LIVESTOCK FARMING RISKS AND IMPLICATIONS FOR INDEMNITY INSURANCE IN THE WEST REGION, CAMEROON

ABSTRACT

Poultry and pig farming in the West Region of Cameroonare threatened by several risks. Notwithstanding, the absence of insurance has limited farmers'risk management options and prevented themfrom bouncing back rapidly from significant losses. This research explorespoultry and pig farming risks and the implications for farming insurance schemes in the West Region of Cameroon. To achieve this, a total of 430 poultry and pig farmers were sampled through a cluster and snowball sampling technique in the Mifi, Bamboutos, Upper-Plateau and Koung-Khi Divisions. The risks farmers faced were assessed as low, medium and high, depending on theirlikelihood of occurrence and potential impact. This information was supported by farmers' experiences of livestock losses. Data on the risks farmers would like to get insurance for was analyzedusing descriptive statistics. Research results revealed that 75% of risks faced by poultry farmers were ranked low, while 25% were medium. For pig farmers, 64% of risks were low, 27% were medium, and 9 % were high. Diseases (epidemic and non-epidemic) and market/price risks are among the top three risks pig and poultry farmers face. Many farmers would like to get insurance for epidemic diseases (31.5%)and non-epidemic diseases (26.6%). Most farmers in the Bamboutous Division are more willing to get insurance for non-epidemic diseases (54.5%) and epidemic diseases (32.8%), while farmers in the Mifi Division were more willing to get insurance for epidemic diseases (46.7%) and less for non-epidemic diseases (1.5%). Insurance companies can start piloting a disease and market/price fall insurance scheme in the Mifi and Bamboutos Divisions. Insurance companies can create awareness of the importance of livestock insurance through the Interprofessional Association of Pig Farmers and the Interprofessional Association for Poultry Farmers in the West Region.

Keywords*: Risk Assessment, Indemnity Insurance, Diseases, Poultry, Pig and Willingness*

1. INTRODUCTION

Poultry and pig farmers face many risks affecting their livelihoods, income and poverty reduction efforts (Mahul &Stutley, 2010). Livestock farmers face idiosyncratic risks that affect their farms individually and covariate risks that affect farmers in a community (Abimbola, Omowunmi & Abayomi, 2013). Epidemics likeHighly Pathogenic Poultry Influenza (H5N1) and African Swine Fever are covariate risks affecting poultry and pig farmers, respectively. According to the Platform for Agricultural Risk Management (PARM) (2016), Adeyinka (2015) and Iheke&Igbelina (2016), livestock farming risks (LFR) can be categorized into production, price/marketing, casualty, technological, government/institutional, financial and human risks. The occurrence of these risks, like the outbreak of epidemics, resulting in substantial economic losses for farmers, plunges them into a "spiral of destitution" from which they will never recover (Syroka& Wilcox, 2006) or an endless cycle of "shock-recovery" on one hand and shock-market exit on the other. These cycles affect a country's capacity to sustainably plan for the livestock sector (World Bank Group, 2016).

When these risks manifest, farmers experience untold economic losses. During the 2006 episode of the Avian Flu in Cameroon, the sector's leading modern production farms operated at less than 50% of their capacity. Some ceased their activities, while others planned the total cessation of production of chickens in two months, eggs in four months and day-old chicks in six months after the outbreak. Employees experienced technical unemployment throughout the production chain as companies downsized their staff. Several small poultry operators and distributors could not have access to loans. A total of 1,649,210,414 CFA ($2,733,243)was lossed on production costs and 2,568,786CFA ($4257) for total commercial losses (Teleu and Ngatchou, 2006).The ASF first emerged in Cameroon in April 1982 and caused the death of about 73,720 pigs worth about $5,233,180. The economic losses that this sector experienced in 1982 wereway below that of 1987 ($25,263,600). In the West Region, over 54,432 pigs died. There was a drastic shortage of pork, which led to an increase in the price of meat by 30%. Some farmers and feed store owners lossed $36,000 and $26,000, respectively, impeding their ability to repay their loans and re-engage in farming. In 2011, ASF led to the death of more than 100,000 pigs in the Northern Regions. Many farmers lost 200 to 500 pigs and left their farms (Ebanja, Ghogomu & Paeshuyse, 2021).According to Bernard Ngatchouessi Souop, President of the Interprofessional Association of Pig Farmers in the West Region (IPORCO)cited in Honore (2021), pig farmers had lost about 500 million CFA($828,652) due to the 2021 wave of ASF. Pig heads experienced a decrease from more than 400,000 to less than 350,000 in the West Region due to the ASF.Administrative authorities in the North-West and West Regions of Cameroon banned the sale and transportation of pigs in their regions due to an

outbreak of the ASF, which resulted in the death of about 6,254 pigs in the North-West Region in the latter part of June 2021 as stated by MINEPIA (Sina, 2021).

