased, bringing with it an increase in vectors such as mosquitoes, which carry not only animal diseases but also zoonotic diseases. Scientists are constantly looking for ways to combat infectious diseases through prevention rather than treatment, as this is the most cost-effective way of dealing with disease.

Climate-smart pest and disease management has the following potential benefits:

- Decrease in mortality rates
- Decrease in morbidity rates
- Increase in disease reporting
- Increase in productivity
- Increase in fertility
- Increase in income
- Decreasing of Greenhouse gas emissions

Climate-smart pest and disease management for pigs is divided into three categories: biological vector control, resistant breed development, vaccination campaigns, and parasite control (CCARDESA, 2019).

4.2 WHERE TO START?

- Examine your target farmers’ farming practices
- What are the issues that they believe require the most attention right now?
- What is the primary goal of their farming business?
- How do they look for disease symptoms in their animals?
- How do they keep track of their animals’ whereabouts?
- What information do they keep in their records?
- What criteria do they use to decide which animals to keep?
- What vaccines, veterinary drugs, and feed supplements do they use?
- Where do they get their vaccines, veterinary medications, and supplements?
- What kind of infrastructure is there?
- How much labor are farmers able to access?
- Farming equipment owned by the farmer.

What then?

Once you understand how the system works, you can create a plan with the farmers’ help based on what they see as their biggest problems and on disease observation and recording.

4.3 HOW TO IDENTIFY A SICK ANIMAL?

The only way to tell if an animal is sick is to observe how a healthy animal appears (FAO, 2021).

- Looking from a distance
  The animal should stand straight, with its feet squared and its head held high. It must be constantly alert and aware of its surroundings. A good overall impression, as well as group
behavior such as rest or social body care, are required. Animals who separate from the group and refuse to eat or move are sick. Animals should bear weight evenly on all four legs while standing or moving, without arching their backs, and their hooves should be worn evenly.

- **Listening**
Pigs are very vocal animals, so learning to distinguish between a normal sounding herd and one in distress is essential. Keep an ear out for signs of coughing or sneezing.

- **Looking at the skin**
Pigs' skin is exposed, which can be a good indicator of health. Look for blisters or marks if the color is not uniform. Symptoms of excessive animal fighting Mosquito bites can be quite noticeable. Sun damage in lighter-colored pigs should be investigated.

- **Looking at the head**
  - The eyes must be bright and clear, with no discharge
  - The ears should be checked for the presence of ticks and any foul smell should be noted
  - The snout must be moist and free of any colored discharges
  - There should be no excessive saliva dripping from the mouth. Food falling from the mouth can be an indication of tooth decay. A pig should not be breathing with its mouth open
  - Discolouration in the ears should be checked

- **Looking at the chest**
When resting, a newborn pig should take no more than 50-60 breaths per minute, growing piglets should take no more than 40, and adult pigs should take no more than 18 breaths per minute. The pig’s heart can be felt just behind the left elbow; a newborn piglet has a heart rate of up to 250 beats per minute, growing piglets have a heart rate of 80-100 beats per minute, and adult pigs should have a heart rate of no more than 70-80 beats per minute. A gland just in front of the shoulder can be felt if it is enlarged, which is a sign of disease.

- **Looking from behind**
An animal’s body condition score can be determined by looking at it from behind. Regardless of breed, pigs should always appear well-rounded.

- **Looking at the udder or scrotum**
Mastitis symptoms such as heat, swelling, pain, and inflammation must be looked for in the udder. The udder must also be checked for piglet biting. The milk can also be tested for thickness, flakes, and blood. The scrotum of a male animal must be examined for the same signs of heat, swelling, pain, or inflammation, as well as lumps.

- **Taking the temperature**
A temperature should be taken of any animal showing signs of illness; a normal temperature for a pig can range between 38.7-40°C.

- **Looking at the dung of animals**
It is necessary to observe a normal-appearing fecal consistency and color. Furthermore, excessive wetness/diarrhea can be caused by disease such as E.coli, parasites, lawsonia, and so on. Too much dryness can lead to dehydration or feed issues.

- **Looking at the urine**
Urine should be clear to slightly cloudy, and the animal should not urinate in pain. The inability to urinate is also a problem.
4.4 DISEASE REPORTING

One of the most important functions of the extension officer is to assist in the notification of controlled and notifiable diseases to the authorities, as regulated by the Animal Diseases Act 35 of 1984 and its associated regulations.

