

AGRICULTURAL RISK MANAGEMENT IN EUROPE

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Abstract

This paper is based on a study performed by the IPSC-Agrifish unit of Joint Research Centre (JRC) of the European Commission for DG Agriculture under request of the European Parliament. Most information comes from fact sheets collected by experts or consultants in the different countries.

The definitions of crisis and disaster eligible for public aid in EU member states are analysed and compared with the “Community guidelines for state aid in the agriculture sector” (EC, 2000). New Commission Guidelines and a new Regulation have been adopted in December 2006.

The paper makes a review of the agricultural risks management systems in Europe (EU27) with a special focus on agricultural insurances. The different types of agricultural insurance systems in Europe and key figures in each country are analysed. Some technicalities like reinsurance, triggers and deductibles are described. The relationship between Government involvement and insurance development is highlighted. Usually, private companies insure only hail and fire, but as the government involvement in insurance increases, more comprehensive coverage is provided by the insurance system, becoming possible the insuring of agricultural systemic risks.

The role of Governments is analyzed for every country: offering or subsidising insurances and providing aid ex-post. Aid related to risks in agriculture is also given on an ad-hoc basis or through compensation schemes or calamity funds, which can be partially financed by the agricultural sector on a voluntary or compulsory basis. Payments ad-hoc and from calamity funds in most European countries are summarised and their levels are compared.

The existing insurance level is generally insufficient to smooth significant income reduction in bad years. Risk management tools available in the MS could be developed further. However, given the heterogeneous situation, the interest of a harmonised EU-wide system of agricultural insurances is debatable. Conditions for a feasible EU-wide insurance scheme are analysed and classified into a) decisions of the policy makers (political criteria); b) decisions of the private sector: insurers, re-insurers and farmers (socio-economic criteria); c) technical conditions. Last, the possible amount of costs of an EU-supported insurance system has been roughly quantified for a few hypothetical scenarios, under given assumptions.

Keywords

Risk management policy, agricultural insurance, calamity funds, ad-hoc aids, natural disaster.

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1 Introduction

The economic stability of an entire rural area can be jeopardized by crises caused by different types of natural disasters, from climatic events to livestock or plant diseases. Weather risks are a major source of uncertainty for farms. Drought or excess rain is responsible for bad harvests all over the world. Besides, it seems that the volatility of temperature and precipitation weather and the occurrence of extreme weather events increased in the last decade and are likely to continue increasing due to global climate changes. This leads to destabilization of farm incomes in particular in countries with strong yield variability. Climatic risks are more important for crops and sanitary risks are more important for livestock, but none of them are exclusive: pests can have a considerable impact on crops and a bad climatology can make strong damages on livestock farming through the pastures or forage availability.

The economic situation of farms can be subject to strong variability due to other reasons:

- Policy reforms, marked by trade agreements and market liberalisation and the consequent reduction of prices paid to farmers.
- An unbalanced relationship between retailers, generally well organised to put a strong pressure on prices and farmers.
- Sanitary measures and risk of animal diseases.

Producers can try to compensate the negative economic consequences of bad weather events by buying insurance, but also, since the mid-nineties a new class of instruments, namely weather derivatives. Generally speaking, weather derivatives are index based weather insurance are financial instruments that allow to trade weather related risks. However, in Europe traditional crop insurances and calamities funds are the most used tools to manage climatic risks. Some countries have decided to help the stabilization of their agriculture by supporting the agricultural insurance schemes.

The aim of the study is to improve the knowledge about climatic and sanitary risks in EU agriculture and to examine the role and the functioning of agricultural insurance as a risk management tool. Weather risk is a major challenge in agricultural policy, and it is important to have a new look at it providing suitable information to analyse a possible integration in the Common Agricultural Policy. Sanitary crises and also economic crises caused by the changes of market conditions may also endanger farm's viability. The CAP should enhance appropriate risk and crisis management strategies, providing an improved response to crises in the agricultural sector.

2 Policy framework

2.1 WTO Agreements

Public aids in agriculture have to comply with the WTO agreements, which classify agricultural aids into three boxes: Green, Blue and Amber.

The Blue Box contains aids for goods that have a production limitation (e.g. milk in the EU)

The Green Box defines other aids that do not distort trade: For **Income insurance** and income safety-nets, aid is admitted when the *income loss (...) exceeds 30 per cent of average gross income or the equivalent in net income terms (...) in the preceding three-year period or a three-year average based on the preceding five-year period, excluding the highest and the lowest entry. The amount of such payments shall compensate for less than 70 per cent of the producer's income loss in the year (...)*. Programs based on farmers' income are not frequent.

Canada notified one program. Payments for relief from **natural disasters** (directly or by subsidies to crop insurance) also fall in the Green Box if there is a *formal recognition by government authorities that a natural or like disaster () with a production loss which exceeds 30 per cent of the average of production in the preceding three-year period or a three-year average based on the preceding five-year period, excluding the highest and the lowest entry.* Agricultural insurances are mentioned, but mostly ad-hoc payments are notified, because one of the main reasons that make subsidies to insurance not eligible for the green box is that they do not follow a formal recognition by government authorities of the natural disaster. Such recognition is not operational in an insurance model managed by private companies. Other reasons often exist but do not apply to all types of insurance products (e.g. 30% threshold or being product-specific).

The Amber Box contains other support measures to agriculture. Aids in the amber box which exceed the “de minimis” limits (5% of agricultural production for developed countries, 10% for developing countries) are subject to reduction commitments. Most of the subsidies to crop insurances have been notified within the Amber box.

2.2 The definition of crises and disaster and EU- regulations on state aids

The definition of crisis and disaster is rather generic. More precise conditions can be found to authorise state aids in case of disaster or adverse weather conditions. In general an official declaration of disaster is needed. At national level such a declaration by the government is usually quick. A potential EU-wide regulation should define the competent body to make a declaration of disaster.

Article 87 of the EC Treaty authorises certain State aids, more precisely defined in the “Community guidelines for state aid in the agriculture sector” (EC, 2000), generally followed by MSs. These guidelines state that adverse weather conditions (hail, drought, frost, rain, etc.) on agricultural production may be assimilated to natural disaster (like earthquakes, avalanches, landslides and floods) if the damage is more than 20% of normal production in the less-favoured areas and 30% in other areas. Aids in case of animal and plant diseases are permitted normally as a part of an appropriate programme for prevention, control or eradication. In general, all aids in these circumstances may be granted up to 100% of actual costs. Insurance premiums may be subsidized up to 80% when insurance covers natural disasters, or assimilated events. If the insurance covers other losses, the maximum aid is 50% of the premium.