Cameroon does not currently have a National Livestock Insurance Policy. Only AXA and ACTIVA insurance companies, with support from the World Bank, which operate index insurance in the Northern Region of Cameroon. This implies that agricultural insurance has been limited to losses caused by weather-related events in this part of the country. Thus, farmers (poultry and pig) do not have the necessary protection they need to build their resilience (their ability to bounce back rapidly from incredibly huge losses). This research assesses the risks that poultry and pigfarmersface and the implications for a prospective livestock farming insurance scheme in the West Region of Cameroon. This information can serve as a basis for crafting and implementing a National Livestock Insurance Policy and insurance company-based schemes.

2. MATERIALS AND METHODS

This study was conducted in the Mifi (5° 28′ 45″ N, 10° 25′ 11″ E), Koung-Khi (5° 22′ 29″ N, 10° 24′ 43″ E), Bamboutos (5° 37′ 34″ N, 10° 15′ 17″ E) and Upper Plateau (5° 20′ 05″ N, 10° 22′ 06″ E) Divisions of the West Region of Cameroon as shown in Figure 1.

Figure 1. Map of the West Region of Cameroon, showing case study divisions
National Institute of Cartography (2020) and Fieldwork (2020)

Quantitative and qualitative data for this studywere collected from 430 poultry and pig farmers in the Bamboutos, Upper Plateau, Mifi and Koung-Khi Divisions,using structured questionnaires and semi-structured interviews on the loss experience of farmers. The cluster sampling technique was used to identify the main poultry and pig production areas from which farmers were sampled using the snowball sampling technique.

Although risks are defined as the probability and impact of a future occurrence, this study went further to demonstrate that farmers have experienced these risks by including excerpts of their experiences. In this way, the concept of risk is not seen as an abstract one in the study area.

The risk assessment of poultry and pigrisks was done based on farmers' perception of the degree severity (impact of occurrence) and likelihood of occurrence of each risk category. Farmers indicated if the

likelihood of occurrence of each risk category was low, medium or high. This was the same case with the severity. Codes were given to each measurement category as follows: 1 = low, 2 = average, 3 = high. Furthermore, the degree of severity and frequency of each risk category was multiplied against each other. This enabled the researchers to situate the risks as low, medium and high on the risk matrix. Thus, risks were classified as low if they were between 1 – 2, between 3-4 for medium and 6-9 for high risks.

3. RESULTS AND DISCUSSION

Poultry Farming Risk Assessment

Poultry farmers face a myriad of risks that can hamper their production capacity. To enhance the understanding of the risks that farmers face daily in a bid to plan better risk management strategies, the researchers analysed the severity and likelihood of the occurrence of these risks, as shown in Figure 2.

LIKELIHOOD ↓ / SEVERITY →	1	2	3
1	**LOW** - Non-epidemic diseases - Fire caused by humans - Theft - Natural disasters - Poor feed composition - Bad species of chicks - Transport risk - Financial risk - Human risk	**LOW**	**MEDIUM** - Epidemic diseases - Market/prices - Government regulation/ institutional risk
2	**LOW**	**MEDIUM**	**HIGH**
3	**MEDIUM**	**HIGH**	**HIGH**

Figure 2: The risk assessment matrix for poultry farmers
Source: Fieldwork (2020)

Seventy-five per cent of risks faced by poultry farmers in the West Region have a low likelihood of occurrence (frequency) and low severity (potential impact). In contrast, 25% (epidemics, market prices and government regulation/ institutional risk) have a medium likelihood of occurrence and severity. The risk of fire outbreaks in poultry farms is due to anarchical electricity connections. In rural areas with intermittent electricity, poultry farmers use firewood to heat their chickens from when they are a day old to 14 days. This constitutes a significant risk of fire outbreaks.The losses due to the transportation of mature chickens to the market and day-old chickens to the poultry are usually (between $4-20). These losses usually occur when chickens are choked up in a car, and some end up suffocating, and when matured chickens and chicks are transported under stressful conditions (heat). The stress can lead to mortality even after the chicks are put in the poultry. Farmers usually give their chicks vitamin C once installed on their farms to overcome this challenge. Transportation risks can equally be associated with farmers not being able to get their farm inputs (feed) and evacuate matured chickens to the market due to poor roads that are usually impassable during the rainy season. This increases their cost of production and reduces their profit margin.Financial risks is prevalent among poultry farmers due to the several episodes of the H5N1 that resulted in economic losses. Some have not been able to repay their loans. The financial risks are reduced due to the presence of savings and loan organisations called *Njangi houses*, which are replete in the West Region. The main natural disasters that have affected poultry farmers are floods and landslides. With the West Region along

the Cameroon volcanic line, there is a risk of volcanic eruptions that can affect poultry farms. The fluctuation of prices always constitutes a significant risk for farmers. The prices fluctuate in caseswhere the supply is more than the demand, especially during epidemics. During the sale of chickens, the traders enter the poultry to select the best chickens. During this period, the chicks constantly run around and are subjected to a high level of stress, which can cause mortality after the trader has gone. To overcome this, farmers give give their chickens Vitamine C to give them energy.

