

PROS AND CONS OF GMO FOODS

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GMO's

- **organisms “in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination” (EC, 2001).**
- **first stages - products different as DNA/characteristics of the conventional mother organisms (from which they came).**
- **the current GM techniques make difficult the differentiation of the transgenic organisms from those which are conventional.**
- **difficulties in identification of transgenic organisms, the methods based on the authentication of DNA being inefficient.**

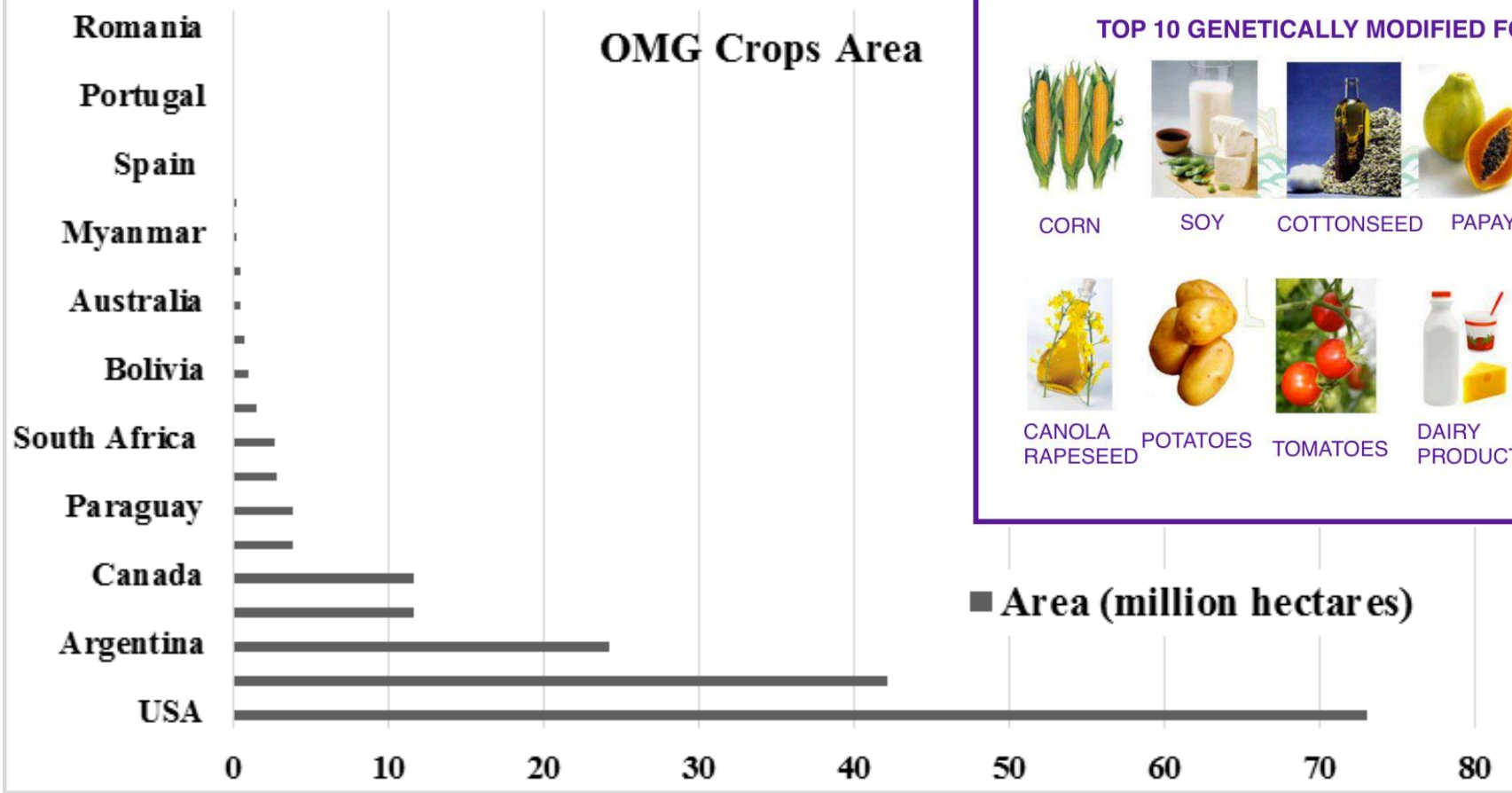
In the World....

