ICAEM2015 ICOOP2015

The Joint International Conference on Agribusiness and Cooperatives

Theme: The Future of Agribusiness and Cooperative Enterprises: Examining Local and Global Contexts

CITATION

Sastado, Hazel May A., Dinah Pura T. Depositario*, Normito Zapata Jr., and Nanette A. Aquino. 2015. "Effects of Climate Variability on a Livestock Value Chain: The Case of the Sorosoro Ibaba Development Cooperative (SIDC) Hog Business." Paper presented at the Joint International Conference on Agribusiness and Cooperatives, Davao City, Philippines, 14–16 October.

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Effects of Climate Variability on a Livestock Value Chain: The Case of the Sorosoro Ibaba Development Cooperative (SIDC) Hog Business

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Outline of Presentation

- Introduction
- Objectives
- Methodology
- Results and Discussion
- Conclusion and Recommendation

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Introduction

- Climate change is one of the most pressing challenges facing the agribusiness sector.
- Agriculture, forestry, agro-forestry, fishing, aquaculture, and tourism sectors in South and Southeast Asia are among those most vulnerable to risks due to climate change already experiencing impacts from increased climate variability (CSR Asia, 2011).

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Introduction

Risks of climate change/ variability to agribusiness enterprises (CSR Asia, 2011):

1. Risks to core business operations ("effectiveness or efficiency of production processes, the cost of operations and maintenance activities, or the quality of a product");
2. Risks to the value chain (availability of production inputs, changing consumer demands, and consumer access to products, availability and quality of natural resources, particularly water, utility services, logistics networks, and the health and safety of workers)

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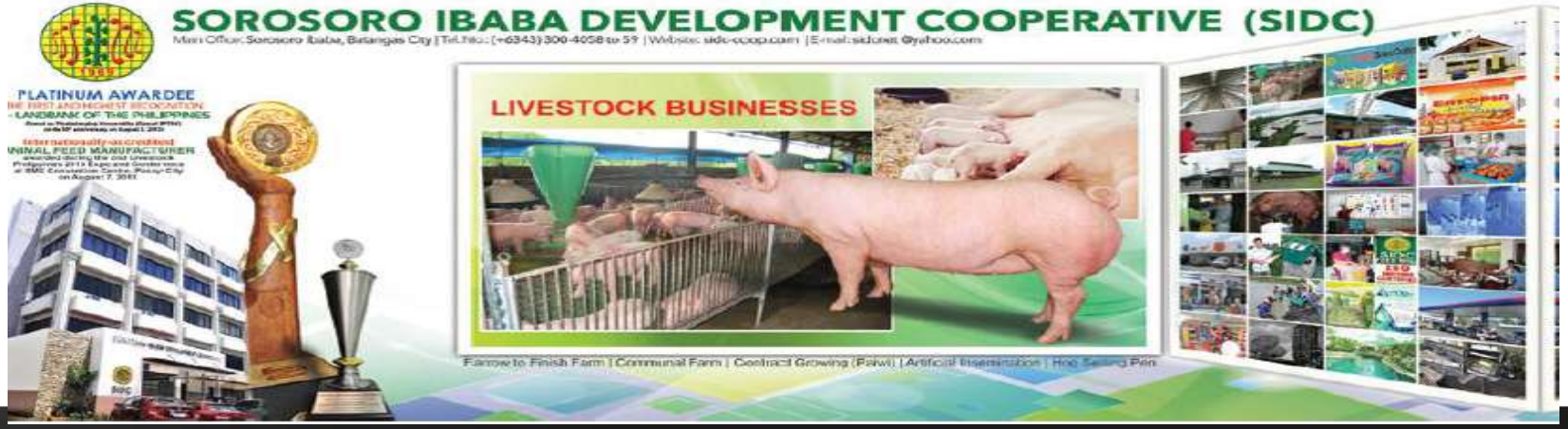
Introduction

Sorosoro Ibaba Development Cooperative (SIDC)

- It is the largest agri-based cooperative in the country, operating diverse businesses (e.g. feedmill, hog production, artificial insemination center, etc.)



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There is currently a dearth of studies on how profit-oriented agribusiness firms are affected by climate change and how these firms strategically respond to climate variability.

