

# Legumes in Europe and the Mediterranean basin: challenges and perspectives



*Diego Rubiales*



*“Personal” opinions  
to boost discussion*



# Legumes are multifunctional crops with extraordinary importance for the agriculture, environment and culture

key role in animal feed



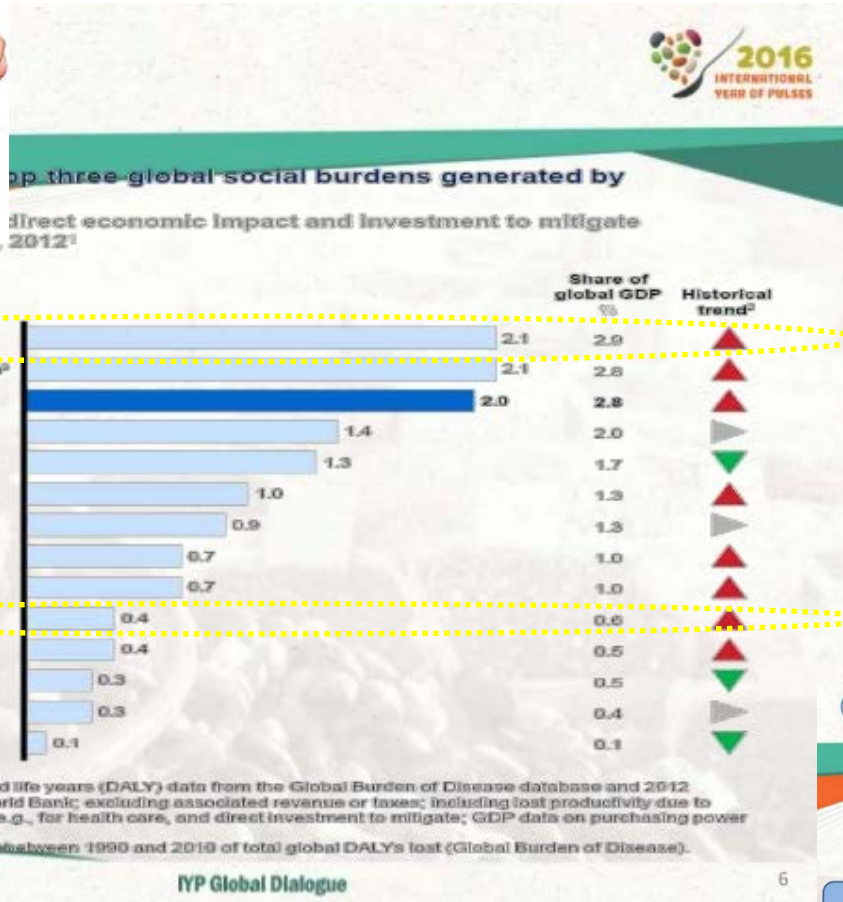
key for sustainable agriculture and environment