- 1.7 million hectares in 1996 /6 countries
- 181.5 million hectares in 2014/28 countries (ISAA Reports, 2015)
- annual rate of increase of 3-4%.
- developing countries - adopted rapidly the GMO's
- 16.5 million little farms - 65 million people (ISAA, 2014)
- Bangladesh - approved the cultivation of the transgenic plants/2014
- 2015 Vietnam and Indonesia approved the commercialization of the GM crops (obtained in 2014).
- more than 75% from the total of the GMO cultivated areas on a global scale
 - **USA - 40,3%,**
 - **Brazil -23,3%**
 - **Argentina - 13,4% .**
 - **Romania -50,000 ha (genetically modified maize)**



Global Area of Biotech Crops in 2014

OMG Crops Area



TOP 10 GENETICALLY MODIFIED FOODS



binspired2

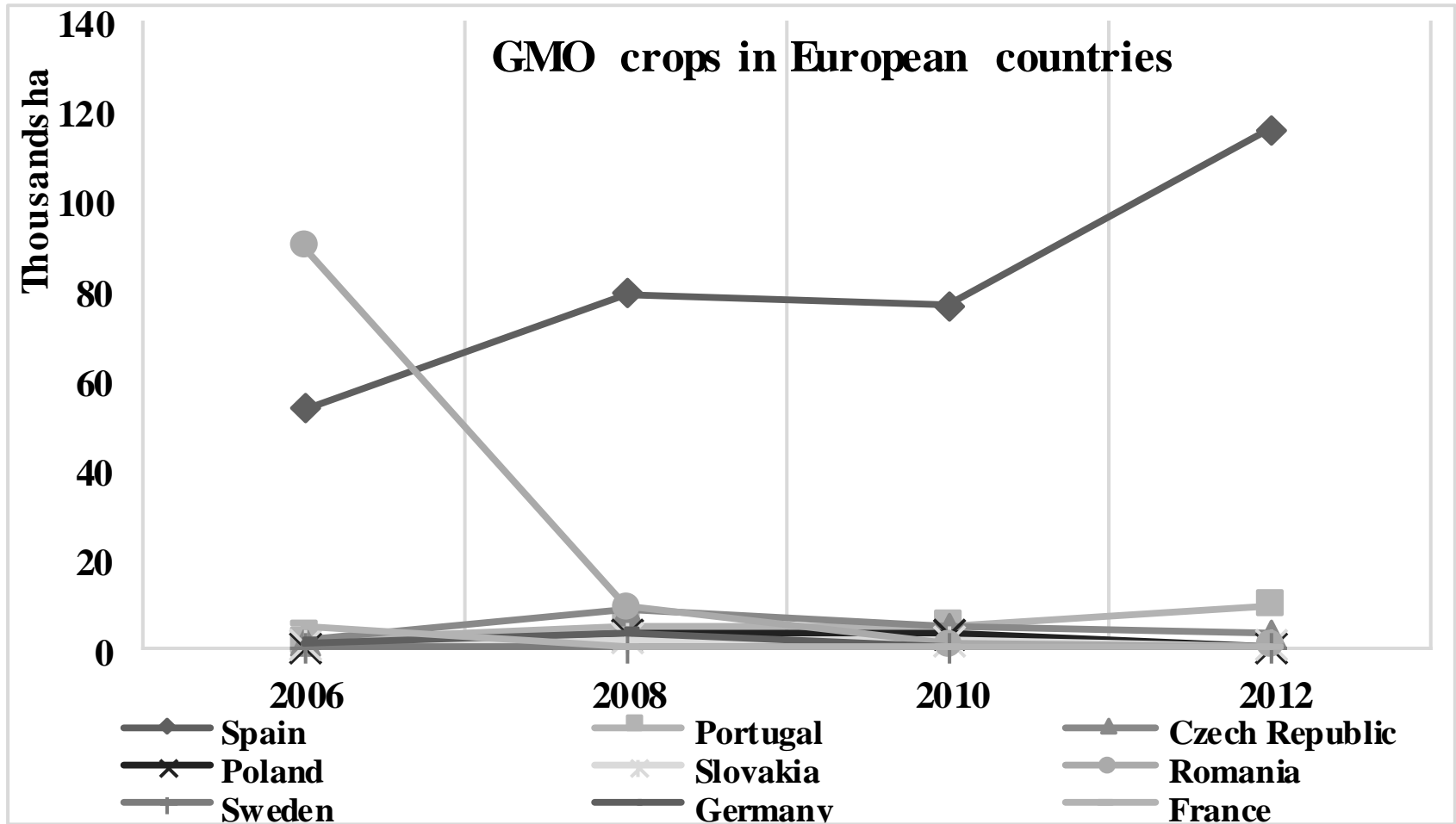
....and in Europe

- precaution on the cultivation/use of the transgenic plants.
- rigorous process of approval
- 48 GMO"s authorized on EU market (cotton 7, maize 28, modified microorganisms 2, oilseed rape 3, soybean 7, sugar beet 7)
- 1998-2015 - 5 transgenic plants approved for EU farms
- 2015 - BT corn/Monsanto
- Spain (116,306 hectares), Portugal (9,278 hectares), The Czech Republic (3, 052 hectares), Romania (217 hectares) and Slovakia (189 hectares) use GMO" s crops
- 1.35 % /9,5 million hectares of corn cultivated in the EU