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Objectives

The paper specifically:

1. Describe the manifestations of climate variability in Batangas City from 2008 to 2014;
2. Present a profile of SIDC's hog business and map out the value chain process and actors of SIDC's hog business;
3. Discuss the effects of climate variability at each point along SIDC's hog value chain;
4. Describe the current adaptation strategies being utilized by SIDC to address the effects of climate variability; and
5. Suggest climate variability adaptation strategies for SIDC's hog business.

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Methodology

- This study can be considered an exploratory one as there have been very few studies delving into the effects of climate variability on a value chain, specifically in the context of the Philippines.
- It identified the effects as well as the climate change adaptation strategies at all points of the SIDC hog value chain using the value chain approach.
- Under this approach, the interconnections in the system using a framework of relationships, roles, rules, resources, and results are identified.

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Methodology

- The analysis attempts to address the following questions (ACDIVOCA, 2013), among others:

  1. Who, in what function, is connected to whom?; and
  2. Where are there risks (i.e., financial and environmental) in the system?

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Methodology

- Primary data were gathered through semi-structured key informant interviews among veterinarians, technicians and production operators.
- A survey was conducted among 29 contract growers of SIDC, as well as, five hog haulers who regularly bought live hogs from the SIDC hog selling pen.

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Methodology

- Secondary data was sourced from the cooperative’s records and files like SIDC’s annual reports for the last five years.
- Other secondary data were gathered from the records of BAS, PCAARRD-DOST and PAGASA.

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Results and Discussion

1. Manifestation of Climate Variability in Batangas Province, Philippines

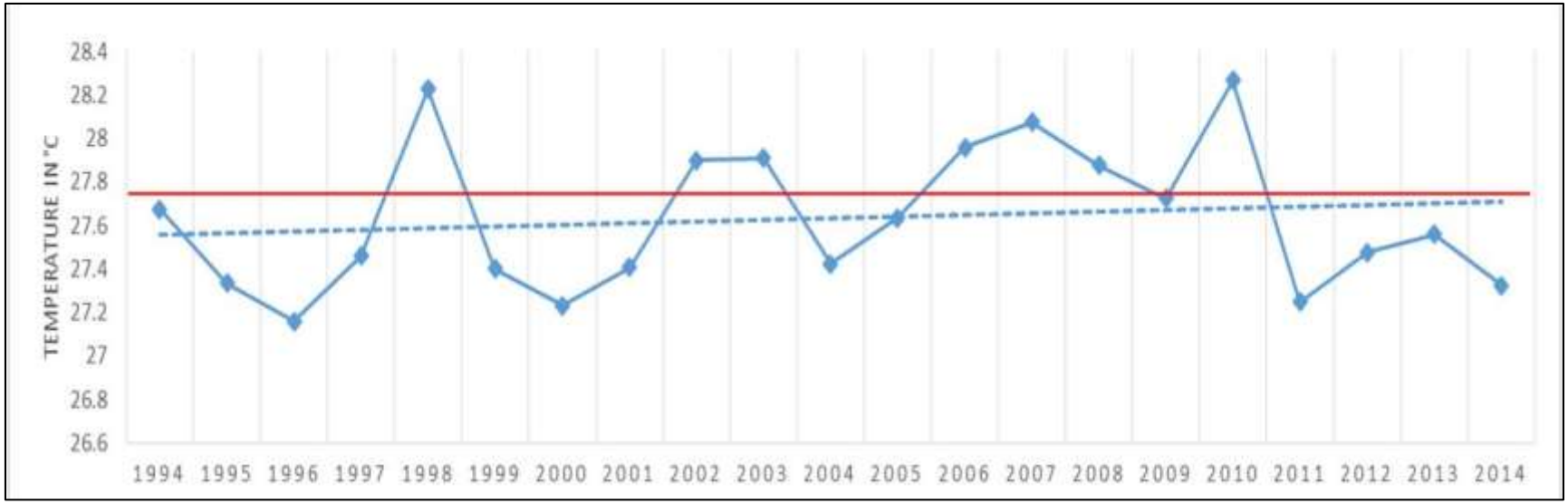

Figure 1. Average annual mean temperature in Batangas from 1994 to 2014

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Results and Discussion

- It can be seen that over the past 20 years, mean temperatures from 1994 to 2014 exhibited sharp fluctuations.
- This trend is more apparent when the points are plotted along the long term mean temperature normal value of 27.77°C (represented by the red line).
- Moreover, the dashed line (representing the mean temperature) exhibits an increasing trend and implies that the mean temperature is increasing in Batangas.

