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## ABSTRACT<sup>1</sup>

The aim of this paper is to analyze agricultural risk management based on insurance schemes in Italy to evaluate the efficiency of risk management strategies. The Italian agricultural insurance market in the last decade has been characterized by a systemic shift from a public system to a highly subsidized “Public Private Partnerships System”, and by a development of combined risk/multiple perils contracts. Public spending is significantly high, but the market penetration is low, and the demand is concentrated in Northern Italy and focused on some specific crops. The approach appears inefficient in facing the farms’ risk and in public funds allocation, too focalized on insurance schemes, not sufficiently diversified and not able to remove the causes that hinder the creation of an insurance market. The research should be developed in the future with more quantitative analysis focused on some specific aspects to confirm our findings, such as adverse selection, moral hazard, systemic risk and, over all, farmers’ willingness to pay for insurance contracts. The current Italian agricultural risk management policy is too expensive and does not really reflect needs and conditions of farms. The public intervention sustains farms with limited needs for financial support and does not encourage development of a private insurance market. The research can contribute to stimulate a scientific and politics debate. The study provides a critical overview of the Italian situation.

**KEYWORDS:** agricultural risk management, agricultural insurance, CAP 2014-2020, Italian agricultural insurance market.

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## 1. Introduction

In recent years, increased price volatility in agricultural markets, the reduction of traditional market regulation instruments in the European Union (EU), and the increase in extreme climatic events have stimulated, both at the EU level and inside the individual Member States (MSs), a growing debate on risk management in agriculture. Many events related to climate conditions and changes in the market cannot be controlled by the farmer, but have a direct and relevant effect on the outcomes of farms, such as yields, revenues, and incomes.

In this scenario, the EU since the early 2000s has encouraged the development of agricultural insurance tools. Most recently, the Common Agricultural Policy (CAP) for 2014–2020 offers a financial facility for the ex-ante subsidization of agricultural insurance contracts. These measures have been extended to the transition period before the enforcement of the upcoming 2021-2027 CAP (Pieralli et al., 2020).

This paper analyzes the agricultural insurance within the theoretical framework of agricultural risk management, to highlight the advantages and limitations of this instrument. Then, the Italian situation is illustrated using statistical data and literature findings.

## 2. Risk management and agricultural insurance: a theoretical framework

The spectrum of risks that affect agricultural outcomes – yields (or quantities produced), revenues or incomes – is quite broad in comparison with other economic activities. It concerns unfavorable weather conditions, input and output price volatility, plant or livestock disease outbreaks, pests, and other natural factors. Moreover, changes in policies (e.g., trade liberalization, or restrictions in the use of chemical inputs), financing difficulties, and personal situations contribute to create risks for farmers. In particular, weather phenomena are hard to predict and even harder to mitigate against, at least in the beginning of growing season; other types of weather risks to consider as unforeseeable are sudden events like hail, heavy rain, windstorms or frost. The effects of weather are also difficult to generalize because of the complexities in the global climate; moreover, at the same time, specific agricultural systems and local conditions influence the impact of the weather (e.g., the kind of crop and soil or water balance). The effects of weather conditions are also influenced by the characteristics of infrastructures, such as drainage and irrigation systems, and the quality of farm management (Selvaraju, 2010; World Bank, 2005, 2010, 2011). This is highlighted by the fact that weather conditions often affect large areas and, consequently, several farms; therefore, the agricultural sector is characterized by a systemic risk on the main limits for insurability of agricultural risk.

The risks in agriculture can be catalogued following different criteria. These are set in accordance with the frequency of the event, severity of damages caused, and degrees of correlation between affected units (Capitanio *et al.*, 2013). Similarly, the source of risk can be classified in: human or personal risks, asset risks, production or yield risks, price or market risks, institutional and regulatory risks, and financial risks (Hardaker *et al.*, 1997; World Bank, 2011). Thus, it is possible to distinguish between business and financial risk and between tactical and strategic risk (Boehlje *et al.*, 2005). Finally, the classification of risk can be

elaborated to include systematic risk, non-systematic risk, and disastrous risks (Newberry and Stiglitz, 1981).

In this context, the farmer has to manage risk by adopting a mix of strategies that can be distinguished in: a) on-farm, household, local community or rural area measures; b) market instruments adoption (insurance, futures, options), c) public policies (regulatory measures, fiscal measures, etc.) (EC, 2001). According to the literature, insurance schemes and policies are the most effective risk mitigation tools available in the agricultural industry (Wang *et al.*, 2020).

Table 1. Risk-management tools in agriculture

<b>Level of intervention</b> <b>Strategy</b>	<b>Farm / household / community</b>	<b>Market</b>	<b>Government</b>
<b>Risk Reduction</b>	– Technological choice	– Training on risk management	– Macro policies – Disaster prevention (flood control...) – Prevention of diseases
<b>Risk Mitigation</b>	– Diversification in production – Crop sharing	– Futures / options – <b>Insurance</b> – Vertical Integration – Production / market contract – Spread sales – Diversified finance – Off-farm work	– Tax system income smoothing – Counter-cyclical program – Border and other measures in the case of contagious disease outbreak – Market-price support (intervention buying, buffer stocks)
<b>Risk Coping</b>	– Borrowing from neighbors / family – Intra-community charity	– Selling financial assets – Saving / borrowing – Off-farm income	– Disaster relief – Social assistance – All agricultural support programs

Source: Scottish Government (2010), adapted from OECD (2009).

Tools for managing risks in agriculture can be split into those that reduce or mitigate risk or those for coping with risks (OECD, 2009). Risk-reducing strategies are generally preventative measures aimed at reducing overall risk exposure, as in the case of livestock vaccination to promote herd immunity to diseases. Risk-mitigating strategies allow farmers to lessen the potential effect of remaining risks, such as insurance against disease outbreaks. Finally, risk-coping strategies involve measures to assist in dealing with the impacts of risk once an adverse event has occurred, e.g., disaster relief payments in the event of a disease

outbreak. Table 1 sets out the range of risk-management tools. The main features of the aforementioned risk management strategies are summarized in Table 1.

In this context, agricultural insurance is only one of the multiple alternative tools for risk management, and its adoption depends on the operating insurability of risky events.