Government officials in charge of the livestock sector were equally requested to appraise the risks that farmers faced as shown in Figure 3.

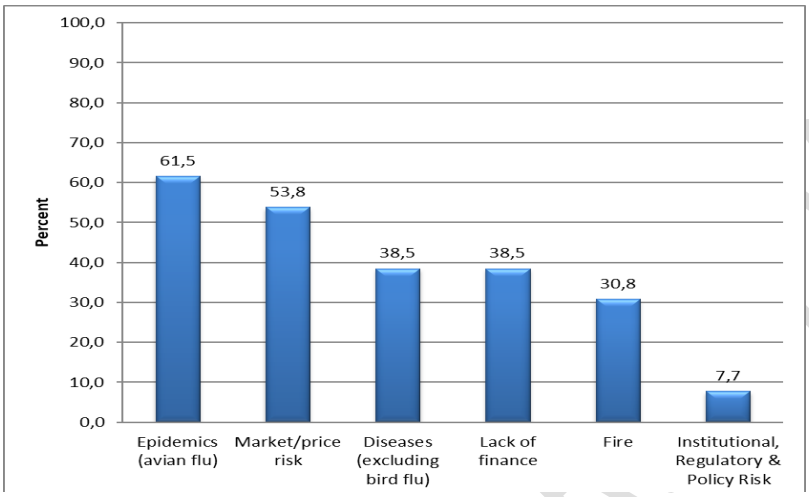

Figure 3: Risks faced by poultry farmers as perceived by governmentrepresentatives of the livestock sector
Source**:** Fieldwork (2020)

Government officials perceived epidemic (H5N1) at 61.5%, market/price risk at 53.8%, diseases (excluding bird flu) at 38.5%, and lack of finance at 38.5%assignificant threats facing the poultry sector. Thus, according to poultry farmers and government officials, epidemics and market/price risks are significant because they significantly affect farmers' run capital and profit margins. Generally, there is a relationship between epidemics and market/price risks. To contain the H5N1 in 2006 and 2016, the government prohibited the sale of chicken in Yaounde and the West Region, ordered the culling of birds in the sites of infection, and banned the transportation of poultry products. During this period, Gabon and Equatorial Guinea stopped poultry imports from Cameroon, and the market prices of poultry products dropped by more than 50%. The purchase and consumption of chicken dropped drastically due to the fear of transmission to humans.

Risk Experiences

Poultry farmers have experienced these risks as they recount their experiences in the excerpts below. In excerpt 1, a poultry farmer in the Mifi Division recounts his misfortune due to poor feed management(excess salt in fish used to make feed).

> "In 2005, my feed producer bought fish (preserved with excess salt), used as an ingredient to produce feed for my chickens. The excess salt in the fish caused my chickens to have diarrhoea, loss of appetite and much weight. My poultry floor (sawdust mixed with chicken droppings) was always damp due to the watery stool of my chickens. This created a perfect condition for incubating and multiplying bacteria that could cause morbidity and mortality on my farm. The stench from my poultry was unbearable. My neighbours and passers-by complained bitterly. I replaced the sawdust in the poultry every day. With the help of an agricultural technician, I discovered that excess salt was the main cause of my predicament. In one week, I lost 30 chickens (35 days old). These chickens were worth 2,500frs each. Even though I had some leftover feed, I borrowed money to make more feed. I fed my chickens longer than I anticipated before they got an appreciable marketable weight. This led to great economic losses and stress. The feed company only apologised and did not compensate me. They explained that due to the scarcity of fish in Cameroon, some Cameroon companies

> supplied ground fish mixed with sawdust to their company. When they discovered this malpractice, they imported fish from Senegal without knowing it was preserved with too much salt. To guard against this risk, I only get feed from a reputable producer in my area".
> *Interviewee: Kandem Rigobert, 36 years old, a poultry farmer in Mifi Division*

In excerpt 2, another poultry farmer also recounted losses due to kennel use and excess wheat bran in feed production.

> "In 2008, I discovered that my feed producer put more wheat bran than corn chicken feed. This caused my chickens to have diarrhoea and lose weight. My poultry farm was constantly wet. A senior poultry farmer helped me to determine the cause of this problem. I had to purchase more feed from another feed factory. This situation happened because the price of corn had increased due to scarcity and the feed producer's desire to make more profit. To deal with this challenge, I purchased more feed from another feed factory in my neighbourhood. I always ask other farmers how good feed is produced in the feed factory I patronise. In the feed factory, I ensure they put the right feed ingredients (they get the right formula). Sometimes I go to the extent of supervising while they are making my feed".
>
> "Other poultry farmers who patronised the same feed producer noticed that he mixed kennel in chicken feed, and this caused their chickens to be "giant" with an inappreciable marketable weight due to excess fat accumulation. As a result, poultry farmers ended up selling their chickens at a lower price than they had anticipated.
> *Interviewee: Mariane Tchoupou, 46 years old, a poultry farmer in Mifi Division*