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Results and Discussion

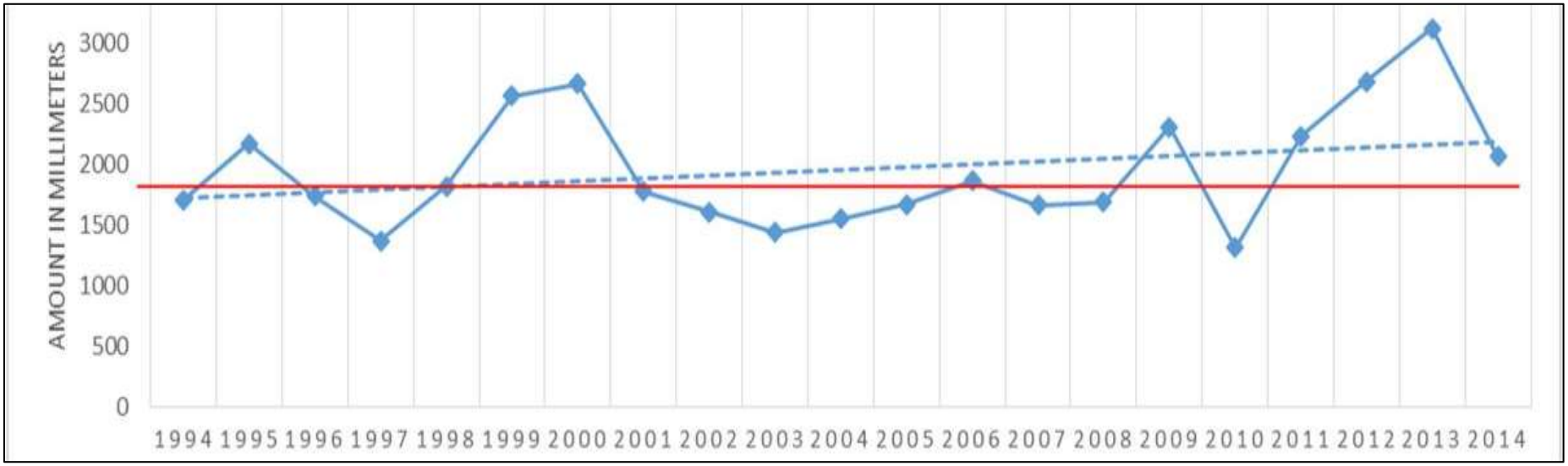

Figure 2. Average annual rainfall amount (in mm) in Batangas from 1994 to 2014

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Results and Discussion

- When compared to the long-term rainfall amount normal value of 1767.1 millimeters (mm) (represented by the red line), there is also a manifested fluctuating rainfall amount over the past 20 years (from 1994 to 2014).
- The dashed line (representing the mean rainfall amount) exhibits an increasing trend.

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Results and Discussion

2. Background and Profile of SIDC
   - SIDC was formed on March 19, 1969
   - It is now one of the most successful famers' cooperatives in the Southern Tagalog Region and in the Philippines.
   - SIDC has ventured into diversification establishing many different businesses considered as one of its edge among other cooperatives.

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Results and Discussion

The businesses of SIDC include:

- **SIDC Feeds**
- **SIDC Savings and Loans**
- **SIDC AgriTrading and Financing**
- **SIDC Oriental Mindoro Operations (rice mill)**
- **SIDC Aquacare (Water-refilling station)**
- **SIDC Coopmarts and Coop Supermart**
- **SIDC Gas Station and Auto Supply (Petron)**
- **SIDC Koop Likas (Organic Fertilizer)**
- **SIDC Layer Farm**
- **SIDC Livestock ("paiwi" system)**
- **SIDC SMATV and Internet bundle**
- **SIDC Printing**
- **Sorosoro Springs Resort and Adventure Park.**

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Results and Discussion

- In 2014, SIDC's hog business contributed P33,624,108.67 (or 61% of total) to the the cooperative's total surplus (i.e., income).
- Among the hog production-related businesses, the feedmill earned the highest at P27,100,409.48.
- This was followed by the hogs business and the pig farm business which earned P3,343,868.23 and P1,231,245.82, respectively during the same year.

