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# Measures of Efficiency of Agricultural Insurance in Italy, Economic Evaluations

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**Abstract:** Risk management policy in agriculture has become particularly prominent nowadays, considering the evolution of the Common Agricultural Policy (CAP) and climate change. Moreover, the World Trade Organization places constraints on it. In this context, (1) the aim is to analyze the causes of the loss of effectiveness of the Italian insurance system, unable to deal with the specific coverage demand from agriculture. (2) The analysis is carried out through the economic evaluation of convenience in adhering to the instruments offered by the insurance market to winegrowers in the Controlled and Guaranteed Denomination of Origin (DOCG) area of Conegliano-Valdobbiadene. (3) The study highlights that the subsidized coverage alone is not the most adequate measure of agricultural policy. Adhering to preferential programs implies the drafting of a supplementary insurance policy to minimize the loss function. (4) The current insurance system impasse demonstrates that the producer hardly accepts to policies which do not convert into an immediate income benefit. The European risk management regulation confirms its limits in terms of usefulness and efficiency of the agrarian policy. (5) The prediction of probabilistic increase of severe-weather patterns makes the search for innovative risk assessment models more urgent, models which can combine the different needs of stakeholders: farmers, insurance companies, and society.

**Keywords:** risk management; agricultural insurance policy; subsidies; grape insurance; insurance indicators

## 1. Introduction

Winter in 2016 was the hottest ever, with rain and snow decreasing by more than 20% in Italy, and crops at risk due to the dry climate. Spring and the extended drought starting from April 2017 brought the topic of extreme weather conditions and climate change to light. In this context, farmers and operators cyclically bring back the issue of crop insurance coverage and, more generally, of instruments for the stabilization of farmers' income and the role of the public in said scope, with the impression that a new era has begun for risk management in agriculture.

The topic of risk management, as it is known, has entered the European discussion about the Common Agricultural Policy (CAP) only over the last few decades. After two extremely significant progressive passages, the so-called MacSharry reform and Agenda 2000, it is only in 2001 that the European Commission makes the first concrete step towards this direction, by publishing a Statement titled "Risk management in agriculture", which was destined to become the starting point for following initiatives. These would find the first normative realization in the 2007 Common Market Organization (CMO) reform, limited to the wine, and fruit and vegetable sectors.

A further, substantial development was later achieved with the Health Check (reg. UE 73/2009), which, for the first time, has offered Member States the possibility to use, in a generalized manner, part

of the budgetary resources destined to direct payments to support farmers in accessing two coverage types: insurance policies and social welfare funds for damages to the production due to adverse weather, plant diseases, epizooties and environmental emergencies. The enabled resources for said purpose—and entirely spent by member States, resorting to the opportunity offered by art. 68 of Reg. UE 73/2009, overall, amounted to 761 million, between 2010 and 2013. Using them were five countries, Italy, France, Belgium, the Netherlands, and Hungary, which mainly destined the resources to the facilitation of access by farmers to the insurance instruments, whereas very limited, and often of experimental nature, were the initiatives relating to social welfare funds.

Later came the 2013 reform which, ever since its premises, certified the importance of the risk management theme for the future of CAP. The Commission Statement preceding the legislative proposition for CAP 2014–2020 allowed great space to the theme, also in the wake of the heated academic and political debate which was accompanying the highs and subsequent lows of the international prices for agriculture registered between 2007 and 2011. The document at issue had a specific paragraph titled “Risk Management Toolkit”, whose indications anticipated in quite minute detail what would be the content of the reform. It is a set of measures disposed by the Member Countries, with regards to the rural development, to facilitate the farmers in resorting to three coverage instruments. Other than facilitations regarding the stipulation of insurance policies and social welfare funds, a new instrument has been introduced, that is the *Income Stabilization Tool (IST)*. The procedure appears particularly innovative, not as much in the formula—social welfare-based, as for the damage-coverage funds—as in the fact that it is the risk of experiencing substantial losses in the company income which is covered.

The toolkit protocol is entrusted to articles 37, 38 and 39 of the Regulation 1305/2013, which defines three types of intervention:

- financial contributions for the insurance policies for adverse weather conditions, plant diseases, epizooties, parasitic infestations (art. 37). The contribution covers part of the insurance cost (65%) and the coverage acts when the loss surpasses 30% of the farmer’s average yearly production;
- financial contributions for mutual funds for plant diseases, epizooties, environmental emergencies (art. 38). The contribution covers part of the losses (65%) and the reimbursement intervenes when the loss surpasses 30% of the farmer’s average yearly production;
- financial help for mutual funds for income stabilization—income stabilization tool (IST, art. 39). The contribution covers part of the income decrease (65%) and the reimbursement intervenes when the loss surpasses 30% of the farmer’s average yearly income.

The new instrument, while having been widely welcomed with trust, has not had the hoped-for success. As a matter of fact, if one looks at how each Member State implemented the planning of resources dedicated to rural development in the timeframe 2014–2020, the total commitment amounts to around 2.67 billion Euros, of which 1.7 billion have come from the European Union and the rest (47%) have been made available from Member States’ budget as match-funding. A certainly not-so-substantial measure, equal to 0.4% of the CAP total budget. It is, nevertheless, to be noted how, in this context, the Italian situation is quite different: the Country, as a matter of fact, is the main activator of resources for risk management in the CAP environment, with a high planned expenditure, of about 1.64 billion for the timeframe 2014–2020, which represents alone over 60% of the total planned expenditure in Europe and almost 8% of the available resources on a national level for rural development.

The not-so-encouraging result found from this last measure—which many consider the most innovative measure to mitigate the risks of European farms—have persuaded the Commission, in the framework of the Omnibus Regulation, to propose a new typology of IST, of sectoral type, promoted by giving participants a lowering of the threshold over which one can have an indemnification, from 30 to 20% of the average income.

The range of the Commission's initiative was then expanded through the legislative procedure, by extending the modifications which were applied to the *sectoral IST* to the stipulation of insurances and the participation to social welfare funds. On the other hand, by extending the public contribution for all four subsidized insurance formulas disciplined by CAP—subsidized policies, social welfare funds for plant diseases, epizooties, environmental emergencies, *IST*, and the new *sectoral IST*. These modifications will allow farmers to benefit from indemnification, in case they subscribe subsidized policies, or planned compensation, in the case of social welfare funds and *sectoral IST*, if the product, or income, loss exceeds 20% of the average of reference—not 30% as it is nowadays. In both cases, the maximum coverage of the public contribution increases from 65%, as it is now, to 70%.

The introduced modifications aim to increase the demand of subsidized instruments for risk management, by improving their cost-opportunity ratio. In the same direction, the chance that public resources could contribute to the building of the initial capital of mutualistic funds and *IST* is established. With regards to the latter, in order to simplify the evaluation of participant-recorded income losses—which many deem responsible for part of the delays in the activation of the measure—it is also established that the loss evaluation reference can be represented through economic indexes, solving part of the problem which is linked to the rebuilding of company income.

In the light of these considerations, the aim of this study is to highlight the inadequacy of the current coverage offer, that is, the lack of efficiency of the current subsidized insurance policies, in particular cultivation and territorial contexts.