- 0.23 % from the 55,1 million hectares of corn genetically modified in the world
- Austria, Bulgaria, Greece, Germany, Hungary, Italy, Luxembourg and Poland adopted measures of safeguarding

EU - Precaution on the cultivation/use of the transgenic plants/Restrictions on Research, Production, and Marketing

- (1) to protect human and animal health and welfare, consumer interests, and the environment, as required by articles 168 (public health), 169 (consumer protection), and 191 (environment) of the Treaty on the Functioning of the European Union (TFEU);
- (2) to ensure that authorized GMOs, or genetically modified (GM) products derived from a GMO may circulate freely within the EU and the European Economic Area to ensure their effective functioning
- (3) Regulation CE 1830/2003 - traceability and labelling of the GMO's. (for higher than 0, 9% GM).
- (4) zero- tolerance policy for GMO not approved on the EU market

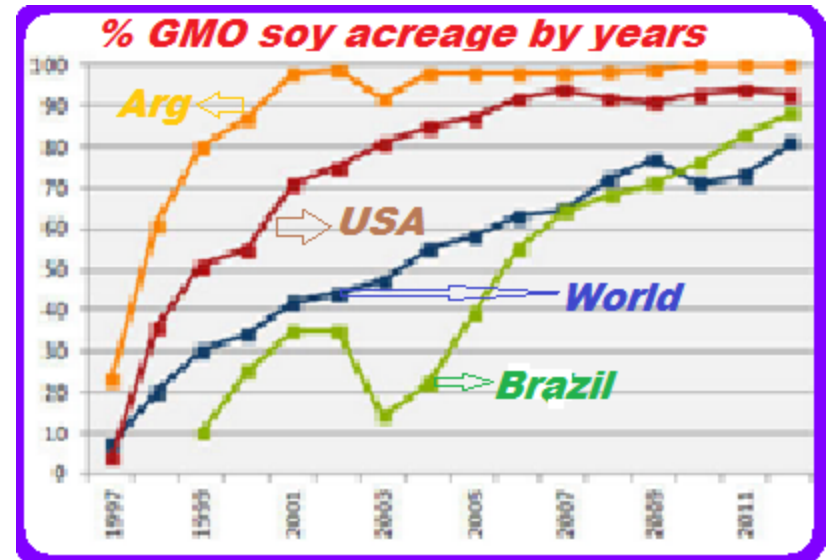
Areas GMO's cultivated in Europe



GM soya crops in Romania

1998 – 2007 in Romania, 14 varieties of transgenic soya approved for cultivation

	2004	2005	2006
GM Soybean cultivated area (ha)	5523	87600	137275.5
GM Soybean plant varieties Glycine max. (L.) Merrill	AG160, DKB94, PR92B, S148, PKB	PR92B, S148, S099	DKB94, PR92B, S148