A worldwide increase in the price of corn caused the phenomenon in except 5.2. Corn is the primary ingredient used in chicken feed production. Due to the scarcity of corn, feed prices rose by almost 40% between 2008 and early 2009 (from 11,000FCFA to 15,000FCFA). This caused some farmers to cut down on the size of their poultry farms while others temporarily suspended poultry activities. Due to the rise in corn prices, 200,000 one-day-old chickens were destroyed between December 2008 to February 2009 because producers could not feed them. The scarcity and high costs of corn and other poultry products partly fueled the nationwide protest in 2008. Livestock and corn farmers accused the Ministry of Agriculture and Rural Development (french acronym MINADER) of embezzling €1.2 million donated by the European Union to subsidise corn production in Cameroon (Euronews, 2009).

In excerpt 3, a farmer recounts how she experienced losses due to the poor quality of chicks.

> "In 2018, I was unfortunate to get poor chicken species from a supplier. From my discussion with an agricultural extension agent, the supplier had old layers affected by diseases, or eggs were hatched under unhygienic conditions. Thus, these chickens had stunted growth. I fed my chickens for 50 days, and they looked like chickens that were 36 days old. Under normal circumstances, good chickens can be sold at 35 days. So, I spent more money, time and energy feeding my chickens and later incurred losses. This discouraged me from rearing chickens. Without my husband's support, I would have stopped growing chickens. Now, I get referrals of good suppliers from other farmers based on how well their chickens are doing".
> *Interviewee: Tchafack Laurentine, 40 years old, a poultry farmer in Koung-Khi Division*

Excerpt 4 recounts the losses experienced by poultry farmers due to transportation/weather risks.

> "I remember in 2019, the rainy season, coupled with bad roads, caused my poultry business to incur a loss. I made a contractual agreement with a trader who always purchased all my chickens when they were 35 days old. Rain fell the night before, and the night after, he had to start purchasing my chicken. The road leading to my house became impassable due to the rains. When the road was passable, I contacted him, but he had gotten chickens from another farmer. With much effort, I contacted another buyer who bought them at a price that did not reflect their weight. I had to let go because I could not continue feeding 1,500 chickens that already had a marketable value for four (4) extra days. Now, I have a chain of restaurant owners I supply. Once my chickens are ready, I equally inform my neighbours. Furthermore, I engaged in community labour with other inhabitants to open gutters and improve the condition of the road to my house".
> *Interviewee: Kenfack Huges, 30 years old, a poultry farmer in Koung-Khi Division*

Excerpt 5 recounts losses incurred by farmers due to the diseases.

> "In October 2011, I experienced significant losses in my poultry farm due to green diarrhoea. I was ignorant about this disease as it had never attacked my chickens. A veterinary doctor diagnoses this disease. I lost over 400 chickens (of 27 days each) out of 800 chickens. With a running capital of about $2761, I lost $1299. I am very vigilant as I watch the stool of my chickens to see if they have green, white or brown diarrhoea. Once I see traces of these kinds of diarrhoea, I give them drugs immediately. When chickens are affected by green diarrhoea, it is easy to lose 50 chickens overnight.
> *Interviewee: Jean Tchakounte, 50 years, a poultry farmer, Koung-Khi Division*

Pig farming risk assessment

Unlike poultry farmers, pig farmers had a different pattern of likelihood of occurrence and severity of risks, as shown in Figure 4.

SEVERITY →

LIKELIHOOD ↓	1	2	3
1	**LOW** - Fire caused by humans - Theft - Natural disasters - Poor feed composition - Financial risk - Human risk -Government/institutional risk	**LOW**	**MEDIUM** Epidemic diseases
2	**LOW**	**MEDIUM** - Market/price fall - Transport risk	**HIGH** Non-epidemic diseases
3	**MEDIUM**	**HIGH**	**HIGH**

Figure 4: The risk assessment matrix for pig farmers
Source: Fieldwork (2020)

Pig farmers stated that 64% of risks they faced had a low likelihood of occurrence and severity, 27% of risks (market/price fall and transport risk) were medium, and 9 % (non-epidemic diseases) were high. Motorbikes are very practicable in rural communities and constitute one of the primary modes of transport for small-scale pig farmers. This mode of transport is highly susceptible to road accidents in urban agglomerations. Diseases can generally stay for a long time on a farm and be transmitted from one set of livestock to the next, where strict biosecurity measures are not upheld. The diseases can infect the livestock slowly and result in moderate losses or aggressively and result in high losses.

Government officials equally reveal how they perceived pig farming risks, as shown in Figure 5.

