Assessment of consumer patterns of meat and dairy products derived from animals fed with Genetically Modified feed

Christina Kleisiari[1], Leonidas- Sotirios Kyrgiakos[1], Spyros Niavis[2], Evangelia Tigka[1], Christina Moulogianni[3], Marie-Noelle Duquenne[2], George Vlontzos[1]
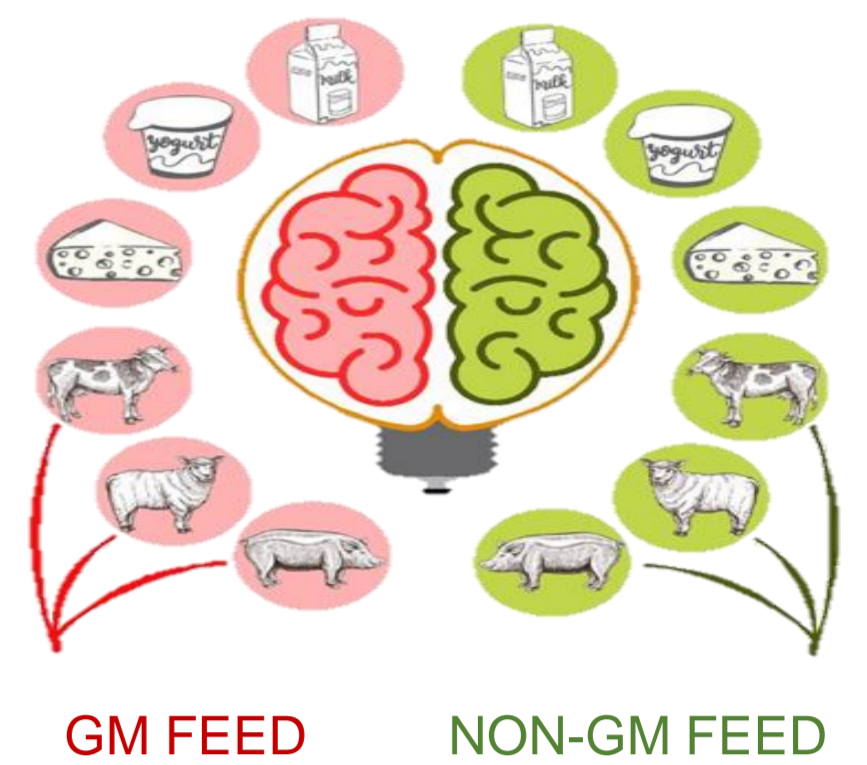
1 University of Thessaly, School of Agricultural Sciences, Department of Agriculture, Crop Production and Rural Environment, Volos, Greece
2 University of Thessaly, School of Engineering, Department of Planning and Regional Development, Volos, Greece
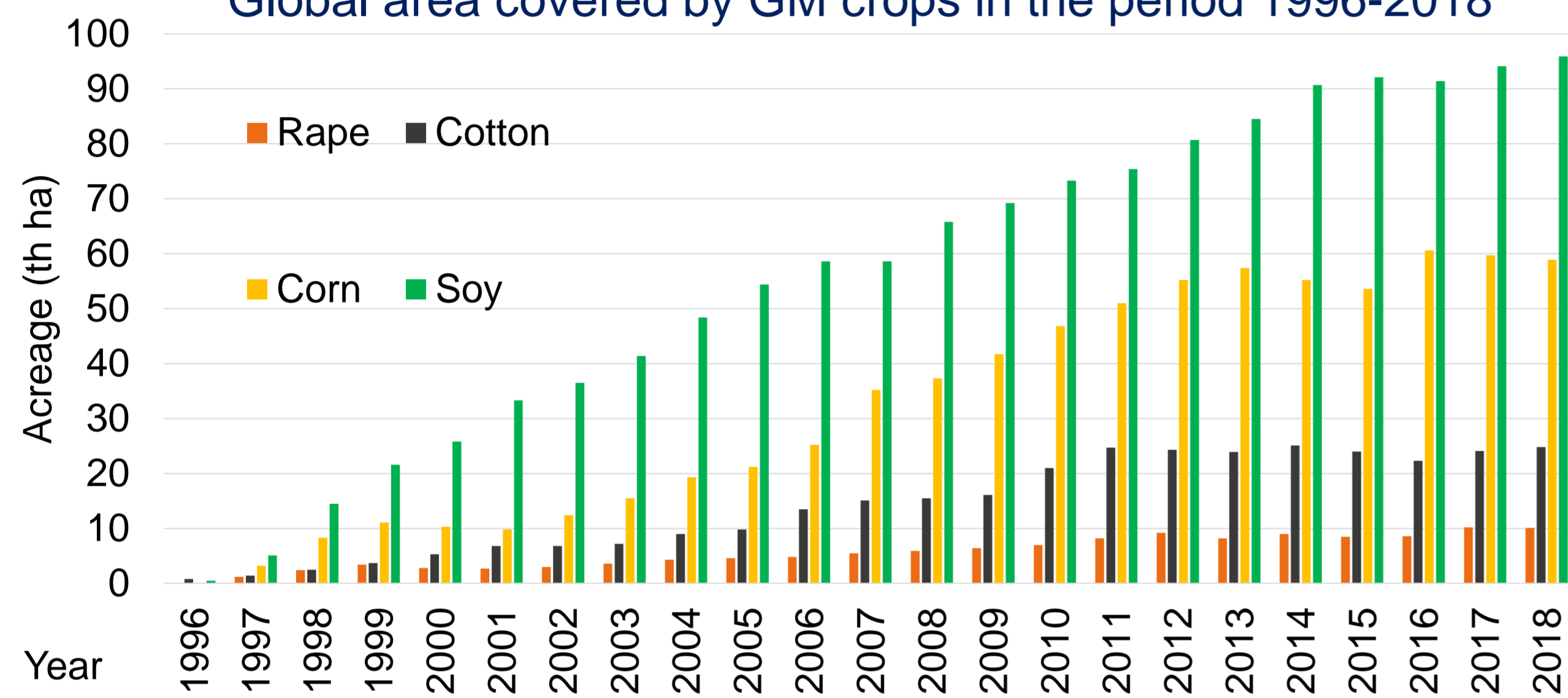3 Aristotle University of Thessaloniki, School of Agriculture, Department of Agricultural Economics, Thessaloniki, Greece