Note that individuals have different attitudes towards risk, and the literature shows that farmers are often risk averse, although the attitude towards risk is different among farmers (Ahsan *et al.*, 1982; Nelson and Loehman, 1987; Sulewski *et al.*, 2020).

With respect to their insurability, risks can be divided into three groups (EC-ISPRA, 2006):

- a) all risks that offer economic protection without limit to the amount of coverage are those that could be fully transferred to the insurer by concluding insurance;
- b) the risks that could only be partially transferred to the insurer are those risks that exceed total capacities of insurers and all reinsurance, by the size of potential damage, and one portion of surplus risk remains uncovered;
- c) the risks that could not be actually transferred to insurance companies, and therefore are not covered by any insurance type.

According to Skees and Barnett (1999), the risks are insurable if:

1. the insurer and the insured have the same information as regards the probability of a bad outcome (symmetric information); in agriculture, asymmetric information is frequent, so the main related problems can be moral hazard and adverse selection;
2. risks should be independent across insured individuals; in agriculture, many risks (related with weather and market factors) are correlated (systemic risk);
3. to fix the premium rates, the insurance company must be able to calculate the probability of loss; in agriculture, lack of data is a major obstacle to the determination of a premium calculated on an actuarial basis; moreover, it can be difficult to determine the exact cause of loss;
4. the premium must be affordable for farmers.

Given this scenario, researchers and policy makers usually assume that some serious problems, such as asymmetric information with moral hazard and adverse selection, and systemic risk will affect agricultural insurance markets. In this scenario, the failure of the private market of agricultural insurance products occurs (Chambers, 1989). Other analysts point out also that the limited understanding farmers have about the benefits arising from the use of insurance tools contributes to making the private insurance markets too vulnerable (Capitanio and Adinolfi, 2013).

Therefore, public authorities and insurance companies in different countries have developed, over time, new and different insurance schemes, with the aim of determining some (fully) insured events and for coping with farmers' adverse selection and moral hazard, but also to respond to special needs and issues on a pilot basis (Bokusheva, 2004).

In several cases, the diversity of insurance products makes it difficult to draw a clear distinction between these contracts, but it is possible to individuate some characteristics that differentiate one scheme from another (each scheme is a specific mix of these characteristics) (Bokusheva, 2004):

- 1) breadth of risk insured: all-risk, multiple risk, and particular risk;
- 2) parametric and non-parametric insurance;

- 3) mechanism to determine premium and loss: actual production history (APH) of the farm or parametric or index-based insurance;
- 4) object insured: single elements such as building, crop (or yield), livestock; farm revenue or farm income.

In contrast to crop insurance, revenue and income insurance schemes provide protection against both production and price risks. Note that usually outside the agricultural sector, price risk is non-insurable for an economic firm.

This process of product differentiation is often accompanied by public support and regulatory intervention, and so therefore, historically, agricultural insurance has never seen a market on a large scale without public intervention (Capitanio and Adinolfi, 2013). However, there is a heated and ongoing debate regarding this issue, especially in the USA (Coble and Barnett, 2013; Goodwin and Smith, 2012).

It is interesting to note that this evolution of insurance schemes for agricultural risk management is characterized by the attempt to make insurable risks not (easily) insurable rather than adopting other tools and/or combining together different risk-management instruments (see Tab. 1 above). This is in stark contrast to a basic principle of economic policy, according to which achieving the desired value of a certain number of targets requires the policymaker to control an equal number of instruments designed or suitable for pursuit of the goal. Therefore, for stabilizing income or revenues or crop production, it is necessary to face or control different sources of risk, but these are not always insurable. This aspect is well emphasized by Capitanio *et al.* (2013, pp. 18), and discussed in the next section of this manuscript.

### **3. The agricultural insurance system in Italy**

The Italian situation should be analyzed in the EU context in the light of the issues discussed in the above section; to do that, both statistical data and the evidence of scientific literature will be used. The EU situation is characterized by a high heterogeneity of situations between the MSs, which present different degrees of insurance products' market penetration and different levels of risk coverage, due to the specific national experiences, needs and policies (EC, 1999, 2001).

In particular, since the Mac Sharry reform of the CAP in 1992, EU farmers have faced increasing competitive markets, due to the gradual reduction of guaranteed prices and protectionist measures. This reform process has continued over the years but market liberalization could have affected more agricultural revenues than farm incomes, as a consequence of payments granted directly to farmers.

It also should be noted that EU agriculture is a sector particularly vulnerable to the prospects of climate change. Expected in the next 50 years are a decrease in average annual and seasonal rainfall, sudden heatwaves and droughts, and more frequent storms and floods with even greater intensities; higher temperatures combined with humidity could create, in some areas, an increased pressure from weeds, fungal diseases, and other pests. These factors will negatively affect, in particular, southern and southeastern European regions (IPCC, 2014).

In this evolving situation, the EU started with guidelines on agricultural risk management that focused on the ex-ante subsidization approach, and in particular on insurance tools (EC, 1999, 2001). Then, with Regulation No. 73/09, the EU enforced its support of agricultural insurance and defined the preconditions to grant support to farmers as contributions to

