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ECONOMIC IMPACT OF RICE BLAST ON THE ITALIAN RICE PRODUCTION

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TARGET OF THE STUDY

The present study, starting from analyzing the importance of rice in Italy:

- describes **rice blast spread** and **damages** on different rice varieties
- analyses the **possible defense strategies** and their **adoption by the rice-growers.**

Based on such info collected from official sources and direct survey, a simulation model has been tuned with hypothetical scenarios to **assess the economic impact of changes in the current chemical-based strategies to control rice blast.**

The study was carried out together with: University of Milan, Ente Nazionale Risi, Ente Nazionale Sementi Elette (INRAN-ENSE), Agro-sfera

OUTLINE

- **The rice blast and the Italian rice industry**
- **Rice growers' perception of rice blast epidemics (survey)**
- **Current protection strategies against rice blast**
- **Future possible scenarios for control of rice blast**

THE RICE BLAST AND THE ITALIAN RICE INDUSTRY

WHY ITALY?

- Italy is the European leading rice producer (48% of the EU production volumes) and exporter (38% of the EU rice exports).
- The Italian rice is popular and well-known worldwide for its unique varieties and quality

WHY THE RICE BLAST...?

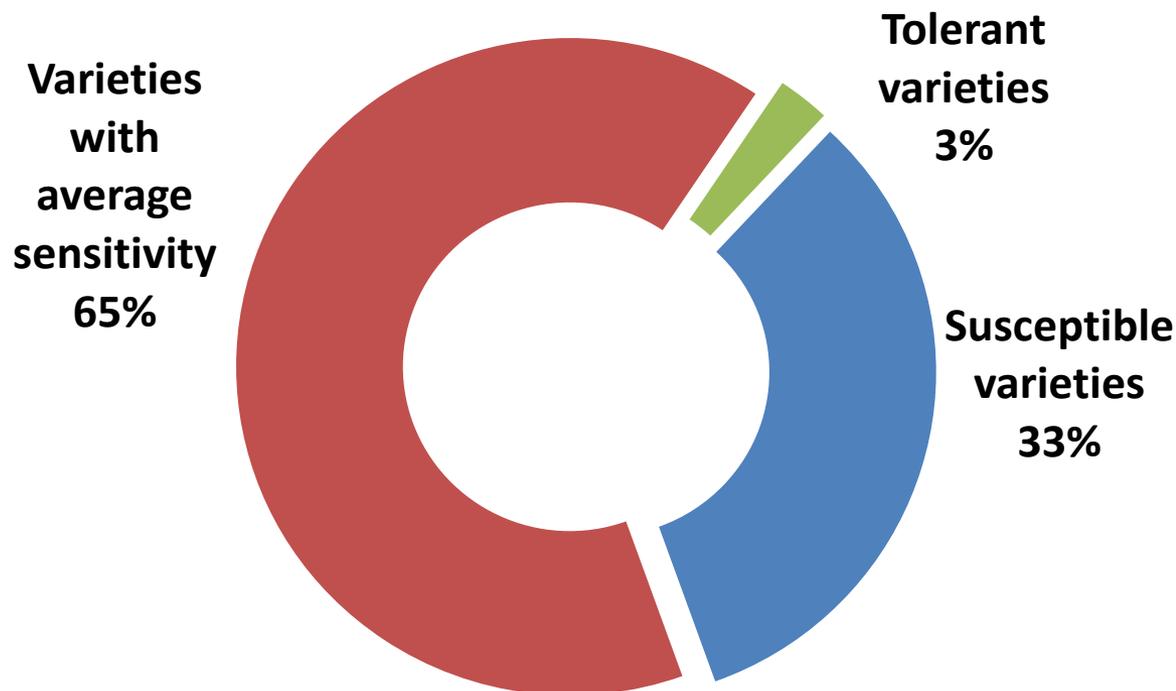
The Rice blast is a disease brought by the pathogenic fungus *Magnaporthe oryzae*. It is one of the most destructive diseases of rice worldwide. Its attack on rice seriously affects:

plant growth

grain yield

grain quality

ITALIAN RICE VARIETIES SENSITIVITY TO RICE BLAST



Rice cultivated area (2009):
230,848 ha
 (excl. experimental varieties)