| Abstract

This survey assesses consumers' profiles towards meat and dairy products consumption, derived from animals fed with genetically modified feed, based on Health Belief Model. Taking into consideration relative literature review, a questionnaire was designed and distributed to a random sample of 848 adult consumers, on an equal proportion between men and women. The analysis identified the most significant factors affecting consumers' choices, revealing a negative attitude towards the products under consideration, perceiving them as hazardous, avoiding at the same time consumption. 72.4% of respondents are rejecting meat products and 74.4% are rejecting dairy products derived from animals fed with GM feed. Age, gender, and educational level have a significant effect on respondents' answers, as young and educated individuals are more aware of biotechnology and genetically modified foods, while women appear to be more interested in healthy eating, compared to men.
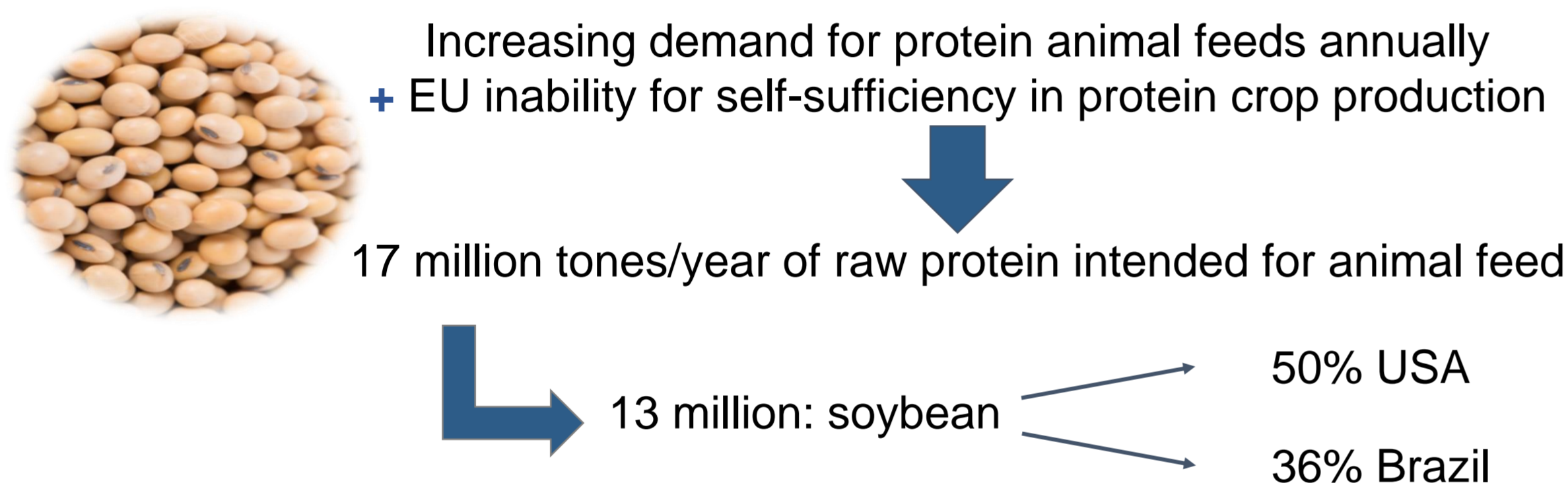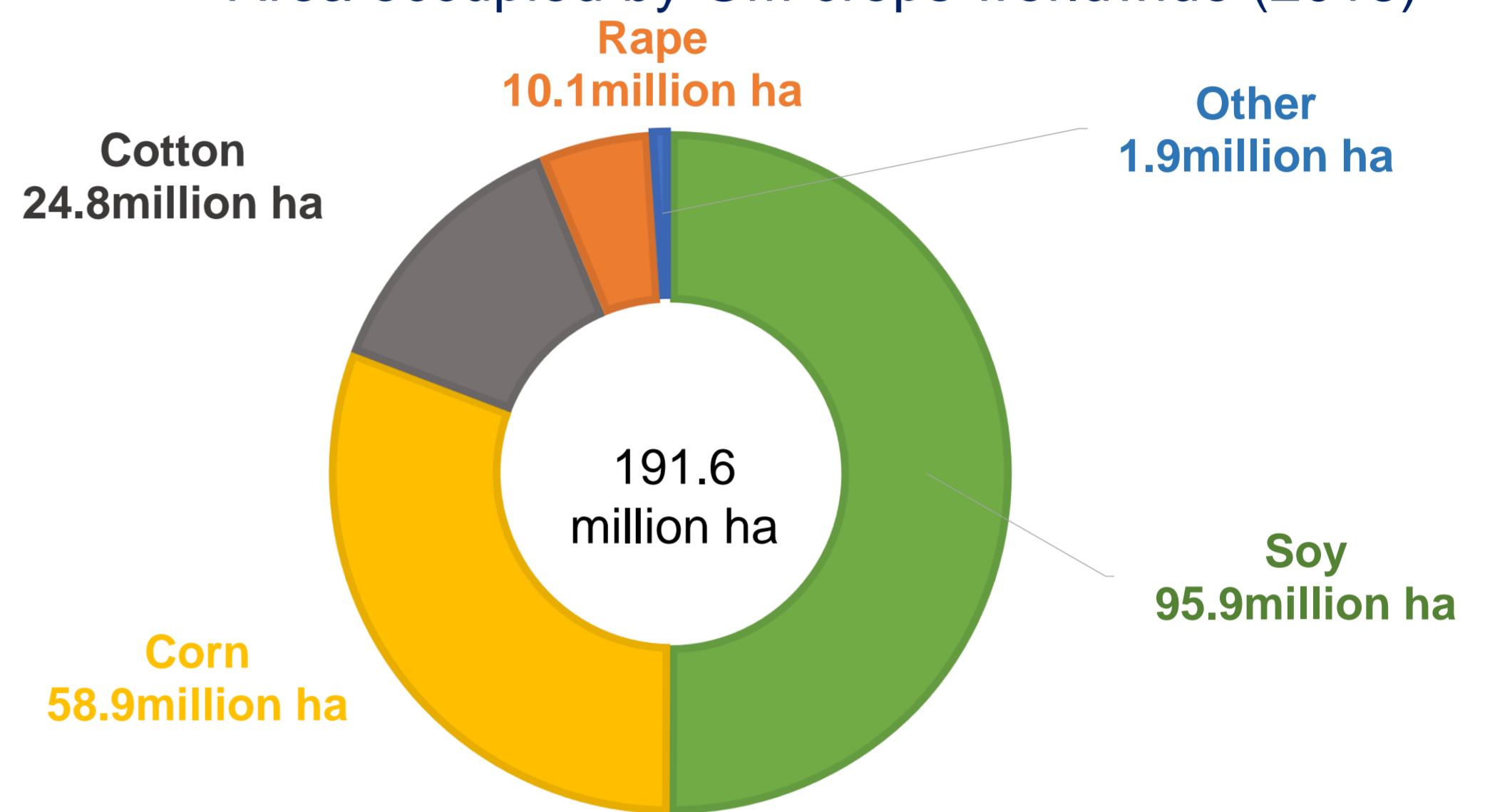
GM FEED · NON-GM FEED