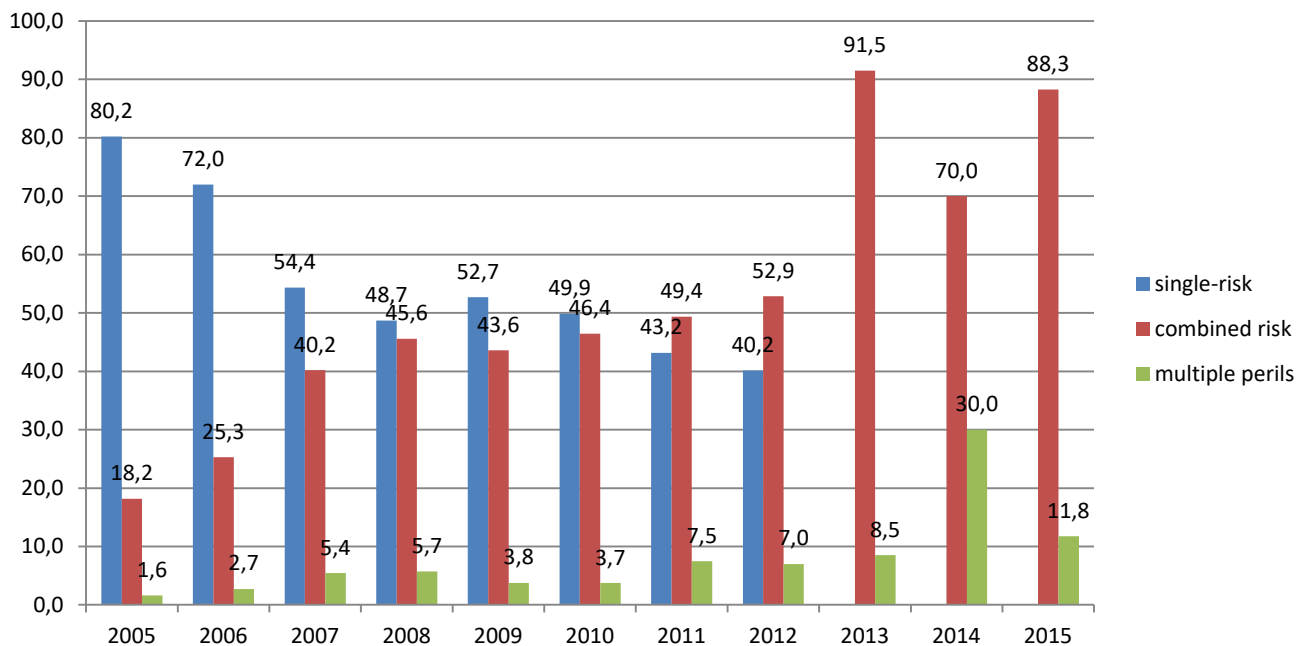
insurance premiums. This Regulation adopts a broadly inclusive definition of 'losses,' including yield, revenue, and income insurance, all of them would be eligible to receive ex-ante subsidies from the EU budget. Later in 2011, the EU adopted an income stabilization tool based on risk-sharing schemes “in the form of financial contributions to mutual funds, providing compensation to farmers who experience a severe drop in their income” (EC, 2011).

In this context, it is relevant to note that the current Italian crop insurance system formally started after the introduction of the National Solidarity Fund (NSF) in 1970, before the EU initiatives. The NSF institutionalized the coverage of agricultural losses due to uncontrollable variables through ex-post public compensation and included ex-ante interventions, providing for active collective protection and subsidized insurance. During its first 30 years of activity, 70% of the budget of the NSF was aimed at ex-post compensation, with ex-ante subsidization playing a marginal role (ISMEA, 2011).

To modify this too expensive situation, and to follow the EU guidelines on agricultural risk management, the Legislative Decree 102/2004 amended the NSF priorities and gave a prominent role to the ex-ante tools for the promotion of insurance coverage through public subsidies. This law also established that insurable crops and premises would be excluded from ex-post compensation. In addition, the co-reinsurance consortium against natural disasters in agriculture was founded in 2007, with the objective of promoting the introduction of innovative insurance products through the apportionment of risks among private agents that constitute the consortium (ISMEA, 2011).

The collaboration between private insurers and the public sector, through ex-ante subsidization and ex-post public reinsurance, has made it possible for premiums to remain stable and at affordable levels for farmers. The main effect has been the reduction of single-risk contracts and the development of combined risk and multi-perils insurance (Fig. 1).

Fig 1. Insured value trend per kind of policies (crops, greenhouse and anti-hail net).



Source: Own elaboration on ISMEA data.



Moreover, the data show that the number of contracts in 2015 are fewer than in 2005, but the insured value is almost double, with a ratio of premium paid/insured value that is slightly down and a loss ratio that remain too high over time (over 50%) (Tab. 2).

Table 2. Italian subsidized agricultural insurance (crops - livestock -greenhouse and anti-hail net), 2005-2015.

Years	Policies n.	Policies n. D%	Insured Value (.000 €)	Insured Value D%	Premiums (.000 €)	Premiums D%	Indemnified value (.000€)	Indemnified value D%	Premium / Insured Value	Loss ratio [g]/[e]
	[a]	[b]	[c]	[d]	[e]	[f]	[g]	[h]	[i]	[j]
2005	213.292	-	3.810.222	-	269.124	-	159.984	-	7,06%	59,45%
2006	216.171	1,35%	3.982.341	4,52%	265.033	-1,52%	145.975	-8,76%	6,66%	55,08%
2007	241.857	11,88%	4.690.900	17,79%	292.888	10,51%	184.626	26,48%	6,24%	63,04%
2008	272.082	12,50%	5.858.133	24,88%	317.210	8,30%	272.711	47,71%	5,41%	85,97%
2009	233.668	-14,12%	5.586.167	-4,64%	317.210	0,00%	234.781	-13,91%	5,68%	74,01%
2010	217.072	-7,10%	5.865.181	4,99%	285.502	-10,00%	169.259	-27,91%	4,87%	59,28%
2011	210.207	-3,16%	6.559.088	11,83%	338.797	18,67%	215.824	27,51%	5,17%	63,70%
2012	214.711	2,14%	6.826.556	4,08%	321.658	-5,06%	231.022	7,04%	4,71%	71,82%
2013	216.015	0,61%	7.287.692	6,76%	377.230	17,28%	268.254	16,12%	5,18%	71,11%
2014	206.394	-4,45%	7.953.260	9,13%	485.591	28,73%	322.009	20,04%	6,11%	66,31%
2015	165.115	-20,00%	7.443.942	-6,40%	402.133	-17,19%	232.977	-27,65%	5,40%	57,94%

Source: Own elaboration on ISMEA data.

Industry-aggregated data show that, up until 2015, public support was concentrated in medium to big-size farms, those less likely to effectively need institutional incentives to subscribe to insurance contracts, rather than smaller, more vulnerable farms, whose limited adoption of insurance schemes is linked, among other reasons, to the perception of absence of direct income benefits (Capitanio and De Pin, 2018).

Table 3. Italian subsidized agricultural insurance for selected crops, 2015-2018.