For this purpose, the paper reproduces some elaborations and simulations of descriptive indicators, which have been used in the literature for the insurance system performance evaluation; as an advantage, it makes use of specific information coming from Producers Insurance Consortium. Furthermore, it proposes an original yet simple efficiency index of the sector policy, suggested as a plausible measure for the reliability of subsidies. In the study, the overall economic loss of the farmer not covered by the policy is compared to the presence of insurance coverage. The research adopts a comparative static approach and measures the specific atmospheric adversities that have damaged the wine production. The economic convenience compares alternative situations, until it is possible to identify the elements of judgement relevant to the farmer. This is conditioned on the one hand by expected losses, on the other by the costs of joining insurance programs.

A further research question, indeed, is to explore the goodness of the sectoral public intervention, understood as the capacity of the measures designed to provide specific benefits to producers. On the other hand, the subsidized regime is aimed at the spread of agricultural insurance. The elements referring to public costs are part of this assessment. Public contributions to farmers, in fact, must not result in undue surplus for insurance companies.

The simulations developed on a however limited geographic area and the main conclusions reached on a circumstantial basis, can focus on the determining elements of choice on insurance adhesion of one of the most important products, wine grapes, among those which benefit from the subsidized system.

## 2. Materials and Methods

### 2.1. The Risk Management Regulatory Evolution and the Literature Review

Formally, the public intervention for risk and crisis management in Italy started in 1970 with law n. 364, which established the birth of the National support fund (FSN) which had two distinct functions: compensatory payments to farmers who had production and income compromised due to events which were out of their control; support to insurance policies. The access to ex-post compensatory payments was guaranteed to all farmers who had suffered damages, regardless of the stipulation or lack of an insurance contract.

For 1981 to 2009, the expenditure emitted by FSN reached around 10 billion Euros (Capitanio and Cioffi 2010).

A big part of public spending was used for compensatory payments in the event of disasters and calamities, whereas the remaining part was dedicated to the support of the insurance instrument. The Italian system of damage compensation, however, has proved to be very flexible with regards to the requirements of the circumstances, that is the fund capacity was yearly supported, when necessary, by ad-hoc legislative interventions.

Besides, the system based on the ex-post damage compensation worked well in times in which the adversities were sporadic, due to the lesser vulnerability of the agricultural activities (Cafiero et al. 2006). With the increase of the frequency of adverse weather conditions, this public intervention modality has shown, through the years, all its limits, as bearer of distortions of company conduct (Capitanio and Cioffi 2010). As a result, the expectance of ex-post damage refund was alimented, and the adoption of preventive actions by companies and the diffusion of insurances were discouraged, thereby increasing the total cost to be borne by the people.

This quite unsatisfying situation led policy makers to substantially modify the public intervention in risk and crisis management in agriculture in Italy.

Since 2002, the main modifications—which culminated with the emission of legislative decree 102/2004—can be summarized as follows: the possibility given to cooperatives to stipulate insurance contracts, as defense associations; the possibility given to cooperatives to establish mutualistic funds for risk management, which can receive by the public intervention as much support as insurances—funds which, in fact, have yet to become available—with the public support for administration costs; the authority given to single farmers to directly stipulate subsidized insurance policies with insurance companies.

2005 was the first year of full implementation of the subsidized insurance system reformation in agriculture, when the decree requiring the insurance of the whole production in a given area, with regards to the product which is object of the policy, became law.

As introduced above, with the introduction of the Health Check (2008), the topic of risk management in agriculture and the subsequent public support to the instruments, began to be talked about at European level. Focusing on the viticultural sector, of interest in our study, the subsidized insurance remains the most important part of the system, as it is considered in the international sector support program with a maximum subsidized rate of 65% of the owed premium.

In Italy, to overcome the regional differences and the historic lack of subscriptions to insurance instruments in the southern and central regions, the choice made was to rely on a national measure, within the National Rural Development Program, with an endowment of 1.64 billion Euros.

The Regional Rural Development Program completes the system, with ex-post actions primarily focused on the restoration of the agricultural potential, which was damaged by catastrophic events (measure 5.2). In this case, the capital contribution payment comes from the national support fund and amounts to 50% of the admissible costs.

The contributions to the insurance market coming from the European Union are distributed through European Agricultural Fund for Rural Development (EAFRD), through the National and Regional rural development plans, as well as through the first pillar of the CAP. The viticultural sector's CMO, established with reg. (CE) 1493/99, is in fact, embedded in the unified CMO (reg. (CE) 1234/07). The 2008 Wine CMO reform includes also risk management measures whose application was delegated to the Government with the National support program to the viticultural sector. The vine insurance is obviously included among the financing<sup>1</sup>. The granted funds to insurances for distillation and part of those destined to promotion are still exclusively under national management. The yearly amount for the support to harvest insurances is 20 million Euros, 5.9% of the total<sup>2</sup>.

<sup>1</sup> "Support for harvest insurance shall contribute to safeguarding producers' incomes where there are losses as a consequence of natural disasters, adverse climatic events, diseases or pest infestations." reg (EU) 1308/2013.

<sup>2</sup> The yearly funds for the National wine support program amount to 336.997 million Euros, for the 2014-18 period to 1,684,985,000 Euros.

The “M measure” of the Program includes the support to vinicultural businesses to cover climate-related risks, diseases, infestations on wine grape harvests, in compliance to the Agricultural Insurance Plan<sup>3</sup> (Seccia 2016). The executions of autonomous Regions and Provinces are carried out over data from digitized policy certificates, obtained from the database of SIAN (National agricultural information system). The insurance plan compliance check verifies the correspondence between insured vines and cadastral data of the company’s dossier.

There is no doubt that the role of the public policies in support of risk management is increasingly relevant, granting in massive form the subsidies to insurance premiums and the distribution of ex-post reimbursements.

The innovative element pertains to the fact that at least until the application of the Omnibus Decree, the European agricultural policies prove to be increasingly subject to the international agreements (WTO) (Cafiero et al. 2007). This forces governments to search for indirect measures of support to businesses, more compliant to the global rules which, although still in progress of definition, in time will appear increasingly binding for local agricultural economies<sup>4</sup>. Consequently, the ability to consider agricultural insurances as partially immune measures to the obligations of reduction of the internal support which is expected by the General Agreement on Tariffs and Trade (GATT), becomes the incentive to strengthen public assignments by local governments, without a careful analysis of the efficacy and efficiency of the implemented policies, from the financial point of view as well.

The obviousness of the agricultural insurance private market failure, on the other hand, leads to wonder over more suitable forms and procedures of public intervention, in a context in which the progressive reference to increasingly demonstrated climate change seems almost useful to lure even the most hostile farmers into subscribing policies.

From a theoretical point of view, the American literature mainly focused on identifying the causes of agricultural insurance market imperfections is plentiful (Knight and Coble 1997; Babcock 2012). Quite different is the rich and ever-growing European research, which favors countries in which the public intervention on insurances and mutuality is more significant (Italy, Spain, France, Scandinavia) (Garrido and Zilberman 2008). Or, in which the representation of the differences in business-risk profiles is of interest because of the agronomic, structural, and social differences. (Cafiero et al. 2006; Enjolras et al. 2012) In Italy as well, because of a weaker public intervention than other economies, the importance of identifying the main factors of the agricultural insurance demand is highlighted (Capitanio and Cioffi 2010).

