



African Swine Fever in Aizawl: The Detrimental Consequence on Livestock Market

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Abstract

A viral illness affecting pigs known as the African Swine Fever (ASF) had threatened piggeries all across the world. In Sub-Saharan Africa, the virus has been identified since 2007. Although the virus's exact origin is unclear, it is generally accepted that it began in this area and spread first to wild warthogs before moving on to pigs. The nature of ASF viruses varies; some of them are fatal strains that could cause as much harm as killing pigs, while others are less dangerous and just cause minor injury to pigs. Little progress has been made in the development of vaccines, thus the antidote for viral infection therapy is urgently needed. In Mizoram, the deadly ASF virus had spread to many pig farms, claiming the lives of countless pigs. In addition to negatively affecting the supply of meat, the effect also had an adverse influence on the pig farmers and meat vendors, whose daily livelihoods are entirely dependent on the meat market. This paper tries to investigate the negative impact of ASF outbreak on both meat vendors and pig breeders. In order to determine the extent of impact, a study was conducted.

Keywords: *African Swine Fever, Meat Vendors, Pig Breeders, Pork Consumers, Viral Infection.*

Introduction

The African Swine Fever (ASF) is a global pandemic viral disease of pigs that is fatal and causes loss of lives of many pigs around the world. Developments on vaccines and antidotes in connection with the disease are scarce. India has more than 9 million pigs, with 45% of them living in the North East states. Pig mortality from viral illnesses is a serious worry, and it costs pig producers a lot of money. African Swine Fever is one such illness that had already breached the open borders of India's North East states. ASF is a fatal, extremely contagious illness that kills all pigs and wild boars. African Swine Fever Virus (ASFV), the

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etiological agent, is a member of the *Asfivirus* genus and *Asfarviridae* family. (Sharanadagouda, et al., 2020)

The only animal impacted by this virus is pigs. The entire pig population is swiftly infected due to the fast pace of transmission. Given the similarities in clinical signs, it is particularly challenging to distinguish between the ASF and conventional swine fever. To control the disease, diseased and in contact pigs should be immediately killed and buried underground, and sheds and facilities should be cleaned and sanitised. There is no commercially available vaccination. The disease has been documented from countries in Europe, the Russian federation, China, and Burma since its first report in Kenya in 1921 (Grady McGregor, 2021). Indian pigs are at risk from the illness.

On May 21, 2020, the Office International des Epizooties (OIE) released the first report on ASF in India, stating that a total of 3701 pigs perished from 11 outbreaks (Morbidity: 38.45%; Mortality: 33.89%) in the Indian states of Assam and Arunachal Pradesh (World Organisation for Animal Health, 2021). The ASF has already had a disastrous impact on pig populations in India's surrounding nations, warning decision-makers to be vigilant in stopping the spread of illness. Keeping an eye out for ASFV introduction into our territory is crucial for protecting the pig population and ensuring food security.

To minimise the terrible losses that epidemics could bring about in the near future, this region needs to continue relying on the adoption of preventive measures. With focus on Indian settings, the various adaptive control measures to reduce the hazards related to the transmission of ASF have been presented. The study's risk-analysis methodology will help in the development of control plans and related actions to lessen the ASF disease's disastrous effects by providing a deeper knowledge of the dynamics of disease transmission (Bora, et al., 2020).

African Swine Fever in Aizawl

Pork constitutes an important position in Mizo meal. Mizos view pork as a delicacy, and they consider it to be an absolute necessity for any meal, celebration, or social gathering. The majority of Mizos eat it and see it as a significant type of meat. Pork fat is converted into a well-known fermented fat (sa-um) that is a key component of the traditional Mizo porridge known as *bai*. Thus, pork plays a significant role in Mizo cuisine. Aizawl, the capital city of the State of Mizoram is also not spared by the ASF virus along with many parts of Mizoram, according to a report made by local newspaper, Vanglaini on 10th October, 2022, over 2236 pigs perished in Aizawl locality alone in 39 areas (Vanglaini, 2022). Many families whose livelihood was primarily dependent upon piggery farming suffered the most, with meat vendors, and also to some extent on the consumers of meat, the virus had its detrimental consequences. During the heaviest of outbreak of the virus, pork production in Aizawl was halted and remained in that state for almost half a year.