<b>Winegrape</b>											
Year	Policies n.	Policies n. D%	Combined risk policies %	Multiple perils policies %	Insured value (.000 €)	Insured value D%	Premiums (.000€)	Indemnified value D%	Indemnified value D%	Premium / Insured Value	Loss ratio [g]/[€]
2015	41.339	-	10,70	89,30	1.503.162	-	95.330	38.510	-	6,34	40,40
2016	41.575	0,57	10,00	90,00	1.353.463	-9,96	82.279	53.346	38,53	6,08	64,80
2017	38.224	-8,06	15,90	84,10	1.392.317	2,87	84.750	145.422	172,60	6,09	171,60
2018	42.414	10,96	14,30	85,70	1.778.564	27,74	128.427	86.792	-40,32	7,22	67,60
<b>Apples</b>											
Year	Policies n.	Policies n. D%	Combined risk policies %	Multiple perils policies %	Insured value (.000 €)	Insured value D%	Premiums (.000€)	Indemnified value D%	Indemnified value D%	Premium / Insured Value	Loss ratio [g]/[€]
2015	18.233	-	24,40	75,60	688.124	-	75.321	66.229	-	10,95	88
2016	13.357	-26,74	31,10	68,90	576.768	-16,18	64.078	60.055	-9,32	11,11	94
2017	14.455	8,22	39,50	60,50	622.261	7,89	68.531	282.323	370,11	11,01	412
2018	15.141	4,75	50,80	49,20	717.912	15,37	100.516	87.979	-68,84	14,00	88
<b>Industrial tomatoes</b>											
Year	Policies n.	Policies n. D%	Combined risk policies %	Multiple perils policies %	Insured value (.000 €)	Insured value D%	Premiums (.000€)	Indemnified value D%	Indemnified value D%	Premium / Insured Value	Loss ratio [g]/[€]
2015	4.138	-	4,30	95,70	350.540	-	26.543	24.263	-	7,57	91,40
2016	2.743	-33,71	15,00	85,00	278.869	-20,45	20.984	43.819	80,60	7,52	208,80
2017	2.581	-5,91	19,30	80,70	267.053	-4,24	21.178	33.534	-23,47	7,93	158,30
2018	2.740	6,16	13,90	86,10	274.925	2,95	23.289	33.099	-1,30	8,47	142,10
<b>Common wheat</b>											
Year	Policies n.	Policies n. D%	Combined risk policies %	Multiple perils policies %	Insured value (.000 €)	Insured value D%	Premiums (.000€)	Indemnified value D%	Indemnified value D%	Premium / Insured Value	Loss ratio [g]/[€]
2015	10.575	-	3,40	96,60	144.265	-	3.408	2.078	-	2,36	61,00
2016	8.945	-15,41	2,80	97,20	115.294	-20,08	2.613	3.596	73,05	2,27	137,60
2017	7.746	-13,40	2,20	97,80	101.881	-11,63	2.392	1.613	-55,14	2,35	67,40
2018	9.083	17,26	2,70	97,30	123.471	21,19	3.437	3.756	132,86	2,78	109,30

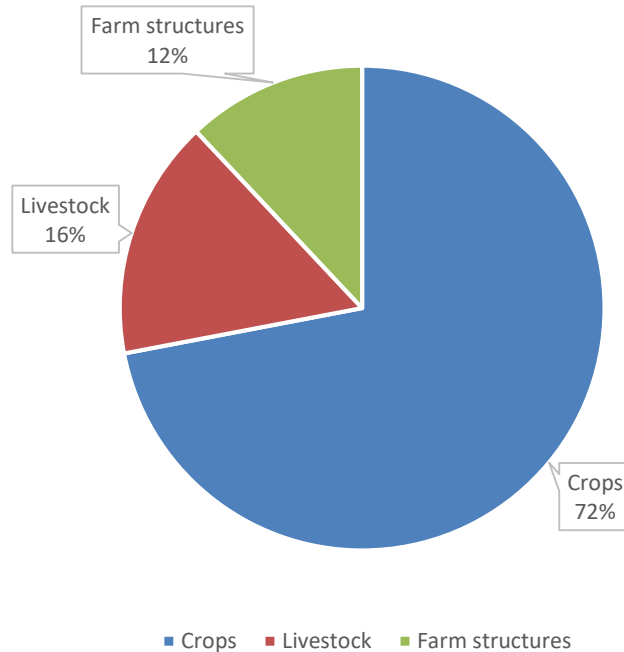
Source: Own elaboration on ISMEA data.

According to most recent, crop-specific data, publicly available up until year 2018 (Tab. 3), the industry seems to be gradually approaching maturity as trends and figures tend to stabilize. In fact, figures on number of subscribed policies, preference for combined risk or multiple perils policies, insured value and premium paid, appear to confirm gradual reduction of fluctuations. Nevertheless, farmers' risk attitude, and subsequent insurance decisions and behaviors may vary through time, as an effect of increased variability of climate (Fusco *et al.*, 2018), but also as a consequence of policy decisions and incentives (Bozzola and Finger, 2020).

Another weakness is related to uneven geographical distribution of insurance policies, most of which (approximately 80%) subscribed by farms in Northern Italy, with Northeastern regions counting for about half of the total contracts signed countrywide (Fig. 3). Once again, the geographically uneven adoption of insurance schemes may result in limited

capacity to manage and offset losses in case of systemic problems or disastrous events (Porrini *et al.*, 2019). Nevertheless, according to the estimates by ISMEA (2020) for year 2019, the crop insurance market is growing faster in Southern regions, in terms of number of insured farms (+15,3%), insurance prize collection (+38,5%) and insured value (+31,8%), than it does in the North (respectively, -0,9%, +3,2%, and +1,8%) or in the Centre (-3,6%, +5,7%, -0,6%).