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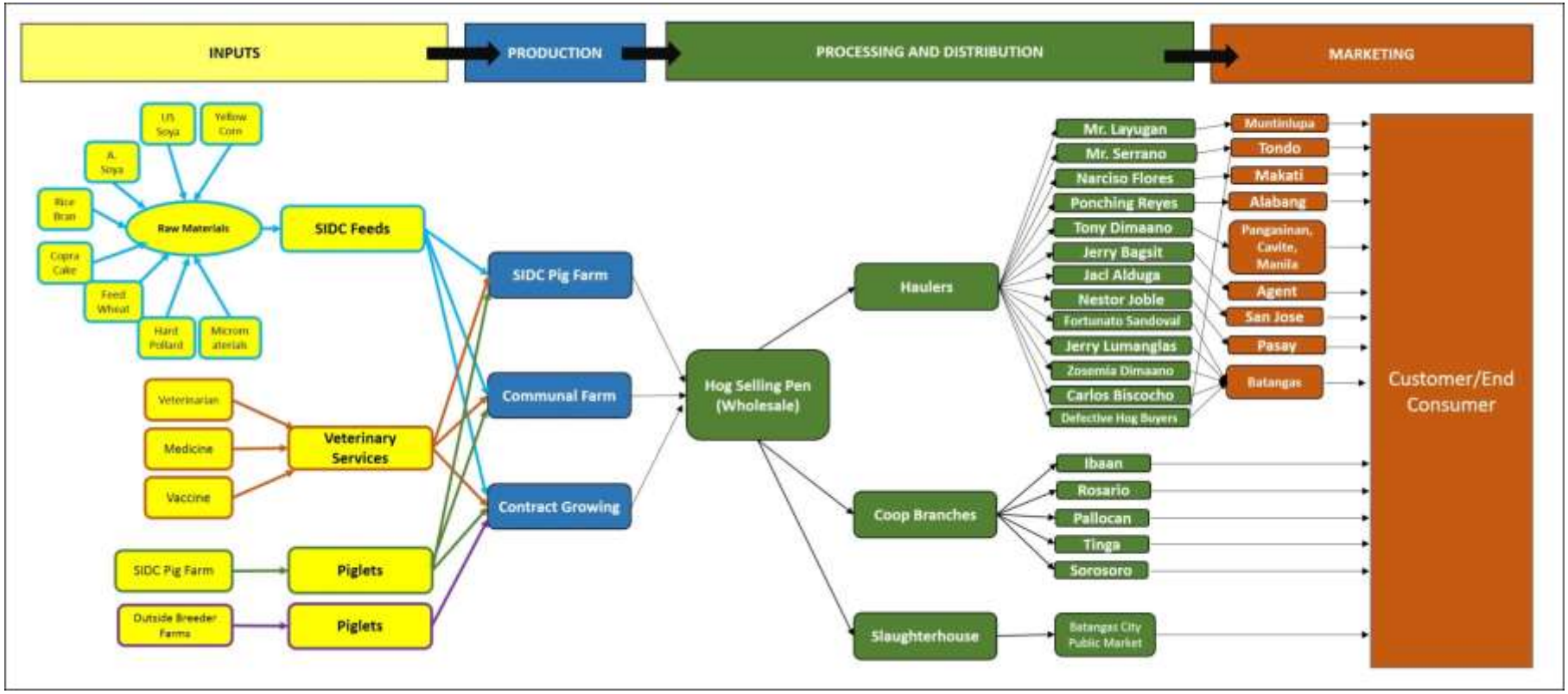
Results and Discussion

3. The SIDC Hog Value Chain



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Results and Discussion

- The **Input Link** is composed of the SIDC Feedmill business, internal (i.e., SIDC pig farm) and external (i.e., breeder-farms) weanling suppliers, SIDC's veterinary services (provided by the Livestock Division) and the contract-growers who provide the housing.
- The **Production Link**, on the other hand, is composed of the SIDC Pig Farm, the cooperative's communal farm and the contract growers.
- For the **Transport and Distribution Link**, the major players were the haulers who SIDC transacted with at the hog selling pen as well as the CoopMart branches and outside slaughterhouses

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Results and Discussion

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Results and Discussion

- Lastly, the **Marketing Link** in the value chain consists of the wholesalers and retailers who sold to end consumers in CALABARZON and NCR.

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Results and Discussion

4. Effects of Climate Variability Along the Value Chain of SIDC's Hog Business

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Results and Discussion

Inputs

- Very low temperature causes some ingredients to solidify such as molasses and coco oil. Based from the sample feed formulation provided, molasses and coco oil make up 4% and 0.50% of feeds per batch.
- Veterinary services have been more frequent in the recent years due to increasing number of hogs affected by different diseases.