key role in healthy human diets



# Legumes have a major role to play in human balanced diets:

## Obesity and malnutrition are today larger burdens at global level than undernutrition



Food and Agriculture Organization of the United Nations

2016 INTERNATIONAL YEAR OF PULSES

### Pulses as a valuable component for healthy diet

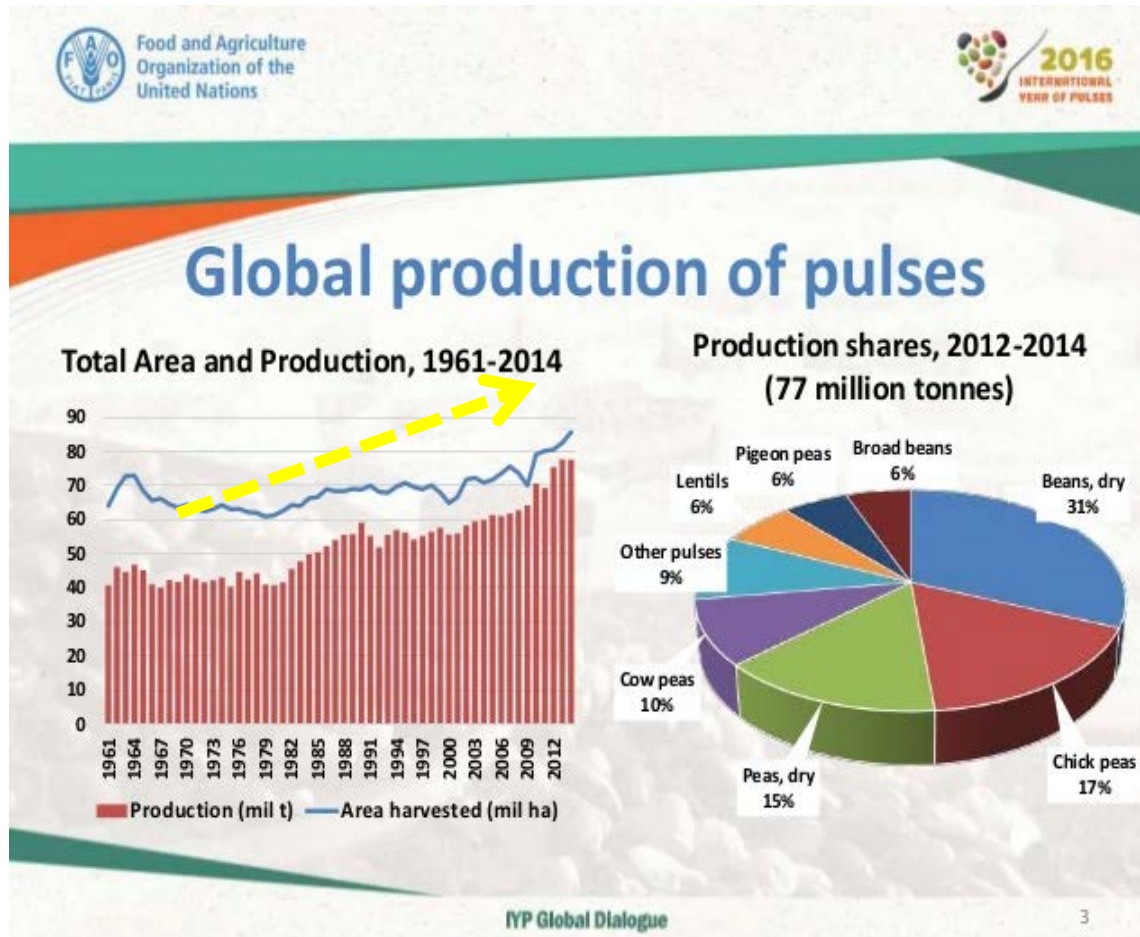
Nutritional attributes that contribute to a healthy diet

- Reduces risk of diabetes and other NCDs
- Improves colon health reduces risk of colorectal cancers
- Phytonutrient promotes anti-cancer properties
- Increases satiety and weight loss