New Commission Guidelines and a new Regulation on the application of Articles 87 and 88 of the Treaty have been adopted in December 2006. The definitions adopted have been strongly shaped by the WTO Agreements.

The main changes added by this Regulation in the field of risk management aids in agriculture related to climatic risks, besides the fact of being a Regulation and not only Guidelines, can be summarised in the following:

- **Adverse climatic events** (Art. 11) can be assimilated to natural disasters when they exceed the threshold of 30%, but there is no more the 20% threshold for less favoured areas. The compensation cannot exceed 80% of the losses and 90% in less favoured areas (formerly 100%), what means that additional to the threshold there is a deductible.
- It sets as a condition for **losses suffered after 2010** in case of adverse climatic events: compensation must be reduced by 50% unless it is given to farmers who have taken out insurance covering at least 50% of their average annual production or production-related income and the statistically most frequent climatic risks in the Member State or region concerned.

- There are no changes on the aids to the payment of **insurance premiums** (Art. 12),

Member States keep several types of positions on State Aids for exceptional climatic events:

- Most of the countries apply the “Community Guidelines”, with explicit mention in their legislation (Belgium, Cyprus, Estonia, Greece, Italy, Latvia, Lithuania, Slovenia), or without explicit mention (Finland, Germany, Ireland, Luxembourg, Spain)
- Other MS have more restrictive criteria: Austria, France, Portugal, Romania
- Bulgaria, Czech Republic and Hungary seem to have a broader definition.
- Some countries simply do not give any aids to agriculture for climatic events, but have compensation programs for livestock diseases (Netherlands, Sweden, UK)

Some of the countries have the constraint to aids given in case of crisis or disaster that it must not be due to an insurable risk (see 6 “Funds and ad-hoc aids”).

If a common EU definition for natural disaster were to be applied to all member countries, it could consider:

- Exceptional character of the climatic phenomenon
- Minimal number of farms or surface should be affected, and thresholds for losses at crop level and/or at farm level (already existing in the Guidelines).
- A fast procedure for an official declaration.
- Exclusion if efficient preventive techniques or developed insurances are available.

3 Risk management tools

3.1 Risk management tools in agriculture

Tools for risk management in agriculture can be either on-farm strategies (diversification of production programmes, stabilization or self-insurance funds, etc.) either risk-sharing strategies like marketing contracts, production contracts, hedging on futures markets, or the participation in insurance, mutual insurance or regional mutual schemes. Government involvement when these strategies are not enough often takes place ex-post through the form of ad-hoc aids or the organization of compensation schemes.

In Europe the main risk-sharing tools for risk management in agriculture are **calamities funds, regional mutual schemes, and insurance**. **Calamities funds** are usually regulated by the Governments and they are described on section 6.

Regional mutual schemes (also called **mutual insurance funds**) refer to the funds owned by the participants and organized at micro (regional) level. The advantage of the regional organisation is that farmers organise their own cross-control reducing moral hazard and adverse selection. The disadvantage of these funds is the danger that many or even all farmers incur losses at the same time. On the other hand farmers are not always sufficiently organised to set up an efficient mutual scheme structure. Solutions for this problem are re-insurance or the cooperation with mutual schemes in other regions which would cover a share of the loss. Many regional mutual schemes enlarge and evolve in time to become mutual insurance companies (similar to profit-oriented insurance companies but non-profit and partially owned by farmers).

Insurance is probably the best known risk pooling tool. Two basic requirements, among others, have to be met for a risk to be insurable: managing the adverse effects of “asymmetric

information” and overcoming the implications of “systemic risks” (a lot of people suffer a loss at the same time). Natural disasters or epizootic diseases cause special problems for insurance because of the systemic nature of these risks.

If re-insurance or state guarantees are not available, the nature of the systemic risks makes it necessary for an insurance company to charge very high premiums which can be unaffordable for farmers, and to build up substantial capital reserves. This means that comprehensive agricultural insurances schemes need a strong support from the public sector to provide broad coverage at an affordable price for the farmer. On the other hand, if governments provide ad-hoc disaster payments, it stifles the development of insurance products.

3.2. Risk Management tools for livestock

Livestock main risks are sanitary risks, and they are mostly managed within disease eradication programs at European and/or national level. DG SANCO of European Commission has undertaken an in-depth study on the risk management tools for livestock sanitary crisis. The main report of the study (BIELZA ET AL. 2006) offers a summary of the conclusions reached.

Livestock epidemics can result in substantial losses for farmers and all the other participants in the livestock production chain involved. Member states are obliged to apply the control measures established in EU directives if an outbreak of ‘List diseases’ arises (Office International des Epizooties, 1998). Recently, the European Commission (EC, 2006b) has approved a financial package of €193 million to support programmes to eradicate, control and monitor animal diseases during the year 2007. The 155 programs which were selected for EU funding will deal with animal diseases that impact both human and animal health. The large EU contribution towards these programmes reflects the high level of importance attached to disease eradication measures, for the protection of both animal and public health.

In the livestock sector, there is a different treatment for direct losses and for consequential losses. MS Governments and European Institutions generally support the largest part of the **direct losses** due to mortality or morbidity, such as the value of destroyed animals. Some member states finance the non-EU compensated *direct losses* from the national budget (Denmark, Finland, France, Ireland, Italy, Luxembourg, Portugal, Spain, Sweden, and United Kingdom). Other member states have set up some form of statutory system to co-finance the direct losses. These Public-Private financing schemes have a compulsory fund structure in which all farmers pay a tax (Austria, Belgium, Germany, Greece, The Netherlands).

Consequential losses, such as losses resulting from empty buildings and movement standstills, are most often completely borne by the farmers themselves. Some EU member states partly compensate consequential losses in a form of ad-hoc relief program (Austria, Belgium, Ireland, etc) or by compensating above the value of the animals which are forcibly slaughtered to cover part of the consequential losses. In some other EU member states the absence of public assistance has led to the creation of **private insurance schemes** for consequential losses for some types of livestock production (Germany, Italy, Netherlands, Sweden and United Kingdom). There are also some forms of public-private partnership in which the government acts either as an insurer or a re-insurer of a subsidised consequential loss insurance policy (Greece and Spain). However, producers do not commonly take up private policies that are specifically designed to cover consequential losses.

Private insurance exists in many countries for non-epidemic diseases and accidents (see section 4.4).

4 Agricultural insurance systems

4.1 Definitions

The most widely extended crop insurance in the EU is hail insurance, which often includes other scattered risks such as fire (**single risk insurance**). In many countries this is nearly the only existing type of crop insurance. Some kind of insurance policies cover also the risk of frost or a limited number of meteorological events. These are known as **combined risk insurance**.