Link to the act: https://www.dalrrd.gov.za/Branches/Agricultural-Production-Health-Food-Safety/Animal-Health/importexport/legislation/diseaseact

Link to the regulations: https://www.lawexplorer.co.za/StatutoryDatabase/SubordinateFile/SubordinateFileDownload/5843

Additional diseases with trade implications are also reported to the OIE through the Department of Agriculture, Land Reform and Rural Development (DALRD), as extension officers do not have formal training in these diseases and are not expected to note them.

According to the Animal diseases, ACT 35 of 1984 the definitions:

- **'controlled animal disease'** means any animal disease in respect of which any general or particular control measure has been prescribed, and any animal disease which is not indigenous or native to the Republic. Table 2 of the regulations on the act gives a list of controlled diseases, those pertaining to pigs are summarized in Table 2 in this document.

- **'notifiable animal disease'** an animal disease specified in Annexure 3 of the act.
Defining the term vector as per the CCARDESA definition: Vectors are insects, birds or other animals that transmit a disease and/or pest from one host to another.

### Table 2  Controlled animal diseases (in terms of the Animal Disease Act, Act 35 of 1984) pertaining to pigs.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Clinical signs</th>
<th>Vector (insects, ticks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African swine fever (ASF)</td>
<td>High fever, loss of appetite, Red blotchy skin, vomiting and diarrhoea, coughing and difficulty breathing. Abortions and death. Discharges from the eyes.</td>
<td>Ornithodorus ticks- hut tampan. Hosts include humans, poultry, domestic pigs and warthog. Carriers of ASF is warthog</td>
</tr>
<tr>
<td>Anthrax</td>
<td>Sudden death with small amount of un-clotted blood coming out of all openings. Trashing and convulsions, fever.</td>
<td>NO</td>
</tr>
<tr>
<td>Aujeszky's disease (Pseudorabies)</td>
<td>Neurological signs in young piglets. Fever, foamy saliva, seizures, paralysis and death. Older pigs shows respiratory signs, coughing, sneezing, abortions might be seen.</td>
<td>NO</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>Infectious disease of the genital organs with fertility disorders and possible joint diseases. Abortion, stillborn or weak piglets, return to oestrus if early abortions. Because piglets get eaten abortions are missed and only infertility seen.</td>
<td>NO</td>
</tr>
<tr>
<td>Classical swine fever (CSF)</td>
<td>Similar to African swine fever (ASF), purple discolouration of the extremities. Fever, conjunctivitis, discharge from the eyes, appetite-loss, lethargy, gastro-intestinal signs, abortions.</td>
<td>NO</td>
</tr>
<tr>
<td>Foot and mouth disease (FMD)</td>
<td>Highly contagious viral disease Blisters in the oral cavity and on the tongue, blisters between the toes and above the hooves and on teats. Hyper salivation.</td>
<td>NO</td>
</tr>
</tbody>
</table>
Porcine reproductive and respiratory syndrome | Reproductive failure, abortions, stillbirths. Respiratory disease, fever, lethargy, failure to thrive, coughing, sneezing. | NO

Rabies | Sudden behavior changes, incoordination, abnormal bellowing, convulsive head movements, excessive salivation, paralysis of the throat. | NO

Swine vesicular disease | Vesicles between the hooves and on the mouth (looks like FMD) | NO

Tuberculosis | Persistent cough, diarrhea, weight loss and abdominal pain. | NO

Any animal disease or infectious agent that is not known to occur in South Africa. | Usually there is a history of an animal being imported or feed that has been imported or taken from ships in the case of these diseases. |

### 4.5 NOTIFIABLE ANIMAL DISEASES

#### 4.5.1 Other common diseases

Other diseases will vary depending on your location and circumstances. Animals become anorexic at higher temperatures because pigs are happiest between 18 and 25 degrees Celsius (Quiniou et al, 1999). Bacterial growth and survival in the environment are accelerated by higher temperatures. Bacteria such as E. coli live longer in the environment and cause a variety of symptoms, including diarrhoea in piglets, respiratory disease in growing piglets, and mastitis-metritis-agalactia syndrome in sows (Jang et al, 2017).

Certain diseases, such as Salmonella, will be more prevalent in wet conditions, as will biting flies that cause skin irritations. Pigs can be infected with roundworms and tapeworms. Animals will not die from roundworms, but they will gain less weight. Roundworm eggs can survive in the environment for years. To hatch, these eggs require warmth and moisture (Ballweber, 2015). Tapeworms do not cause illness in animals, but they can cause zoonotic disease if the meat is consumed raw.