IYP Global Dialogue 10



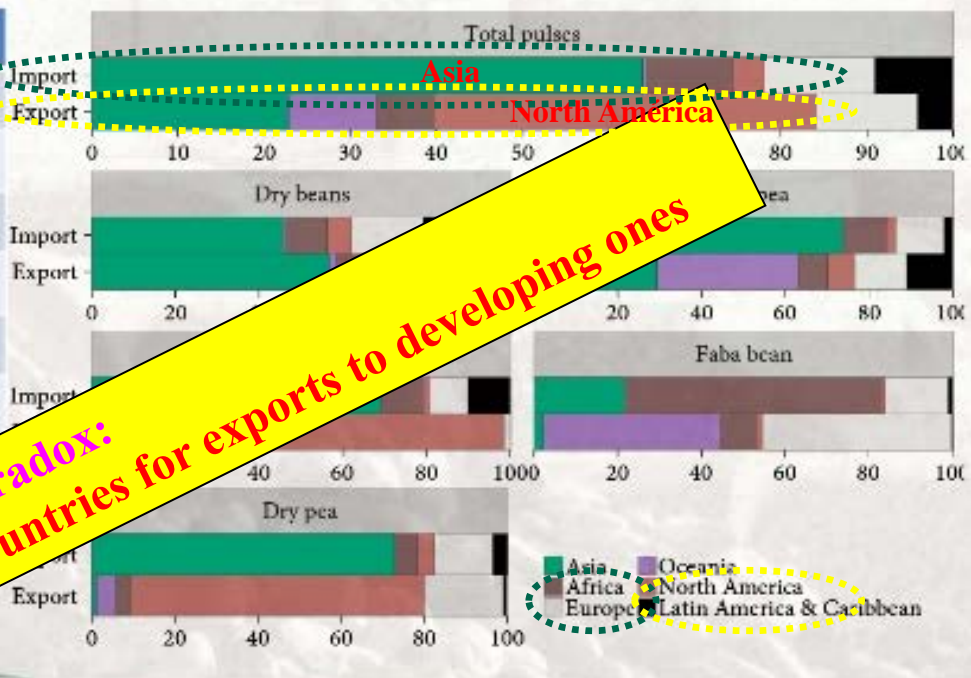
There is an increasing trend on pulse cultivation at world level