We call “**yield insurance**” the type of policy that covers yield losses for a given crop due to the major meteorological events affecting the production (plant diseases and plagues usually not covered). In general all the fields of a farm with the same crop have to be insured. We avoid here the term “multi-risk” or “multi-peril crop insurance (MPCI)” because it is sometimes applied to combined insurances and sometimes to yield insurances (USA). In European yield insurances, the meteorological origin of the damage has to be identifiable, while the US “Multiple Peril Crop Insurance” (MPCI) includes yield losses by plagues and diseases and damages are calculated simply as the difference between guaranteed and actual yield: The European system has higher loss-adjustment costs, but it helps to avoid moral-hazard, one of the big problems for the US insurance system.

Whole-farm yield insurance covers to all the crops produced by the farm. A yield reduction in one crop will not be compensated by the insurer if the global production reduction of the farm does not reach the trigger.

Revenue insurance combines yield and price insurance. The farmer is paid if the total value of his production falls below a threshold. **Income insurance** takes also into account the costs of production; it is only applied in USA but not in Europe.

All the former types of insurance are based on the results of the individual farms and losses are adjusted on the field and the total losses are most often calculated at the farm level. However, **index insurances** are based on an index common for an area. In **area-yield insurance**, the compensation paid to the farmer (and the trigger) depend on the statistical yield for the year in a predefined area, usually an administrative unit. **Area-revenue insurance** is based on the area yield multiplied by the area price. If the average yield/revenue in that area is below a certain threshold, all the insured farmers in the area are compensated. **Indirect-index insurance** does not refer to the average yield in an area but to a meteorological indicator or satellite images. Weather derivatives can be included in this category of insurances.

4.2 Technicalities in agricultural insurance

The technicalities or technical characteristics of agricultural insurance should aim to provide an actuarially sound system. Their proper use in insurance design can avoid **moral hazard** and **adverse selection**. Adverse selection means a situation in which the insured farmer only insures the part of the farm with a higher risk, or in which only farmers with higher risks get insured. This can happen because the farmer has more detailed information about his or her risk of loss than does the insurance provider. As a consequence, the level of risk in the insured population is higher than in the total population (HARWOOD ET AL 1999). Moral hazard refers to an individual’s change in behaviour after having taken out an insurance policy. The change in behaviour results in an increase in the potential magnitude and/or probability of a loss. Some technicalities can also make risks in agriculture - in particular **systemic risks** (risks affecting a big population at the same time) -on the one hand insurable to the insurer and, on the other hand, affordable to the farmers.

Deductibles and insurance coverage:

The coverage level refers to the proportion of the insured value that is effectively covered by insurance. The threshold or trigger is the percentage of the insured value the losses must exceed in order to trigger the payment. Once this value is exceeded, the payment of the indemnity can take place for the entire loss or only for a part of it, if there is a deductible (the portion of an insured loss to be borne by the insured). The losses on which the different deductibles are to be applied can be evaluated per field, per crop (all fields with the same crop on the farm), or even per farm in whole-farm insurance products.

In general deductibles in crop insurance range from 10% to 30%, some times up to 50% depending on the contract and premium rate.

Bonus/malus system

The bonus-malus system or system of deductions and penalties on the premiums due to former results is also used to avoid moral hazard and adverse selection problems.

Premium rates

Premium rates vary a lot, depending on many factors. Besides the geographical variability inside each country, which has associated different levels of risks, there is a high variability of the insurance products offered across Europe, which cover different risks and crops.

Among others, in general the magnitude of premium rates in crop insurance depends on:

- The frequency of adverse events.
- The type of risk (e.g. hail as a very local risk, drought as a large area risk)
- The sensitiveness of crops
- The number of risks covered (single- risk, combined-, yield insurance)
- The number of insured farms, to spread the risks
- Technicalities like deductibles

The premium rates in yield insurance for arable crops vary from 3-8%. The highest premium rates are obtained for fruits, in average 8-14%, but in some regions rates up to 20% are possible.

Re-insurance

There are two main types of re-insurance in agricultural insurance: non-proportional (stop loss) reinsurance and proportional (quota share) reinsurance.

Stop-loss: The re-insurer takes charge of the losses above a fixed threshold of the annual balance (annual loss or loss ratio) of the insurance company.

Quota-share reinsurance: The re-insurer assumes a set percentage of risk (covered sum insured) for the same percentage of the premium, minus an allowance for the ceding company's expenses. Or, what has a similar result, the re-insurer takes charge of a percentage of the loss of the company, and the same share on the profit.

In Europe the most frequent form of re-insurance is a combination of both types and almost in all countries it is made in the international re-insurance market (for some exceptions see section 5.2).

4.3 Main types of crop insurance in EU-27

Table 1 shows different types of agricultural insurance systems in Europe, their level of penetration and key figures in each country. Single-risk (mainly hail) insurance is well developed with a long history. It exists in almost all European countries. Usually, private companies insure only hail and fire, but as the government involvement in insurance increases in some MS, more comprehensive coverage can be provided by the private insurance. So

there is in general a direct relationship between public support and the level of insurance development.

Single- risk insurance

For Belgium, Germany, the Netherlands and UK hail insurance or single-risk insurances are the main products available. Probably there is no broad coverage provided in these countries because of the missing public support to insurance.

In some northern countries, including the Baltic States, there is less demand of crop insurance or they are starting to develop their systems (Latvia and Lithuania).

In Finland private crop insurance is less developed, but there is a public “Crop Compensation Scheme” provided to compensate yield losses after natural disasters.

Combined- risk insurance

In Bulgaria, the Czech Republic, Hungary, Poland, Portugal, Slovakia, Slovenia and Sweden, single and combined risk insurance is available. Only hail and a few additional risks like fire, frost, rain and wind are covered. The coverage against drought, as one of the most difficult insurable systemic risk (because a large area can be affected) is usually not included in combined risk insurance, whereas it is usually in the wide coverage against all climatic risks of yield insurance.

The schemes in Greece and Cyprus are different: a compulsory insurance system is provided by the public sector.

Yield insurance

In Spain the Government collaborates with farm unions and insurance companies to run the system. All the insurance companies operate in a pool, in a co-insurance regime. Most risks are covered in yield insurance policies.

In other countries such as Austria, France, Italy, and Luxembourg the insurance system also is well developed and most climatic risks are covered depending on the contracts. Mostly there is a basic coverage for hail and in addition yield insurance covering the most important risks.