**Table 3** Notifiable animal diseases (in terms of the Animal Diseases Act, Act 35 of 1984) as pertaining to pigs.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Clinical signs</th>
<th>Vector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swine erysipelas-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamond skin disease</td>
<td>Sudden death, fever, skin lesions that are diamond shaped, arthritis. Abortions due to the fever.</td>
<td>No</td>
</tr>
</tbody>
</table>
4.5.2 Zoonotic diseases

The most common of these diseases found recently in South Africa are Cysticercosis (Taenia solium), E. coli, Swine Flu, Tuberculosis, Brucellosis, Rabies, Salmonella, Anthrax, and Erysipelas.

If you become ill, please notify your healthcare provider that your job requires you to work with sick animals.

4.5.3 Reporting of diseases by farmers.

Educating farmers on their obligation to report any animals that show signs of disease to you as the extension officer or to the animal health technician who will contact the veterinarian. It’s also a good idea to try to avoid the stigma that comes with reporting some of these diseases. Keep in mind that farmers will only share information with you if you have a strong relationship with them. According to the Animal Diseases Act, it is also the responsibility of animal owners to report these diseases, and failure to do so is a violation of the law.

4.6 BIOLOGICAL CONTROL OF VECTORS

In recent investigations, it has been discovered that climate changes and a shift towards more wildlife production have led the control line for African Swine fever to shift, and tampans have been found in warthog burrows in Gauteng. Diseases spread by biting flies are most common during the rainy season, when mosquitoes and biting midges are more plentiful. Some ways to control these diseases include:

• Long empty period to ensure that the vector dies before new hosts are introduced
• To prevent transmission, fence off areas or herd animals away from other herds
• Getting rid of breeding areas for the vectors for example stagnant water where mosquitoes breed
• Pest traps for e.g. fly traps that is set up.

( CCARDESA, 2019)

4.7 OTHER METHODS OF DISEASE CONTROL

Not all diseases are transmitted by vectors, some other transmission methods include:

• Direct contact between sick animals is prohibited (domestic animals and wildlife).
• The sick animals’ excretions
• Personnel, clothing, and equipment
• It is found naturally in soil
• Housing was not cleaned after sick animals were housed in it
• Feed and water
• Pasture rotation plan to limit parasitic diseases

4.7.1 Biosecurity

Good biosecurity is the key in keeping these diseases out of your herds.

• On your farm, quarantine all new animals for at least 14 days
• Separate any sick or dead animals from the healthy ones immediately
• Allow no visitors to your herds
• Wash your hands regularly
• Use Coveralls when working with your animals
• Take care to disinfect your footwear when coming back to your farm after travelling
• Make sure you disinfect your equipment and vehicles if you lend them to somebody and at regular intervals
• Always move from the healthy animals first to the sick animals last
• IF you have no sick animals move from the youngest to the oldest animals.
• As an extension officer do not visit multiple farms in the same clothing.
4.7.2 Selecting of resistant breeds

Production trainers go over this in further depth. In general, indigenous breeds are more resistant to diseases that occur naturally in the area. Certain diseases are not endemic to the area, however, and it is important to avoid the misconception that local breeds do not need to be vaccinated.

The best way to go is to choose animals from your herd that are constantly afflicted with a disease. Allowing unintentional mating to occur will damage your herd.

4.7.3 Vaccination campaigns, endo- and ectoparasite control

If extension officers are in charge of vaccination campaigns rather than veterinarians, make sure that any other problems in the animals are documented and brought to the attention of the veterinarian or animal health technician so that treatment and veterinary drugs can be provided. Using commercially available vaccines, many diseases can be prevented or the intensity of symptoms reduced. Farmers might also be provided stock treatments at the same time.

When planning a vaccination campaign ensure:
- Arrangement as to the time is made with the owners of the livestock
- Try to visit the pig farms no more than once every three days
- Make plans for how much the farmers will have to pay for vaccines and stock treatments
- Check to see if there are any handling facilities available
- Check for equipment and storage to ensure that vaccinations and stock medicines are kept at the proper temperature
- Ensure that there are adequate trained vaccine providers
- Estimate the number of animals that will need to be vaccinated
- Verify that sufficient vaccines and stock medicines have been ordered and are available to carry out the campaign
- Make sure the immunisation is done at a period of year that is appropriate for the disease and the farmers' schedules
- Ensure that farmers are informed about the vaccine's benefits and the necessity for revaccination
- Ascertain that a means for identifying vaccinated animals exists
- A method of keeping track of the animals that have been vaccinated as well as receipts for payment from the farmers
- Will the farmers be able to continue receiving these vaccinations?