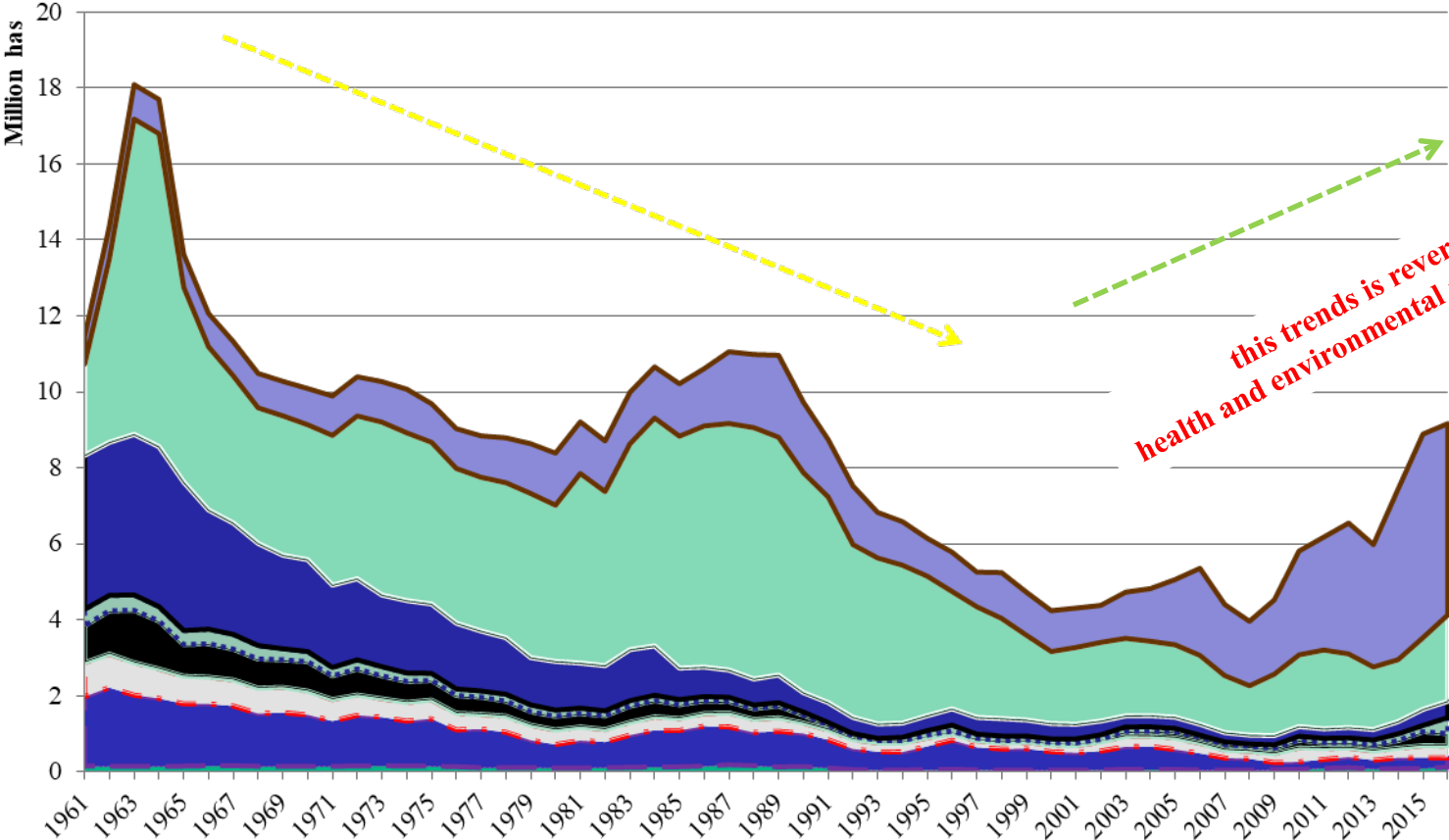
# Export and Import of Pulses

Exports	2001	2013
Dry bean	2.7	4.2
Dry pea	3.5	4.5
Lentil	1.1	2.2
Chickpea	0.8	1.6
Faba bean	0.5	0.8
Total pulses	8.8	13.6
Crop	2001	2013



**Paradox: raw food grown in developed countries for exports to developing ones**

# EUROPE



**Historic trend in legume cultivation in Europe**

# Perspectives for further growth of plant protein as word demand will increase

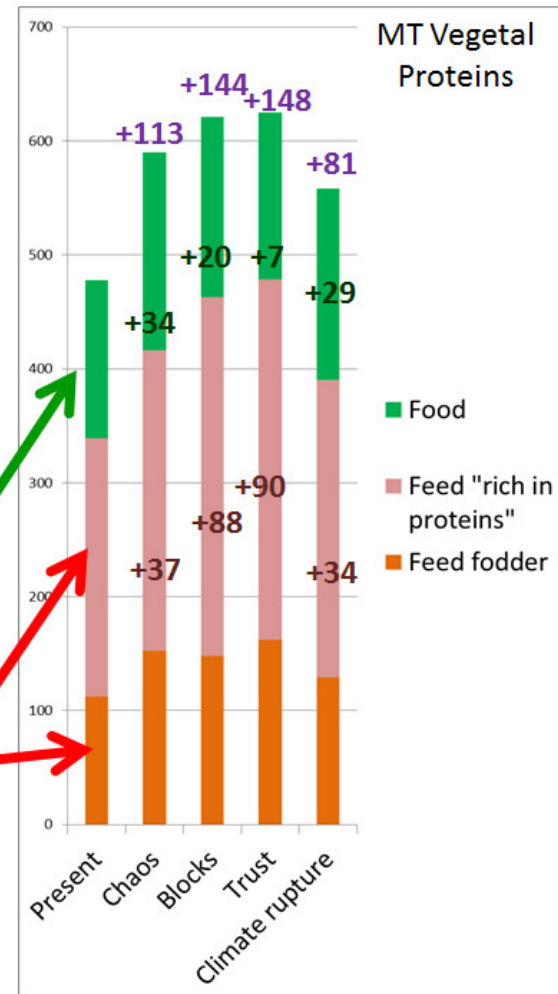
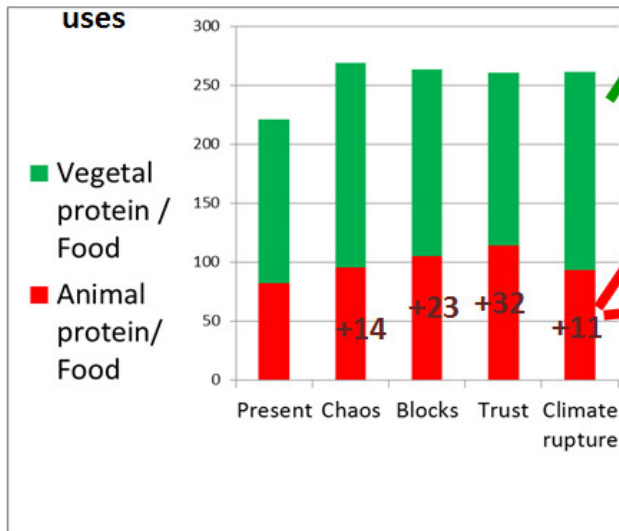
(Pilorge & Muel, 2016)