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Results and Discussion

Inputs

- Common diseases of hogs include fever, colds, coughs, pneumonia and diarrhea as claimed by contract-growers.
- The respondents also mentioned a disease outbreak caused by Actinobacillus pleuropneumonia (APP) and Pseudorabies virus (PRV).

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Results and Discussion

Production

- Poor FCRs were observed in 2011 on the average. During the years 2012 and 2013, the FCRs exhibited were fair while during the year 2014 the hogs exhibited the least (and therefore satisfactory) FCRs.
- From the hog raisers' interview, in general, hogs tend to eat less or have lower appetite during hot seasons. It should be noted that the temperatures in 2011 and 2012 were higher compared to that of 2013 and 2014.

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Results and Discussion

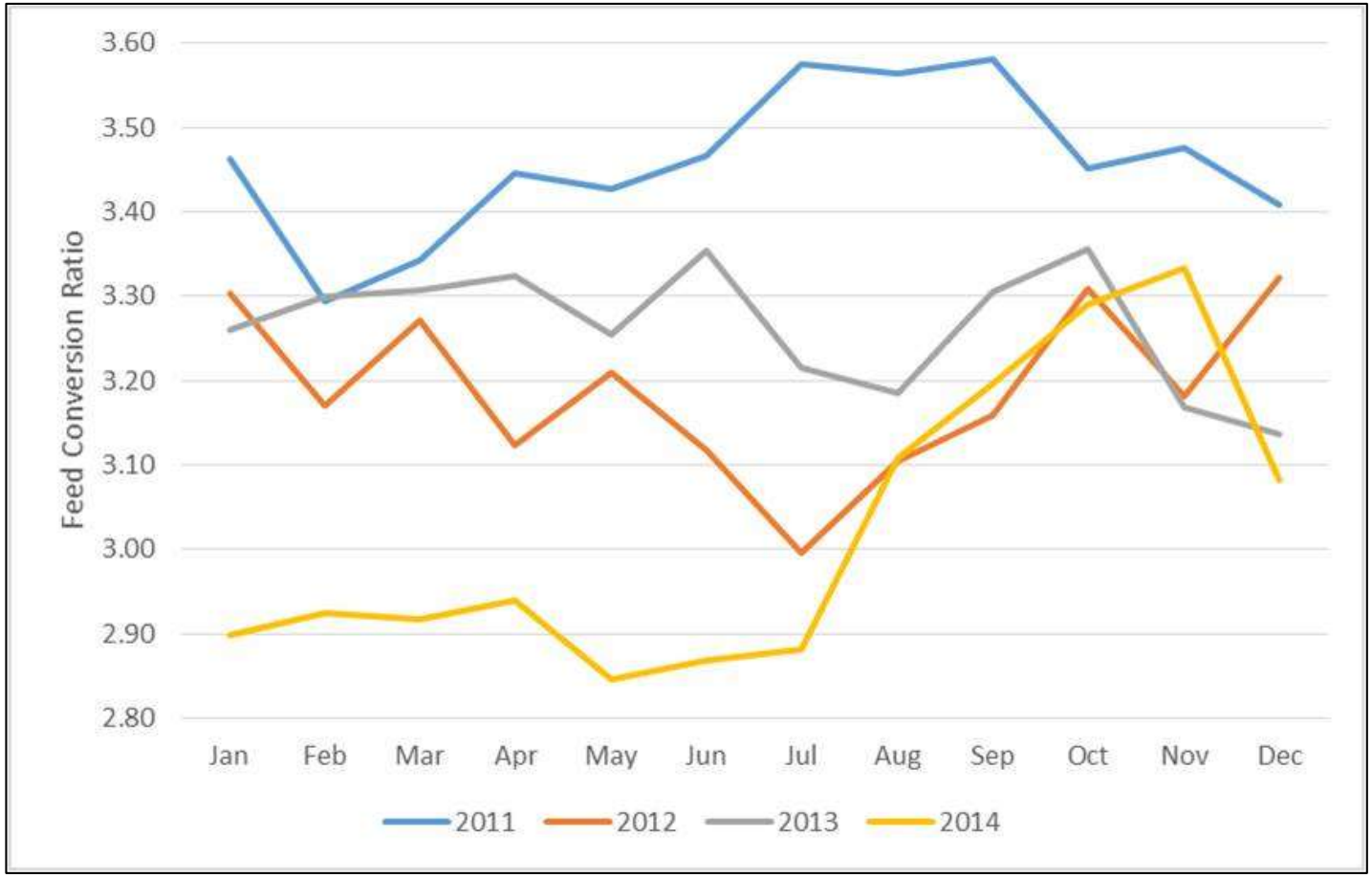

Figure 3. Feed conversion ratio of fattening hogs per month from 2011 to 2014

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Results and Discussion

- Relative to their FCR, the average daily gain was lowest in 2011 (i.e., poor) while the highest (i.e., satisfactory) ADGs were achieved in 2014.
- On the other hand, during the years, 2012 and 2013 the ADGs exhibited were fair and satisfactory, respectively.
- The lower ADGs in 2011, 2012 and 2013 observed could be directly related to the higher temperature recorded during those years.