In light of this, from the point of view of the economic analysis, it seems fitting to have an approach which starts with the instance of maximization of the farmer’s income. The probability of participation in the insurance contract gains positive, statistically significant values, with references to the expected return from subscribing a policy as compared to the costs (Gardner and Kramer 1986). In this context, a determining role is played by the policies of subsidy to premiums paid by the farmers (Babcock and Hart 2005).

This seems to be the starting point of research, which can later identify the role of other variables of the farms, such as the relevance of the farm’s dimension, or the relative value of the production in deciding whether to adhere to an insurance program, or even detect the existence of positive connections among different, structural and social, variables (Goodwin 1993; Walters et al. 2012).

## 2.2. Elements of Analysis

The empirical analysis is carried out through the economic evaluation of the instruments which are currently offered by the insurance market and of the simultaneous comparison with the probabilistic

<sup>3</sup> Art. 103 unvicies, reg. (EC) 1234/07.

<sup>4</sup> The WTO regulation includes support to agricultural insurances and ex-post to calamities in the “green box” (art 7 & 8, Annex II, Agreement on Agriculture).

evolution of adverse weather events in the Controlled and Guaranteed Denomination of Origin (DOCG) area of Conegliano-Valdobbiadene. The observed research is carried out through a sensitivity analysis, using a comparative static approach, and considering the timeframe 2010–2017: the specific adverse weather conditions which damaged the viticultural production are measured. In the analyzed static scheme, the total economic loss of a farmer who is not covered with a multi-risk policy is compared to that of a farmer who has a subsidized insurance. The economic convenience estimate in alternative situations leads to identify crucial judgement elements in the ex-ante choice of the farmer, in the light of the adverse events which have in fact happened. This leads to shape up the better cut out insurance typology on an actual climate risk, and thus income, profile of the companies in the analyzed area. The aim is to emphasize the high loss of efficiency of the Italian insurance system nowadays, incapable of meeting the specific coverage requirements of each section and territory. The too generic profile of the current insurance offer, in fact, cannot safeguard a great part of the primary production in Italy, so less than 20% of the gross saleable production has proved to be insured in 2017.

A sensitivity analysis is carried out about the passive defense of the productive risk management by the vine grower, with regards to three comparative scenarios<sup>5</sup>. The comparison is accomplished through the ex-post study of the function of total loss in value associated, relying on a comparative statics approach<sup>6</sup>.

Firstly, the effects of frequent and catastrophic adversities are calculated when there is no insurance policy, a frequent situation among small vine growers.

The second scenario includes businesses subscribing a subsidized policy, while the third alternative considers the hypothesis that the vine grower could get a full insurance, even signing a complementary, non-subsidized policy.

The procedure which minimizes the function of total loss overall will be the most convenient for the farmer.

The analysis allows us to identify the operational and regulatory conditions under which insuring harvests can be perceived as convenient by a wider group of agricultural producers.

At the same time, the role of the other participants, such as that of the insurance companies and the public actor, which organize the distribution of the subsidies to the policies, is highlighted.

In wine grape production, for the vine grower, the function of total loss in value calculated in a given timeframe can be described as:

$$\sum_{t=1}^n VLt(dt) = \sum_{t=1}^n [VDt + PRt - Rt(dt)] \quad (1)$$

where  $t$ : years;  $VLt$ : value of the loss;  $dt$ : damage rate;  $VDt$ : damage value;  $PRt$ : policy premium;  $Rt(dt)$ : value of the indemnification, as referred to  $t$  time.

From this, one can obtain the function of indemnification:

$$R(d) = \begin{cases} 0 & \text{if } d \leq t \\ IV * d - IV * dr = IV * (d - dr) & \text{if } d > t \end{cases} \quad (2)$$

where:  $t$ : threshold of damage qualification;  $IV$ : insured value;  $dr$ : deductible rate; where  $dr < t$ .

In subsidized insurances, deductibles and threshold of damage qualification are present and expressed as percentage of the insured value.

<sup>5</sup> We refer to active defense (on farm strategies) when technologies for the mitigation of risk, such as the anti-hail system are used; the evaluation of economic convenience of said technologies as compared to passive defense, might constitute a preliminary level of choice (Pilati-Boatto 2009).

<sup>6</sup> In fact, the climate-caused accidents do not have consequences only on the itinerant production, but rather on the vegetative components, influencing the future harvests. The damage reimbursement does not provide, however, for dynamic components (Prestamburgo 1995).

The indemnification function acquires positive values only when the damage is greater than the threshold. The presence of an accident qualification threshold modifies the economic convenience parameters, both for the vine grower and the insurance company.

Once the sensitivity analysis has been carried out, the results of empirical evidence in terms of potential loss and predictable damage can be used for an ex-ante evaluation of subsidized insurance programs.

In this case, the function of loss can be:

$$E[LV(d)] = E[VD] + E[PR] - E[R(d)]; \quad (3)$$

where:  $E[VP(d)]$ : expected loss value;  $E[VD]$ : expected damage value;  $E[PR]$ : expected policy premium value;  $E[R(d)]$ : expected compensation value.

The expected benefit of the vine grower  $E(B)$  equals the received indemnities, minus the payed premium, apart from the subsidy:

$$E(B) = E(R) - E(PR - Ai) = E(R) + E(Ai) - E(PR) = E(R) + E(PR) \cdot (a - 1) \quad (4)$$

where:  $Ai$ : public aid to the premium, equivalent to  $PR \cdot a$ , where  $a$ : aid rate.

The public aid ( $Ai$ ) is detracted from the tariff gross rate ( $T$ ) to identify what is at the expense of the vine growing company, which represents the tariff net rate ( $Tn$ )<sup>7</sup>.

$$PRn = PR - Ai = IV \cdot Tn \quad (5)$$

where  $PRn$ : net premium at the expense of the vine grower.

$$Ai = PR - PRn = PR - IV \cdot Tn. \quad (6)$$

The vine grower's favorite solution will be the one which maximizes the expected benefit  $E(B)$ .

In ordinary market conditions, with premiums based on actuarial rates, their expected value should correspond to that of the expected indemnities.

$$E(PR) = E(R) \rightarrow E(B) = E(R) - E(PR) + E(Ai) = E(Ai) \quad (7)$$

With this hypothesis, the expected benefit will be equivalent to the premium aid ( $Ai$ ).

It is important to specify that in the analysis we do not consider the elements linked to the different risk aversion profiles in the different typologies of local agricultural businesses, which can clearly influence the willingness to pay for the insurance instrument (Santeramo et al. 2016). At the same time, we do not include in the analysis all the information about the structural equipment and the cultural/income diversification of businesses in the considered area, which, like risk aversion, can considerably influence the willingness to subscribe an agricultural policy.

Thus, only the aspect linking the value of the requested premiums for policy subscription and climate risks is to be considered; this simplification is quite plausible when considering the current pay-off of the insurance policies offered by the market, up to nowadays. This pay-off is based on the damage to the produced quantity, caused by adverse meteorological evolution.

Proceeding, the public contribution might overestimate the benefits offered to producers. In this case, the expected benefit decreases, as:  $E(R) - E(PR) < 0$ , thus  $E(B) < E(Ai)$ .

This situation results in a decrease of the loss-ratio indicator ( $P/PR$ ), which will benefit insurance companies, whose aim is to maximize the contribution margin of the policies, that is the effect of the difference:  $PR - R$ . A loss-ratio indicator which is lower than 1 means that part of the aid is transferred to

<sup>7</sup> The public aid appears directly related to the cultural performance and the surface, and thus cannot be defined as uncoupled (Pilati-Boatto 2009).

the insurance companies ( $PR - R > 0$ ). If  $PR - R = A_i$ , then the whole aid is transferred to the insurance system, that is  $(PR - R)/A_i = 1$ .