## World demand for proteins (MT)

Depending on:

- Population growth
- Food habits

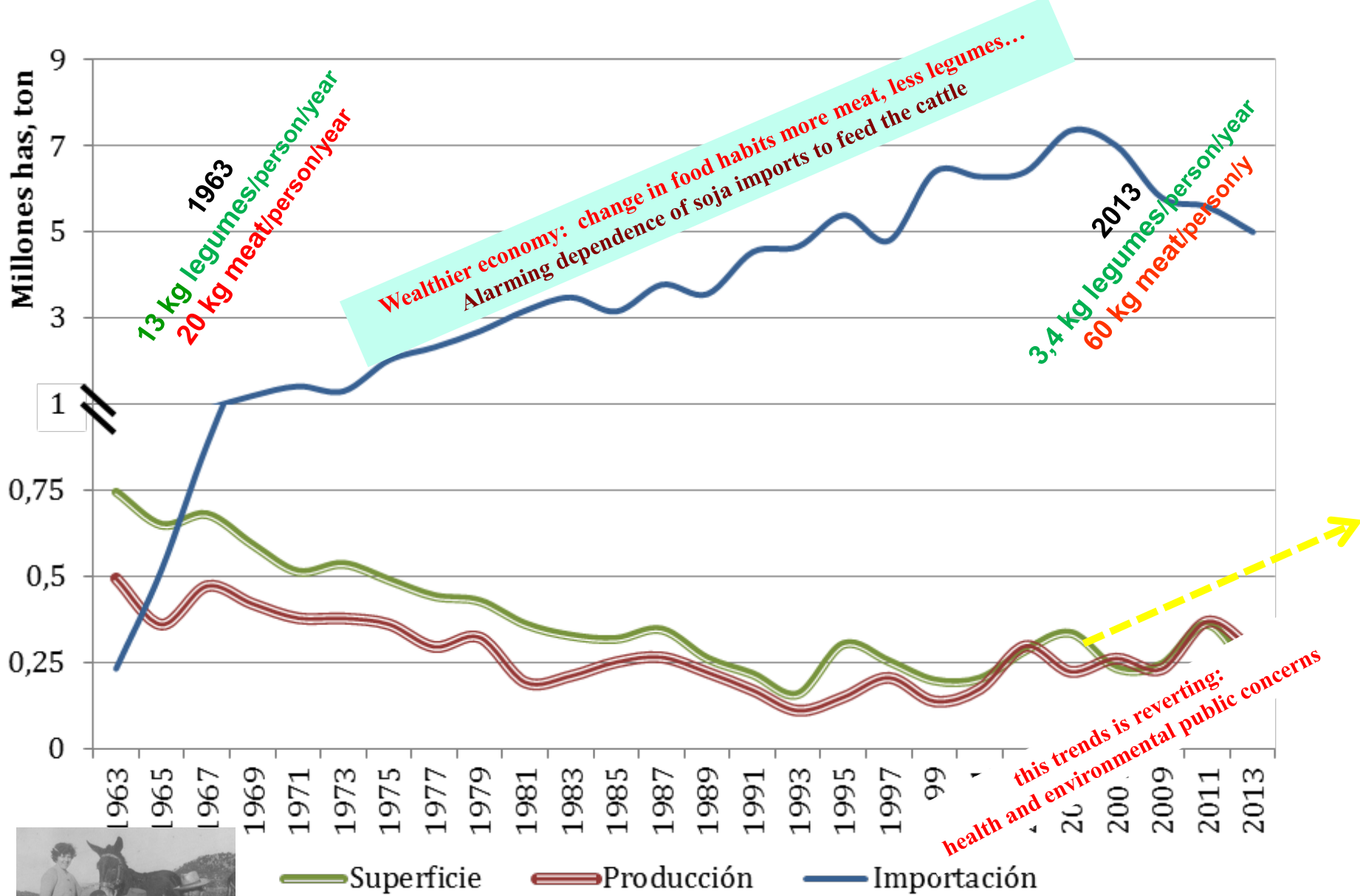
### Protein food uses



# **What is wrong with legumes in EU and Mediterranean countries???