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Results and Discussion

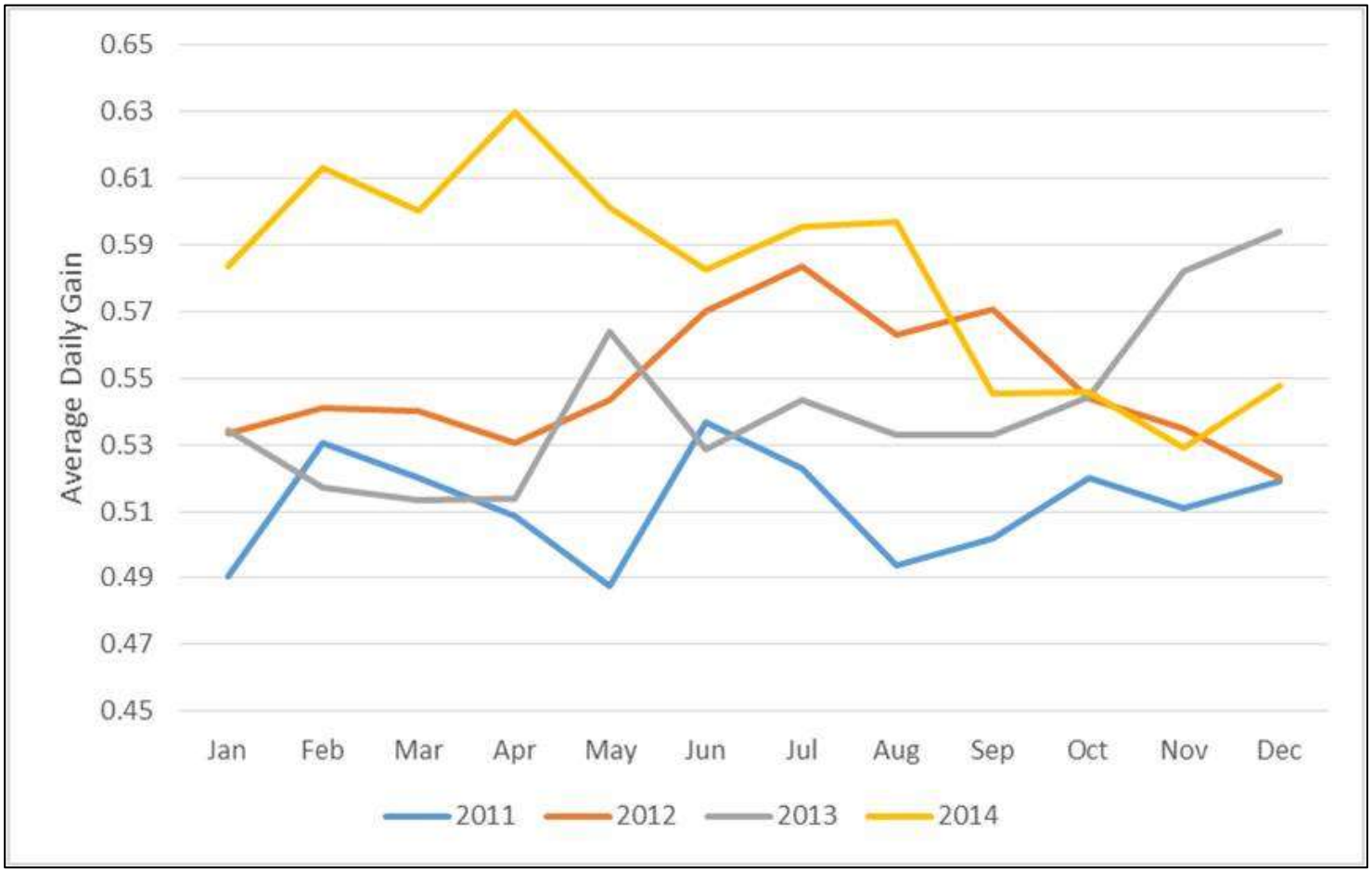

Figure 4. Average daily gain of fattening hogs per month from 2011 to 2014

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Results and Discussion

- There is an irregular trend in terms of mortality from 2011 to 2014.
- This could be attributed to different factors like diseases, biological causes and environmental forces that triggered cases of death among the hogs.
- An interview with one of the veterinarians in the livestock department revealed the incidence of diseases was triggered by intense weather situation which favored the faster multiplication of bacteria.