Review of Literature

Emad Beshir Ata et al., (2022) published an article on the topic, 'African Swine Fever Virus: A Raised Global Upsurge and a Continuous'. Their paper highlighted that African swine fever (ASF) was a serious illness that affected pigs and causes significant economic losses. It is endemic in many regions of the world. Thus, it poses a severe threat to the safety of food around the world. The first instance was noted in Kenya in 1921, where the disease is still endemic in sub-Saharan Africa. It is now widespread throughout the entire world, affecting more than 50 nations, including the Republic of Korea, China, Malaysia, Germany, Bhutan, and India. It is also present in Africa, Europe, Asia, and the Pacific. The global pig business is increasingly threatened by the African swine fever virus. The virus has the ability to evade host immune defences and inhibit the creation of particular proteins. Spreading rates are accelerated by the variety of infection and transmission channels. How the virus was carried on from one place to another should be re-evaluated, and prevention of entrance of disease to one pig from another is the most viable option to control the virus since production of vaccine is inefficient.

Even though the ASFV vaccine has been developed substantially over the past few years, Le Liu, et al., (2021) in their research paper, 'Research Progress on Live Attenuated Vaccine against African Swine Fever Virus' revealed that an efficient, reliable ASFV vaccine is still inadequate. This paper focuses on recent advancements made in the production of an ASF live-attenuated vaccine. Before the attenuated vaccine is made commercially available, there are a few things that need to be clarified. On the one hand, additional in vivo tests should be performed on the prospective live-attenuated vaccines now available to ascertain their biological efficacy and level of protection against non-homologous wild strains. On the other hand, identifying a suitable cell line is vital for the development of live, attenuated vaccines.

In their article 'African Swine Fever - A Survey of Current Information,' Sandra Blome et al. (2020) claimed that the virus spreads to many European and Asian nations and is fatal to farmed pigs and Eurasian wild boars. Also, they concentrated on current research and advancements in the ASF virology, clinical illness brought by contemporary strain infections, epidemiology, diagnostics, and control. Integration of all parties was crucial to limiting the virus's spread or even putting an end to it. This essay also emphasised the knowledge gaps and divisive viewpoints around the ASF. Mousumi Bora, et al., (2020) in 'Assessment of Risk Factors of African Swine Fever in India: Perspectives on Future Outbreaks and Control Strategies' argued that one of the most significant pig transboundary infections was African Swine Fever (ASF). The ASF has been discovered in domestic pigs in India for the first time as a result of outbreaks that were reported in 2020 in two Northeastern States, viz., Arunachal Pradesh and Assam. About 3700 pigs had died in a total of 11 ASF outbreaks across various regions, which had a devastating economic impact on both states' small-scale livestock owners. In light of the initial ASF epidemic in India, a general methodology for risk assessment was developed to find potential risk factors that might encourage the disease's recurrence in the future.

Based on the Indian situation, this paper examined the likelihood of future ASF outbreaks and the potential for endemism by taking into account host population density, farming practises, availability of biological vectors and animal reservoirs, epidemiological cycles, and international trade. By conducting a rigorous examination of the risk factors linked to the ASFV transmission that had been established, the study found that these risk factors were well conserved in the geography of India and may contribute to future outbreaks that spread the illness to surrounding nations. The domestic and wild pigs in this area are constantly at risk of infection because there is currently no vaccine available against ASF.

Statement of the Problem

The ASF in Aizawl had negative effects on a number of parties involved in the pig market. It had an effect on the breeding, selling, and consumption of pigs in the livestock market. Several livestock farmers who are involved in the production of pigs incur significant losses as a result of the viral infection and its lethality. Additionally, some of them ended up in a severe crisis because they lost all of their investment on it.

Then there are meat vendors, whose daily wage to sustain a livelihood solely depend upon the selling of the meat. One impediment to sustaining a livelihood was the difficulty to sell meat products due to the lack of healthy pigs due to the ASF and the necessary preventive restrictions put forth by the Mizoram State Government in its notification[‡] which states that “complete ban on illegal entry of pigs and pork products from neighbouring countries and States as a measure for preventing African Swine Fever from entering Mizoram” (AH&Vety., 2019). Several meat vendors may encounter debt crises since they are unable to operate their businesses during the ASF epidemics.

Consequently, although they may appear to be less impacted by the ASF, the pig consumers nonetheless experience some difficulties, particularly those related to restaurants and food merchants. The omission of one of their key menu items would have led to fewer consumers, which would have reduced revenue for the company. In addition to this, many families, especially over the festive season, were unable to enjoy the meal they desired.