Index insurance

Regarding indirect index insurance, we have only found three examples in Europe.

In Spain an insurance product for pastures is available since 2001, based on vegetation indices computed on coarse resolution satellite images.

In United Kingdom an index-based insurance programme was launched in 1998 based upon the yield statistics of the Home Grown Cereals Authority and prices based upon the LIFFE commodity futures. The cover provided indemnity for a 10% fall in yield and a 5% fall in price. Take up was minimal and the product offering was cancelled in the following season.

In Austria an indirect index insurance based on meteorological data for the coverage of arable crops against drought risk has been commercialized for the first time in 2007.

Table 1: Agricultural insurance in Europe

Country	Single-risk ins.	Com-bined ins.	Yield ins.	Penetration level	Insured area (1000 ha)	Premium amount (M€)	Premium /insured value (%)	Average indemnities (M€)	Insurance subsidies in M€ (%)
Austria	PS	PS	PS	78%	1,054	52,0	2.6%	32,0	24 (46)
Belgium	P	-	-	n.d.	n.d.	49,0	n.d.	n.d.	0
Bulgaria	P	P	-	52%	1,276	6,6	4.8%	4,5	0
Cyprus	GC	GC	-	(100%)	112	8,7	7.2%	4,5	4,4 (50)
Czech Rep.	PS	PS	-	35%	1,074	32,0	1.8%	24,0	7 (30)
Denmark	P	-	-	n.d.	n.d.	n.d.	n.d.	n.d.	0
Estonia	P	-	-	<1%	n.d.	0,1	n.d.	n.d.	0
Finland	P	P	-	<1%	n.d.	1,8	n.d.	1,1	0
France	P	P	PS	n.d.	3,507	211,0	1.7%	n.d.	5 (2.4)
Germany	P	-	-	43%	7,265	129,2	1.2%	104,5	0
Greece	P	GC+GS+G	-	(100%)	n.d.	n.d.	2.5-3%	218,0	n.d.
Hungary	P	P	-	52%	n.d.	43,5	n.d.	30,7	0
Ireland	P	-	-	n.d.	n.d.	n.d.	n.d.	n.d.	0
Italy	PS	PS	PS	8%	976	271,2	7.4%	166,2	180 (67)
Latvia	PS	-	-	<1%	n.d.	0,1	n.d.	n.d.	0,05 (50)
Lithuania	PS	-	-	1%	9	1,1	4.3%	1.1	0,55 (50)
Luxembourg	PS	PS	PS	45%	26	1,3	2.3%	1.0	0,65 (50)
Netherlands	P	-	-	n.d.	n.d.	75,0	n.d.	30,7	0
Poland	P(S#)	-	-	7%	n.d.	9,9	n.d.	6,3	0
Portugal	PS	PS	-	22%	298	46,9	8.4%	30,2	32 (68)
Romania	PS	PS	-	12%	812	14,0	n.d.	4,4	7 (50)
Slovakia	PS	PS	-	n.d.	n.d.	n.d.	n.d.	n.d.	(50)
Slovenia	PS	P	-	17%	n.d.	9,5	7.6%	13,8	4,3 (45)
Spain	PS	PS	PS	26%	5,850	564,7	6.3%	388,3	232 (41)
Sweden	P	P	-	60%	1,500	n.d.	n.d.	n.d.	0
UK	P	-	-	7%	370	11,1	0.8%	n.d.	0
TOTAL						1,538		1,061	497 (32)

Legend:

