Modernizing Crop Insurance Coverage for Hay

Presentation for Clients

Program Integration Branch
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La Financière agricole
Québec

PRESENTATION OUTLINE

BACKGROUND AND FINDINGS

Concerns About Current Coverage

⇨ Dissatisfaction due to the **complexity** and **incomprehension** surrounding the current method

⇨ Doubts about certain **coverage parameters**, especially how gains in quantity can compensate loss in quality

⇨ Questions concerning the **accuracy of weather data gathered** at manual stations with observers

Response to Clients' Concerns

↳ Development of a simple and effective method for the **appraisal of loss**

  ➢ Three main causes for loss can be identified by observing weather-related variables: **frost**, **drought** and **excessive rain**

  ➢ **Tables** were developed to connect weather-related variables to loss rate

BACKGROUND AND FINDINGS

Response to Clients' Concerns (Cont.)

⇨ Modernizing **participation parameters**

➢ By offering more personalized coverage

➢ By tailoring options to types of operation and to regional particularities

⇨ Modernizing the **weather station network**

➢ Information available on the Internet (e.g. Agrometeo website)

Appraisal of Loss

APPRAISAL OF LOSS

Three Tables

- ⇨ To directly connect the impact of the weather-related data observed to the loss rate calculated
  - ➢ **Frost table**: Impact of winter frost on loss rate
  - ➢ **Quantity table**: Impact of drought on loss rate
  - ➢ **Quality table**: Impact of excessive rain during harvesting on loss rate
- ⇨ Established using data observed between 1998 and 2014
- ⇨ The tables are included in the insurance contract

APPRAISAL OF LOSS

How the Tables Work

⇨ **Loss** (quantity and quality by cut) are **calculated independently** one from the other and are **cumulative**

- ➢ Tables do not take into account gains in quantity or quality like the current method does

- ➢ Loss from one cut is not reduced when there are gains from another cut

- ➢ Loss in quality will no longer be compensated by gains in yield

APPRAISAL OF LOSS

Frost Table

↳ **Objective:** Express the "Quantity" loss rate through the number of days of winter stress

↳ **Winter stress** occurs when the temperature drops below a certain threshold and forage crops are not sufficiently covered by snow, during the **period from November 1 to April 30**

↳ **Parameters used to determine winter stress**

  ➢ Low snow cover
  ➢ Average daily temperature $\leq$ -12°C

APPRAISAL OF LOSS

Frost Table

The loss rate seen in the table stems from **two components**

1. Loss rate for a **drop in yield** caused by winter frost

2. Loss rate equal to **reseeding costs** following forage crop mortality

By combining these two components, a global loss rate is obtained based on the number of days of winter stress

APPRAISAL OF LOSS

Frost Table
Short version: Loss of yield and reseeding

Days of winter stress	Drop in yield Loss rate	Reseeding Loss rate	Global loss rate
11	0.5	0.5	1
12	1.0	1.0	2
13	1.5	1.5	3
14	2.0	2.0	4
15	2.5	2.5	5
16	3.0	3.0	6
17	3.5	3.5	7
18	4.0	4.0	8
19	4.5	4.5	9
20	5.0	5.0	10
…	…	…	…
30	10.0	10.0	20
…	…	…	…
40	15.0	15.0	**30**

This table will be used for both hay and pasture forage quantity

APPRAISAL OF LOSS

Quantity Table

⇨ **Objective:** Express the loss rate for hay quantity based on the amount of precipitation cumulated per cut

⇨ **Reference periods** for cuts to apply the quantity table

No. of cuts	No. of days per cut	Period 1	Period 2	Period 3
2	60 days	May 1 – Jun. 30	Jul. 1 – Aug. 30	---
3	45 days	May 1 – Jun. 15	Jun. 16 – Jul. 31	Aug. 1 – Sept.15

APPRAISAL OF LOSS

Quantity Table

**Quantity Table
(based on a gradation
by mm of rain)**

Short version: 2-cut option (60 days)