Scope of the Study

The study is limited to only three stakeholders in the livestock market of pork production and consumption, viz., the pig breeders, meat vendors, and the consumers. The study is confined to Aizawl city, covering different localities where the victims of ASF related issues were experienced.

Research Objectives

The research aimed at studying three objectives related to the ASF virus and the people involved in the livestock market, notably the meat vendors and the pig breeders.

- a) To examine the economic drawbacks on pig breeders and meat vendors as a result of ASF.

[‡]Notification No.D.12016/21/2019-AH&V, dated 19th September, 2019

- b) To assess the severity of virus on seasonal wise.
- c) To study the prejudice upon pork products during and after the outbreak of virus.

Hypotheses

The following points were highlighted as hypotheses for the study.

- 1) The ASF resulted in economic distress on both the pig breeders and meat vendors.
- 2) The effect of virus is more severe in summer than during other seasons.
- 3) The general public or consumers had developed prejudice on pork products, resulting in the decrease of sale of pork.

Research Methodology

The study is primarily based on data collected from primary sources through the use of schedule technique. As the study covers livestock market in Aizawl, it is thus necessary to make samples, non-probability sampling technique is utilised. The idea behind the use of this technique is that it was rather difficult to identify the quantitative data of all meat vendors, consumers and pig breeders in Aizawl, thus making it difficult to use random sampling technique.

Accordingly, a total of 30 interviews were conducted among various respondents, which comprises of 10 meat vendors, 10 pig breeders, and 10 pork consumers. Different schedule of questions was prepared for meat vendors, consumers and pig breeders. Secondary data comprised of research journal publications related to the study were also utilised. Local newspapers constituted a useful source of information on understanding the ground reality of the virus-related issues.

Interview respondents		
10 Meat vendors	10 Pig Breeders	10 Consumers

Data Analysis

The study was carried out by covering different parts of Aizawl where interviews were conducted. Since the study was meant to cover Aizawl city, many localities inside the city were covered for data collection. Therefore, the addresses of various respondents were given as under;

Table 1: Addresses of respondents of the schedule interview

Addresses of interview respondents					
Meat vendors	Chanmari Bazar	Pig Breeders	Durtlang Leitan	Consumers	Dawrpui Vengthar
	Tlangnuam Bazar		Aizawl Venglai		Chawlhhmun
	Vaivakawn Bazar		Ramrikawn (1)		Saikhamakawn
	Chanmari West Bazar		Ramrikawn (2)		Chawnpui

	Bazar Pui (1)		Zemabawk		Sihphir
	Bazar Pui (2)		Zemabawk North		Tuikual North
	Treasury Bazar		Tlangnuam		Durtlang
	Bawngkawn Bazar (1)		Venghnuai		Luangmual
	Bawngkawn Bazar (2)		Salem Veng		Khatla
	Dinthar Bazar		Central Jail Veng		Tlangnuam

(Source: Field Survey)

Places where pigs were procured

The study revealed that most of the pork in the local market were procured from local pig breeders, i.e., within Aizawl (75%), while a little portion of meat vendors imported from outside Aizawl, but within Mizoram (20%). Very little fraction of pigs was imported from other states like Punjab, Tripura, Nagaland, and some from Burma (5%).