A further research query regards the exploration of the reliability of the sectoral public intervention, that is the ability of the arranged measures to offer producers specific benefits. The referred-to concept of efficiency of the public action does not rely on the maximization of the contributions to producers, as much as the attachment to the idea that the subsidized regime aims at the diffusion of agricultural insurances. On the other hand, the elements referring to the public costs are included in the evaluation, whose motion of minimization implies the not having to become unfair surplus for insurance companies.

An original and simplified indicator of efficiency of subsidies ( $IES = (R - A_i)/A_i$ ) is proposed. The index has positive values in presence of indemnities greater than aids, whereas, without reimbursements, its value is  $-1$ .

The indicator of efficiency can be suited for a punctual reading, varying each year, taking into consideration a limited area, or an individual section. On the contrary, it could be more stable in a multi-section analysis, or a multi-year one, as proposed in this research.

Index positive values indicate the ability of the public subsidy to exert the desired effects of the improved agrarian policy measures. On the contrary, negative values, especially when verified in a suitable timeframe, lead us to consider a probable inefficiency of the agricultural expenditure, partially unable to result in real advantages for the farmer. This has a greater momentum in the insurance field, where the effects of the public action are influenced by the uncertainty of joint events.

### 2.3. Risk Management for Wine Grapes in The Prosecco Area of Conegliano-Valdobbiadene

The empirical analysis is carried out in the production area of Prosecco wine for Controlled and Guaranteed Origin Denomination (DOCG) Conegliano-Valdobbiadene<sup>8</sup>.

The study selected the fifteen municipalities included in the DOCG area, situated in the hill country between Vittorio Veneto and Valdobbiadene. The area of the municipalities generally presents great incline; this characteristic, from a meteorological point of view, grants plots relative protection, guaranteeing an efficient incidence of rays of light and a fast drainage of water, protecting vineyards from humidity and stagnation. The evaluation of the damage caused to the wine production takes into consideration the actual adversities in the DOCG area in the last eight years (2010–2017), because, as established in the European regulations, the public contribution as it is now was introduced in 2010. The timeframe, although not very long, seems long enough to offer a trustworthy scenario of the frequency and dynamics of the weather adversities on a local level.

In fact, in the analyzed timeframe, the winegrowers suffered several damages which compromised the harvests; said damages resulted in situations of income decrease (Table 1).

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<sup>8</sup> The territory boasts a wine-growing and producing tradition well-known all over the world. In 2016, there were 7549 hectares destined to vines and 3387 vine-growers, for a production amounting to 677,000 hectoliters of DOCG Prosecco. The production reached more than 90 million bottles, of which 85 millions of sparkling wine, for a value of almost 500 million euros. Its success on the market, with a yearly growth of 10%, is accompanied by a significant growth in exports, which have reached 40million bottles. Exports highlight a 12% yearly growth, for a 190millions Euro value. The most important markets are Germany (7.4million bottles), Switzerland (7.1), United Kingdom and USA (5.5 and 2.8million bottles). Within these dynamics, the area is, as well, one of the most important wine tourism districts in Italy. The Prosecco of Conegliano-Valdobbiadene was awarded DOCG in 2009 and was the first in Italy. The sparkling wine is called "Prosecco Superiore" and the top-of-the-range of the denomination, the sub-area of Cartizze of 107 hectares, is called "Superiore di Cartizze". The other areas in Veneto can only produce Prosecco DOC (Controlled Origin Denomination).



**Table 1.** Frequency of Catastrophe Events in the Conegliano-Valdobbiadene area, y. 2010–2017.

Town	2010	2011	2012	2013	2014	2015	2016	2017
% damage								
Conegliano	Hail 20	Flood Rain 20	Rain 15	Hail 12	Wind Rain 12	Wind Rain 10	Wind Rain 15	Rain Hail 15
Susegana	R. 10	Fl. 10	R. 6	H. 10	W.R. 10	W.R. 8	W.R. 12	R.H. 16
San Vendemiano	H. 18	R. 10	R. 2	H. 10	W.R. 10	W.R. 8	W.R. 10	R.H. 12
Colle Umberto	R. 10	R. 8	W.R. 8	R. 8	W.R. 12	W.R. 12	W.R. 10	R.H. 18
Vittorio Veneto	W.R. 12	H.W. 25	W.R. 18	R. 10	R.Frost 28	W.R. 22	Fl. 30	Fl.H. 50
Tarzo	W.R. 15	H.W. 20	R.H. 20	H. 15	R.Fr. 24	W.R. 18	Fl. 24	H.Fr. 26
Cison di Valmarino	W.R. 24	H.W. 15	H. 50	Fr. 20	R.Fr. 24	W. 15	Fl. 20	H.Fr. Drought 60
Follina	W. 20	W. 15	H.W. 20	F. 20	R.Fr. 20	W. 12	W. 15	H.Dr. 35
Miane	W. 15	W. 8	R. 11	Fr. 20	Fr. 15	W. 7	W. 10	Fr.Dr. 12
San Pietro di Feletto	W.R. 20	H.W. 20	R.H. 40	H. 15	R.Fr. 22	W. 12	R. 10	H.Fr. 17
Refrontolo	H. 15	H. 20	R.H. 35	H. 15	R.Fr. 25	W. 8	R. 10	H.Fr. 19
Pieve di Soligo	H.W. 25	H.W. 25	R.H. 45	R.H. 20	R.Fr. 30	W.R. 23	W.R. 20	H.Fr. 49
Farra di Soligo	H.W. 16	H.W. 15	R.H. 35	R.H. 15	R.Fr. 15	W.R. 8	W.R. 15	R.H. 12
Vidor	R. 10	R. 10	R. 14	F. 15	R.Fr. 15	W. 7	R. 10	R.H. 15
Valdobbiadene	R. 7	R. 10	R. 6	F. 10	R.Fr. 15	W.R. 5	R. 8	Fr.Dr. 15

Source: Condifesa data processing.

Some characteristic aspects of the adverse weather conditions arise, such as the extreme localization and variability of the accidents<sup>9</sup> (ARPA 2002).

Thus, the most feared frequent adversity, the hailstorm, appears to hit two main areas, the municipalities of San Pietro di Feletto, Refrontolo, Pieve and Farra di Soligo, as well as the area of Conegliano, San Vendemiano and Susegana; on the contrary, other municipalities do not seem to have suffered indemnifiable damages: Colle Umberto, Tarzo, Cison di Valmarino, Vidor and Valdobbiadene. Historically, among the adverse weather conditions, it is the hailstorm which has had a greater index of accident, despite excess rain being the most frequent adversity. However, in more recent years, other catastrophic adversities have emerged, such as ice and frost, especially due to the early vegetative development of the vine. Furthermore, studies have observed the intensification of other phenomena such as whirlwinds, which, although limited, have huge destructive potential, as well as draughts and sunstrokes, having greater and greater impact in terms of frequency, duration, intensity, which directly affect the quality of grapes.

Where there is a quantity damage, the quality damage—that is the damage to the organoleptic characteristics of the grape—is often present. In this case, the damage evaluation is carried out through consecutive stages; in particular, the evaluation of the loss of quality is carried out on the remaining product. The quality loss can only be considered as such from a specific period of ripening of the grape.