Global area covered by GM crops in the period 1996-2018

Legend: Rape, Cotton, Corn, Soy. Y-axis: Acreage (th ha). X-axis: Year 1996–2018.

Area occupied by GM crops worldwide (2018)

Rape 10.1million ha · Cotton 24.8million ha · Other 1.9million ha · Corn 58.9million ha · Soy 95.9million ha · Center: 191.6 million ha

Source: International Service for the Acquisition of Agri-biotech Applications (ISAAA, 2018)

Increasing demand for protein animal feeds annually
+ EU inability for self-sufficiency in protein crop production

17 million tones/year of raw protein intended for animal feed

13 million: soybean → 50% USA / 36% Brazil

Soybean origin (GM and non-GM) from the main exporters into EU for 2013

Categories: Paraguay, USA, Argentina, Brazil. Legend: non-GM soybean, GM soybean. X-axis: million tones (0 to 14).
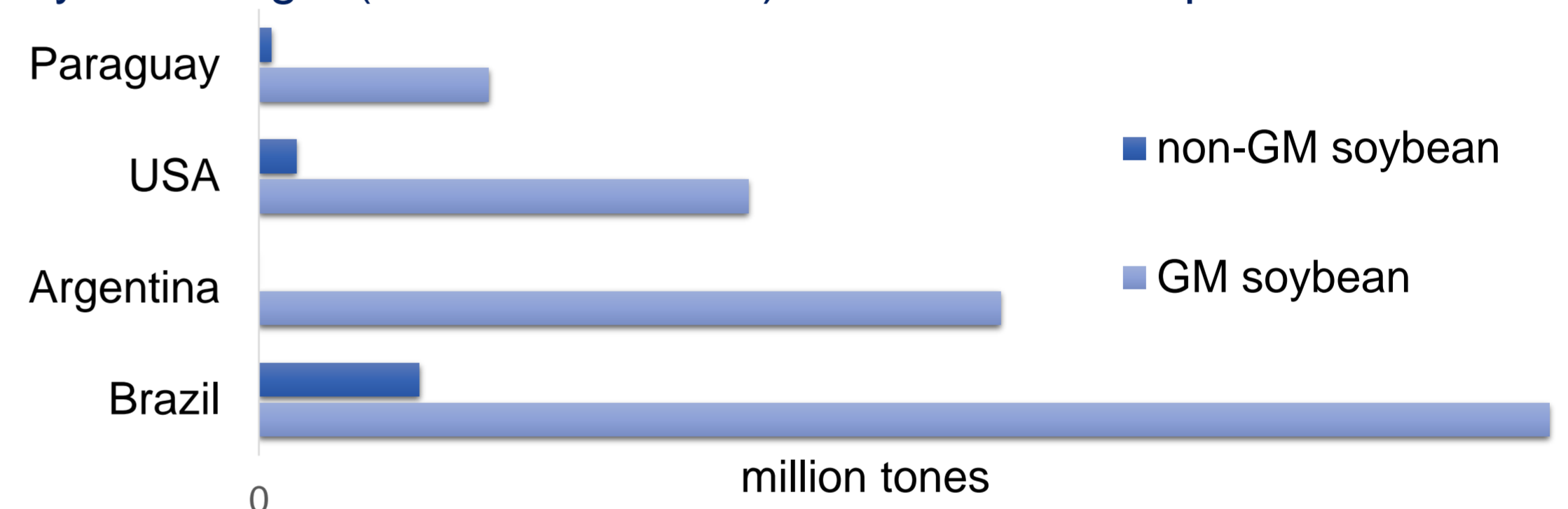
| Research question