- : Not existing

n.d.: no data

#: Pilot experience

S : Subsidized

P : Private non-subsidized

PS : Private partially subsidized

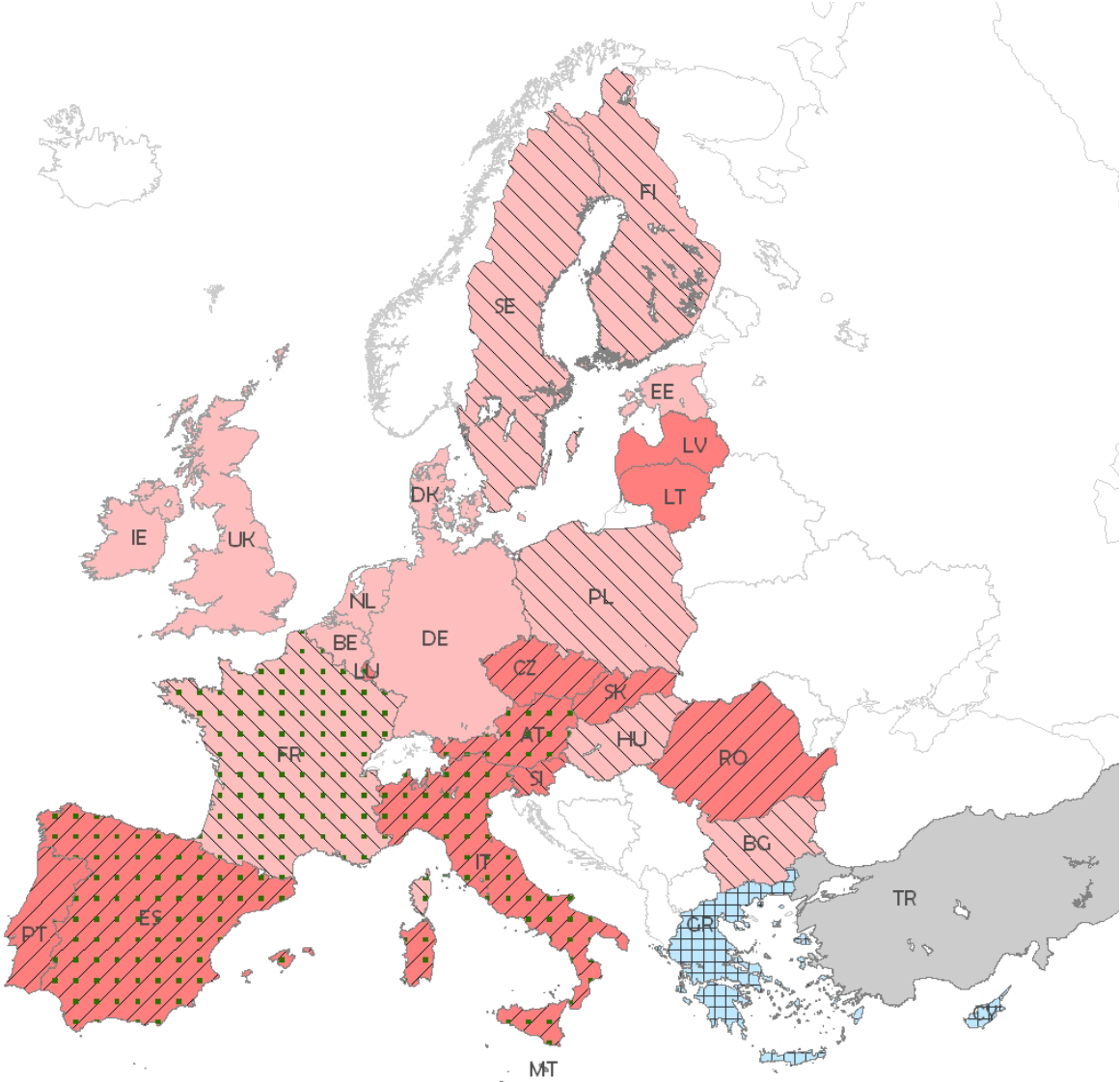
G : Public non-subsidized

GS : Public partially subsidized

GC : Public compulsory partially subsidized

Source: Prepared from information in the fact sheets provided by the experts in each country

Figure 1: Developed insurance systems in Europe



Single risk insurance	Combined insurance	Yield insurance
Private, non-subsidized	Public	Private, part. subsidized
Private, part. subsidized	Private, non-subsidized	
Public	Private, part. subsidized	
no data		

Source: Own representation, prepared from information in the fact sheets

4.4 Livestock Insurances

Livestock main risks, sanitary risks are mostly managed within disease eradication programs at national and/or European level. However, non-epidemic diseases, accidents, and catastrophic climatic events can also have a direct impact on the animals (floods, etc.) and are susceptible to being insured. Last, other weather events can affect pasture and forage availability and therefore have an impact on the economic sustainability of the farm. The information collected on insurance available for accidents and some livestock diseases in the EU-27 countries is shown on annex 1.

Pasture and forage availability can also be insured. Recently, a new livestock insurance product was introduced in Spain with the aim to prevent the effects of the possible decrease of pasture forage availability in case of adverse climate conditions. The aim of this kind of guarantee is to indemnify the farmer for the increase of his/her production price, due to the necessity of feeding the animals with different modalities.

With this type of insurance farmers get a reimbursement when, due to bad climatic conditions (mainly drought), the forage present on the pasture is reduced compared to the normal production average in the correspondent area. This insurance system has a specific evaluation of damage; it is based on indirect indexes computed on satellite images. The currently used system in Spain is based on NDVI (Normalised Difference Vegetation Index).

Aquaculture insurance is also available in some countries. It is developed mainly in Spain and in Greece (see annex 2).

5 Public involvement to insurance

5.1 Subsidies to insurance

The amount of support provided by EU Member States to subsidize insurance premiums varies depending on the country's policy to promote some particular type of coverage, to help some agricultural sub-sector or to facilitate some types of farms. Some countries have integrated it as an essential agricultural policy instrument for the stabilisation of agriculture income.

Table 1 reports subsidies per country, where available. Some additional comments are:

- **Italy:** around 67% of total premium; 64% for the multi-peril yield-type product
- **Spain:** around 49% including the regional subsidies
- **Austria:** around 46% of total premium including regional subsidies; 50% for hail and frost
- **France:** The 2.5% average of three years is due to a majority of non-subsidised single-risk insurance. Since 2005 new yield insurance products have been launched with subsidies of 35% (40% for young farmers)
- **Portugal:** around 68% of total premium; subsidies vary from 35% to 75%
- **Czech Republic:** Subsidies from 15% for livestock to 30% for crop insurance
- **Slovenia:** Subsidies for crop insurance given the first time in 2006. 30 to 50% for the basic risk coverage (hail, fire and thunderstorm)
- **Slovakia:** 50%
- **Romania:** in 2005 the level rose from 20% to 50%
- **Latvia and Lithuania:** 50% subsidy, but still very low penetration of insurance.
- **Cyprus:** 50% for all insurable risks in the compulsory scheme

- **Luxembourg:** 50% for all insurable risks

The annual subsidies to agricultural insurance in EU are around **500 M€** (32% of premiums). The average amount of ad-hoc aids in EU is around **900 M€** (does not include all aids given for livestock).

Most often, support to agricultural insurance comes directly from the national and/or regional budget. In some of these countries, it is not directly the Government by means of a Ministry, but a public institution, who manages the agricultural insurance-related affairs like in Spain, Italy, Greece and Cyprus.

In those countries that also have funds, most often funds and insurance support are closely related, a part of the fund being used for subsidizing insurance premiums. This is the case for Austria, Italy, the Czech Republic since 2004 and to a minor extent in France.

5.2 Public re-insurance

In most countries, reinsurance is undertaken by private companies. However, there are some exceptions in which insurance is totally or partially managed by the Government or public companies. It is the case for Portugal and to a minor extent in Spain and Italy.

In Portugal, the main part of reinsurance is made through a public reinsurance system. It undertakes 85% of the losses above a certain threshold. The adhesion to this mechanism is voluntary but - up to date - all the insurance companies selling crop insurance have adhered to this system.

In Spain, there is compulsory public reinsurance, undertaken by the *Consortio de Compensacion de Seguros*. The CCS is a public company but it functions as a reinsurance company from a financial point of view. This public company is itself reinsured by international private companies. Also, private companies can freely reinsure the share of risk they assume through the international reinsurance market.

In the case of Italy, there is a Public Fund of Reinsurance. It was introduced in order to help the development of the new multi-risk insurance products (and for the pluri-risk with more than a couple of perils included), so, it only works for these insurance types. It appeared in the 2000 budget law, but its first year of implementation was 2004 (this delay was due to the notification to the EU). It works within the Reinsurance Plan (Ministerial Decree general for all reinsurance).

5.3 Public insurance

In Greece the government operates a compulsory agricultural insurance scheme via the Greek Agricultural Insurance Organisation "ELGA". ELGA does organise and implement programmes of proactive protection and insures the production in the crop and livestock sector. However, it does not seem to be a true insurance form an actuarial point of view, because premiums don't discriminate insured crops or regions. Additionally, private insurance is provided for not covered risks.

In Cyprus the crop insurance system is also public and compulsory, but there is no insurance for livestock available and no complementary insurance on the private sector for crops.

6 Calamity funds and ad-hoc aids in Europe

When there are no market based instruments available to manage risks such as insurance or regional mutual schemes, or complementary to these instruments when they are not enough,

aid is provided by the Governments in order to help farmers in case of calamities or natural catastrophes.