Strata (mm of rain)	Cut 1	Cut 2
	May 1 – Jun. 30	Jul. 1 – Aug.30
	Loss rate (%)	
175 and +	0.0	0.0
174	0.4	0.7
173	0.9	1.3
172	1.3	2.0
171	1.8	2.6
170	2.2	3.3
...		
160	6.6	9.9
…		
150	11.0	16.5
….		
140	15.4	23.1
….		
130	19.8	29.7
….		
120	24.2	36.3
…		
100	33.0	49.5
….		
90	37.4	56.1
….		
< 85	40.0	60.0

APPRAISAL OF LOSS

Quantity Table

Quantity Table (based on grading by mm of rain)

Short version: 3-cut option (45 days)

Strata (mm of rain)	Cut 1 May 1 – Jun. 15	Cut 2 Jun. 15 – Jul. 31	Cut 3 Aug. 1 – Sept.15
	Loss rate (%)		
135 and +	0.0	0.0	0.0
134	0.5	0.8	0.8
133	1.0	1.5	1.5
132	1.5	2.3	2.3
131	2.0	3.0	3.0
130	2.5	3.8	3.8
…..			
120	7.5	11.3	11.3
……			
110	12.5	18.8	18.8
……			
100	17.5	26.3	26.3
……			
90	22.5	33.8	33.8
…..			
80	27.5	41.3	41.3
….			
70	32.5	48.8	48.8
…..			
60	37.5	56.3	56.3
< 55	40.0	60.0	60.0

- 14 -

APPRAISAL OF LOSS

Quality Table

↳ A single loss rate is evaluated for dry hay and wet hay

↳ This table is based on analysis results that show that:

- The number of 2-consecutive-day sequences of good weather during the harvest period is the variable that enables to best connect the relation between excessive rain and the quality loss rate

- The fewer the 2-consecutive-day sequences of good weather, the higher the loss in quality

APPRAISAL OF LOSS

Quality Table

One day of good weather is defined as a day without rain or a day with under 2 mm of rain

A day of good weather will **not be considered if it is preceded** by:

➤ A day with **30 mm or more of rain**

➤ **2 or 3 consecutive days of rain** (50 mm or over)

Jour 1	Jour 2	Jour 3	Jour 4	Jour 5	Jour 6	Nombre de séquences
☀	☀	🌧	🌧	🌧	🌧	1 séquence
☀	☀	☀	🌧	🌧	🌧	1 séquence
☀	☀	☀	☀	🌧	🌧	2 séquences
30 mm 🌧	✖	☀	🌧	🌧	🌧	0 séquence
40 mm 🌧	10 mm 🌧	✖	☀	🌧	🌧	0 séquence
25 mm 🌧	20 mm 🌧	5 mm 🌧	✖	☀	☀	1 séquence
25 mm 🌧	☀	20 mm 🌧	☀	☀	🌧	1 séquence

APPRAISAL OF LOSS

Quality Table

↳ Quality is evaluated over a **period of 30 days** of harvest for all cuts

➤ The average length of time for a cut at harvest is **26 days in Québec**

➤ For a period of 30 days, the historic normal is **8 sequences** of 2 consecutive days of good weather per cut

APPRAISAL OF LOSS

Quality Table (Cont.)

⇨ The table is based on a **relation between the loss rate and the number of 2-consecutive-day sequences** of good weather

⇨ The table is used for 3 cuts

⇨ The maximum quality loss rate value is 20% (validated with Valacta)

APPRAISAL OF LOSS

Quality Table

Number of 2-consecutive-day sequences of good weather	Quality loss rate (%)
8 sequences and +	0
7 sequences	4
6 sequences	8
5 sequences	12
4 sequences	16
≤ 3 sequences	20

Application Parameters

APPLICATION PARAMETERS

Personalized Protection

✤ Four options based on the number of cuts and the starting date of the first cut

2-cut option	3-cut option
Start of harvest < June 25	Start of harvest < June 16
Start of harvest ≥ June 25	Start of harvest ≥ June 16

✤ The proportions of volume per cut are determined based on the option chosen by the producer

2-cut options			
Start of harvest < June 25		Start of harvest ≥ June 25	
Cut 1	Cut 2	Cut 1	Cut 2
65%	35%	70%	30%

3-cut options					
Start of harvest < June 16			Start of harvest ≥ June 16		
Cut 1	Cut 2	Cut 3	Cut 1	Cut 2	Cut 3
50%	30%	20%	55%	30%	15%

