

## ASPECTS ON INSURANCES AND DETERMINATION OF DAMAGES IN AGRICULTURE

**Eduard BOGHIȚĂ<sup>1</sup>, Alexandru Dragoș ROBU<sup>1</sup>, Ștefan VIZITEU<sup>1</sup>**

E-mail:ediboghita@uaiasi.ro

### Abstract

Risk and uncertainty are two aspects specific to agricultural activities, the influence of natural factors can cause significant damage to producers. Determining and analysis of risk in agriculture is a problem for all agricultural producers. Insurance is a system of economic relations involving a large number of individuals and legal entities in the creation of a fund, as they are all threatened by the same dangers. The purpose of the paper is to evaluate and analyze the risk related to agricultural activities, which are under the influence of natural factors whose uncertain evolution can cause significant damage to agricultural producers. The objective of the paper is to determine by economically and estimative point of view damages by quantifying the damage and determining the amount of compensation against the level of the damage. The paper analyzes, punctually, methodologically the degree of damage of wheat cultivated with wheat in Trade Company "ROXDAL AGRO" LLC. Based on the calculation made for determining the degree of damage of the surface cultivated with wheat at Trade Company ROXDAL AGRO LLC, based on the inclination of 30<sup>0</sup>, the inclination of 45<sup>0</sup> and the inclination of 60<sup>0</sup>, resulted the following degrees of damage: 11.38%, 13.99% and 19.88%. Total damage, calculated on a weighted average basis, is 15.83% on an area of 50 ha. The degree of damage to crops in the field, given by the ratio of the number of plants destroyed and the number of plants found to exist before the occurrence of the phenomenon, was 23.45% for fruit and flowers and 4.59% for stems and leaves. The final degree of damage is 28.04%. If the culture is totally calamitous, the damage rate would be 50%, taking into account the time from planting to the recording of the calamity phenomenon = 120 days and the output of the crop, related to the time spent by at planting, 50.

**Key words:** damage, insurance, risk, uncertainty

Insurance is a risk transfer system and a risk-sharing system (Constantinescu D.A, 1999).

Damage is the loss in monetary terms, of an insured asset as a result of the occurrence of the phenomenon against which the insurance has been concluded (Iulian Văcărel, Florian Bercea, 2007).

For an insured asset at an amount equal to the risk that will be recovered at the time of the sinister, the amount of the indemnity corresponds to the actual actual loss. If the insured value is less than the value of the good, the compensation will be reduced in proportion to the insured value. Each time, at the time of the sinister, the real value of a good will be higher than the value for which the good was secured (Mioara Borza, 2004).

### MATERIALS AND METHOD

The research methods can be grouped as follows:

- Documentary analysis;
- Methods used to study structure phenomena divided on components and the

interrelationship between them: the method of division of the results;

➤ Methods used for determining the level of the phenomenon such as the method of comparison;

➤ Statistical grouping method;

➤ Case study.

### RESULTS AND DISCUSSIONS

The main activity of Trade Company ROXDAL AGRO LLC, trade in products for agriculture and cultivation of cereals and crops in the field, is carried out on own land with an area of 80 hectares. Trade Company ROXDAL AGRO LLC has suffered damage to a wheat crop 30 days before harvest, which covers an area of 60 ha, with a density of 400 plants / m<sup>2</sup> and vegetable crops. Causes of these crops were torrential rains. In Trade Company ROXDAL AGRO LLC, the damages were partial and the finding and the evaluation are done in two stages: a) the preliminary stage immediately after the endorsement of the covered risk; b) final assessment at the maturation stage of the

<sup>1</sup> "Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine, Iași

crop preceding its harvesting and offering the possibility of accurate assessment of final production. To determine the affected areas, in the case of damage suffered by Trade Company ROXDAL AGRO LLC took the following steps:

- contact with representatives of Trade Company ROXDAL AGRO LLC, subsequently identifying the plan / plan with the location of the culture insured and affected by the event, then delineated in plot field, marked with the markers at the level

of the sketch / situation map the bodies / parcels affected by the event from the rest of the insured plots / plots;

- visually inspected the sole, what kind of damage occurred;

- the areas were actually measured and verified if they were the same inscribed on the survey poll.