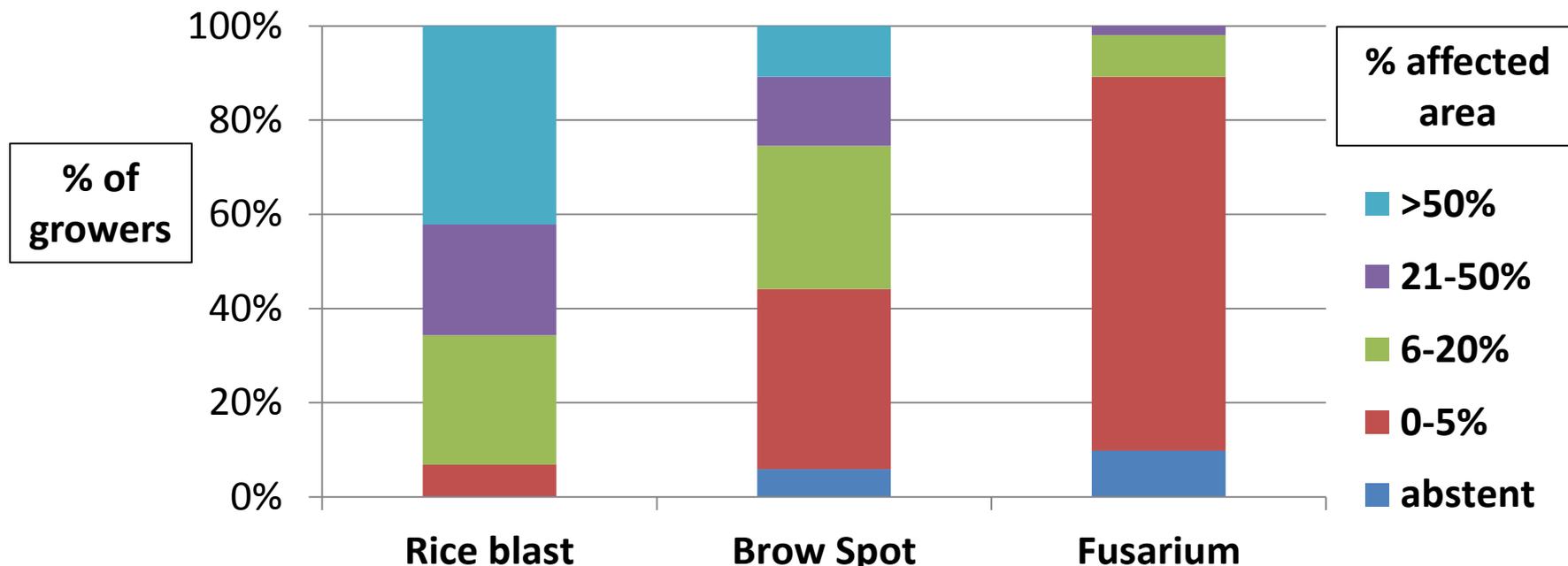
Source: Ente Nazionale Risi, 2009

Most of the rice varieties cropped in Italy (around 90%) is susceptible (high susceptibility or medium susceptibility) to rice blast. High quality varieties to make “risotto” are included as well.

In general all the varieties cropped in Italy show medium-high susceptibility

THE SPREAD OF RICE FUNGAL DISEASES

The rice growers' perception : spread of rice fungal diseases (2009)