Personalized Protection

↳ Set proportions for pasture forage loss

- ➤ Loss rate will be evaluated based on **3 growth periods** regardless of the option chosen

- ➤ Application of the **same quantity loss rates** as for hay

- ➤ The breakdown of proportions of **volume per growth period** will be different from the proportions applicable for hay and will be established as follows

  - ✓ Growth period 1: 40%
  - ✓ Growth period 2: 30%
  - ✓ Growth period 3: 30%

APPLICATION PARAMETERS

Coverage Maintained

↳ Two options to establish the insurable volume

  ➢ "Feed need" option

  ➢ "Area" option

↳ Two types of coverage

  ➢ "Quantity only" coverage

  ➢ "Quantity and Quality" coverage

APPLICATION PARAMETERS

Coverage Maintained

� Choice of insurance options

  ➢ Guarantee options (75%, 80%, 85% and 88%) and unit price options (60%, 80% or 100% of 125 $ /m.t.)

  ➢ These options, along with the type of coverage ("Quantity" or "Quantity and Quality"), are the same for each forage type (hay and pasture forage)

➢ Two types of compensation

 ➢ Collective loss
  ➢ Spot loss

APPLICATION PARAMETERS

Identification of Hay Type

� Participants will no longer need to indicate their proportions of dry hay and wet hay, since one quality loss rate will be calculated

➭ Participants will indicate **only the proportions of hay and pasture forage,** representing what is normally consumed by their animals ("Feed need" option)

APPLICATION PARAMETERS

Choice of Stations

- ⇨ Each participant's hay field will be associated with the **closest weather station**, according to its position

- ⇨ A producer could be associated with **more than one weather station**

- ⇨ A producer **could choose** a neighbouring station
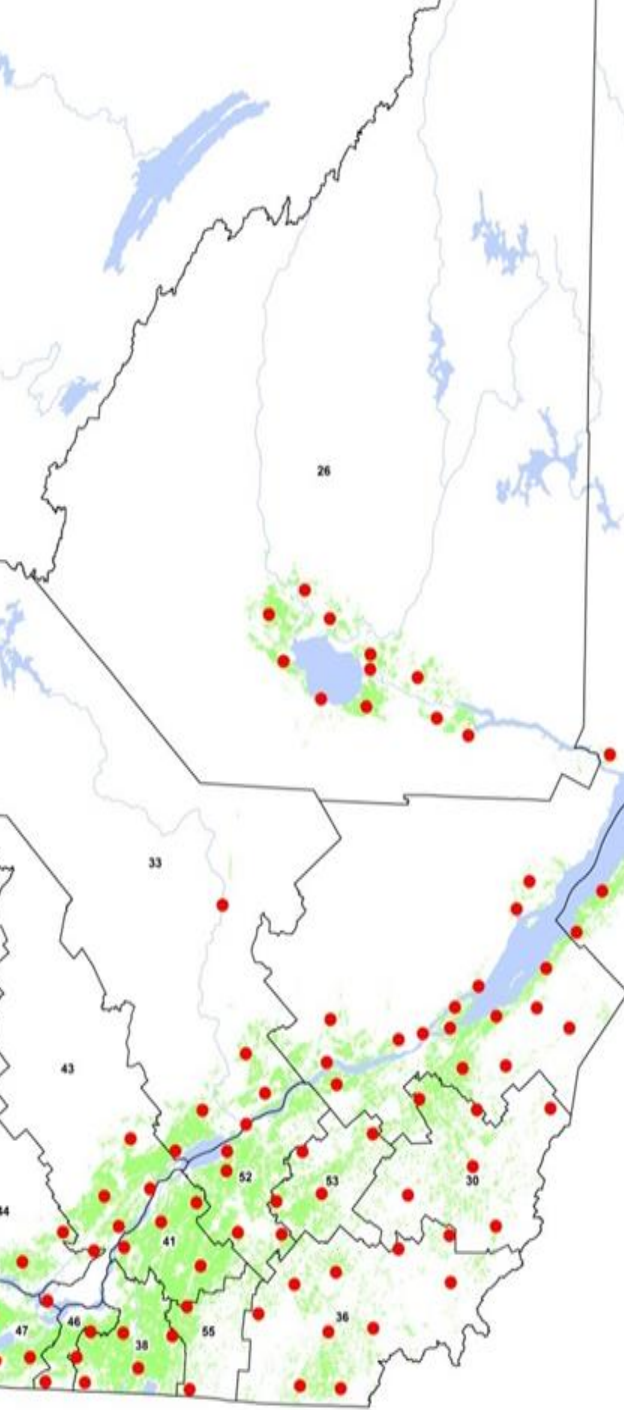
Weather Station Network Modernization

History and Findings

↬ In 2015-2016, the partnership agreement for validated weather data acquisition between La Financière agricole and MDDELCC came to an end and, since 2015, FADQ has been using its own weather station network.