In some countries, most of the risk management protection for crops is privately provided, while for animal diseases most often there is a Government intervention (this is the case for the Netherlands, Ireland, the United Kingdom, etc.). The rest of the countries give their aid to agricultural catastrophic losses by means of ad-hoc aids or through calamity funds.

Aid-hoc aids or ex-post assistance in case of natural disaster usually cause big distortions in the national budget. For this reason, many countries create funds for risk management in agriculture. Usually these calamity funds have the purpose of accumulating money on a regular (yearly) basis for the years when it is necessary to provide assistance after a natural disaster. Some countries feed the funds entirely from the public budget, and others receive also contributions from the private sector, usually in the form of compulsory levies to production or levies to insurance premiums. All compensation payments from the funds aids are given under the declaration of catastrophe. The main advantage of the funds over ad-hoc aids is that they avoid big distortions of the government budget. Funds sometimes

A key point for the development of agricultural insurances is whether or not the law forbids that ad-hoc measures or calamity funds compensate damages that could have been insured.

In Austria, Spain, Greece and Sweden there are no payments from the public budget if there is insurance available. In Italy subsidized risks are excluded from public ad-hoc payments after natural disasters. In Romania and Portugal, disaster payments from the public budget are conditioned to farmers having bought some type of insurance. In France, payments include those damages for which there is no insurance at all or that insurance has not reached yet a significant diffusion level, independently of its being subsidized or not. In other countries there are no explicit regulations.

Table 2: Payments from calamity funds- and ad-hoc payments

Country	Years available	Total payment (M €)	Average payments /year (M€)	Comments
Austria	1995-04	55.9	5.6	Frost, drought, flood
Belgium	1985-02	29.4	1.6	Frost, drought, rain, pests
Belgium	1999	280	-	Livestock: dioxine (no average for the one time event used) !!
Bulgaria	2000-04	2	0.4	Insect pest control fund & others
Cyprus	2001-04	28.6	7.2	-
Czech Rep.	1995-04	369.3	36.9	Flood, drought, frost
Denmark	-	-	-	Storm & forest storm damage
Estonia	-	0	0	No payments
Finland	1996-05	114.2	11.4	Crop damage compensation scheme
France	1996-05	1,555.8 ⁽¹⁾	155.6 ⁽¹⁾	Drought 67%, frost 19%, rain 13%
Germany	-	-	-	no data
Greece	1995-04	701.0	70.1	-
Hungary	1999-02	48.8	12.2	Frost, drought
Ireland	1999-04	400.6 ⁽¹⁾	66.8 ⁽¹⁾	Livestock disease
Italy	2001-06	680.0	113.3	Drought and others not covered by insurance
Latvia	2000-05	19.3	3.2	Frost, drought, rain
Lithuania	2000-05	15.7	2.6	Frost, drought, rain
Luxembourg	-	-	-	No ad-hoc aids for crops. No other data
Netherlands	1998	250.0	-	Excessive rain; aids not allowed any more

Poland	-	10.0	10.0	Epidemic diseases
Portugal	last 10 years	30.0 ⁽²⁾	3.0 ⁽²⁾	-
Romania	last 5 years	56.8	11.4	Drought, frost, floods
Slovakia	-	-	-	no data
Slovenia	1995-04	97.8	9.8	Drought, hail, frost
Spain	2000-05	22.2	3.7	Frost, drought, rain
Sweden	-	-	-	Infectious diseases
UK	2001-05	1,897.7	379.5	Livestock disease (average without the high impact of 1.640 M€ in 2001 for foot and mouth disease would be 51.5 M€ !!)
TOTAL			904.3	

(1) The 50% of this amount comes from sector private contributions, through taxes on agricultural insurances (France) or from levies on the commercialization of the products (Ireland).

(2) Portuguese farmers also contribute to the calamities fund at the moment of buying insurance with a 0,2% of the insured value, but the amount refers only to Government contributions

Source: Prepared from information in the fact sheets provided by the experts in each country

7 An EU-wide insurance scheme under debate

We discuss some potential advantages, drawbacks and limitations of several options of EU-wide agricultural insurance schemes. However any a priori feasibility assessment of a hypothetical EU-wide scheme of agricultural insurance has a large uncertainty. The most important source of uncertainty is probably the farmers' behaviour.

7.1 Alternative options

Risk management tools available in the MS could be developed further to improve sustainability of farms. However, given the big differences in the agricultural risks, legal, social and economic backgrounds in EU countries, an EU-wide system of agricultural insurances can be debatable. Alternatives to a common scheme based on existing systems could be easier to manage and control by the EU administration. An alternative to a proper EU-wide scheme can be a set of actions to foster national systems by:

- Facilitating/subsidizing the composition of yield/income databases, at a detailed level (farm): The use of databases can be considered as a basis for improving the premium rating, although some of these databases have important limitations due to confidentiality rules.
- Reinsuring: Public re-insurance exists in some MS and in the US. Budgetary uncertainty may be the strongest limitation to a hypothetical public participation of the EU in reinsurance.
- Clarifying the framework. The draft of "Commission Regulation (EC) No .../... on the application of Articles 87 and 88 of the EC Treaty to state aid to small and medium-sized enterprises active in the production of agricultural products and amending Regulation (EC) 70/2001" is a significant step forward. To be mentioned in particular that, from 2010 onwards, aid to compensate bad weather losses shall only be exempted if the farmer has also taken out insurance for at least 50% of his average annual production (EC, 2006a).
- Partially subsidizing national systems which are within the framework: This option would stimulate MS to enhance risk management tools, while keeping a flexibility to adapt better the needs in each country.

7.2 The role of the public sector

A clear role of the EU institutions is setting up a regulatory framework, which includes technical criteria such as eligible risks, minimum deductibles or reference product prices

allowed, etc. There is also a role on the control of the approved regulations. A question more open to debate is whether agricultural insurances should be subsidised by the CAP. One of the elements of this debate is the feasibility of purely private agricultural insurances with a wide coverage of risks. There are examples of totally private insurance in agriculture, covering in particular hail damage. Most other insurance schemes are provided under subsidised governmental schemes because the risks being covered are, in fact, not insurable in the sense that a market determined premium would be too high (MOREDDU, OCDE, 2001). In countries, such as Spain, Austria and Italy, with a strong public support to agricultural insurance, systemic risks tend to become insurable.

7.3 Criteria to assess the feasibility

A feasible EU-wide insurance scheme should ideally meet several conditions. Some of these conditions relate to decisions of the policy makers (political criteria); others relate to decisions of the private sector, insurers, re-insurers and farmers (socio-economic); a third category of conditions have a more technical nature.