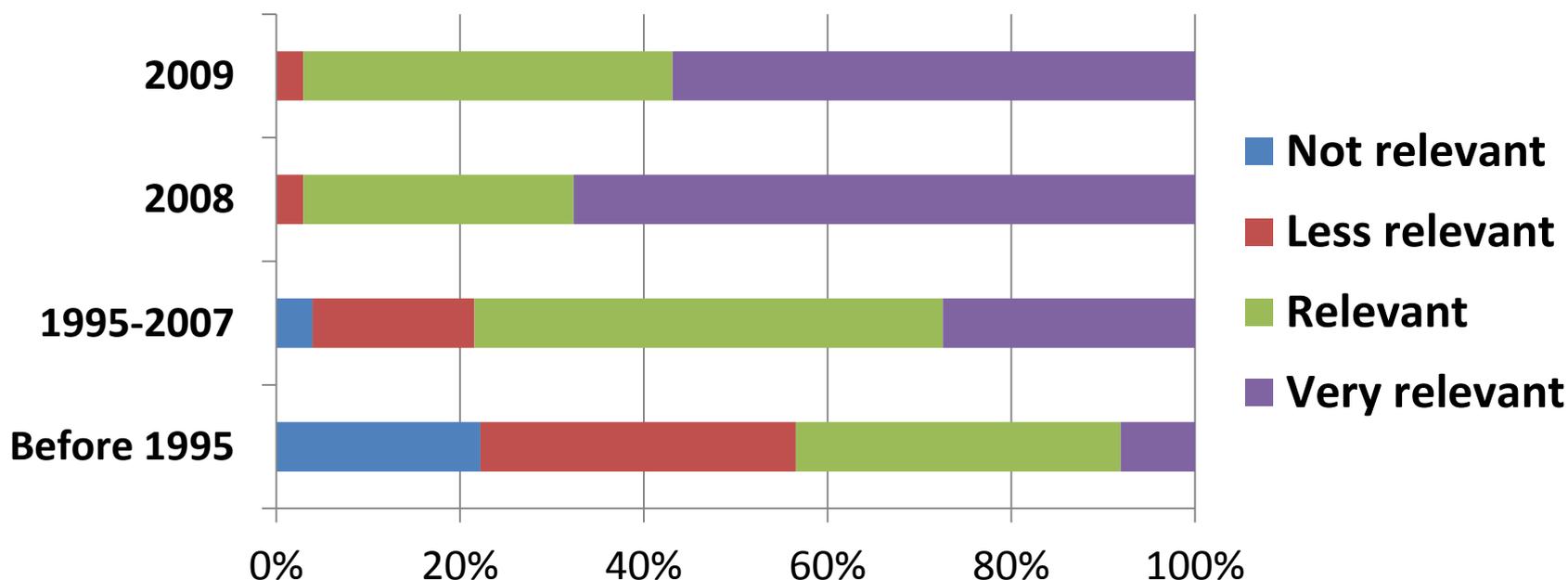


For rice growers rice blast is the **most spread fungus disease**:

- ✓ More than 40% of farmers said that rice blast affects more than 50% of cultivated area.
- ✓ Significantly lower is the perceived seriousness of other fungal diseases (*Helminthosporium oryzae*, *Fusarium*): less than 20%.

INCREASING SPREAD OF RICE BLAST EPIDEMICS

The rice growers' perception : spread of rice blast epidemics (2009)