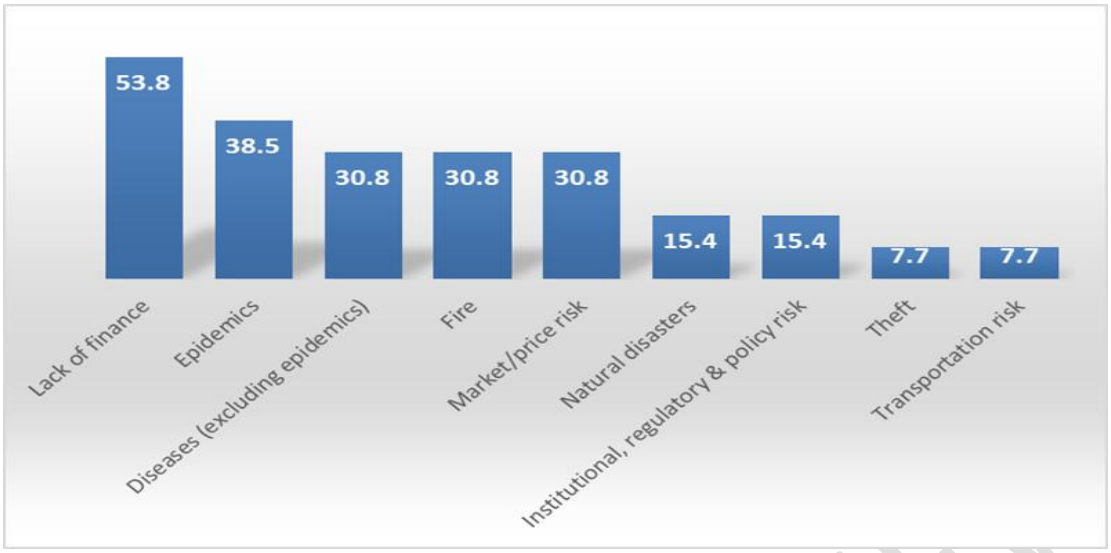

Figure 5: Risks faced by pig farmers as perceived by government representatives of the livestock sector
Source: Fieldwork (2020)

Government officials think the top three risks for pig farmers are financial, epidemics and diseases, fire and market prices, sharing the third position. Diseases (epidemic and non-epidemic) and market/price risks are among the top three risks pig and poultry farmers face because they affect all farmers, cause the highest mortality and reduce their profit margin.

Pig farmers' experience of losses

In excerpt 6, a pig farmer recounts their experiences faced due to diseases and theft. An understanding of how these farmers have adjusted to overcome these risks is equally recounted.

> "I started rearing pigs 15 years ago. In my experience, diseases, especially African Swine Fever (ASF), are the most dreaded risk in the pig sector. I had fifteen (15) mature pigs, of which three (3) were pregnant. Due to ASF, all died. I lost over 1 million FCFA. I had to borrow money from my savings and loans meeting "njangi house" to start rearing pigs again. It was a horrible experience for my family and me. Sometimes, diseases equally cause the reproductive rate of pigs to drop. In 2019, due to Pseudorabies disease, one of my pigs gave birth to four (4) piglets instead of 10. This equally reduced my profit margin. To avoid future losses, I strictly respect biosecurity measures on my farm. Once my pigs reach an acceptable market weight, I sell them to prevent theft or mortality caused by disease".
> *Interviewee: Hulbert Tchwente, 58 years old, a pig farmer in Bamboutous Division*

Theft of pigs is another significant risk faced by pig farmers. Excerpt 7 recounts a pig farmer's experience of losses due to theft.

> "Since I started rearing pigs five (5) years ago, I have lost three (3) pigs to theft. This is a lot for me as a small-scale farmer. These thieves use the strategy to give the pigs groundnut paste (to suffocate them) or snuff to make them fall asleep. I fortified my pig farm to avoid theft and am always alert to detect thieves, especially at night".
> *Interviewee: Jessica Nji, 40 years old, a pig farmer in the Bamboutous Division*

Implications for farming insurance

In the face of several farmers' risks, their risk management strategies have been limited to risk mitigation and coping. The absence of indemnity insurance represents a considerable protection gap for poultry and pig farmers in the West Region of Cameroon. In this light, it is essential to assess the risks that farmers will like to get coverage, their perceived financial viability, and the kind of insurance scheme desired.

Greatest risk farmers would like to get insurance

The significant risk per division for which farmers would like to get insurance is shown in Table 1. This information can be helpful to insurance companies as it will reveal the risks they can cover.

Table 1: Greatest risk poultry and pig farmers would like to get insurance per division

Livestock type	Division	Risk to get LFI	Stats	Percentage
Pig	Bamboutos	Non-Epidemic	73	54.5
		Epidemic diseases	44	32.8
		None	9	6.7
		Natural disaster	7	5.2
		Theft	1	0.7
	Total		**134**	**100.0**
	Upper Plateau	Epidemic diseases	27	41.5
		Non-Epidemic disease	34	52.3
		None	3	4.6
		Natural disaster	1	1.5
	Total		**65**	**100.0**
Poultry	Mifi	All risk	9	6.7
		Epidemic diseases	63	46.7
		Financial risk	4	3.0
		Fire	22	16.3
		Human risks	1	0.7
		Market/price risk	1	0.7
		Natural disasters	21	15.6
		None	12	8.9
		Non-Epidemic disease	2	1.5
	Total		**135**	**100.0**
	Koung-Khi	All risk	32	33.7
		Epidemic diseases	1	1.1
		Natural disaster	19	20.0
		None	38	40.0
		Non-Epidemic disease	5	5.3
	Total		**95**	**100.0**