Political criteria

- Long term financial perspective: This condition depends on political decisions, but is obviously related with the possible cost of the system. Possible cost of different type of systems is considered later in technical criteria. A point that deserves in-depth debate is whether a hypothetical EU support to agricultural insurances can be framed in pillar 2 of the CAP, possibly through modulation. If introduced to the menu of rural development measures, these options would be available for Member States and regions to take up and use, according to their specific priorities for the next programming period. The causes of the weak development of market based risk management tools (insurance, futures market, contract farming) could be addressed by training measures within rural development programmes.
- Compatibility with WTO agreements and CAP: In general, the compatibility with the WTO and with the European legislation could be guaranteed for most tools if they meet the criteria of the 30% threshold and deductibles, and if there was a declaration of calamity by the government for the (single or multi-)peril or yield oriented products. The 30% thresholds and deductibles wouldn't be a big problem for income and for peril/yield based insurance products with high risks. However, for the support of crop insurance products, the need of an official declaration would be a hindering constraint. Crop insurance would not be compatible with the Green box with its current definition.

Criteria related to the behaviour of the private sector.

- A high proportion of farmers should be expected to buy the insurances at medium-long term. There is a high uncertainty level on this criterion. Some studies report that farmer's behaviour does not always conform to theory and that there is a need to better understand farmers' attitude toward risk and the way they adjust their farm operations (MOREDDU, OCDE, 2001, MEUWISSEN ET AL. 1999, MC CARTHY, 1998). Mentality of farmers often evolves slowly. In the US, the system started in 1938 and only in the last years it has reached a high level of penetration (74% of insurable production value). In Spain (law approved in 1978), the system offers a wide range of subsidized options for all types of crops, but the penetration is still less than 30%.
- Acceptable to insurers/re-insurers: Support to insurances systems should be always welcome by the insurance sector. But there are two points to take into account: Some insurance products (index insurance, yield insurance, revenue insurance) are not developed because of the systemic character of risks (need of public support for re-insurance).

Second, a common system would involve a cost for the companies to adapt to it. The insurance sector seems to back the coexistence of national systems rather than the implementation of a single EU system.

Technical criteria

- Meet the needs of farmers: The analysis of income variability with FADN data shows a heterogeneous geographic pattern of the need for income stabilisation tools, depending on farm types and farm sizes. The available range of existing insurance is generally insufficient to smooth significant income reduction in bad years.
- Cost: The possible amount of premiums of an EU-supported insurance system has been roughly quantified for a few hypothetical scenarios, under given assumptions (penetration of insurance of 40% - 60% and average premium rates). Yield insurance for field crops (cereals, oil seeds, sugar beets, and fodder on arable land) could represent a volume of premiums between 1 B€-1.4 B€. An EU-wide system for fruits with similar characteristics to the existing systems in Spain, Italy or Austria could mean 500 M€ to 900 M€ premiums. A similar amount (500 M€ to 800 M€) might be involved in a potential system for vegetables. An area-index insurance for cereals could lead to 450 M€ to 750 M€, while an area-index insurance for a reduction of more than 10% of the average income for specific farm types in FADN regions might correspond to 2-3 B€. In this case we have included livestock farms that have not been considered in the other quantified scenarios. It should be stressed that these quantifications have been made with assumptions that do not necessarily match the choices of a hypothetical political decision. More focussed quantifications are needed when/if such possible scenarios are better defined. For the budgetary impact, additional assumptions are required on the subsidy rate. If we assume for example a 50% subsidy, shared between the Member State and the CAP, the budgetary impact on the CAP would be 25% of the mentioned figures.
- Feasibility/simplicity of control systems to avoid malfunctioning. If a risk management program would be introduced as compulsory tool (parallelism with the cross-compliance), MS would be probably responsible to create risk information programs. Potential fraud by farmers would be controlled by insurance companies that would be the first losers in case of fraud.
- Technical feasibility and database information availability. In theory, any system that exists in one country can always be applied in others. However, some insurance products require databases that are not always available. For example the US approach to revenue insurance requires historical yield data at the farm level that are not available in most EU countries.
- Asymmetric information: potential adverse selection, moral hazard or other problems. The farmer knows better the own risk level than the insurance company, and it can happen that only farmers with a high level of risk buy the insurance. Consequently the risk in the insured population is higher than the average. To limit this problem, detailed databases are necessary. The possible public support to build such databases should be discussed.
- Have advantages compared with alternative tools: Insurance provides farmers with a legal title to get compensation compared to ad-hoc payments from the public sector. It also provides a quicker payment of compensations, the average time of payment being of around 2 months while ad-hoc aid can take 1-2 years. Private insurance probably gives indemnities more adjusted to the farmers' real losses, on an individual basis, because the insurance company tries to optimize the own profit. Subsidizing agricultural insurance is a way to stabilize the budgetary impact on the public sector and to provide farmers a means to manage their own risk management strategies. From an economical point of view it seems that it is easier to plan a financial support to insurance premiums, than to make public ex-post payments for compensation after natural disasters. However, critical views

support that the global cost of insurances is higher because of the cost of loss adjustment, and that subsidizing agricultural insurances means subsidizing insurance companies. Another point of view holds that with a public system (ad-hoc aids), the Administration is in charge of damage assessment, etc. Supporting an insurance system transfers this responsibility to the companies that have a profit in compensation of this service. For example, in the US, the profit of companies ranges from -30 M\$ to 400M\$/year with an average of around 200 M\$/year in a program with a total cost of approx. 4000 M\$/year. In the case of mutual insurance (insurance companies partially or totally owned by the farmers and not focused on profit maximization, for example in Austria) most of the profit has to be used as reserves for bad years and even given back to the farmers when these reserves reach a maximum level.

8 Conclusions

This study highlights the high diversity of agricultural insurance systems in the EU. The level of risk is also very heterogeneous from country to country, from one farm type to another and from small to large farms. The development of agricultural insurances in each country is linked to the needs (risk level), but the MS policy to support the system is also a decisive factor. For non-systemic risks (hail), private sector offers suitable insurances, but for insurance products offering a wide coverage, there is a direct relationship between development and public support. The development of insurances in the livestock sector is generally lower than in the crop sector. Livestock risk management relies on sanitary assistance programs; major crises (diseases with high externalities) are covered by public aids.

Climatic risk analysis has been undertaken, but it still needs to be improved to derive solid conclusions at the appropriate scale (farm level or comparable geographical level).

The total amount of premiums in the EU agricultural insurances is around 1.5 B€ with a public subsidy of approximately 500 M€. The average amount of compensations for losses by farmers is close to 1.1 B€. The total amount of ad-hoc aids for which we could collect data is slightly above 900 M€, but many countries did not provide data on ad-hoc aids for livestock. Therefore this figure is probably strongly underestimated.