In 2015, in the district area of Treviso, the insured value of wine grape was of 184,655 M Euros (source Sicuragro), based on the typologies of policy allowed by the Agricultural Insurance Plan:

- Package A: catastrophic adversities + frequent adversities + additional adversities.
- Package B: catastrophic adversities + at least 1 frequent adversity.

<sup>9</sup> For instance, the hailstorm of August 2017, though exceptional, hit no more than 100 hectares of vines, which amounts to barely 1.5% of the surface for Prosecco.

- Package C: at least three frequent adversities + optional additional adversities + ice and frost.
- Package D: catastrophic adversities.

Package D does not display insured values: it is a little-appealing package to agricultural businesses, as it excludes frequent adversities, in particular hail, which is vine growers' most feared adversity.

The most requested typologies are B—40.8% of the total value—and C (39.9%), preferred to the disadvantage of A (all risks), which has a higher policy rate (13.3%). The vine grower slightly prefers type B policies, even though they have a higher average premium (8.4%), when compared to package C (6.5%) (Pontrandolfi 2014).

The estimate of the insurance premium is carried out on a municipal basis, as it depends on the function of frequency distribution of the weather adversities, quite locally concentrated (Table 2).

**Table 2.** Average rates of the subsidized policies policy for atmospheric adversity DOCG area.

Year	Hail	Wind	Rain	Frost	Drought	Flood	Total Rate	min–max
2010	5.97	0.6	0.5	2.5	0.5	0.1	10.17	8.72–11.62
2011	6.41	0.6	0.5	2.5	0.5	0.1	10.61	9.21–12.07
2012	5.76	0.6	0.5	2.5	0.5	0.1	9.96	9.06–10.86
2013	5.28	0.8	0.5	2.5	0.5	0.1	9.68	8.78–10.58
2014	5.52	0.8	0.8	2.5	0.5	0.1	10.22	9.71–10.72
2015	5.52	0.5	1.2	2.0	0.3	0.1	9.62	9.35–11.98
2016	4.48	0.5	1.2	2.0	0.3	0.1	8.58	7.49–9.67
2017	4.16	0.5	1.2	1.5	0.5	0.3	8.16	7.82–10.91

Source: Condifesa data processing.

In the same municipality as well, weather adversities can be quite different in terms of distribution and intensity, so the technical evaluations are carried out in each single lot of grape.

Once ascertained that type B policies are the most employed, it is on this insurance coverage that the analysis will develop. This package includes catastrophic adversities, such as flood, draught, ice, and frost, as well as at least one frequent adversity, hail, statistically more significant. Also included are two potentially damaging frequent adversities: strong wind and excess of rain.

### 3. Results

The insurable value in the DOCG area equals the expected output in the procedural guideline, which for the Prosecco is equal to 135 quintals per hectare. This is calculated based on the price decree, provided for by the “*Agricultural Insurance Plan*”, which identifies the maximum unitary prices of agricultural products, applicable to establish the insurable values in the subsidized market, on a provincial level.

Without coverage, the total loss per hectare in the DOCG area, based on the verified damage in the timeframe, amounts to 25,503 Euros (Table 3).

With subsidized insurance coverage, the obtained reimbursements (R) are to be subtracted from the total loss, while the policy premiums (PR) are to be added, net of the European Union's aid (Ai)<sup>10</sup>.

The indemnities consider the minimum damage qualification threshold and the deductible. The threshold for subsidized policies is set at 30%, which is the minimum indemnifiable damage limit under the law. The limit concerns the entire production of the company, in the same municipality, though in more than one area. Exceeding said threshold is essential to obtain the right to reimbursements<sup>11</sup>.

<sup>10</sup> The method for calculating the public contribution includes, in most cases, a subsidised rate lower than 65%. This is calculated on the average tariff, e.g., if the tariff is 4, 65% of it amounts to 2.6; a farmer with a tariff of 5, has its contribution decreased at 52%, if the tariff is 3, the contribution is 1.8.

<sup>11</sup> The level of exposure to the expense of the agricultural businesses at 30% represents the damage threshold to gain access to the reimbursement, threshold imposed by the EU following the WTO agreements, allowing the insertion of the subsidised measure in the Green Box, while the lowering of the threshold to 20% moves them to the Amber Box.

**Table 3.** Evaluation of losses for the years 2010–2017, grapes insured per hectare ql 135.

Year	2010	2011	2012	2013	2014	2015	2016	2017	Total	Average
Euros per ql	105	115	120	118	120	138	150	160		
Insured value	14.175	15.525	16.200	15.930	16.200	18.630	20.250	21.600	138.510	17.314
% damage	15	12	33	12	22	10	18	31	18,4	19
Salable prod.	12.049	13.662	10.854	14.018	12.636	16.767	16.605	16.416	113.007	14.126
Damage value	2.126	1.863	5.346	1.912	3.564	1.863	3.645	5.184	25.503	3.188
Subsidized policy										
Premium	1.442	1.647	1.614	1.542	1.656	1.792	1.737	1.763	13.192	1.649
Aid	865	988	968	925	993	1.075	1.042	1.058	7.915	989
Net Premium	577	659	645	617	662	717	695	705	5.277	660
Indemnity 1			1.688		420		461	2.053	4.622	578
Salable prod. 1	11.472	13.003	11.897	13.402	11.974	16.050	15.910	15.711	112.352	14.044
Damage value 1	2.703	2.522	4.303	2.528	4.226	2.580	4.340	5.889	26.158	3.270
Supplementary policy										
Premium	309	359	343	323	355	401	371	375	2.836	355
Indemnity 2	652	372	3.707	446	1.944	175	1.402	3.676	12.374	1.547
Salable prod. 2	11.163	12.644	13.573	13.079	13.563	15.649	15.539	19.012	114.221	14.278
Damage value 2	3.012	2.881	2.627	2.851	2.637	2.981	4.711	2.588	24.289	3.036
Reg. Omnibus										
Aid	1009	1153	1129	1079	1159	1255	1216	1234	9.235	1.154
Net Premium 3	432	494	484	463	497	538	521	529	3.958	495
Indemnity 3	195	75	2.575	87	841	53	742	3.274	7.842	980
Damage value 3	2.364	2.282	3.255	2.287	3.220	2.348	3.424	2.439	21.619	2.702

Source: Condifesa data processing.

In the analysis, considering the occurred adversities, it is to notice that the minimum threshold is not reached in the case of three adversities: the right to reimbursement could be claimed only for the hailstorm in September 2012, with the damage threshold at 33%. The deductible, conversely, concerns the hundredth parts of the insured product, out of the reimbursement. With regards to hailstorms, the deductible amounts to 10%<sup>12</sup>.

In this case, the total loss—keeping count of the insurance premiums net of the contribution and refunds—amounts to 26,158 Euros per hectare, higher than the speculated situation of lack of insurance.

As an alternative, farmers can subscribe a supplementary policy, since there is empirical proof that most adversities do not cause more than 30% damage. This is a non-subsidized policy, which refunds all damage higher than the deductible; having subscribed the subsidized policy is a necessary condition, although it covers only the damage coming from frequent adversities<sup>13</sup>. As for the calculation, 20% of the total rate is applied, where the subsidized policy premium amounts to 80%<sup>14</sup>.