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Results and Discussion

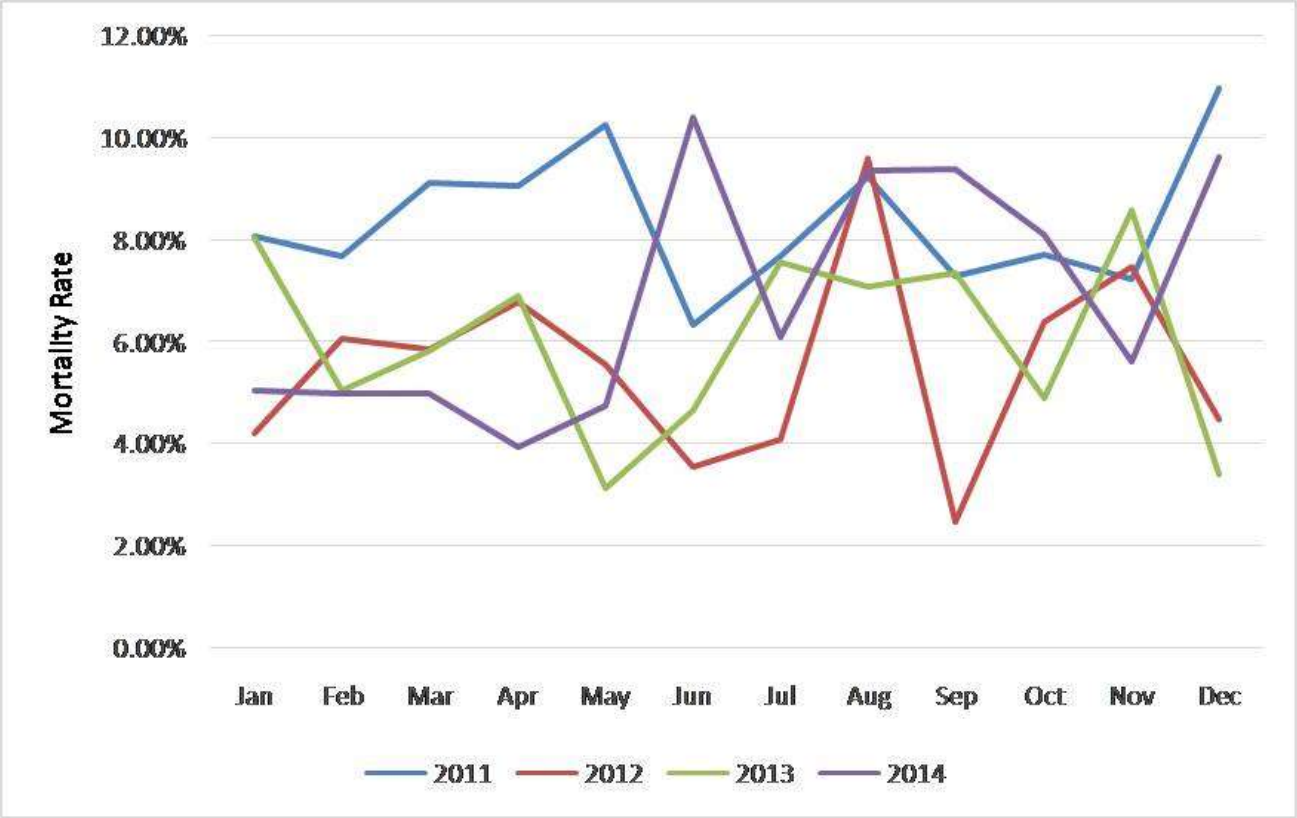

Figure 5. Mortality Rate of Hogs from 2011 to 2014

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Results and Discussion

- Twenty-six (26) out of the 29 contract-growers surveyed claimed that diseases and mortality among their hogs were due to sudden shifts in the weather and changing temperature.
- A high record of mortality in November 2013 could be attributed to typhoon Yolanda which hit Batangas with the public storm warning signal raised at number 2.
- In 2014, the months where typhoon Mario hit Batangas (i.e., September) and typhoon Ruby (i.e., December) was when high mortality was recorded.