Some hypothetical scenarios of EU-wide insurances have been quantified, but the level of uncertainty is very high. Some feedback on the possible EU decisions is necessary to reduce the uncertainty.

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Annex 1: Livestock insurance products

Country	Insurance product name	Products covered	Risks covered
Austria	"Grassland"	Grassland and silo foils	Hail, flood
	"Livestock"	Cattle	Stillbirth and death (epidemic disease excluded)
Bulgaria	"Livestock" (Combined)	Cows and buffalos, sheep, goats, poultry	Death and compulsory slaughter from: fire and natural catastrophes; parasitic and infectious diseases (OIE list B & others)
Czech Republic	"Livestock insurance"	Livestock	Contagious diseases, death by electrical injury, flood, poisoning, overheating, individual losses (non infectious)
Denmark	"Aggregated insurance"	Acreage and crops, livestock, operating equipment and buildings.	For livestock: Fire, theft, water, operating losses, accident and a few diseases (such as botulism)
Estonia	"Cattle insurance"	Cattle	Fire and natural disaster, accident, theft, diseases
Finland	Salmonella insurance (group insurance)	Pigs, poultry, hatcheries, milk and beef cattle	Damage covered include costs due to eradication of salmonella and losses in production for a period of six months
	Group insurance for pig diseases	Pigs	Salmonella, PRRS (porcine reproductive and respiratory disease syndrome), enzootic pneumonia, swine dysentery, scab, and atrophic rhinitis
	Livestock insurance	Livestock	-Death of an insured animal -Severe illness or accident, which according to a veterinary specialist, results in the inevitable and premature culling of the animal - Animal is lost or stolen for a longer time period than one month - Emergency slaughter - Accident insurance for cows covers damages due accident Etc.
Germany	"Livestock"	n.a.	n.a.
Greece	"Public livestock" (is not insurance)	All farm animals (voluntary for pigs % poultry)	Climatic, wild animals, diseases (long list)
	"Private livestock"	Bovines, poultry (also sheep-goats & pigs available)	All risk mortality

Country	Insurance product name	Products covered	Risks covered
Hungary <i>Individual insurance schemes tailored to the demands of customers are available</i>	“Natural disaster and elemental loss livestock insurance”	Cattle, swine, sheep, goat, horse, goose, chicken, hen, turkey, galeeny, pheasant, mallard	Fire, thunder stroke, storm, hail, flood, earthquake, landslip, stonefall, earthfall, cave of an unknown hole, breakdown of water and steam pipes.
	“Cost completeive livestock insurance”	Cattle, swine, sheep, goat, horse, goose, chicken, hen, turkey, galeeny, pheasant, mallard	Extra costs deriving from diseases are covered. Coverable diseases: BSE, food and mouth disease, aphthous stomatitis, oriental rinderpest, cattle infectious lung inflammation, Rift valley fever, blue-tongue disease, lyssa, SVD, African swine plague, infectious swine paralysis.
	“Insurance of high value horses”	High value horses	
Ireland	“Farm insurance”	Among other farm items and products, covers optionally livestock in transit, pedigree livestock, etc.	Fire, lighting, storms, floods, attack of dogs on sheep
Italy	“Stock Farms”	Cattle and buffalo (value, cost disposing of animals, lack of revenue for period of farm stoppage)	FMD, brucellosis, pleuropneumonia, tuberculosis and enzootic leukosis
Latvia	“Livestock insurance”	Cattle, Sheep, Goat, Horses, Pigs, Fur animals, Bees, Poultry	Disease, Accidents, Damages caused by natural disasters, Fire, Flash of lighting , Explosion, Illegal activities of third parties
Lithuania	“Livestock insurance”	Livestock, horses, sheep, goats, pigs; several companies also include bees, birds, fishes	Non-communicable diseases, Infectious diseases, Natural forces or accidents, Theft or vandalism
Poland	“Livestock”	Cattle, horses swine (separate ins. for fur-bearing animals, apiary, fish also exist)	Death & forced slaughter due to non-epidemic diseases, accidents, and natural events
Romania	“Livestock insurance”	Animals, birds, bees, fish	Surgical diseases, obstetrics and internal diseases, wild animal attacks, fire, thunderstorm
Slovenia	“Animal insurance”	Animals	Ruin from disease or accident, emergency slaughter, slaughter from economic reasons
Spain	“Livestock farms”	Cattle, Horses, Sheep-goats Poultry	For cattle: accidents and epizooties For poultry: accidents, asphyxia and panic
	“Dead animals disposal”	Cattle, Horses, Sheep-goats, Pigs Poultry, Rabbits	All disposal costs

Country	Insurance product name	Products covered	Risks covered
	"Index insurance"	Cattle, Horses, Sheep-goats Apiculture	Increase of feeding costs. Apiculture: also fire, flood and rains
Sweden	Animal insurance	Cattle, sheep, pigs, deer	Slaughter, death, theft (optional add-ins: veterinary treatment; milk production breakdown due to viral diarrhoea)
United Kingdom	Livestock insurance	Livestock	Foot and Mouth Disease, Tuberculosis, Brucellosis, Classical Swine Fever
Croatia	Livestock insurance	Livestock	Death due illness or accident, emergency slaughtering, euthanasia
Turkey	Livestock life insurance (since 2006)	Dairy cows	All types of accidents, natural disasters, fire or explosion and all diseases, pregnancy, birth or surgical operations. Contagious diseases compulsory to declare are excluded
	Poultry life insurance	Poultry produced in closed systems (chicken/hens, turkeys, ostrich)	All types of accidents, natural disasters, fire or explosion and all types of poultry diseases. Contagious diseases compulsory to declare are excluded

Source: BIELZA ET AL., 2006

Annex 2: Aquaculture insurance products

Country	Insurance type	Products covered	Risks covered
Greece	Private aquaculture	All fish. Additional: for fish stock in transit, equipment, vessels, etc.	All risk mortality, theft, escape over
Lithuania	Livestock insurance	Several companies also include bees, birds, fishes	
Poland	Livestock insurance	Apiary and fish coverage also exist	
Romania	Livestock insurance	Also covers birds, bees, fish	
Spain	"Aquaculture"	Meteorologic exceptional happenings, chemic pollution, lighting, sea storm, flood, oil spill. Additional guarantees: diseases	Gilthead bream, bass, turbot, meager, trout, mussel
Turkey	Aquaculture		

Source: BIELZA ET AL., 2006