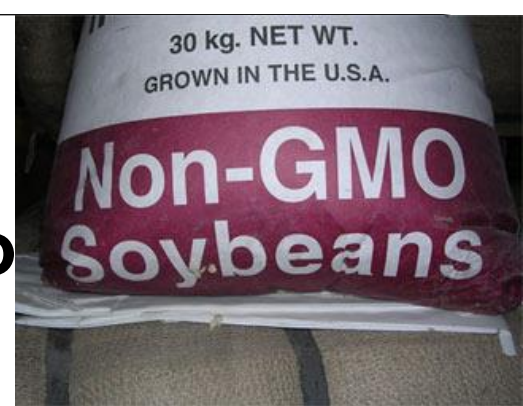


Economic analysis of using GM HT soybeans in Romania (€/ha)

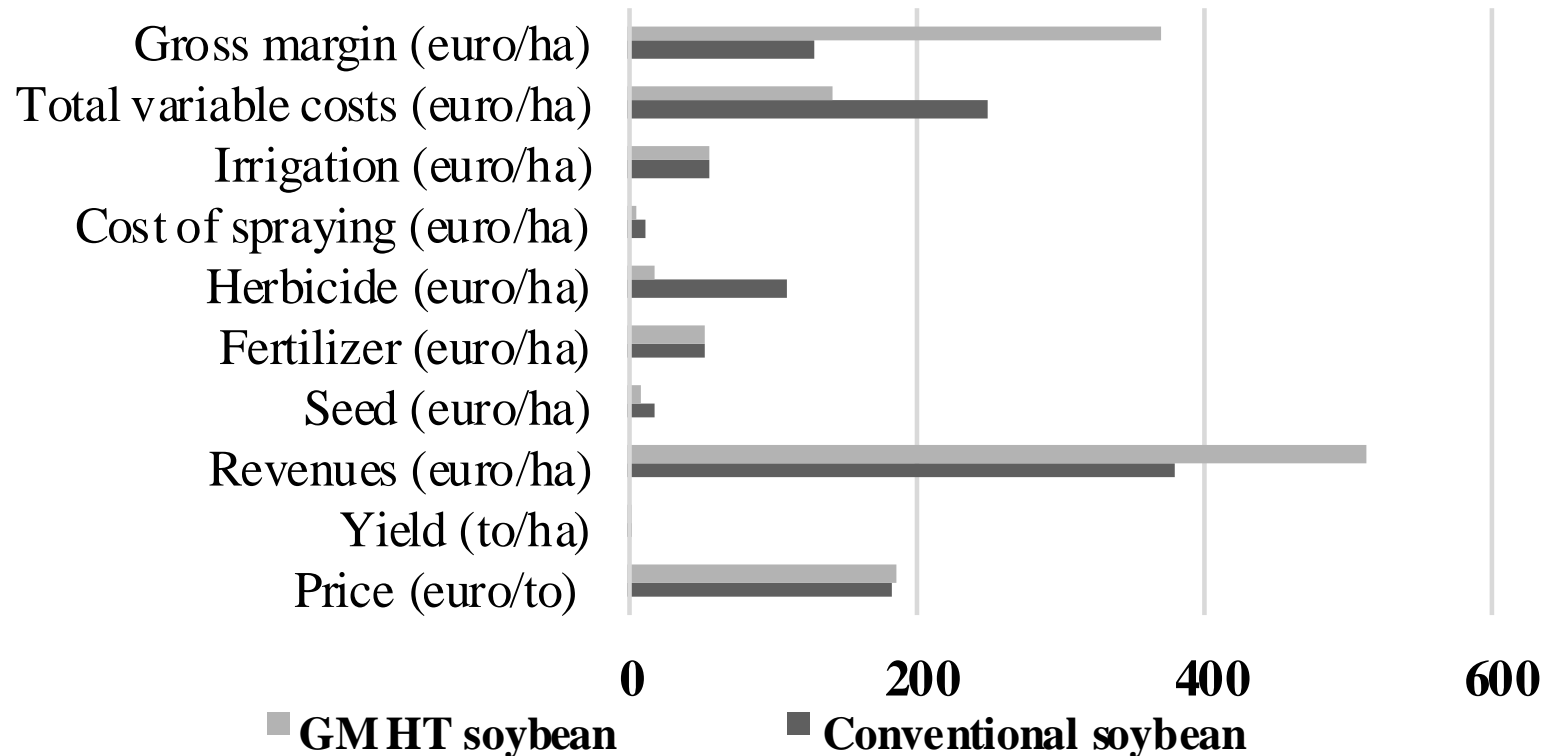
(Brookes 2005)