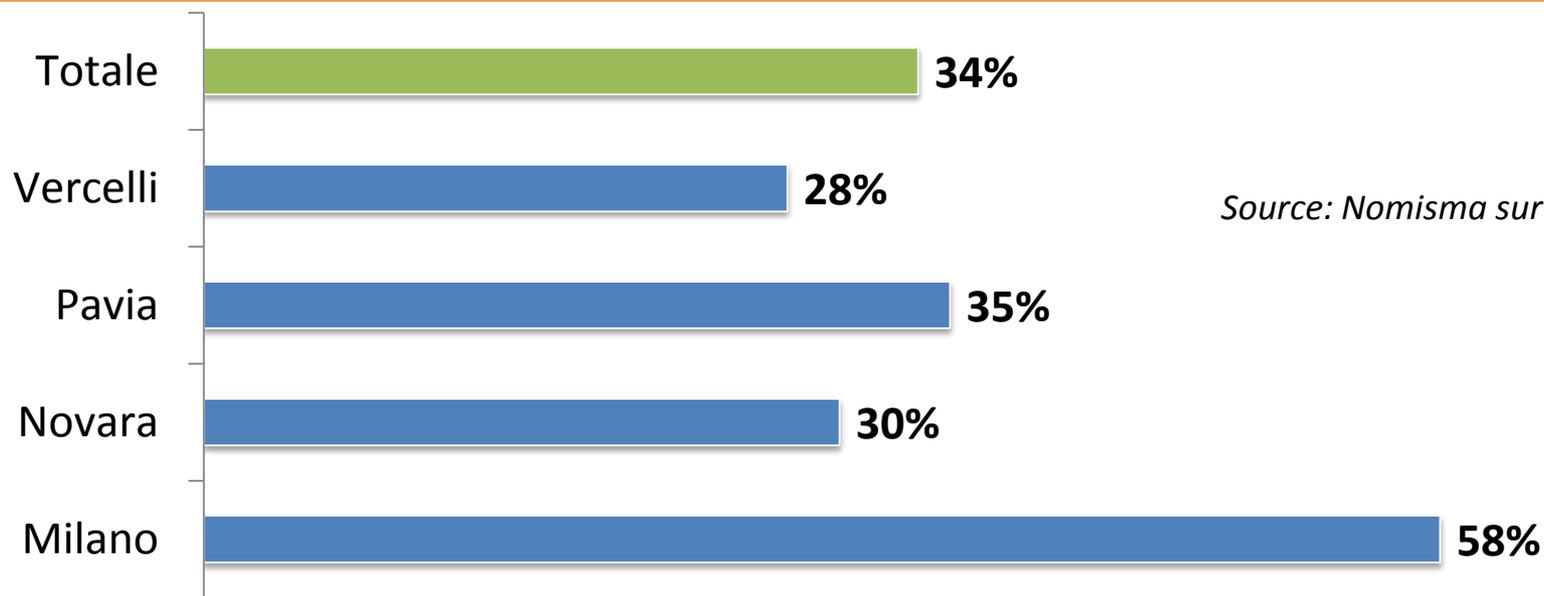


The rice blast has increasingly spread for the last 15 years, becoming relevant and very relevant to 97% of the Italian rice growers

Source: Nomisma survey, 2009

IMPACTS ON RICE PRODUCTION

Rice growers' perception: Crop loss in case of no-treatments against the rice blast (2009)



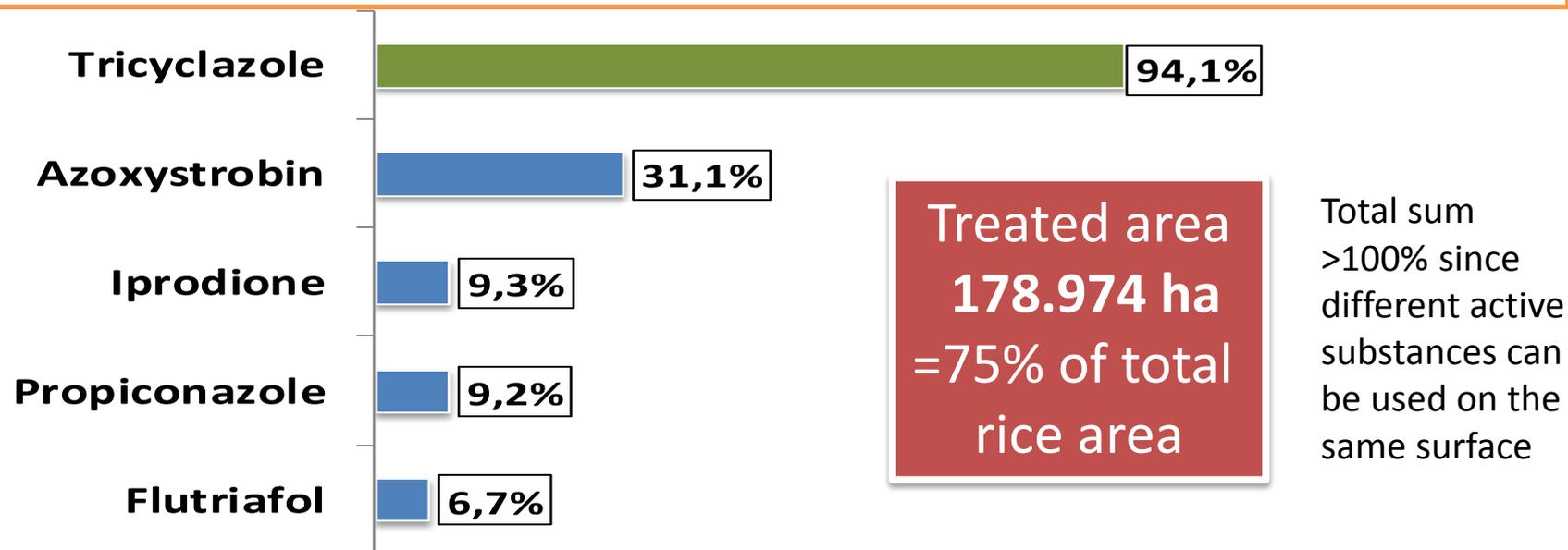
Source: Nomisma survey, 2009

Rice growers estimate an average yield loss of 34% in case of no treatments against the rice blast.