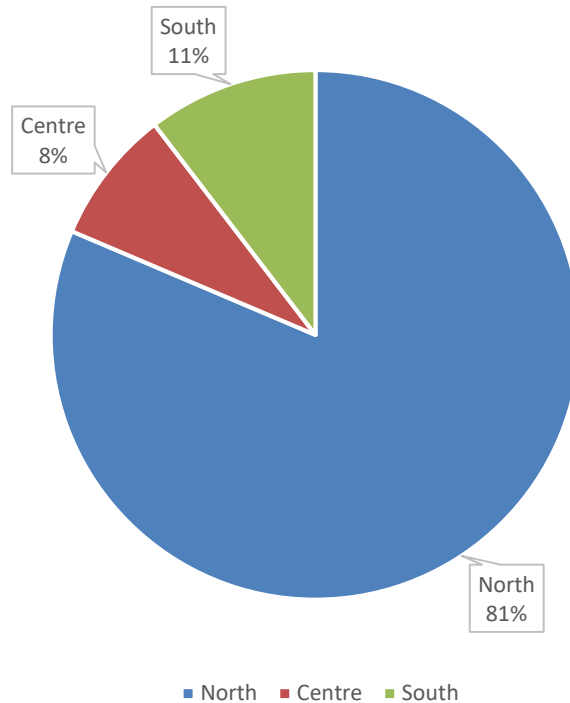
Fig. 2. Market share by insured product value (year 2019).



Source: Own elaboration on ISMEA data

In addition, there is a prevalence of crop insurance (Fig. 2). Capitanio and Cioffi (2010, 2011) suppose that this situation probably depends on the inadequacy of the proposed insurance contracts with respect to the needs of the farms of the area. Another explanation may be that farmers have had experience in the past with single-risk insurance contracts, especially after hail damage, and that the perception of the risk persists and is reflected in multi-risk insurances schemes for areas and crops where the risk is higher (northern Italy, fruits and grapes).

Fig. 3. Market share of geographical areas (year 2019 estimate).



Source: Own elaboration on ISMEA data

These distortions are confirmed by Pontrandolfi (INEA, 2014) that provides evidence that, despite the exposure and vulnerability of their territory to climate risk, trends in costs for insurance premiums are positive only for large companies in terms of income and size. The classes in which fall the majority of Italian companies show a decreasing trend. In addition, the vulnerability maps do not match those of exposure, which indicates the importance of ‘aiming’ the actions and measures of risk management in order to provide a public contribution for more efficient and greater use to farmers. Miglietta et al. (2020) explain similar discrepancies in the agricultural insurance market with the concept of “charity hazard”, that is the crowd-out effect of public interventions and subsidies on the decision to subscribe an insurance.

The territorial issue of insurance contracts has been analyzed also in comparative studies between the farm behavior towards insurance instruments in France and Italy. The two neighboring countries are characterized by similar insurance systems, although their farming industries present different characteristics. Enjolras *et al.* (2012) have noticed that purely agricultural indicators such as the size of the farm, as measured by the cultivated area, and diversification, as measured by the number of cultivated crops, are key factors for insurance purchase decisions. Another study (Enjolras *et al.*; 2014) points out that Italian farms are smaller than the French ones, and therefore more exposed to changes in their income, and that this influences the farmer’s behavior about insurance tools.

This study also reveals another unreasonable problem: the territorial dimension and its correlation with diversification of risk. The more the territory is wide and diversified, the more likely the risk between farms being unrelated, so the risk events are insurable. These elements suggest a need for discussion about the creation of an effective European insurance market, with homogeneous areas of medium-to-large scale across the countries.

The problem of adverse selection on size farms is studied by Santeramo *et al.* (2016). They show that the participation rate in Italy is high for large firms and that it is negatively correlated with crop diversification, which seems to be in itself a form of insurance. Moreover, high premiums tend to inhibit both entry and exit from the insurance market. Larger and wealthier farms are more likely to adopt insurance and renew coverage over time. The research demonstrates that the decision by an insured grower to drop coverage may differ significantly from the corresponding decision by an uninsured farmer to enroll in an insurance program. To the extent that policymakers want to encourage participation in subsidized crop insurance programs, education and outreach efforts towards uninsured farmers may differ substantially from those directed towards keeping insured farmers enrolled in the program.

Farm size also influences the possibility and opportunity to access financial instruments. Landini (2015) has analyzed the role of credit instruments to improve the number of agricultural risk coverages. An adequate coverage of agricultural risk leads to greater security for lender in case of default, where the agricultural enterprise (the borrower) faces adverse events that may affect production.

Another problem concerns the negative indirect effects on the environment of the Italian agricultural insurance policy. Some studies analyze the effects of subsidized crop insurance on input use, land use, and thus, indirectly, environmental outcomes. The findings point out the negative effects on the environment of Italian insurance schemes in the agricultural sector. In particular, they show that, with current crop insurance programs, input use, in particular fertilizer, is expected to increase, while the effect on production is likely to be crop-specific; hence, this type of public intervention could lead to an increase in surface and groundwater pollution by nitrates (Capitanio and Adinolfi, 2009, 2010; Capitanio *et al.*, 2015).

Pontrandolfi (INEA, 2014) also analyzes the general risk situation and points out that the major needs that emerge concern droughts and floods. From this point of view, the behavior of farmers seems not to have changed for adaptation: the structure of farms and investment do not show substantial changes even with PAC interventions in the period 2005–2012. Also, considering the exposure and vulnerability of the territory, which influences income, variable cost trends of farms show a clear preference for risk management through technical tools (adoption of pesticides, fertilizers, and water) rather than financial tools. This also creates greater environmental pressures.

With respect to market characteristics, Capitanio *et al.* (2011) show that, while in the case of a competitive supply, subsidies to insurance would benefit farmers, a monopolistic supply would capture most of the subsidy and, therefore, the benefit for farmers would be very limited. This situation eliminates the potential incentive towards wider participation by farmers in an insurance market.

Finally, Capitanio *et al.* (2013) provide evidence that, for the Italian situation, it is necessary to adopt a broad set of tools to have an efficient risk management approach. In particular, the study points out that “there are risks that can be most efficiently managed by farmers’ own resources, either by diversification of income sources or by coping with the consequences of limited income fluctuations by self-insurance. At the opposite end of the risk spectrum, we found risks for which there is no alternative to the reliance on some form of public solidarity, when predictability is so limited that no preventive action might be conceived. Most of the relevant agricultural risks are ‘in between’ risks, with various combinations of frequency, significance and correlation. Hence, no single instrument is ideal

under all circumstances. Any sensible policy framework should allow for a sufficient degree of flexibility to adapt to the different conditions.”.