When giving the vaccine or stock remedies:
- Make sure you know the vaccine's batch number and expiration date
- Ascertain that the cold chain was kept intact
- Only use the vaccination as directed on the package
- If the vaccination label says you can’t keep it, don't use it again
- Check the vaccination dose
- Check to see if it’s safe to administer to pregnant animals
- Look for potential risks to vaccine recipients and make them aware of them
- Vaccinate only healthy animals
- Never guarantee a vaccine’s 100 percent effectiveness rate to a farmer
4.7.4 Vaccination and routine treatment program

Table 4 Vaccination and routine treatment program (Agricultural Research Council, South Africa, Introduction to pig production manual).

<table>
<thead>
<tr>
<th>Disease</th>
<th>Animals to be treated</th>
<th>When to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Porcine parvo, Erysipelas, Leptospira (farrowsure)</td>
<td>Dry sows</td>
<td>3 Weeks before breeding</td>
</tr>
<tr>
<td></td>
<td>Gilts</td>
<td>6 weeks and 3 weeks before breeding</td>
</tr>
<tr>
<td></td>
<td>Boars</td>
<td>First time 2 vaccinations 2 weeks apart, then 1 vaccination every 6 months</td>
</tr>
<tr>
<td>E.coli and clostridium (litter guard)</td>
<td>Preg sows</td>
<td>2 weeks before farrowing</td>
</tr>
<tr>
<td></td>
<td>Preg gilts</td>
<td>4 weeks and 2 weeks before farrowing</td>
</tr>
<tr>
<td>Iron injection</td>
<td>Piglets</td>
<td>3 days old</td>
</tr>
<tr>
<td>Coccidia treatment (baycox)</td>
<td>Piglets</td>
<td>5 days old</td>
</tr>
<tr>
<td>Endo and ectoparasite control (Ivermectin)</td>
<td>Preg sows</td>
<td>7 days before farrowing</td>
</tr>
<tr>
<td></td>
<td>Grower pigs</td>
<td>When moving from weaning to growing unit</td>
</tr>
<tr>
<td>Tick dip (triatix pig)</td>
<td>Preg sow</td>
<td>7 days before farrowing</td>
</tr>
</tbody>
</table>

Working with your local veterinarian to expand this list based on diseases seen in animals in your area is recommended.

Fenbendazole (Panacur 4 %) powder, which can be given to pig chow, is another anthelmintic (dewormer) to consider.

4.8 CHOOSING A SOLUTION FOR YOUR AREA

A combination of all three of the strategies outlined above is frequently required to effectively control illnesses and pests in your area. If you don't have the backing of your local farmers, none of the strategies will work. A lot of education and trust-building will be required to gain this support. Farmers must buy into the initiative and make it their own in order for it to succeed.
5 CONCLUSIONS

Climate change opportunities for pig farmers
(Editor, 2009)

Savings
- Feed costs are lower since by-products from food and bio-ethanol production are used.
- Pig feed ratios should be planned to improve performance while reducing waste and emissions.
- Increased outdoor finishing options will lower construction, fixed equipment, and energy expenses.
- There will be more options to use renewable energy.

Climate change challenges for pig farmers

Productivity
- Heat stress could lead to a drop in productivity (including fertility problems)
- In some areas, there may be less water available from suppliers or on-farm sources
- In hot temperatures, reduced feed intake has a negative impact on performance and output
- Increased/different diseases, as well as higher veterinary and medicine costs
- Persistence and reduced grass cover (in outdoor systems)

Costs
- Increased capital, maintenance, and energy expenses for ventilation, cooling, heating, and odor and emission control are all possibilities
- Improved housing management is required during extreme weather events
- Extreme weather occurrences are becoming more unpredictable
- Climate change, as well as other market systems and products, may have an impact on global feed prices

Adaptation Suggestions for Pig Farmers
- Improve building insulation to better control internal temperatures and reduce energy waste
- Create ventilation control systems that can adapt to changing weather conditions
- To better regulate the environment for piglets and sows, utilise enclosed creep boxes in farrowing houses
- To avoid soil erosion, choose grass or cover crop varieties that can withstand climatic change
- Wallows and shaded places should be better designed and managed
- Invest in water storage infrastructure, such as reservoirs on farms
- Use less intensive methods of upbringing, such as outside (but recognise this impacts on water pollution and soil erosion and take preventative steps to manage these)
- Because pigs enjoy wallowing in the mud or other wet areas, and they usually begin wallowing at temperatures over 12°C, wallowing holes should be given in outdoor pig production settings. Temperature and humidity have a big impact on roots and wallowing
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