↬ FADQ signed an agreement with Solutions Mesonet, a specialized agency in the field, to manage this network.

➢ This agency uses tried and proven data validation methods, recognized internationally, and sustained and updated by the University of Oklahoma.
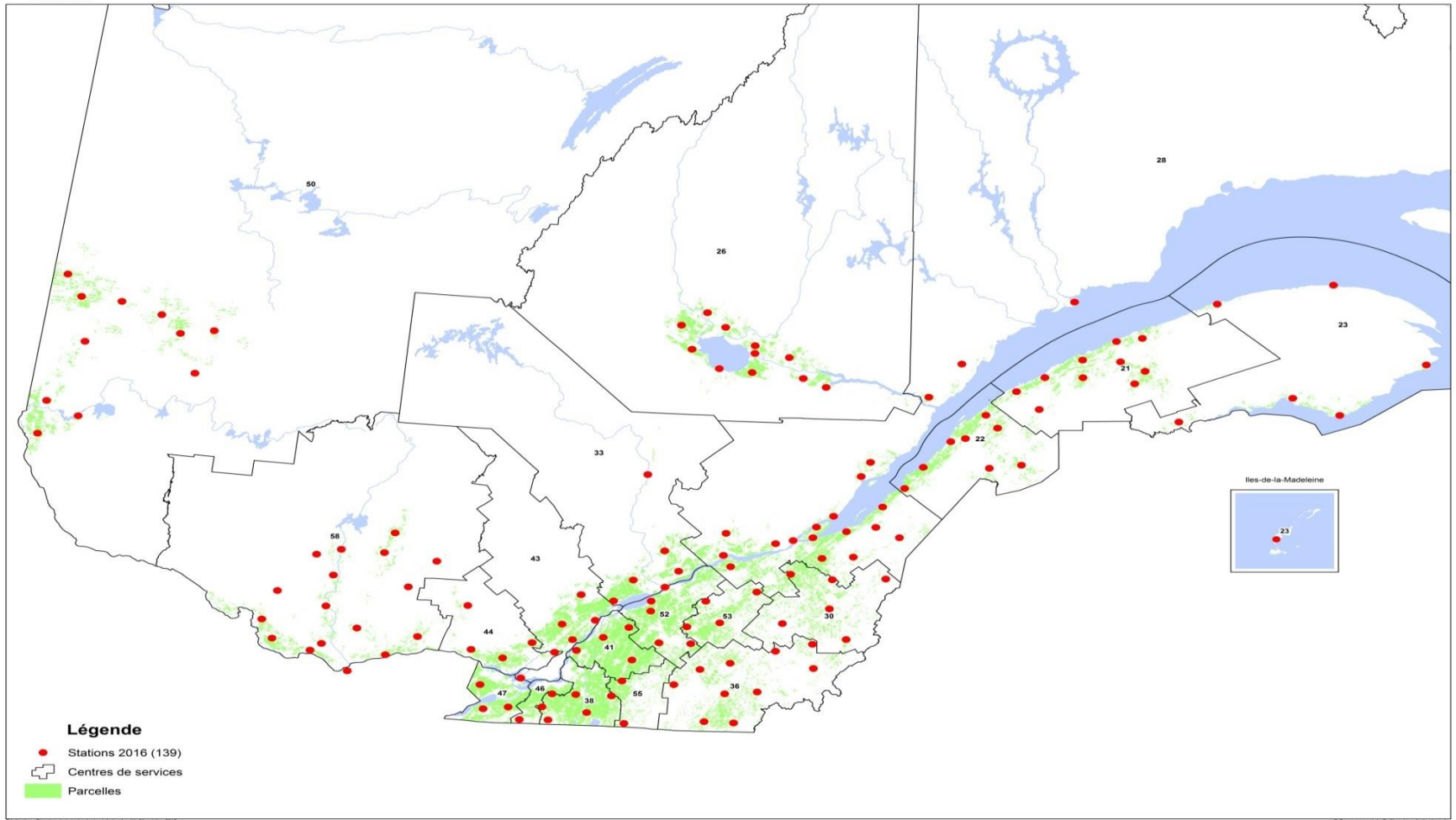
Projected Spatial Coverage of Network of 140 Weather Stations for 2016 Season