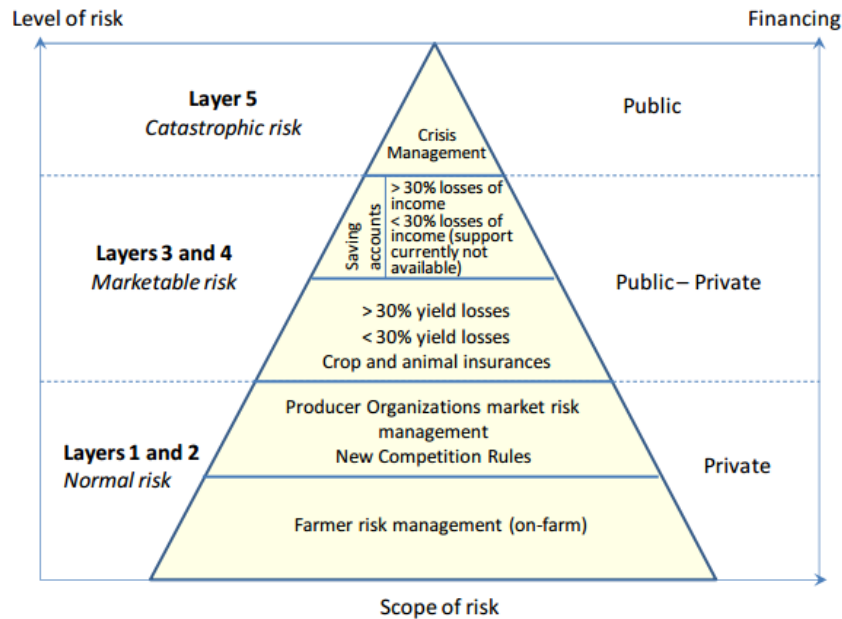
All these studies seem to confirm the findings of research carried out in more mature and developed agricultural insurance markets; mainly, but not only, in the USA. These analyses highlight the difficulties of promoting an insurance market in the presence of information asymmetries and related risks. In particular, the recent works of Glauber (2004), Goodwin and Smith (2012), and Coble and Barnett (2013) point out the inefficiency of government in sustain agriculture in the USA, especially in the case of supporting insurance premiums.

The 2014–2020 CAP introduced substantial shifting funds from income support mechanisms to security and risk management tools, including agricultural insurance; however, this decision was not associated to the emergence of an effective common policy for agricultural risk management, as MS have kept their right of direct intervention. As a consequence, each MS can develop its own country-specific programs and policies, with enhanced probability of by systemic risk and asymmetric information issues. For this reason, a common policy that involves some EU area in a supranational territory might be preferable.

In fact, the most important changes that were introduced in the 2014–2020 CAP were related to the system of fixed direct payments in Pillar 1, as the Basic Payment Scheme (BPS) replaced the Single Payment Scheme (SPS). While direct payments are not explicitly designed as an instrument to tackle price volatility, they help shield European farmers from strong fluctuations in revenues. According to estimates of the European Commission, these ‘decoupled’ payments now account for nearly one third of the income of European farmers. As these continuous financial flows are not subject to market outcomes and are unexpected to change, they provide these farmers with a significant degree of income stability.

In general, such EU strategies could reinforce the Italian expenditure without changing the situation, or else sharpen weaknesses of the Italian system. However, it is worth noting that the European Parliament recently published an extremely interesting and innovative study on risk management tools in agriculture coordinated by Bardaji and Garrido (EC, 2016), which presents the typology of risks and tools as a pyramid (Fig. 4). At the base of the pyramid are low intensity risks, to be managed by any economic agent; risks whose intensity require public-private partnerships are placed in the middle; and at the very top are the hazards that can only be handled by a public policy-driven action.

Figure 4. Layering model of agricultural risk management.  
Source: EC, 2016.



This approach, if applied, should have a significant impact on the Italian management system, because it does not include a direct intervention of public authority in every situation, while the Italian system provides generalized public subsidies.

## 4. Conclusions

Agricultural production has always been a risky activity, but only after the Second World War was there a relevant market expansion and a development of a range of insurance products (Smith and Glauber, 2012). Most of this expansion is determined by an extensive range of government supports, including subsidized premiums, subsidized delivery and loss adjustment expenses, and the public provision of reinsurance services. In particular, global agricultural insurance premiums have increased considerably over the past decade, and in the last years a major driver has been emerging markets (World Bank; 2011).

In fact, in recent years, in particular since the last decade of the XX century, governments and national authorities in some countries, such as the USA, Canada, and Australia have significantly expanded crop insurance choices available to farmers. In addition to the traditional insurance on yields of a single crop, some new schemes have been added, such as combined risk and multiple peril insurances, insurance on revenues and on incomes, weather index-based insurance, and other options. To these the range of crops covered by insurance has been expanded, the available coverage levels have increased, new approaches for using crop yield histories for determining insurance premiums have been developed, and significant premium subsidies in attempts to increase farmer participation have been implemented (Garrido and Zilberman, 2008; Goodwin and Smith, 2012).

Nevertheless, several studies on agricultural insurance seems to provide very few successful examples, and that the different countries give evidence of processes of development, crises, and revitalization of their agricultural insurance systems. Garrido and

Zilberman (2008). In fact, these systems, despite this broad approach, have not been very successful. This trend tries to face a risk that can source by non-insurable situation or event that usually are not insured (e.g. price volatility) using insurance tools (Coble and Barnett, 2013; Goodwin and Smith, 2012; Smith and Glauber, 2012).

The EU and Italian policy seem to not recognize the experience of other countries, the USA in particular, where the government sustaining agricultural insurance is, in fact, political support for agricultural income.

In particular, the agricultural insurance system in Italy in the last few years has been gradually shifting from a public system to a public–private partnership; however, the results of this new approach do not really differ from the old one, in terms of market penetration or availability of sufficiently differentiated tools.

The Italian system appears to have an excessively horizontal, not enough focused approach. While this may grant basic support to every type of farm, only a cluster of agricultural firms concentrated in some areas and producing certain crops have knowledge, expertise and resources to take advantage, resulting in an adverse selection situation. Therefore, the possibility of systemic risk and moral hazard remains high.