Source: Fieldwork (2020)

Most farmers in the Bamboutous Division are more willing to get insurance for non-epidemic diseases (54.5%, 73), followed by epidemic diseases (32.8%, 44). Farmers in the Upper Plateau Division have a similar pattern in which majority would like to get insurance for non-epidemic diseases (52.3%, 34) followed by epidemic diseases (41.5%, 27). Despite the fact that on July 20, 2003, more than 120 landslides occurred within the Bambotous caldera, killing 23 people and 700 livestock and displacing more than 1000 people (Ayonghe and Ntasin, 2008 cited in Mabel, Wai, Dimo, Tebid, Nguh and Samuel (2023), only 5.2%(7) of farmers were willing to get LFI against natural disasters.

In the Mifi Division, most farmers were willing to get insurance for epidemic diseases (46.7%, 63) and less for non-epidemic diseases (1.5%, 2). As a central poultry area, farmers have significantly experienced significant economic losses from successive episodes of the Avian Flu. These losses have served as a motivating factor to get LFI for epidemic diseases. Many farmers (15.6%, 21) indicated they would get LFI against natural disasters because this division has common landslides. In October 2019, a landslide occurred

in the Gouache area, Bamoungoum village in Bafoussam, claiming the lives of 49 civilians, leaving others injured and between 200 and 299 persons displaced, with significant property loss (Mabel et al., 2023).

Many farmers in the Koung-Khi Division (40.0%, 38) are unaware of the importance of getting LFI to protect their LFI farms as they are not willing to get insurance for any risks. The picture is not all that negative in this division, as 33.7% (32) are willing to get LFI for all risks they face.

The significant risk per livestock type for which poultry and pig farmers would like to get insurance is shown in Table 2.

Table 2: Greatest risk poultry and pig farmers would like to get insurance per livestock type

Category	Stats	Greatest risk poultry and pig farmers would like to get insurance										Total
		Non-epidemic diseases	Epidemicdiseases	Theft	Fire	Natural disasters	Market/ price risk	Human risk	Financial risks	All risks	None	
Poultry	n	7	64	1	22	40	1	0	4	41	50	**230**
	%	3.0%	27.8%	0.4%	9.6%	17.4%	0.4%	0.0%	1.7%	17.8%	21.7%	**100.0%**
Pig	n	107	71	0	0	8	0	1	0	0	12	**199**
	%	53.8%	35.7%	0.0%	0.0%	4.0%	0.0%	0.5%	0.0%	0.0%	6.0%	**100.0%**
Total	**n**	**114**	**135**	**1**	**22**	**48**	**1**	**1**	**4**	**41**	**62**	**429**
	%	**26.6%**	**31.5%**	**0.2%**	**5.1%**	**11.2%**	**0.2%**	**0.2%**	**0.9%**	**9.6%**	**14.5%**	**100.0%**

Source: Fieldwork (2020)

A significant proportion of farmers (31.5%, 135 for poultry and pig farmers: 27.8% (64) for poultry farmers and 35.7% (71) for pig farmers) would like to get insurance for epidemic diseases, followed by non-epidemic diseases (26.6%, 114: 3.0% (7) for poultry farmers and 53.8% (107) for pig farmers). Moreover, 9.6% of farmers (all of whom are poultry farmers) would like to subscribe to all risks. A proportion of 14.5% (62) (21.7% (50) for poultry farmers and 6.0% (12) for pig farmers) will not like to subscribe to any risk. Few farmers would like to get LFI against theft, market/price risk, human risk and lack of finance.

The most significant risks that farmers are willing to subscribe for can indicate the risks that cause the most mortality and packages that insurance companies can start piloting LFI within the study area.