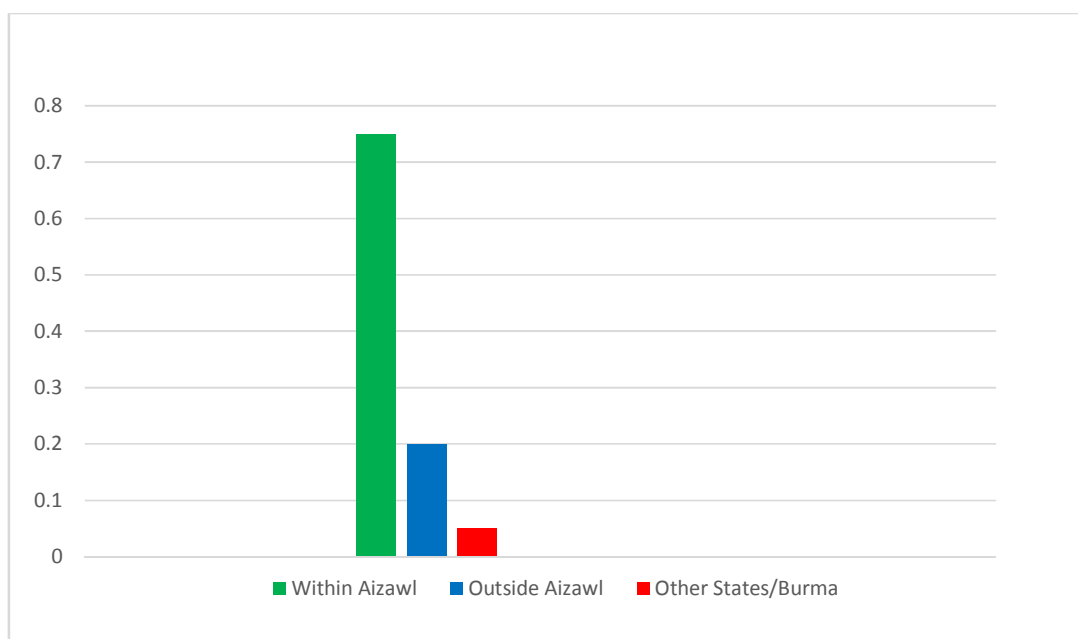


Fig 1: Places where pigs were procured for pork market
(Source: Primary data collected from the field work)

Times when pigs were unavailable for sale as a result of ASF

The study found that the ASF struck Aizawl in the years 2021 and 2022. The intensity of virus varies from season to season and from region to region in the Aizawl area. Vendors of meat were interviewed about the months in which they failed to run a business because of a shortage of pigs subject to virus infection or due to the killing of pigs to control the spread of virus on pigs that had been identified as contagious.

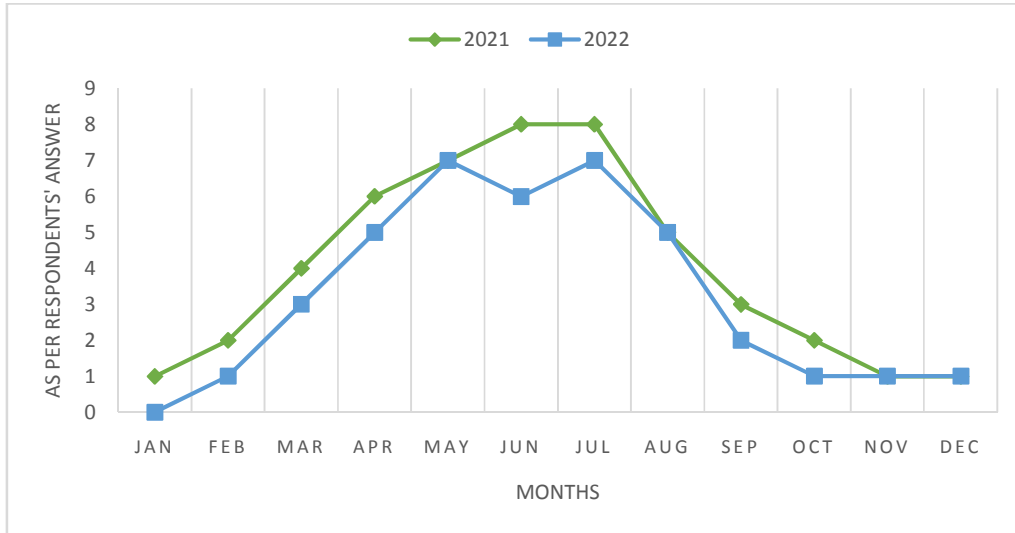


Fig 2: Severity of the virus as determined by the unavailability of pigs in the market
(Source: Primary data collected from the field work)

Consequently, meat vendors were asked if it was difficult to procure pigs from pig breeders since the start of 2023. Out of 10 respondents, 6 respondents replied by saying that they encounter no difficulties in procuring healthy pigs, 1 respondent replied by saying it was still difficult; three respondents replied they found it somehow difficult to procure healthy pigs.