In this scenario, the Italian agricultural insurance market is not enough attractive to commercial insurers in the absence of public incentives. In fact, the generous Italian support mechanism has resulted in one of the highest subsidy to premium ratios in the EU, and this is regarded as a budgetary burden preventing the adoption of a more comprehensive risk coverage (EC, 201, 2011, 2014, 2016; ISMEA, 2011; Meuwissen *et al.*, 2011).

Therefore, this policy can create some effects similar to those of the old PAC price-sustain policy: public intervention sustains farms that have less need of financial support and does not encourage the development of an insurance market. The approach appears inefficient in facing the farms' risk and in public funds allocation. Otherwise, public intervention should use a mix of instruments, such as those reported in Fig. 1 of this paper, adopting the tools or set of tools more suitable for any specific goals.

This implies that the policymakers should, first of all, individuate the specific goals to pursue, without trying to expand the market in generalized way. As Tangermann (2011) points out “farmers should be expected and encouraged to deal with normal business risks themselves; government policies should facilitate, rather than crowd out, the use of the various market instruments available to manage agricultural risk; risk management should be clearly distinguished from farm income support and well justified support to farmers hit by catastrophic risks, should be based on clearly defined a priori rules.”

In particular, Italian authorities should remove the real causes that hinder the creation of an insurance market, including, for example, the modernization of farms by encouraging the increasing of farm size and the adoption of accounting systems, eventually considering funding opportunities by the banking system.

Forcing the creation of insurance markets only through technical solutions that try to create an insurable event from a mix of non-insurable or difficult-to-insure events (systemic risks, asymmetric information) should be avoided. In other words, research analyses and political debates in other countries with long experience, and in several cases failures, of insurance schemes should be of use to avoid repeating the same mistakes and inefficiencies of the current EU approach, which indeed is a manifestation of underlying political and economic issues.



This research may be further developed in the future using more quantitative methods to analyze specific policy and market aspects highlighted in this paper, such as adverse selection, moral hazard, systemic risk and, over all, the willingness to pay of farmers for insurance contracts.

## REFERENCES

Ahsan, S.M., Ali, A.A.G. and Kurian, N.J. (1982), Toward a Theory of Agricultural Insurance, *American Journal of Agricultural Economics*, Vol. 64 No. 3, pp. 520-529.

Boehlje, M., Gray, A.W. and Detre, J.D. (2005), Strategy Development in a Turbulent Business Climate Concepts and Methods, *International food and agribusiness management review*, Vol.8 No. 2, pp. 21-40.

Bokusheva, R. (2004), *Crop insurance in transition a qualitative and quantitative assessment of insurance products. Preliminary results*, Institute of Agricultural Development in Central and Eastern Europe (IAMO) - discussion paper No. 76.

Bozzola, M., & Finger, R. (2020). Stability of risk attitude, agricultural policies and production shocks: evidence from Italy. *European Review of Agricultural Economics*, (jbaa021), pp. 1-25.

Capitania, F. and Adinolfi, F. (2009), The relationship between agricultural insurance and environmental externalities from agricultural input use: a literature review and methodological approach, *New Medit*, No. 3, pp. 41-48.

Capitania, F. and Adinolfi, F. (2010), Negative externalities of crop insurance subsidies: a case study in Italy, *Insurance Market and Companies*, Vol. 1 No. 2, pp. 61-68.

Capitania, F. and Adinolfi, F. (2013), Risk management tools and public policy: what is the real farmers demand? Weakness of the current system of public support for risk management in agriculture, *Economia e Diritto Agroalimentare*, Vol. XVII n.2, pp. 189-207.

Capitania, F., Adinolfi, F. and Santeramo, F.G. (2015), Environmental implications of crop insurance subsidies in Southern Italy, *International Journal of Environmental Studies*, Vol. 72 No.1, pp. 179-190.

Capitania, F., Bielza, M.D.C., Cafiero, C. and Adinolfi, F. (2011). Does market competitiveness significantly affect public intervention in agricultural insurance: the case in Italy, *Applied Economics*, Vo. 43 No. 27, pp. 4149-4159.

Capitania, F. and Cioffi, A. (2010), Evoluzione, sostenibilità e prospettive del sistema italiano di intervento pubblico nelle assicurazioni agricole / Evolution, sustainability and prospects of the Italian system of public intervention in agricultural insurance. *Agriregionieuropa*, anno 6, n°23.

Capitanio, F. and Cioffi, A. (2011), Gestione del rischio in agricoltura ed intervento pubblico. Evoluzione, sostenibilità e prospettive del sistema italiano, *Economia e Diritto Agroalimentare*, Vol. 3, pp. 395-410.

Capitanio, F., and De Pin, A. (2018). Measures of efficiency of agricultural insurance in Italy, economic evaluations. *Risks*, Vol. 6, No. 4, p. 126.

Capitanio, F., Goodwin, B.K., Enjolras, G. and Adinolfi, F. (2013). Risk management tools for Italian farmers: public support, problems and perspectives under CAP Reform, *PAGRI-International Agricultural Policy*, Vol 1, pp. 7-24

Chambers, R. G. (1989), Insurability and moral hazard in agricultural insurance markets, *American Journal of Agricultural Economics*, Vol. 71 No. 3, pp. 604-616.

Coble, K.H. and Barnett, B.J. (2013), Why do we subsidize crop insurance?, *American journal agriculture economics*, Vol. 95 No. 2, pp. 498-504.

EC (1999), *Income Insurance in European Agriculture*, European Commission, Report No. 02, Luxembourg.

EC (2001), *Risk Management Tools for EU Agriculture with special focus on insurance*, European Commission (Working Document), Luxembourg.

EC (2009), *Council Regulation No 73/2009*, Council Regulation

EC (2010), *Internal security strategy for the European Union: Towards a European security model*. Luxembourg: Publications Office of the European Union. (Report). European Commission.

EC (2011), *Proposal for a regulation of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)* (Report No. COM(2011) 627 final/2). European Commission, Brussels (Belgium).

EC (2014), *Regulation (EU) No 661/2014 of the European Parliament and of the Council of 15 May 2014 amending Council Regulation (EC) No 2012/2002 establishing the European Union Solidarity Fund*.

EC (2016), *Research for agri-committee – State of play of risk management tools implemented by Member States during the period 2014-2020: National and European frameworks*, Bardají, I. and Garrido, A. (Coordinators), Directorate-general for internal policies policy department b: structural and cohesion policies agriculture and rural development, Brussels.