Moreover, about 80% of them report reduction in the grain quality

ACTIVE SUBSTANCES EMPLOYED AGAINST THE RICE FUNGAL DISEASES

Percentage use of different active substances on the total surface treated with fungicides (2009)



The Tricyclazole (TCA) is used (alone or in combination with) on 94,1% of the treated area. The Azoxystrobin reaches 31,1%, despite often combined with TCA (24% of the treated area).

Iprodione and propiconazole: authorized for brow spot only, not for rice blast. Mainly used in association with TCA or azoxy.
 Flutriafol: authorized for both brow spot and rice blast but mostly used to control the brow spot.

THE SCENARIO ANALYSIS

TARGET

Assess the economic impact of potential changes in the current chemical-based strategies to control rice blast.

SCENARIOS

- **CURRENT SITUATION:** spread of treatments in 2009.
- **SCENARIO 1:** conversion of hectares treated with TCA into areas treated with Azoxy (*if TCA withdrawn from the market*).
- **SCENARIO 2:** conversion of all the surface areas treated with fungicides into untreated areas (*if lack of effective fungicides against rice blast*).

EFFECTS

1. **Overall effect** in Italy and in the typical rice regions (impact per area and per hectare).
2. **Effects in case of “serious epidemics”** per defined area/rice varieties (with 4 case studies).

THE SCENARIOS - DISTRIBUTION OF AREA IN THE VARIOUS SCENARIOS

HECTARS	No-treatments	TCA	Azoxy	TCA + Azoxy	Total
CURRENT SITUATION	56.691	88.002	11.211	72.514	228.419
	25%	39%	5%	32%	100%
SCENARIO 1	56.691	-	171.727	-	228.419
	25%	0%	75%	0%	100%
SCENARIO 2	228.419	-	-	-	228.419
	100%	0%	0%	0%	100%

IMPACT ASSESSMENT: OVERALL EFFECT

TOTAL VALUES

		Production	Production value	Costs
		.000 ton	€ mil	.000 €
CURRENT SITUATION		1.396	416	15.676
SCENARIO 1	Var.	-101	-30	162,7
	% var.	-7,3%	-7,3%	1,0%
SCENARIO 2	Var.	-416	-125	-15.676
	% var.	-29,8%	-29,8%	-100,0%

VALUES PER HECTARE

		Production	Production value	Costs
		ton/ha	€/ha	€/ha
CURRENT SITUATION		6,1	1.823	69
SCENARIO 1	Var.	-0,4	-132	0,7
	% var.	-7,3%	-7,3%	1,0%
SCENARIO 2	Var.	-1,8	-546	-69
	% var.	-29,8%	-29,8%	-100,0%