3.2. Discussion

Diseases (epidemic and non-epidemic) were significant risks in the West Region. From 1990-2015, epidemics were the most frequent disaster affecting livestock in Cameroon. Six of the eight animal diseases analysed from 2005-2015 could be considered endemic in Cameroon. These include Newcastle disease, Lumpy Skin disease, African Swine Fever, Foot and Mouth disease, Contagious Bovine, Pleuropneumonia, Rift Valley Fever and Highly Pathological Avian Influenza (PARM, 2016). According to MINEPIA/PADFEL, 2015 cited in PARM, 2017, diseases reduce the competitiveness of the livestock sector by 70 per cent. The African Swine Fever is the main cause of mortality of pigs. Between 2013 and 2013, the Epidemiological Surveillance Network registered 47377 cases of the New Castle disease with a 77 per cent mortality rate. Among the disease challenges, African swine fever (ASF) and erysipelas alone are responsible for heavy losses due to outbreaks that occur almost every year in Cameroon (MINEPIA, 2009). According to Kouam, Ngueguim&Kantzoura (2018) MINEPIA, 2009, Kouam, M., Jacouba, M., &Moussala, J. (2020), the following diseases causing considerable economic losses due to reduced weight gain, litter size, poor growth rates, visceral organ condemnation at slaughter and deaths: hog cholera, porcine encephalomyelitis, Aujeszky's disease, enteritis, transmissible gastroenteritis, porcine encephalomyelitis, erysipelas, dysentery, pasteurellosis, tuberculosis and salmonellosis. Parasitic diseases (Strongylid parasites, coccidia, StrongyloidesransomiAcarissuum, Metastrongylus sp., Trichuris suis, Macracanthorhynchushirudinaceus), causing considerable economic losses. According to Guillaume, Jean, Geraldine, and Mfewou (2017), Coccidiosis, Salmonellosis, New Castle, and Gumboro disease were the prevalent diseases that affected broiler and layer breeders in the Dschang Subdivision, Menoua Division, West Region of Cameroon. Salmonellosis (“white diarrhoea”, coccidiosis also known as “brown diarrhoea”), Newcastle disease, avian influenza, avian tuberculosis, and colibacillosis (Escherichia coli infections) were

noticed in poultry farms in the Buea Municipality and most farmers had poor zoonotic poultry diseases prevention and control practices on (Bissong et al., 2022). In the Ikeduru Local Government Area of Imo State, Nigeria, the severe risks that farmers faced included disease outbreaks, pest attacks, price fluctuation, market, culling, death of the farmer, burglary, fire outbreak, and power failure (Iheke & Igbelina, 2016).

A study carried out by Tatfo et al. (2021) on biosecurity measures in the West, Littoral and Center Regions revealed that 39 farms were at moderate risk and 51 farms were at high risk of disease outbreaks and prevalence due to poor biosecurity measures. Viban and Mfondo (2021) identified diseases, thermal stress and technical errors as risks that negatively affect poultry farmers in Douala, Cameroon. According to Laanen, Maes, Hendriksen, Gelaude, De Vliegher, Rosseel, and Dewulf (2014), pig, cattle, and poultry farmers attested to the positive benefits of adopting optimum biosecurity measures on the reduction of diseases in their farms even though they had low knowledge on biosecurity measures with less than 10% able to correctly explain the term 'biosecurity'. Kouam, Jacouba & Moussala (2020), in their study on the management and biosecurity practices on pig farms in the Western Highlands of Cameroon, realised that even though ASF, erysipelas and many other infectious and parasitic diseases have seriously compromised the future of the pig industry in the Western Highlands of Cameroon, the vast majority (73.71%) of farms had a low biosecurity level. Very few (4.73%) farms had a good level of biosecurity. The biosecurity level was generally poor, irrespective of the biosecurity component. In fact, up to 75.85%, 65.85% and 77.46% of farms had a low biosecurity level for the 'isolation', 'traffic control' and 'sanitation' components, respectively, with an adoption rate of biosecurity measures equal to or less than 25%.

The volatility of output prices is a particularly significant risk. As a result, producers face the risk of a low return on their investments (or even a financial loss) due to the difficulty of predicting future price trends (PARM, 2017). Furthermore, lack of finance was a significant challenge for poultry and pig farmers in the West Region. According to PARM (2017), the lack of access to finances contributes to agricultural productivity.

Akinola (2014) revealed that the significant sources of risk for poultry farmers include market (83%), production (69%), disease outbreaks (63%) and political risks (61%), while Iheke and Igbelina (2016) opined that the significant risks encountered by poultry farmers were production (92.5%), financial (90.0%), price/marketing (66.3%) and casualty risks (61.3%). Guillaume et al. (2017) highlighted that inadequate capital was a significant constraint to poultry farming, followed by marketing risks, theft and poultry mortality. Price fluctuation is a considerable risk faced by poultry farmers and traders, given that companies that produced and supplied day-old chicks equally grew broilers and had more competitive prices than farmers who did not produce day-old chicks. In this circumstance, farmers and traders had to reduce prices to compete with big producers.

Research findings by Tereszkiewicz, Kusz and Kulig (2019) revealed that between 2005–2018 pigs worth PLN 178 million (26,245 million FCFA) and chickens worth PLN 321 million (47,329 million FCFA) died during transportation. Yerpes, Llonch and Manteca (2021) posited that environmental conditions (temperature and humidity) and the percentage of day-old chicks stuck in a van cause death during transportation.