The main purpose of this research is to assess consumer perceptions of meat and dairy products derived from animals fed with GM feed and to analyze the factors influencing their consumption. The objective of this study is to identify consumer profiles of people finally purchasing such products, but also to outline the demographic characteristics of people not preferring them.

| Data

For the assessment of consumer preferences, 848 questionnaires were collected from a stratified sample of Greek consumers. The first part of this questionnaire was consisted by questions related to participants´ socio-economic and demographic characteristics such as age, gender, monthly income and education level. The next category of questions, answered using the Likert scale 1-5, aimed to outline the factors influencing consumer decisions for the products under study. The questionnaires were distributed to a stratified sample of individuals aged 18 to 60+ years from July 2019 to December 2019.
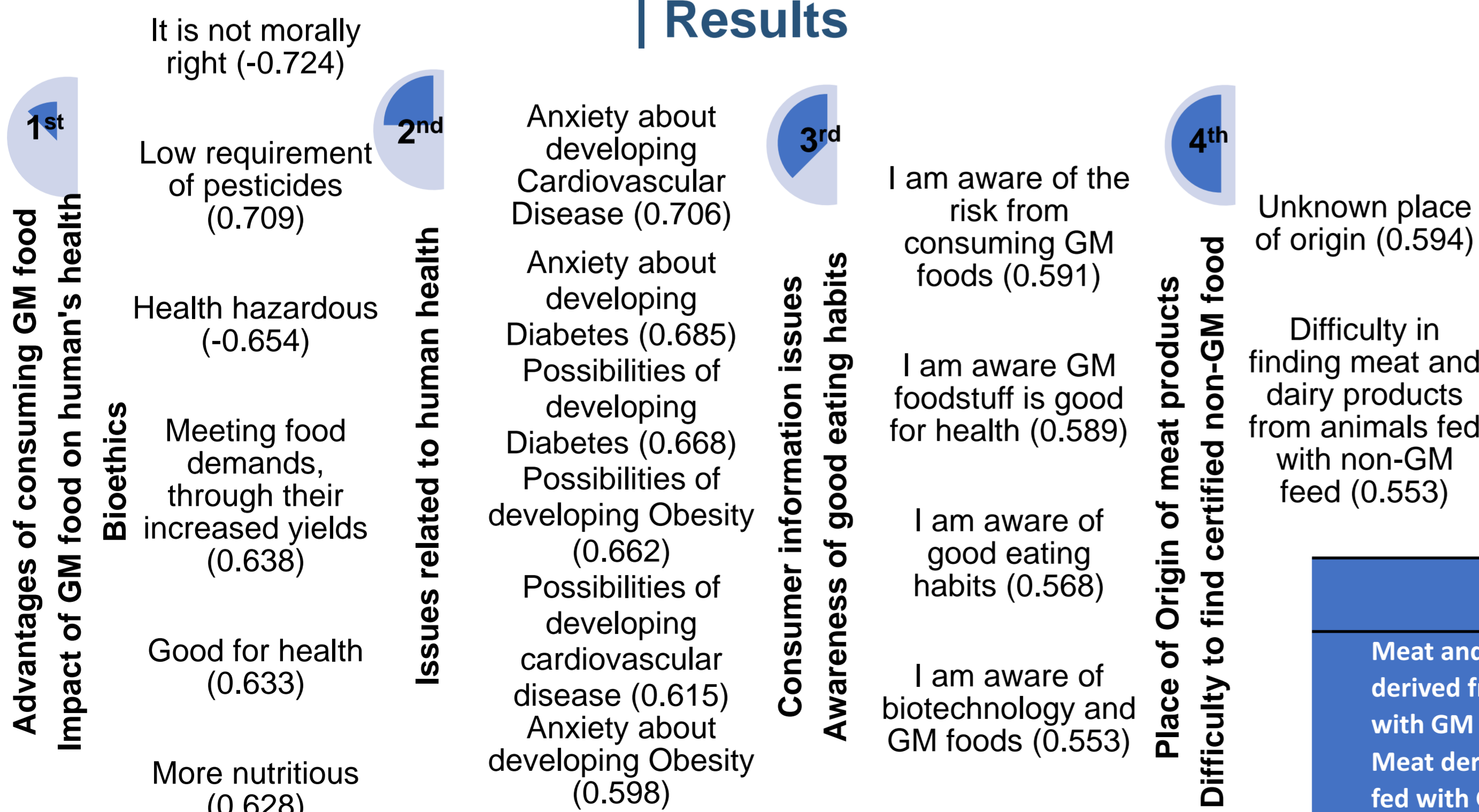
| Methods