While the insurance burden is greater for the farmer, this allows them to obtain the reimbursement for the entirety of the damage exceeding the deductible. In this case, the loss function assumes a 24,289 Euro-per-hectare value, lower than the two former cases.

A necessary requirement for the subscription of a subsidized policy by the farmer is the supplementary policy.

Regarding the insurance companies, they benefit the most from subsidized policies. In fact, the loss-ratio indicator (R/PR) amounts to 0.35, thus resulting in a quite low experience-rate (R/IV), of 3.4, while the reimbursement-aid ratio (R/Ai) reaches 0.58. As a result, the efficiency index of the subsidy is negative (IES = −0.42): this supports the idea that, through the subsidized insurance system, almost half the public subsidies are transferred to the insurance companies (Table 4).

<sup>12</sup> With a harvest of 13,500 kg, the damage at 33% means that 44,550 kg go lost, a value of 5346 Euros, when the grape price is at 1.2 Euro. The deductible of 10% is the excluded part from the reimbursement, of  $1350 \times 1.20 \text{ €/kg}$ , that is 1620 Euros left to be paid by the insured. The reimbursement amounts to 3726 Euros.

<sup>13</sup> The supplementary policy, unlike the subsidized one, has a state tax of 2.5%.

<sup>14</sup> Basically, this happens through the separation of part of the premium, for the supplementary policy, from the subsidized policy (“artatus” division of the premium).

**Table 4.** Economic-Insurance Indicators, Average Values of the DOCG Area.

	Loss Ratio R/PR	Exper. Rate R/VA	R/Ai	R/PRnetto	IES	R/LV	LV/DV	netDV
Subsidized policy	0.35	3.34	0.58	0.88	−0.42	0.18	1.03	0.82
Supplementary policy	1.15	8.93	1.56	1.53	0.56	0.51	0.95	0.51
Omnibus Regulation	0.59	5.66	0.85	1.98	−0.15	0.36	0.85	0.69

IES: expense efficiency index; VDnect: net damage value (VD-R)/V...D.

The supplementary policy forecasts significantly modify the results, therefore the total loss-ratio increases to 1.15, while reimbursements exceed the aids ( $R/Ai = 1.56$ ). This especially benefits the farmer: the reimbursement/net-premium ratio ( $R/netPR$ ) increases up to 1.53, highlighting how favorable this insurance typology is for farmers. This results in an improvement of the IES index, which becomes positive (+0.56). This coverage rewards farmers, whereas it is definitely unfavorable for the insurance system. This stresses the fact that insurance companies get involved in the fate of agricultural businesses: the former knowingly sacrifices a good part of their potential profits as a function of the latter's income requirements, to be able to promote the broadening of the market.

The Omnibus Regulation forecasts, for the medium-term revision of the European policy 2014–2020, substantially modify the common indicators of the insurance, both with regards to the increase of public aid to 70% of the premium and the decrease of the refundable threshold to 20%<sup>15</sup>. The supplementary policy holds at the expense of the loss-ratio index, which amounts to 0.59, therefore the reimbursements become lower than the aid ( $R/Ai = 0.85$ ), whereas it becomes more convenient for the farmer to get insured ( $R/netPR = 1.98$ ). On the other hand, the contribution margin grows to the advantage of insurance companies, while the aid's efficiency index takes on a scant negative value ( $IES = -0.15$ ), making it once more noticeable how the supplementary policy and the joint-participation insurance model are complementary.

The analysis of the indicators with regards to the losses is important: the relevance of the reimbursements over the losses does not surpass 0.18 with a subsidized policy and 0.36 in the Omnibus Regulation's forecasts, but it is only slightly over 50 in the case of the supplementary policy, as well. It is important to notice that none of the possible options results in the complete reimbursement of the suffered damages, such that the net damage index ( $netDI = (D - R)/D$ ) shows a 0.82 value in the subsidized system, but does not go lower than half in other options either. In fact, no insurance typology pays back the whole value of the damages, a big part of the burdens of weather-related accidents falls back on the producers.

#### 4. Discussion

With the 2014–2020 CAP reform, the theme of risk in agriculture represents one of the six priorities of the Rural Development Plan, within the framework of the "Structure policy". The difficulty of passage from the first to the second pillar of the CAP is operational, other factors from the application point of view concern the production yields and the verification of the correspondence of insured agricultural lands. This requires a more elaborate arrangement of the procedures, in terms of relevance and coherence.

The most conspicuous amount of insurance applications—about 80%—comes from the defense associations, through collective policies which award more bargaining power than their insurance

<sup>15</sup> The agricultural part of the Omnibus was adopted by the Council for Agriculture and Fishing in December 2017, and became law from 1st January 2018. The States can create sectoral income stabilization instruments (e.g., milk, meat, cereals, olive oil), the subsidy comes in when the decrease in income surpasses 20% of the Olympic average, even with the use of economic indexes (art. 37–39). Furthermore, the regulation allows to ignore the forecast of the historic outputs if there are innovative products, or for other motivated reasons. The introduced modifications, however, are claimed to be in contrast with the WTO's Agreements on Agriculture.

counterpart<sup>16</sup>. The defense associations, relevant element other than assistance in the arrangement of the procedures, advance insurance premiums for farmers, whose reimbursement occurs at the end of the coverage period<sup>17</sup>.

The around 300 million Euros which associations pay in advance yearly must wait for the subsequent allocation by the government. Should this not happen, or should the amount not equal what has been paid, as was the case of 2009, the whole system of subsidized insurance would suffer huge repercussions, creating remarkable issues, which might transfer to the whole agricultural sector.

The introduction of the *Individual Insurance Plan* (IIP) is itself fundamental. This calls for an early preparation of the yearly cultural plan, which the vine grower, in most cases, completes late. As a result, the subscription of the policies occurs without the documents called for by the regulation<sup>18</sup>. Thus, with the contingent difficulties, many vine growers get insured when the cultural plan is not yet defined, or quite late with regards to the legislative prediction<sup>19</sup>.

The bureaucratic hurdles and the lack of adherence of the insurable outputs—in which the administration data does not correspond with the actual company's data—distance the farmer from the common system. The aim to broaden the insurance base and the surface—and the geographic distribution of the crops through the mutualistic operation—has come to a temporary halt. In 2004 through 2014, this tripled the insured value, the insured businesses, and the surfaces, and strongly decreased the applied contribution rates, broadening the distribution of risk, essential for the farmer's subscription<sup>20</sup>.

The relocation of resources from the “National Support Fund” to the “Rural Development Plan” caused a change of rules, including the passage to a concept of average historic performance. We have moved from a single fund system to an operational division of three separate funds, and three planned procedures<sup>21</sup>. The organizational aspects which refer to the national agricultural policy result in difficult situations for the farmers.

Decree 162, year 2015, which defines the administrative system for risk management, provides for nine institutional subjects, further increasing the organizational issues. Payment delays are this situation's direct consequence.