Generally, farmers would like to get insurance for two main risks: epidemics and non-epidemic diseases. The majority of farmers, 31.5% (135) (27.8% (64) for poultry farmers and 35.7% (71) for porcine farmers), will like to get insurance for epidemic diseases. The second majority, 26.6% (114) (3.0% (7) for poultry farmers and 53.8% (107) for porcine farmers), would like to get insurance to cover non-epidemic diseases. Livestock production insurance cancover lossesdueto business interruption caused by illness/death and cover veterinary costs due to on-farm diseases. Net revenue insurance can cover farmers against losses from the marketplace, while catastrophe insurance can protect farmers against extreme price losses due to the occurrence of a disease that causes a rapid fall in market prices (Turvey (2003).Market insurance is void of moral hazard and adverse selection since the sources of risk are exogenous. Feed quality risk is probably the least crucial since it can easily be solved. However, this often involves some extra cost that small-scale farmers cannot afford. Productivity losses due to feed quality are probably settled through legal channels rather than insurance mechanisms (Turvey, 2003).Spain is promoting the idea of one policy covering all the risks, such as accidents, diseases, fire, and theft (Čolović, Petrović and Mrkšić, 2016). According to Emmanuel, Humphrey and Louis Bernard (2024a), only 33.5% were willing to get farming insurance, 51.2% were unwilling and 15.2% were unsure. Furthermore, most farmers (40.7%) were willing to pay $79 to get farm insurance coverage. For poultry farmers, household and flock size were significant determinants of the premiums farmers were willing to pay for insurance, while years of farming experience, annual farming income, division, household and flock size were significant determinants for pig farmers (Emmanuel, Humphrey and Louis Bernard, 2024b). More farmers in the Mifi Division were willing to get livestock farming insurance than farmers in other sample divisions.

Notwithstanding, in this study, farmers identified more with particular risk factors than a general willingness to get LFI, of which they have little or no knowledge of its importance and need.

Livestock disease insurance should be based on the frequency, duration, and intensity of risks (Turvey, 2003), as was the case in this article. This article included the duration of a pathogenic attack under the intensity(severity) category.

4. CONCLUSION

Achieving sustainable livelihoods for poultry and porcine farmers requires a holistic approach (risk mitigation, coping and transfer). This article strengthens the understanding of poultry and pig risks and risk transfer as a means to strengthen and protect the financial assets of poultry and pig farmers. Cameroon does not have a national livestock insurance policy, and the CIMA code has included micro-insurance provisions in its texts. For this reason, the World Bank, in collaboration with AXA and ACTIVA, have initiated index-based insurance in the North Regions of Cameroon.Diseases (epidemic and non-epidemic) and market/price risks were among the top three risks pig and poultry farmers face because they affect all farmers, cause the highest mortality and reduce their profit margin. A significant proportion of farmers would like to get insurance for epidemic diseases, followed by non-epidemic diseases. In times of uncertainty related to livestock losses due to several risks, poultry and pig farmers are expected to behave rationally by subscribing to LFI to protect their livelihoods. Unfortunately, human beings are not always rational in their thinking. A farmer's decision to get LFI will depend on the expected utility they will get from LFI. Their status quo (income levels, family size, experience in livestock farming), perception of insurance companies, access and affordability of insurance schemes can equally influence a farmer's desire to get LFI.

5. RECOMMENDATIONS

Given the significant risks posed by epidemic and non-epidemic diseases in the West Region, MINEPIA and farmers must enhance disease prevention and control strategies by implementing biosecurity measures, vaccination programs, and regular health monitoring in livestock farms.Strengthening veterinary services and surveillance systems by MINEPIA is also essential to promptly detect and manage disease outbreaks. This could include training and equipping veterinary professionals, establishing effective disease-reporting mechanisms, and conducting regular epidemiological surveillance. Furthermore, the lack of access to finance is a significant challenge for poultry and pig farmers in the West Region. It is essential to develop and promote financial mechanisms such as agricultural loans, grants, and insurance schemes tailored to the specific needs of livestock farmers. MINEPIA, in collaboration with the Ministry of Finance and the Ministry of Planning, Economy and Regional Development and microfinance institutions, can be instrumental in this light. This will help improve productivity and mitigate the financial risks of price fluctuations, disease outbreaks, and other unforeseen events. Enhancing farmers' knowledge and awareness of livestock diseases, biosecurity measures, and risk management practices is crucial for MINEPIA extension services to engage. This can be achieved through training programs, workshops, and extension services that provide farmers with the necessary information and skills to prevent, detect, and mitigate disease risks.Notwithstanding, livestock production insurance can also play a vital role in mitigating the financial losses caused by diseases. Exploring and developing livestock insurance options that cover losses due to disease outbreaks, business interruption, veterinary costs, and market fluctuations is recommended. This will provide farmers withsafety nets and incentivize better risk management practices. Insurance companies can start piloting a disease and market/price fall insurance scheme since most farmers want insurance against these risks. Thus, they must seek to understand the nature of these risks and get technical expertise on how to set up and manage a livestock farming insurance scheme.Furthermore, the Interprofessional Association of Pig Farmers in the West Region (IPORCO) and the Interprofessional Association for Poultry Farmers (IPAVIC) in the West Region can be used by MINEPIA and insurance companies as a channel to create awareness of the importance of LFI. Insurance companies should tailor insurance schemes to the local realities of the West Region.

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