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Results and Discussion

Transport and Distribution

- The hogs were brought and distributed by haulers in Muntinlupa, Tondo, Makati, Alabang, Pangasinan, Cavite, Manila, San Jose, Pasay and Batangas.
- The haulers claimed that climate variability had an effect on their operation because during hot times, hogs usually experience high blood pressure, difficulty in breathing and heat stress.
- Due to sudden shifts in weather (i.e., intense rain or heat) while being transported, the pigs got very weak and were slaughtered before reaching their destination.

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Results and Discussion

Marketing

- The meat coming from the Batangas City slaughterhouse are distributed to different SIDC store outlets which include SIDC's CoopMart.
- The risk involved at this point in the chain is the water loss which leads to reduced weight of meat being retailed.
- Further, based on National Meat Inspection Service (NMIS) standards, fresh meat must only be sold within eight (8) hours from the time of slaughter to market.

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Results and Discussion

5. Current Adaptation Strategies Utilized by SIDC to Address the Effects of Climate Variability

- In relation to addressing the effects of climate variability on the inputs like the decreased quality of yellow corn which got wet during prolonged rain, preservatives during feedmilling were added to maintain the quality of the output which led to an increase in cost of production.
- There was also a continuous monitoring of proper room temperature where raw materials are stored by using a temperature gauge.

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Results and Discussion

In relation to the production link and the problem of increased incidence of diseases among the hogs of contract-growers, the common strategies of the contract growers are:

1. **the use of Creolina to disinfect pig pens;**
2. **the contract growers' request for a modification in the feed formulation to match adaptation needs of hogs;**
3. **the protection of the hogs from extreme weather conditions by using *trapal* or other material to act as shield.**

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Results and Discussion

As for the strategies of the haulers (i.e., transport and distribution participants), these included:

1. spraying water to the hogs before, during and after transporting them
2. putting ice on the truck for additional cooling effects for hogs
3. using delivery vehicles with a roof

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Results and Discussion

At the marketing point, the following adaptation strategies were employed by the meat vendors:

1. Using a cooler for the storage of meat (the meat that was not sold within 8 hours was placed in a chiller or freezer to avoid contaminants and prolong shelf-life)
2. In the SIDC CoopMarts, aircon units have been installed to deter water loss of the meat for retail

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Conclusion and Recommendations

- The SIDC hog value chain, similar to other agri-based value chains, is highly vulnerable to the effects of climate variability.
- Each point on the value chain was assessed to be affected by climate variability.

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Conclusion and Recommendations

- It would do well if SIDC, as well as other multipurpose cooperatives, adopts a value chain approach in addressing climate variability risks.
- There has to be a simultaneous addressing of the risks at all points of the supply chain, including R& D and administration.

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Conclusion and Recommendations

- **R & D (i.e., breeding):** there should be focus on the breeding of more climate- resilient breeds like Landrace and Large White.
- **Administration:** SIDC could avail of an insurance scheme to help protect their contract growers' operations (including housing), especially those caused by disasters.
- **Inputs:** SIDC should increase the storage facilities of raw materials for feeds to accommodate more stocks especially prior to predicted extreme weather events.

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Conclusion and Recommendations

- **Veterinary and Technical Services**: More trainings and seminars related to climate variability adaptation should be provided by SIDC to increase awareness related to climate variability adaptation strategies
- **Facilities:** SIDC must make sure housing or pigpens of hogs are especially designed to minimize the impact of sudden heat to the hogs. They may also opt to purchase an Automatic Weather Station (AWS) which has a built-in sensor for wind gauge, wind speed, solar radiation, relative humidity and temperature.

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Conclusion and Recommendations

- **Transport and Distribution**: Haulers should be encouraged to have their trucks redesigned to allow for enough ventilation and protection from too much heat. Water sprinklers can also be installed.
- **Marketing:** SIDC should extend assistance to its marketing outlets such as the provision of chillers

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