Determination of the degree of damage to the surface based on the inclination of 30° (*table 1*):

Table 1

**Constant Densities in the Field - Tilt of 30°**

Tilt of 30°	Total number of plants per square meter	From which: with fruit	The difference to the insured	
			+	-
Sample 1	530	450	50	-
Sample 2	422	351		49
Sample 3	415	338		62
Total	1367	1139	50	111
Average	455.6	379.6	-	37

According to the data in Table 1, the degree of damage is as follows:

The degree of damage =  $(379.6 * 12) / 400 = 11.38\%$ .

Determination of the degree of damage to the surface based on the inclination of 45° is reflected in the table below (*table 2*):

Table 2

**Constant Densities in the Field - Tilt of 45°**

Tilt of 45°	Total number of plants per square meter	From which: with fruit	The difference to the insured	
			+	-
Sample 1	410	405	5	
Sample 2	340	319		81
Sample 3	412	288		112
Sample 4	325	305		95
Total	1487	1317	5	288
Average	371.75	329.25	-	72

According to the data in Table 2, the degree of damage is as follows:

The degree of damage =  $(329,25*17)/400 = 13,99\%$ .

Determination of the degree of damage to the surface based on the inclination of 60° is reflected in the table below (*table 3*):

Table 3

**Constant Densities in the Field - Tilt of 60°**

Tilt of 60°	Total number of plants per square meter	From which: with fruit	The difference to the insured	
			+	-
Sample 1	410	405	5	
Sample 2	340	319		81
Sample 3	412	288		112
Sample 4	325	305		95
Total	1487	1317	5	288
Average	371.75	329,25	-	72

According to the data in *table 3*, the degree of damage is as follows:

The degree of damage =  $(378,75*21)/400 = 19,88\%$ .

Total Damage Rate - Weighted Average:

- la 30° :  $12 \times 11.38 = 136.56$

- la 45° :  $17 \times 13.99 = 237.83$

- la 60° :  $21 \times 19.88 = 417.48$

Total =  $(136.56+237.83+417.48) / (12+17+21) = 791.87 / 50 = 15.83 \%$

For the correct selection of samples on the disaster areas, at least three elements have been met: a very good observation and positioning in the field, complete objectivity of the insurer in relation

to the occurrence of the event and its consequences, and an understanding of the position of the policyholder recorded harvest losses and compensation calculation.

Determination of damage to vegetable crops in the field.

Determination of crop crop damage in the field was carried out following the following procedure:

1. The liability of the insurance undertaking shall be:

- from the rise of culture;
- from seeding

2. The liability of the insurance company ceases with the end of the production cycle but no more than 150 days from sowing (planting) and no later than 30 September.

3. Compensation is determined and is calculated in correlation with the occurrence and the timing of production. The size of production quotas removed from the crop until the occurrence of the calamity phenomenon is determined by the number of days of vegetation, in the next graduation (*table 4*):

Table 4

**Size of production quotas removed from crop**

Number of days since planting	The harvesting tract and the minimum proportion of production removed from the crop	Conventional minimum production quota extracted from crop
100	I – a = 20%	20%
120	II – a = 30%	50%
135	III – a = 30%	80%
150	IV – a = 20%	100%

After the stage of development of the culture, the damages are:

a) from planting - to the appearance of the first flowers, the damage is determined by the number of plants destroyed: broken from the parcel, malleable, uprooted, broken or broken branches reconstituted and equated as whole plants. The degree of damage is given by the ratio between the number of plants destroyed and the number of plants found to exist before the occurrence of the phenomenon.

b) from the appearance of the flowers and plants loaded with flower and the appearance of the first fruits, the damage represents number of broken flowers.

c) from the binding of the first fruits to the consumer maturity until the end of the production cycle the damage is determined on fruit and flowers by counting, examining and assessing the degree of injury based on conventional equivalence coefficients (*table 5*):