The substantial progress highlighted has come to a halt with the new regulatory provisions. The bureaucratic uncertainties and the administrative complications have resulted in extreme insecurity in the financial management. Thus, three years after the introduction of the new system, the subsidies received by the Condifesa, as compared to the advance payments of the members, are around 50m Euros—funds allocated in 2015, and around the same amount in 2017—in view of advance payments

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<sup>16</sup> The defense associations in Italy are 62; on national level, they are represented by Asnacodi (legislative decree 102/2004). The Association system interacts with insurance companies, through a selection process. Each association, financed by the CAP contributions, pays in advance, on behalf of the farmers, 65% of the policies. Asnacodi, born in 1982, coordinates, represents and protects the Associations, on national level, participates in writing the yearly Agricultural Insurance Plan, for which the Ministry for agricultural policies is responsible, and promotes mutualistic funds.

<sup>17</sup> The Associations pay insurance companies the subsidised rate of premiums in mid-September, and the rest at the end of October. The farmers pay the whole amount between December and January. The procedure's management cost increase the duties for the vine growers.

<sup>18</sup> The Individual Insurance Plan (IIP) is the fundamental operational element for to get the public contribution, facilitating the subscription by farmers and the management by the Defence associations. The IIP is composed beginning with the company's dossier, which the intermediaries and Condifesa complete to receive the contribution. The data is generated thanks to the SIAN portal (National Agricultural Information System). However, due to application delay, this is not able to manage the procedures, as established by the Simplification Decree over the CAP 2014–2020 management (Minister's decree 12.01.2015, 162). However, the temporary dispositions allow the advance stipulation of the policies, complying with the correspondence with the surface of the farm's dossier and in presence of the necessary demonstration of interest to subscribe the policy.

<sup>19</sup> Thus, in 2015, the subsidised insurance demand by the Condifesa was presented in December, in fact after the harvest.

<sup>20</sup> In 2004, the average rate for hail was 9.7%, in 2014 it was 6% with all multi-risk policies.

<sup>21</sup> The National Support Fund for the disposal of animal carcasses; that of the first pillar for the wine grape (European Agricultural Guarantee Fund—EAGF) and that of the second pillar of CAP (European Agricultural Fund for Rural Development—EAFRD).

higher than 600 million<sup>22</sup>. This represents the association's exposure towards the bank, exposure which is functional to support the advance payment on behalf of the farmers. As a result of the current interest rate, however, the greatest damage is suffered by producers. The lack of pertinence to the real requirements of the companies causes them to abandon the subsidized system, and a considerable reduction of insured values, whose negative effect results in an adjustment of the cost of the policies<sup>23</sup>.

Furthermore, this possibility brings up the difficulties suffered by the Centre and South of Italy, due to the scarce development of its agricultural insurance market (Capitanio et al. 2011). In these areas the associations do not have the same ability in doing advance payments as those working in the North.

The propensity to get insured decreases, when the environment evolution appears to predict a probabilistic increase of accidents.

From the financial point of view, it seems fundamental to hasten the payments by the public authority. Actually, farmers cannot receive the financial resources available to subsidized insurances, 1.6B Euros until 2010.

The critical elements discredit the system in the mind of the farmers.

For insurance companies, the disaffection with subsidized policies balances out with a greater demand for non-subsidized, mono-risk products, covering adverse events such as hailstorms. The complexity of the innovative elements and the lack of digitalization of the system result in a delay in the agricultural sector, when compared with other sectors of the economy.

Under the operational aspect, the end of the production process often comes before the insurance application is complete. This brings up new issues, such as the demonstration of interest, which could become implicit simply with the will to subscribe the subsidized policy.

Regarding controls, in other European countries there are specific territorial benchmarks, which represent reliable verification methods; nevertheless, these appear simplified when compared to the Italian ones.

While looking at the insurance market, the guarantees against catastrophes such as ice, frost, and drought represent only 10% of the total, while frequent adversities, such as hail and excess rain, the most part (90%). The farmer, then, clearly has a preference for policies where the perception of risk is high, compared to those against catastrophes, which, nevertheless, can cause the complete loss of production, even compromising the agricultural activity itself.

An instrument to encourage farmers to subscribe subsidized policies might come from the Rural Development Plan, providing that subscribing insurance policies becomes an advantage in the calls for contribution of the Program's measures.

Institutions pay closer and closer attention to the risk management system, as do private subjects and stakeholders, motivated to invest in essential projects for agriculture, which is still directly dependent on the environment. The momentary decrease in value of the insured production is nothing new. Due to legislative decree 1102/04, in the first years of implementation, there was a drop in the number of policies. The introduction of a more advanced system implies a process of adjustment, sanctioned by important steps.

The decrease of the contribution from 80 to 65% is crucial: the procedure for the distribution causes a further decrease in the actual contribution amount given to the farmers.

Other variables might be of economic nature, so the dynamics of prices—decreased at production level of 5.2% only in 2016—influence the dynamics of insured goods.

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<sup>22</sup> The Association system has distributed 218million for year 2015, 223 for year 2016, and the same amount for 2017. 50% of the policy premium for wine grapes must be paid to companies by September 15th, while the rest of the insurance in mid-October.

<sup>23</sup> The decrease in value of the insured production is objective, it goes from 7.9 billion Euros in 2014, to 7.4 billion in 2015 and 7.1 billion in 2016.

Other elements represent as many positive aspects, such as the constant decrease of the insurance tariffs and the concurrent broadening of the portfolio of the applicable coverage instruments.

There remains a considerable discrepancy among the different areas of the Country, so the policy average rates are 8.3% in the South, 6.7% in the Centre, and 5.5% in the North, where the subsidized insurance instruments are concentrated (86% of the total). This is not just the result of a greater insured base, but also of the preference to safeguard productions with a greater added value in the southern areas<sup>24</sup>. The lack of attention to the real specific requirements of the territories, together with the exclusive role of the defense associations in the sale of policies, also explains the absolute asymmetry of insurance coverage on a national basis, where the southern-central area is substantially lacking any protection.

The current contribution model on risk participation deeply influences the insurance demand. The implementation of the new system requires great communication to farmers. The first aim is the widening of the insurance base. A central element is adapting the knowledge of the opportunities given by insurance instruments. For this reason, the information and education action must include agricultural assistance services as well.

The lowering of the threshold of insurance coverage from 30 to 20% is important for the immediate relaunch of the subsidized policies, as is the simultaneous increase of the subsidy from 65 to 70%. These two changes are included into the Omnibus Regulation, for the medium-term review of the European policy 2014–2020, which also establishes the policies on revenues. Other instruments, such as the mutualistic funds, show an operational value in the areas which are not covered by insurance companies. Nevertheless, they appear to be scarcely applicable to the Italian agricultural system, because they are conceived for standards of different production models, where great widths and mono-culture dominate.

As far as implementation is concerned, the forcedly authentic implementation of the European Union laws is almost inevitable: referring to the historic yields, they hardly adjust to technological progress and the introduction of new varieties.

Other innovative risk instruments are aimed at the launch of the subsidized system, such as the income policy for durum wheat, which establishes a 10M Euro allocation ([MIPAAFT 2018](#)).

On a larger scale, the risk management policy identifies, inside the Agricultural Agreements of the WTO, its configuration rules, such as the minimum damage threshold at 30%.

On one hand, WTO encourages the development of insurance programs which—because they are included into the indirect support measures—have fewer distorting effects on the production and commerce ([Glauber 2015](#)). On the other hand, to be considered are the nature and extent of the insurance subsidies, which the WTO must report anyways, and which in fact call for a third economic subject, that is the insurance companies.