STATION NETWORK MODERNIZATION

Implementation of a New Fully Automatic Weather Station Network

⇨ FADQ is the **owner of its data and** can now allow its clients to benefit from the data

⇨ **Better located stations** no longer in need of observers

⇨ **Stations calibrated and maintained** by climatology specialists

STATION NETWORK MODERNIZATION

Implementation of New Fully Automatic Weather Station Network

⇨ **Rapid validation** of data by a recognized method (under 48 hours)

⇨ Producers can consult the data on the **Agrometeo** website

Calculation Example

CALCULATION EXAMPLE – LOSS RATE

Frost Table: Winter Preceding 2015 Insurance Year

2015 year	Number of days of winter stress	% of loss according to the Frost table
2014 winter	15	**5%**

Quantity table: Drought cases in F1 and F3

2015 year	Precipitation (mm)	% of loss according to Quantity table	Proportion of hay volume from the cut %	% of loss from the cut for the year
Station X	(A)	(B)	(C)	(D = B × C)
Period 1	95	20	55	11
Period 2	160	0	30	0
Period 3	99	27	15	4
Weighted loss rate for hay				**15%**
Weighted loss rate for pasture forage	= (20% × 40%) + (0% × 30%) + (27% × 30%)			**16%**

- 33 -

CALCULATION EXAMPLE – LOSS RATE

Quality table: Excessive rain cases in F2 and F3

Cut	No. of 2-day sequences of good weather	% of loss according to the table	Proportion of hay volumes per cut %	% of global quality loss
	(A)	(B)	(C)	(D = B × C)
Cut 1	10	0	55	0.0
Cut 2	4	16	30	4.8
Cut 3	6	8	15	1.2
Total				**6%**

Summary

Description		Breakdown of rates according to contract		
Rates calculated	Weighted loss rate	Hay – Quantity	Pasture forage – Quantity	Hay - Quality
Frost quantity (all season)	5%	5%	5%	
Hay quantity (total cuts)	15%	15%		
Pasture forage quantity (all season)	16%		16%	
Hay quality	6%			6%
Total		**20%**	**21%**	**6%**

Calculation Example – Compensation

1. INFORMATION ON CONTRACT

Hay	**400 000 kg**
Pasture forage	**100 000 kg**
Total insurable need (u.a. × feed need)	500 000 kg
Unit price	$125/t
Insurable value	$62 500
Guarantee option	88 %

2. APPRAISAL RESULTS

Loss rate (Hay quantity 20%, Pasture forage 21%, Hay quality 6%)

Hay quantity loss (400 000 kg × 20%)	**80 000 kg**
Pasture forage quantity loss (100 000 kg × 21%)	**21 000 kg**
Quantity of hay harvested (400 000 kg - 80 000 kg)	320 000 kg
Loss of feed quality (320 000 kg × 6%)	**19 200 kg**

3. CALCULATION OF COMEPNSATION

Producer's total loss (80 000 kg + 21 000 kg + 19 200 kg)	120 200 kg
Gross loss (Total loss / Feed need × 100)	24%
Net loss (Gross loss – Deductible of 12%)	12%
Compensation paid (Insurable value × Net loss)	**$7 500**

Conclusion

CONCLUSION

Responses to Clients' Concerns

- ▷ **Simple method** ➡ Three distinct and cumulative loss appraisal tables

- ▷ **Better understanding** ➡ Connection between compensation and weather-related data, easier to understand

- ▷ **More detailed contract** ➡ The tables are included in the insurance contract

- ▷ **Available information** ➡ Agrometeo website

- ▷ **Personalized coverage** parameters to identify representative weather data

- ▷ New better performing fully automatic weather station network

Thank you for your attention!

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