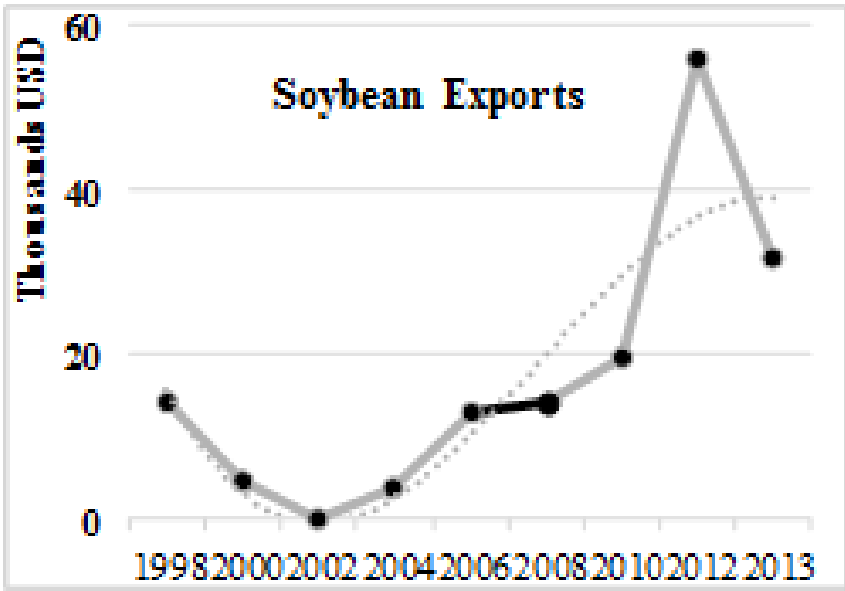
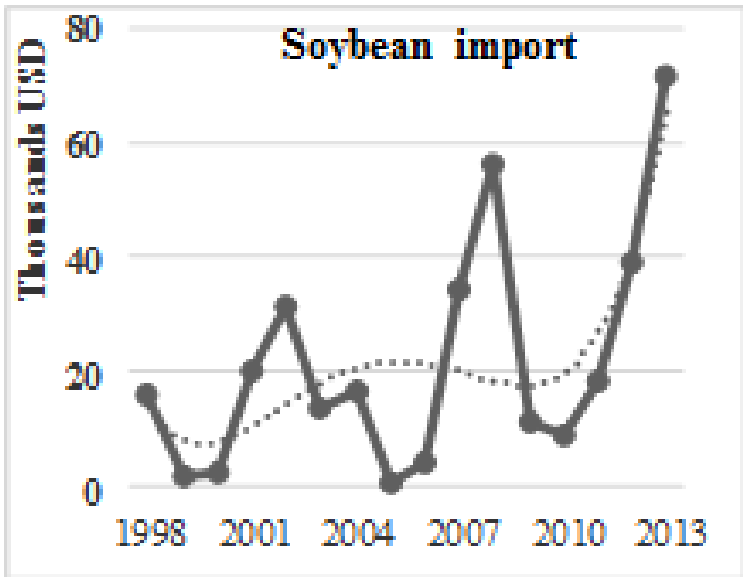
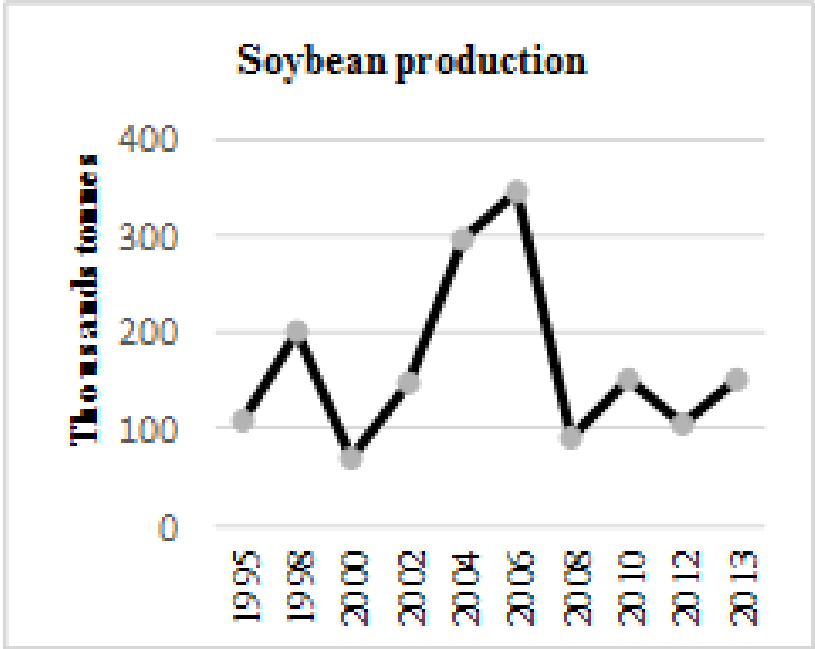
	Farms smaller than 5000 ha		Farms larger than 5000 ha	
	Conventional	GM HT	Conventional	GM HT
Seed	45 (40–50)	Not applicable	40.5 (27–54)	Not applicable
Herbicide	152 (124–180)	Not applicable	109.5 (91–128)	Not applicable
Total cost of seed and herbicide	197 (164–230)	141.5 (135–148)	150 (118–182)	110
Cost of spraying	12 (9–15)	6	10.5 (9–12)	6
Total	209 (173–245)	147.5 (141–154)	160.5 (127–194)	116