EC-ISPRA (2006), *Agricultural Insurance Schemes, Summary report*, modified February 2008, Luxembourg.

Enjolras, G., Capitanio, F., and Adinolfi, F. (2012), The demand for crop insurance: Combined approaches for France and Italy, *Agricultural Economics Review*, Vol 13 No. 1, pp. 5-22.

- Enjolras, G., Capitanio, F., Aubert, M. and Adinolfi, F. (2014), Direct payments, crop insurance and the volatility of farm income. Some evidence in France and in Italy, *New Medit*, N. 1, pp. 31-40.
- Fusco, G., Miglietta, P. P., and Porrini, D. (2018), How drought affects agricultural insurance policies: the case of Italy. *Journal of Sustainable Development*, Vol. 11 No.1.
- Garrido, A. and Zilberman, D. (2008), Revisiting the demand for agricultural insurance: the case of Spain. *Agricultural Finance Review*, Vol. 68 No1, pp. 43-66
- Glauber, J. (2004), Crop Insurance Reconsidered, *American Journal of Agricultural Economics*, Vol. 86, pp. 1179-1195.
- Goodwin, B.K. and Smith, V.H.(2012), What harm is done by subsidizing crop insurance?, *Journal of Agricultural and Resource Economics*, Vol. 95, N.2, pp. 489–497.
- Hardaker, J., Huirne, B., Ruud, B.M. and Anderson, J.R. (1997), *Coping with risk in agriculture*. CAB International, Wallingford.
- INEA (2014), *Analisi della domanda di strumenti di gestione del rischio climatico in agricoltura in Italia*, Pontrandolfi, A. (Eds), INEA, Roma.
- IPCC (2014), *IPCC Fifth Assessment Report (AR5)* (No. WGII), Intergovernmental Panel on Climate Change, Geneva (Switzerland).
- ISMEA (2011), *L'assicurazione agricola agevolata in Italia. I risultati della campagna 2010*. Ismea Roma.
- ISMEA (2020). *Rapporto ISMEA sulla gestione del rischio in agricoltura 2020*. Ismea, Roma.
- Landini, S. (2015), Agricultural risk and its insurance in Italy, *European Insurance Law Review*, No 2, pp. 31-38.
- Meuwissen, M.P.M., van Asseldonk, M.A.P.M., Pietola, K., Hardaker, J.B. and Huirne, R.B.M. (2011), *Income insurance as a risk management tool after 2013 CAP reforms?*, Contributed paper for the European Association of Agricultural Economists 2011 International Congress, August 30-September 2, 2011, Zurich, Switzerland.
- Miglietta, P. P., Porrini, D., Fusco, G., and Capitanio, F. (2020). Crowding out agricultural insurance and the subsidy system in Italy: empirical evidence of the charity hazard phenomenon. *Agricultural Finance Review*, Vol. 81 No. 2, pp. 237-249.
- Nelson, C.H. and Loehman, E.T. (1987), Further toward a Theory of Agricultural Insurance, *American Journal of Agricultural Economics*, Vol. 69 No. 3, pp. 523-531.
- Newbery, D. and Stiglitz, J. (1981), *The Theory of Commodity Price Stabilization. A Study in the Economics of Risk*. Clarendon Press, Oxford.

OECD (2009), *Risk Management in Agriculture: A Holistic Conceptual Framework*. Part of the Trade and Agriculture Directorate project on Risk Management in Agriculture.

Pieralli, S., Pérez Domínguez, I., Elleby, C., and Chatzopoulos, T. (2020). Budgetary Impacts of Adding Agricultural Risk Management Programmes to the CAP. *Journal of Agricultural Economics*, Vol. 72, No. 2, 2021, pp. 370–387.

Porrini, D., Fusco, G., and Miglietta, P. P. (2019). Post-adversities recovery and profitability: The case of Italian farmers. *International journal of environmental research and public health*, Vol. 16 No. 17, p. 3189.

Santeramo, F.G., Goodwin, B.K., Adinolfi, F. and Capitanio, F. (2016), Farmer Participation, Entry and Exit Decisions in the Italian Crop Insurance Programme, *Journal of Agricultural Economics*, Vol. 67 No. 3, pp. 639–657.

Scottish Government (2010). *Risk and risk management strategies in agriculture: an overview of the evidence*. Final Report October 2010. Rural and Environment Analytical Services (REAS) Rural and Environment Research and Analysis Directorate (RERAD).

Selvaraju R. (2010), *Climate risk assessment and management in agriculture*, FAO Rome.

Skees, J. R. and Barnett, B.J. (1999), Conceptual and practical considerations for sharing catastrophic/systemic risks, *Review of Agricultural Economics*, Vol. 21 No 2, pp. 424-441.

Smith, V.H. and Glauber, J.W. (2012), Agricultural Insurance in Developed Countries: Where Have We Been and Where Are We Going? *Applied Economic Perspectives and Policy*, Vol. 34 No.3, pp. 363–390.

Sulewski, P., Wąs, A., Kobus, P., Pogodzińska, K., Szymańska, M., and Sosulski, T. (2020). Farmers' Attitudes towards Risk—An Empirical Study from Poland. *Agronomy*, Vol. 10 No 10, 1555.

Tangermann, S. (2011), *Risk Management in Agriculture and the Future of the EU's Common Agricultural Policy*, International Centre for Trade and Sustainable Development (ICTSD), Issue Paper No. 34, Geneva, Switzerland.

Wang, H. H., Tack, J. B., and Coble, K. H. (2020). Frontier studies in agricultural insurance. *The Geneva Papers on Risk and Insurance - Issues and Practice*, Vol. 45, pp. 1-4.

World Bank (2005), *Managing agricultural production risk; Innovations in developing countries*, Agriculture and Rural Development Department, The World Bank, Washington DC.

World Bank (2010), *Government Support to Agricultural Insurance: Challenges and Options for Developing Countries*, Agriculture and Rural Development Department, The World Bank, Washington DC.

World Bank (2011), *Weather index insurance for agriculture: Guidance for development practitioners*. Agriculture and Rural Development, The World Bank, Discussion paper 50, Washington, DC.