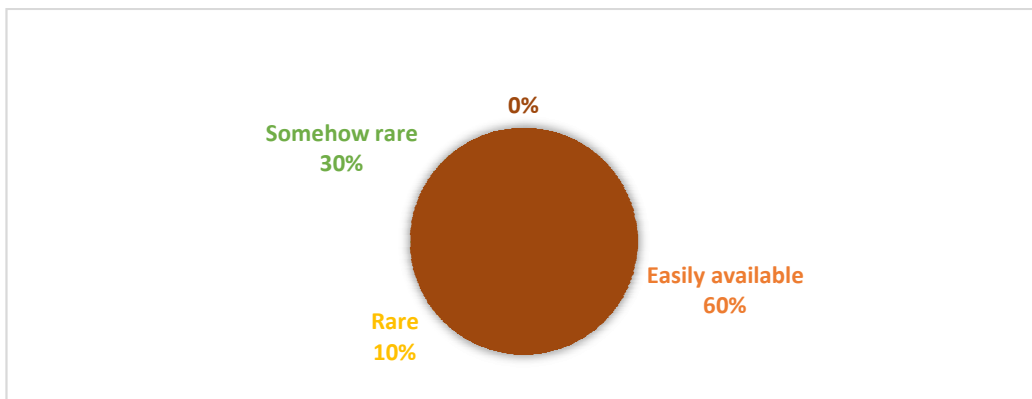


Fig 3: Availability/Unavailability of pigs for sale in the market since 2023
(Source: Primary data collected from the field work)

Estimated loss among meat vendors as a result of unavailability of pigs

A total of ten (10) meat vendors from different local markets within Aizawl were questioned about the financial losses they had experienced during virus outbreaks in 2021 and 2022. The amount of money that various meat vendors lost each month varied depending on the location because some vendors sporadically conducted business while others were forced to shut down their operations entirely. The statistics also demonstrated that the length of outbreak differed in various areas of Aizawl.

Table 2: Estimated loss among meat vendors as a result of impossibility of running business during ASF outbreak in 2021 and 2022

Sl. No.	Meat vendors' addresses	Loss per month (in Rupees)	Duration (in Months)	Cumulative
1.	Chanmari Bazar	30,000	6	1,80,000
2.	Tlangnuam Bazar	30,000	5	1,50,000
3.	Vaivakawn Bazar	45,000	10	4,50,000
4.	Chanmari West Bazar	10,000	9	90,000
5.	Bazar Pui (1)	30,000	3	90,000
6.	Bazar Pui (2)	42,000	6	2,52,000
7.	Treasury Bazar	40,000	3	1,20,000
8.	Bawngkawn Bazar (1)	35,000	6	2,10,000
9.	Bawngkawn Bazar (2)	40,000	5	2,00,000
10.	Dinthar Bazar	20,000	2	40,000
Average		32,200	5.5	1,78,200

(Source: Primary data collected from the field work)

Thus, it was discovered that the ASF had a seriously detrimental effect on meat vendors. Many of them could not pay their bills and could hardly sustain a livelihood with their savings. The study also found that Covid – 19 with its regulatory preventive measures by the State Govt. contributed to the closure of business. Furthermore, after the ASF outbreak, the price of pigs for slaughter increased significantly without increasing the meat per kilogram, making it more difficult to earn.

Estimated loss for pig breeders as a result of death of pigs

A total of ten (10) pig breeders of different locality were questioned how much money they lost as a result of the viral outbreaks in 2021 and 2022. It's important to note that not every interview participant witnessed the deaths of pigs. Hence, even if the impact was terrible on some people, nevertheless it inflicted no loss on certain others. Value for money of pigs fluctuated depending on their sizes. Piglet costs Rs. 8,000, pigs over 30 inches on their belly costs around Rs. 20,000; pigs over 40 inches on their belly or above costs around Rs. 32,000 or more according to their length.

So, the data showed that out of 10 pig breeders, six (6) of them replied that their pigs were infected and the fatality was shown in the above table. Over 225 pigs perished, that caused them approximately Rs. 47,48,000.

Table 3: Estimated loss of money as a result of death of pigs in 2021 and 2022 outbreaks among ten pig breeders

Sl. No.	Addresses of Pig Breeders	Total no. of death pigs	Classification according to their size			Cumulative
			Piglets or below 30 inches	30 inches - 38 inches	40 inches or above	
1.	Durtlang Leitan	2	-	-	2x32,000	64,000
2.	Aizawl Venglai	48	20x8000	14x20,000	33x32,000	14,96,000
3.	Ramrikawn (1)	-	-	-	-	-
4.	Ramrikawn (2)	34	8x8000	5x20,000	21x32,000	8,36,000
5.	Zemabawk	19	-	15x20,000	4x32,000	4,28,000
6.	Zemabawk North	100	60x8000	24x20,000	16x32,000	14,72,000
7.	Tlangnuam	-	-	-	-	-
8.	Venghnuai	-	-	-	-	-
9.	Salem Veng	22	10x8000	1x20,000	11x32,000	4,52,000
10.	Central Jail Veng	-	-	-	-	-
Grand Total		225	7,84,000	11,80,000	27,84,000	47,48,000