SHORT AND LONG TERM IMPACTS

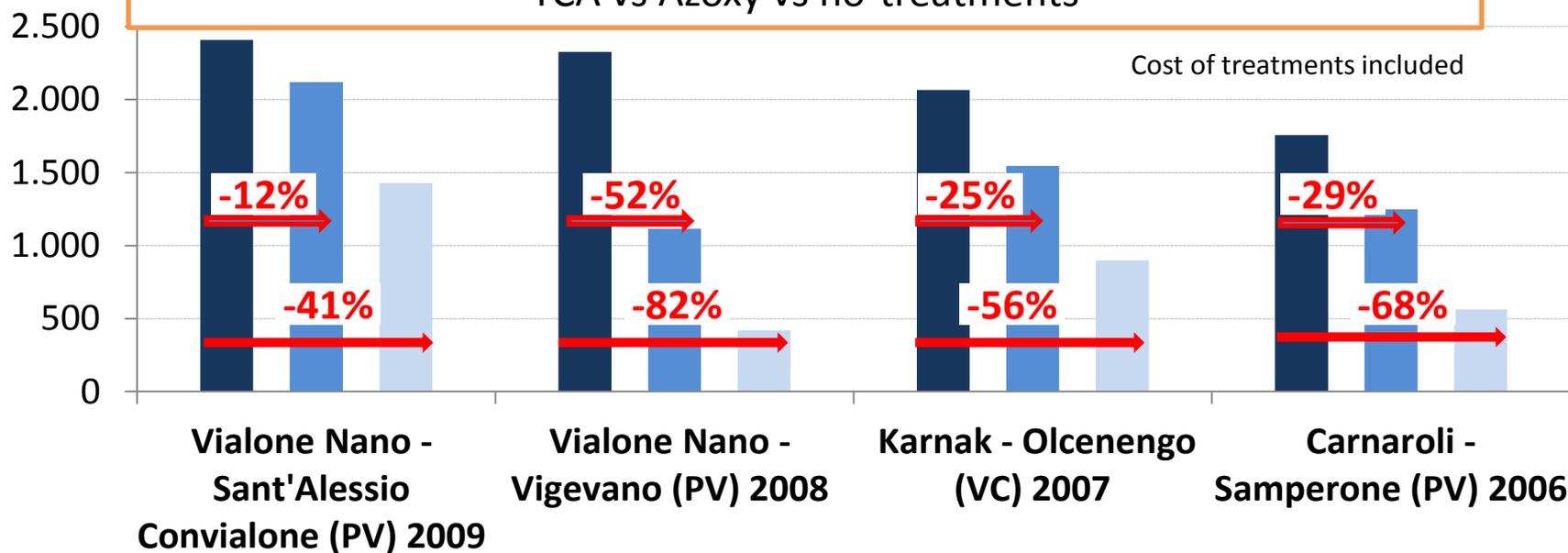
short term, resulting in a negative impact on the Italian rice sector (with more serious effects in certain regions) → SCENARIO 1

medium term, resulting in possible weakening of fungicides against rice blast due to high resistance development (increased selection pressure on the pathogen caused by repeated use of fungicide). Therefore 75% of the national rice area would also become unprotected. → SCENARIO 2

IMPACT ASSESSMENTS: SEVERE EPIDEMICS (CASE STUDIES)

Change in production value per hectare (€/ha) in 4 case studies

TCA vs Azoxy vs no-treatments



■ Treated with TCA

■ Treated with Azoxy

■ No treatments

In case of particularly sensitive rice varieties and in presence of strong epidemics the production and economic performances of the crop tend to be distinctly more negative compared to average data.

FINAL REMARKS/1

CONTROLLING THE RICE BLAST

- The disease is increasingly spreading and worries the rice growers for its impact on the plant growth, on yields and on the grain quality
- Most of the rice varieties cropped in Italy (around 90%) is susceptible (high susceptibility or medium susceptibility) to rice blast.
- 75% of the Italian rice area is treated against the rice blast
- Tricyclazole and Azoxystrobin are the most used active substances employed by the Italian rice growers against the rice blast
- FRAC (Fungicides Resistance Action Committee) reported rice blast among plant pathogenic organisms resistant to disease control agents. In the FRAC code list 2015 tricyclazole is classified as 16.1 (resistance not known), azoxystrobin as 11 (high risk of resistance).

FINAL REMARKS/2

THE ITALIAN RICE SUPPLY CHAIN

- Rice is a very relevant crop for the whole Italian agricultural and food industry and particularly for the economy of specific regions (Piedmont and Lombardy)
- The rice supply chain is characterized by its strong links with the national processing industry that adds value to the Italian raw material both in domestic and foreign markets.
- At national level and especially in the Italian regions specialized in rice cultivation, any negative effect on rice cultivation and on ancillary activities would be significant, potentially compromising the whole economic equilibrium.

FINAL REMARKS/3

THE ECONOMICS OF CONTROLLING THE RICE BLAST

- Controlling the rice blast means preserving the rice growers' income. Avoiding to treat rice against rice blast causes major crop loss and drop in revenue (-125 millions €)
- The improved productivity widely compensate for the cost of the treatments
- Different plant protection strategies show differences in the crop yield and grain quality thus with different effects on the farmers' revenue
- In case of very sensitive rice varieties and very serious rice blast epidemics, the rice production performances would be further penalized and rice-growers would face a substantial drop in their income.
- Rice growers' income is also seriously affected by the effect of the new CAP reform. Between 2015 and 2020, the new direct payment scheme will gradually cut the (average Italian) rice farm direct payments by more than € 200.

THANKS FOR YOUR ATTENTION!!

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