Table 5

**Examining and assessing the degree of injury based on conventional equivalence coefficients**

SPECIFICARE	damage -%		
	Tomato	Pepper	eggplant
a) Fructe sau flori nevătămate	0	0	0
b) Fruit with stroke marks on the cuticle with depigmentation on the epidermis	5	5	5
c) Fruits - Tumors of the tissues or with epicarp scar tissue (2-4)	20	15	15
d) Fruit with more contusions	35	35	30
e) Fruit with lesions in the pulp	50	60	50
f) Fruits with deeply deformed pulp or fruit	70	-	65
g) Fruits with very deep wounds in the pulp to the seminal cavity	100	100	100

Determination of damage to field crops in the field Trade Company ROXDAL AGRO LLC (*table 6*):

Table 6

**The degree of damage to the plant**

	Degree of damage per plant (%)		
	Easy	Moderate	Critical
The state of development of culture	percent of damage		
a) from planting-emergence to the first flowers	0	4	10
b) from the first flowers to the flower loading of the plant and the appearance of the first fruits.	2	8	20
c) from the binding of the first fruits to the end of the production cycle	2	6	15

Damage on fruit and flowers = 23.45%  
 Damage caused by plant injury (strains and leaves)  
 = (100 - 23.45) x 6% = 4.59%  
 Total Damage = 23.45% + 4.59% = 28.04%  
 The degree of damage to vegetation (plant) is appreciated by an expert based on the degree of pest damage, namely:

- easy = 0-20%
- moderate = 20-50%
- critical = ... > 50%

Examining damage and determining the amount of loss is done:

- on samples of 20 plants arranged consecutively, on two adjacent rows, 10 per row, taken further;
- by counting and examining all the items found:
  - plants, flowers, fruits-total
  - plants, flowers, fruits-affected
- by quantifying the losses in production - fruit, flowers - based on equivalence coefficients.

The degree of damage is calculated by reporting number of lost items at total number of the elements found in the analyzed samples, expressed according to the stage of the crop in plants, flowers, fruits. In crops with more than 100 days since planting, with partial calamity planting - no. the total of the elements found in the analyzed samples are increased with the minimum production quota extracted from the crop until the phenomenon recorded. In such cultures, in the case of total calamity, the amount of damage is given by the difference: 100 - the production quota expressed as percent of the crop until the occurrence of the calamity phenomenon.

For partially calamitous crop 120 days after planting:

- number total fruit ..... 100  
 from which affected ..... 74  
 - number of total flowers ..... 38  
 of which: affected ..... 23

- number of conventional fruit lost..... = 30

Degree of damage to fruit =  
 (30+23) / 100+38+(production quota out of culture x 100+38)

That is,

$$\frac{30 + 23}{100 + 38 + \left(\frac{50}{100} \cdot 100 + 38\right)} = \frac{53}{226} = 23,45\%$$

The final degree of damage = 23.45 + 4.59 = 28.04%

The same total calamity culture:

- Time from planting to recording of the calamity phenomenon = 120 days
  - the production quota out of the crop according to item 3, related to the time from planting .. 50%
- Damage degree = 100 - 50 = 50%

### CONCLUSIONS

Degree of damage to vegetable crops in the field, given by the ratio between the number of plants destroyed and the number of plants found to exist before the phenomenon, was 23.45% for fruit and flowers and 4.59% for stems and leaves. The final degree of damage is 28.04%.

If the culture is totally calamitated, the damage rate would be 50%, taking into account the time from planting to the recording of the calamity phenomenon = 120 days and the output of the crop, related to the time spent by at planting, 50%.

### REFERENCES

- Borza Mioara**, 2004 – *Evaluări rurale*, Editura Terra Nostra, Iași.
- Constantinescu, D.A.** ș.a. 1999 - *Dicționar de asigurări*, S.C. Naționala S.A., București.
- Văcărel, I., Bercea, F.**- *Asigurări și reasigurări*, Ed. Expert, Bucuresti, 2007