GM versus conventional soybean cro

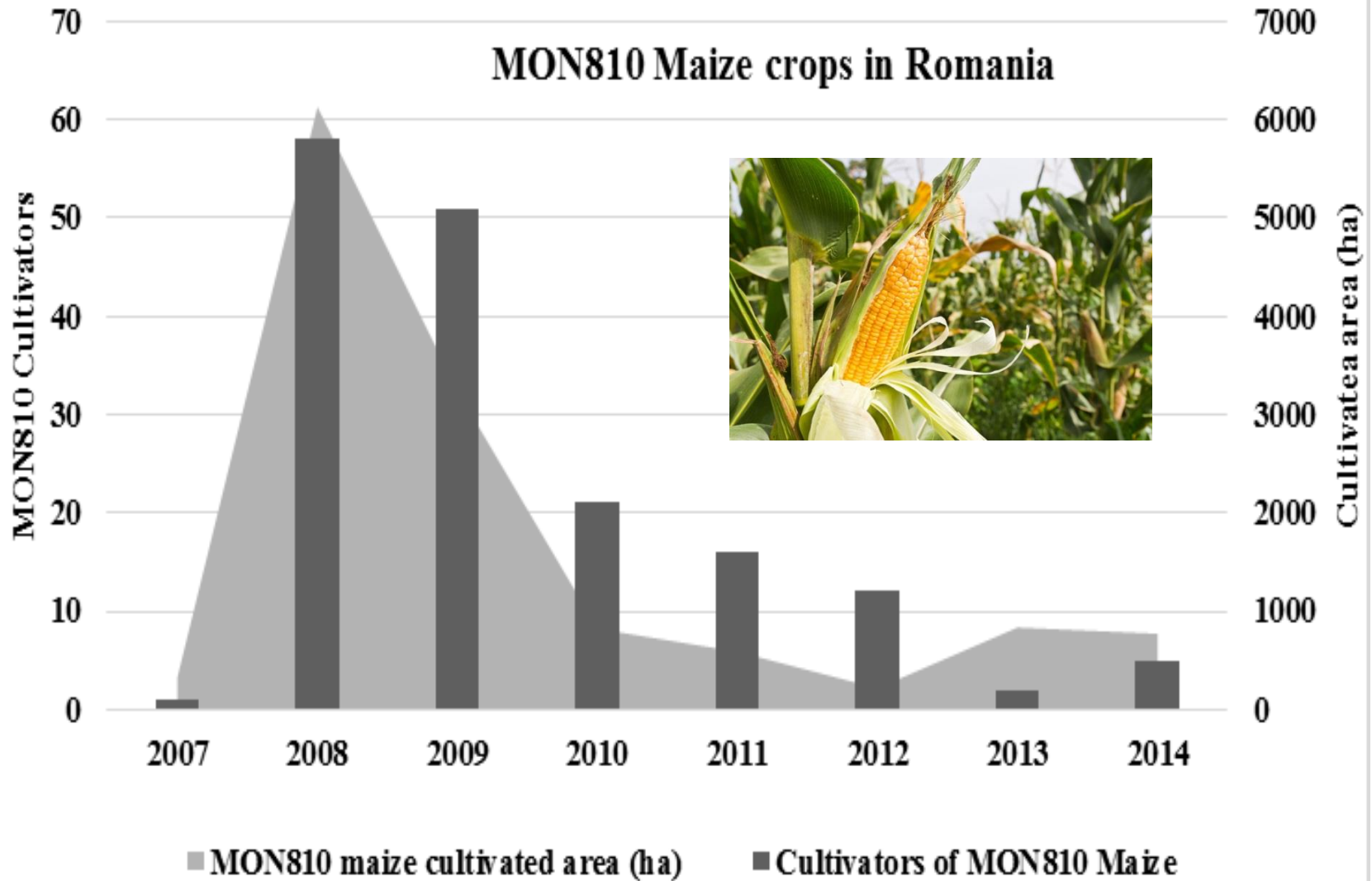


Estimated performance of GM- HT soybean crops

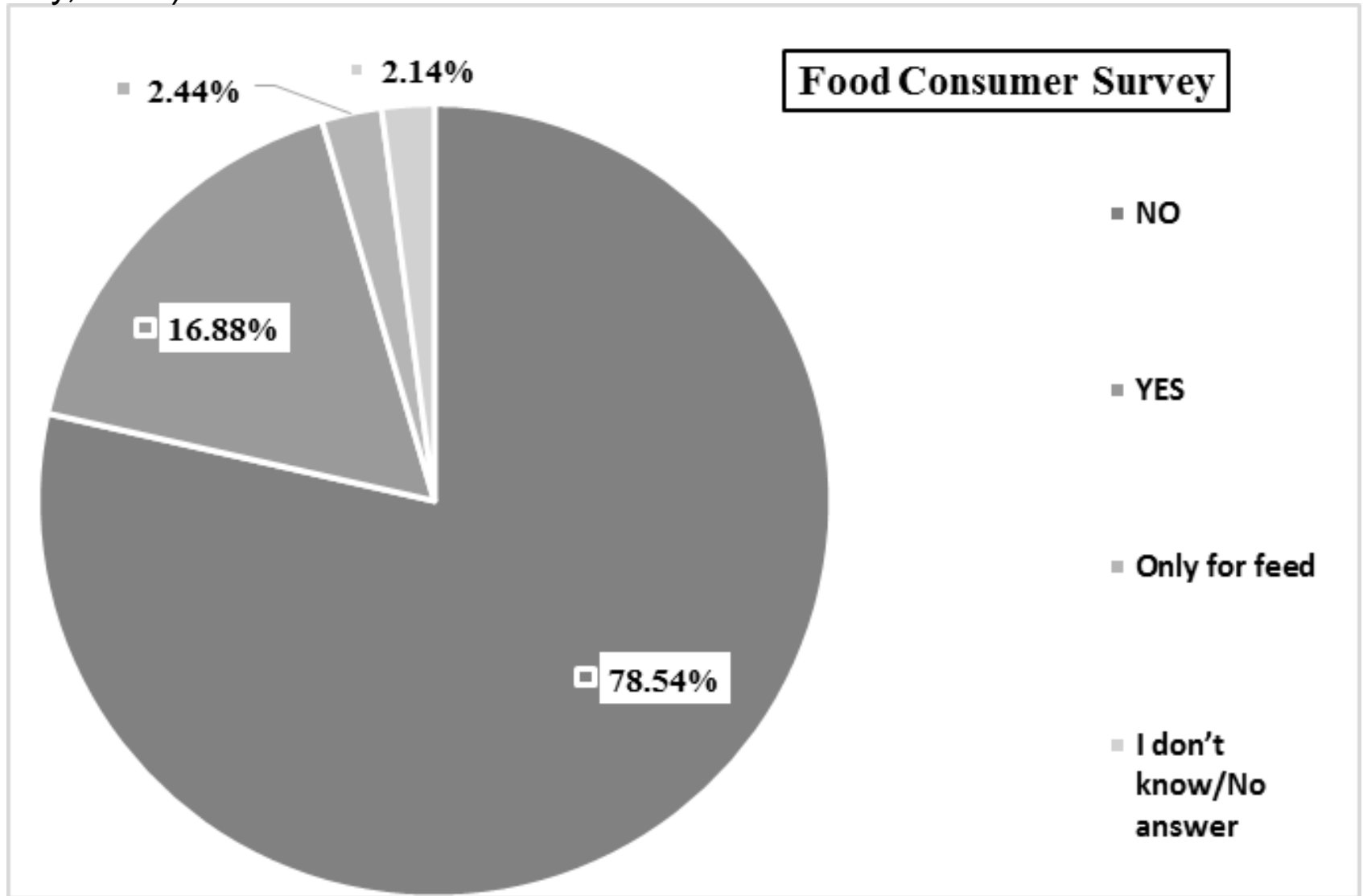




MON810 Maize crops in Romania



Do you agree with genetically modified foods? (Online Survey, 2011)



PROS

- GM created **plants better resistant** to weeds, pest and other diseases- generating healthier crops
- **Bigger yields** - more efficient use of land, less uses of herbicides and other pesticides.
- GM produce a **longer shelf life** -safe transport to people in countries without access to nutrition-rich foods.
- **Environmental benefits** - less chemicals, time, machinery, and land are needed for GMO crops and animals -reduce environmental pollution, greenhouse gas emissions, and soil erosion