The will to shift the attention from direct support measures to indirect ones, in particular to those focused on the abatement of the costs of production, might appear to be an attempt to bypass the international regulations for the containment of the internal support, causing even more issues. As is clear from the commercial disputes against countries which present great recourse to insurance programs (USA, China) ([Andersen and Taylor 2009](#); [Mahul and Stutley 2010](#)).

The difficulties in conjugating a quest for improvement in the transparency of measures in different countries and the peculiarity of risk management policy suggest suggests new horizons and promising research addresses. These are concerning, for example, the alternative negotiation chapters in which subsidized insurance could be placed; the degree of decoupling of this policy; the preferability of direct support to farmers in place of indirect ones and, finally, the prospect of calling into question the whole system of agreements concerning agricultural insurance ([Josling 2015](#)).

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<sup>24</sup> The hail insurance is greater in the North because it is a more probable adversity; however, its rate is lower in the South where it has a lower risk.

In the European Union as well, the need to follow the rules of WTO encourages the shift to a greater number of subscriptions to crop insurance programs.

Nevertheless, the current impasse of the insurance system, other than reasons of temporary nature, shows that the producer hardly adjusts to measures which do not result in direct income benefits, but rather involve more financial costs and administrative commitments. Furthermore, as they are now, the aid-distribution procedures are proportional to the harvests and the surfaces. On the other hand, the cost of the risk management policy is also high for the community, to whom the idea of only part of the contributions indirectly transferring to farms would not appeal. Thus, the intervention of a third subject—the insurance companies—introduces new elements of criticality. In fact, the farmer compares the certainty of present costs to the uncertainty of future reimbursements. Moreover, even if the compensations were to equal the policy premiums, the management costs of the insurance system would still be borne by the community.

In this sense, the adoption of indirect measures of income defense results in less efficacy and efficiency of the agricultural expenditure, to the disadvantage of the contributors as well.

With regards to the last point, the European risk management policy supports the attempt to adjust to global rules, despite the subsequent loss of efficiency and efficacy of the instruments, while the farmers only partly become the recipients of the benefits.

Moreover, the application procedures adopted from time to time show the difficulty of more advanced agricultural systems in respecting international laws which strongly limit the application of direct intervention measures, which have always been useful to increase their competitiveness.

The objective difficulty in adjusting the internal agricultural policies to the instances of the deregulation process—which is ruled by the international agreements on agriculture—becomes known.

## 5. Conclusions

The evolution of the subsidized insurance market has greatly grown after the implementations made in 2005. The development, though, has recently come to a halt.

The reduction of the average cost of the policies plays an important role in the growth of the insurance demand, thanks to the collective negotiations of associations on behalf of farmers.

In the impasse of the recent years, by contrast, the lowering tariffs and the subsidy to the policy premiums were opposed by the adverse timing of the distribution of the contributions—which might require years—and the lack of adherence to the specific risk profiles of the territories and cultures of the current insurance offer. These aspects have discouraged the Italian agricultural businesses—in Veneto in particular, especially if small and not part of defense associations—from subscribing subsidized insurance policies. The variable choice factors seem several, the most relevant is surely the environmental factor and the relative expectations. The frequency density verified in the empirical analysis does not seem probative, considering the relatively short timeframe analyzed. It is important to consider that, in a short time, a generally milder climate might even lessen the risk perception of extreme events and thus diminish the propensity of farmers to pay for insurance policies.

This perception is clearly distorted; it is truly an increase in global temperature, in fact, which is modifying the possibility of extreme weather events to happen (Bozzola et al. 2018). Events which had a lower frequency before, happen with greater frequency and intensity now (Di Falco et al. 2014).

As for the economic side, the analysis highlights that the subsidized policy alone is not the best solution.

In most cases, the intensity of the adverse events does not reach the damage qualification threshold (30%); in this context, the novelties of the Omnibus Decree can increase the benefits of agricultural policies. This possibility represents the focal point of the whole strategy of subsidized policies. Its value might be fundamental in the farmer's choice. The current legislative forecasts might result in an undeniable homage to insurance companies, while they do not favor the broadening of the market to the producers (Capitanio et al. 2011).



Despite the subsidies, then, the findings of the investigation lead us to think that most small vine growers will continue without insurance, also due to the non-essential nature of the income coming from vine production—the farms are often managed part-time. The small vine grower builds its convenience judgement on the weight of the culture with regards to the family budget. The aim to maximize the difference between earnings and costs leads him to reduce the outflows, implicitly risking the possible recurring loss of the harvest.

The professional entrepreneur, on the contrary, identifies grapes as their main source of income and thus stipulates insurance coverage, as the best choice. The analysis confirms that the subsidized coverage alone is not the most adequate option anymore. The main conclusions allowed on a circumstantial basis prove that adhering to preferential programs implies the drafting of a supplementary policy. This aspect introduces the importance of considering the risk aversion of each type of agricultural business, which can be further linked to the culture and income wallet of the agricultural families (Moschini and Hennessy 2001).

Instead, for major companies, with a more substantial transformation and commercial activity, the need to preserve the brand loyalty modifies the choice elements. Beside the insurance costs, other compensatory behaviors operate. In the case of scarce supply, such as the one that occurred in 2017, the preference not to get insured goes along with the purchase of grapes from producers exceeding the procedural guidelines, often at discounted prices. In this case, the awareness of the information asymmetry in the wine market leads companies to reticent behaviors over the real size of the damage. This is estimated as lower than the market cost of a potential loss of the brand reputation.

With the cover, uncertain future costs become fixed present expenses and that sophisticate the evaluation process of the farmer, whose main aim remains the maximization of the income in the long run.

The intervention of public support modifies the optional parameters.

The reliability of public aid improves substantially with a supplementary policy. Not only does the winegrower take advantage of it, but rather the whole community, as the positive IES index highlights. Adherence to subsidized programs implies the stipulation of the supplementary coverage to minimize the loss function.

Insurance companies benefit from subsidized policies, as suggested by performance indicators. With the supplementary policy, however, they renounce to potential profits to stimulate the adhesion of the winemakers. However, in the highlighted lack of convenience in subscribing subsidized policies, the propensity to consider public subsidies for farmers an undue contribution to insurance companies remains prevailing.

The Omnibus Regulation predictions on the CAP medium-term revision tend to provide better measures regarding the producers' requests, forecasting, nevertheless, greater public resource investments. It is the loss-ratio index which suffers the most from it, with lower compensations than subsidies.

Considering this, the findings of the survey, even with the restrictions of the analytic approach, may constitute a circumscribed map for promising research developments on agricultural risk management. Research strands could be multiple, referring, for instance, to the different risk profiles of the farms, to variables linked to the allocation of factors and crop and income diversification, up to enlarge the studies to international agreements and to the improvement of advanced hedging instruments.

A pre-eminent line of research could focus on the development of innovative models of agricultural risk assessment. The identification of a fair level of policy premium with respect to the actual risk, in fact, involves all the players in the supply chain: farmers, insurance companies, policymakers, stakeholders.

The study could employ qualified actuarial instruments. Among these, the models of cluster analysis, fuzzy logic, multi-criteria analysis, which would be able to involve researchers of different disciplines, appear to be significant.

A possible answer to the current impasse of the agricultural insurance system might come also from index-based policies, introduced in 2018's Agricultural Insurance Plan. Because they erase the

issues of information asymmetry and cut down the expert-related costs, these policies might seem more purposeful and convenient to agricultural farms which are currently out of the insurance market.

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