Based on this Stimulus- Organism- Response (SOR) model and the relevant literature review, demographic, cultural, social, and psychological factors influencing consumer decision-making were examined. Health Belief Model was also applied, to reveal the influence of health issues under which consumers decide to purchase food of animal origin, and more specifically when animals being fed with GM feed. Questionnaires were distributed mainly through personal interviews without affecting or manipulating respondents' opinions. Principal Component Analysis - (PCA) was used to further process the data, highlighting individuals' attitudes, perceptions and beliefs on these specific issues.

| Results

1st — Advantages of consuming GM food / Impact of GM food on human's health / Bioethics
- It is not morally right (-0.724)
- Low requirement of pesticides (0.709)
- Health hazardous (-0.654)
- Meeting food demands, through their increased yields (0.638)
- Good for health (0.633)
- More nutritious (0.628)

2nd — Issues related to human health
- Anxiety about developing Cardiovascular Disease (0.706)
- Anxiety about developing Diabetes (0.685)
- Possibilities of developing Diabetes (0.668)
- Possibilities of developing Obesity (0.662)
- Possibilities of developing cardiovascular disease (0.615)
- Anxiety about developing Obesity (0.598)

3rd — Consumer information issues / Awareness of good eating habits
- I am aware of the risk from consuming GM foods (0.591)
- I am aware GM foodstuff is good for health (0.589)
- I am aware of good eating habits (0.568)
- I am aware of biotechnology and GM foods (0.553)

4th — Place of Origin of meat products / Difficulty to find certified non-GM food
- Unknown place of origin (0.594)
- Difficulty in finding meat and dairy products from animals fed with non-GM feed (0.553)

Correlation of socio-economic characteristics with the 4 components

COMPONENTS	Age	Gender	Education	No of children	Income
1st	**	-	-	*	-
2nd	*	-	**	-	*
3rd	**	**	**	-	-
4th	**	**	-	**	-

SOCIOECONOMIC CHARACTERISTICS

* Significant difference in perception (p-value <0.05)
** Very significant perception difference (p-value <0.01)

Consumer perceptions about GM feed

	Rejection	Neutral attitude	Willingness to consume
Meat and Dairy products derived from animals fed with GM feed	578 (68%)	216 (25.5%)	55 (6.4%)
Meat derived from animals fed with GM feed	614 (72.4%)	182 (21.5%)	53 (6.25%)
Dairy products derived from animals fed with GM feed	631 (74.4%)	174 (20.5%)	43 (5.1%)

Logos: European Union European Regional Development Fund · EPAnEK 2014-2020 Operational Programme Competitiveness Entrepreneurship Innovation · Hellenic Republic Ministry of Economy & Development · ΕΣΠΑ 2014-2020 Partnership Agreement 2014-2020 · University of Thessaly · CropFeed · ΘΕΣγη · ecce Prague Czech Republic 2021