- **Better nutrition –perfect foods** - modifying GMO foods in terms of mineral or vitamin content - more necessary nutrients and help fight worldwide malnutrition (e.g. "golden rice," reduce global vitamin A deficiencies).
- **“Pharming”** – the use of molecular biology in vaccination development (plants to produce vaccines, proteins, and other pharmaceutical goods)

Cons GMO's

- **Allergic Reactions** - Food allergies in children under 18 (spiked from 3.4 % in 1997-99 to 5.1 % in 2009-11 US National Center for Health Statistics, 2015)
- **Decreased Antibiotic Efficacy** (according to Iowa State University, 2015)
- **Genes may migrate** - through 'gene escape,' they can pass on to other members of the same species and perhaps other species (FAO)
- **Poor economic efficiency**
 - \$200 million - invested in creating Flavr Savr tomato, and almost none of the investment was able to be reclaimed.
 - GM crops have cost the United States an estimated \$12 billion in farm subsidies, lost sales and product recalls due to transgenic contamination
 - Massive failures in Bt Cotton up to 100% in India.

Position of the Romanian Academy and ASAS (2009)

- natural conditions favorable for GM soybean
- potential between 500,000 and 1,000,000 hectares
- 400,000 to for intern consumption/potential of export of 500,000-2,000,000 to/year
- biodiesel fuel manufacture based on the soya oil
- reduction of the environmental pollution
- additional incomes for farmers
- no biologic impact of the cultivation of transgenic soya over - absence of the harmful effects over the diversity of the population of weeds, insects or microorganisms from the soil, which should be associated to these crops

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Thanks for your attention !

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