(Source: Primary data collected from the field work)

Accounts from pork consumers

A total of 10 pork consumers were interviewed on how the ASF had affected their dietary supplies. While the consumers had incurred no loss as a result of ASF, unlike that of the meat vendors and pig breeders, they too however had faced certain inconveniences. 5 (50%) of the respondents agreed that ASF resulted in the disruption of their dietary supply, while the other half (50%) said unavailability of pork in the market did not affect their dietary desire. It is obvious that during the viral outbreak, consumers developed the tendency to put prejudice on all pigs despite the vendors' acclamatory remarks on safety concerns. Therefore, among the interview respondents, 60% of consumers revealed that they abstained from purchasing pork during the outbreak, while 40% of consumers purchased the product as far as safety was guaranteed by the vendors.

Results

Firstly, the study revealed that the ASF's consequence on pig breeders and meat vendors was huge, inflicting huge economic loss for both the parties. From the study data, out of ten pig breeders in Aizawl, the average loss was estimated to be Rs. 4,74,800. Data from ten meat vendors showed that the average loss during the viral outbreak in 2021 and 2022 was approximately Rs. 1,78,200. Thus, hypothesis 1 is proved to be true. Secondly, as shown in Fig 2, it was certain that the viral infection was severe during summer after incorporating various accounts from meat vendors, as well as from pig breeders. Some even have the argument that hot climate would bring with it various pig-related diseases. Thus, hypothesis 2 is deemed to be true. Thirdly, looking from the consumers' response, the sale of pork product declined during the outbreak. However, after receiving information from the meat vendors, it is established that since the viral outbreak was considered over, not many consumers were

reluctant to purchase pork items. In fact, the meat business seemed to be in the normal track. Thus, hypothesis 3 is hardly considered true.

Emerging issues from the ASF outbreak in Aizawl

There are certain issues that surfaced during and on the aftermath of the viral outbreak, such as the following:

- a) Interview with meat vendors revealed that increase in the price of pigs was observed after the outbreak of ASF in 2021 and 2022. But the price per kilogram of pork did not increase though. This situation placed them in a position where they could not earn as much profit as possible like before the outbreak of virus.
- b) Many meat vendors had their view that local pig breeders did not produce the desired number of pigs for the livestock market, thus it was necessary to procure pigs from outside the state – Punjab, Tripura, Nagaland, and also Burma. The same allegation was also put forth by consumers by revealing that there are times when consumers could not purchase pork meat in the market as a result of shortage of supply. Most of the meat vendors were critical of the State Government’s policy on shutting borders for pigs import. They alleged that shutting borders for pigs’ import did not help in preventing the viral outbreak. Rather, a test conducted by competent authorities was a solution, so tested and certified healthy pigs could be imported.
- c) Many meat vendors criticised the State Government of not checking on import of frozen meat items from outside the state, especially pork. This has placed them in a precarious position where they faced the threat of being taken over by frozen pork products.
- d) Pig breeders had the view that the viral infection was inevitable once the outbreak erupted. It was certain that taking the utmost preventive measures – avoiding physical contact, cleansing the farm area and isolating the pigs did not help to salvage the pigs from being infected.
- e) While the State government grant some amount of money for consoling for the loss of pigs as a result of viral infection. Many pig breeders did not get any consolation, or either any words from the government whether they were to get any.
- f) Some pig breeders, after devastated by the virus, lose hope in rearing pigs and decided to discontinue their business on pig farming.

Conclusion

The African Swine Fever virus with its deadly and lethal infection, caused death to many places of the world among pigs and warthogs. Pig breeders and meat vendors are the primary stakeholders in the livestock market, thus experiencing the initial consequence of outbreak. Since it was clear that attempt on containing the virus, or preventing the spread of the virus with all means did not help, it is thus highly necessary to develop an efficient vaccine. This has posed a challenge for the medical world to develop the virus vaccine at the earliest, or seek alternative ways to absorb the magnitude of the viral effects. It is also a high time for the State government to look into the matter and find amicable solution once the outbreak re-occurred. It is a concern because many families’ livelihood depended upon it in Mizoram.

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