**

**in spite of the good performance at global level  
legume cultivation is decreasing**

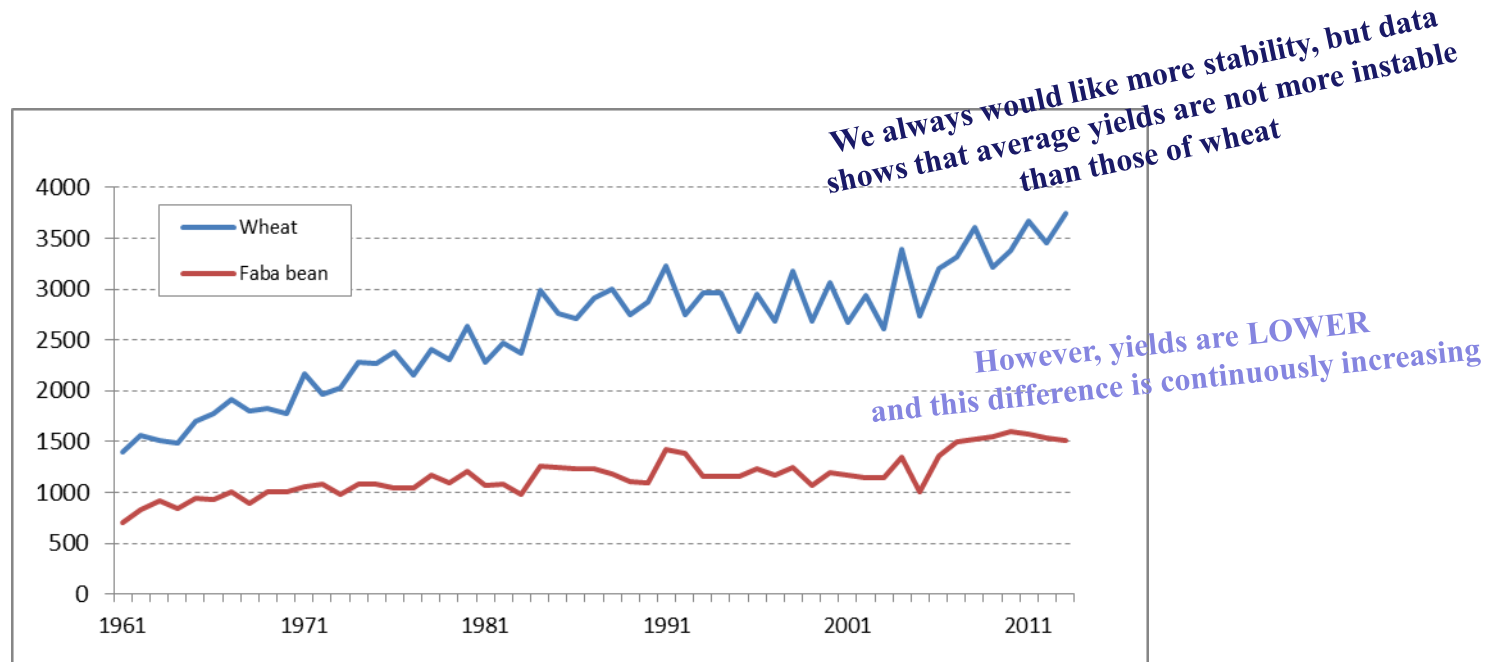




**Historic trend: change in economy and agriculture (Spain as case study)**

# “wrong assumptions” hampering legumes image

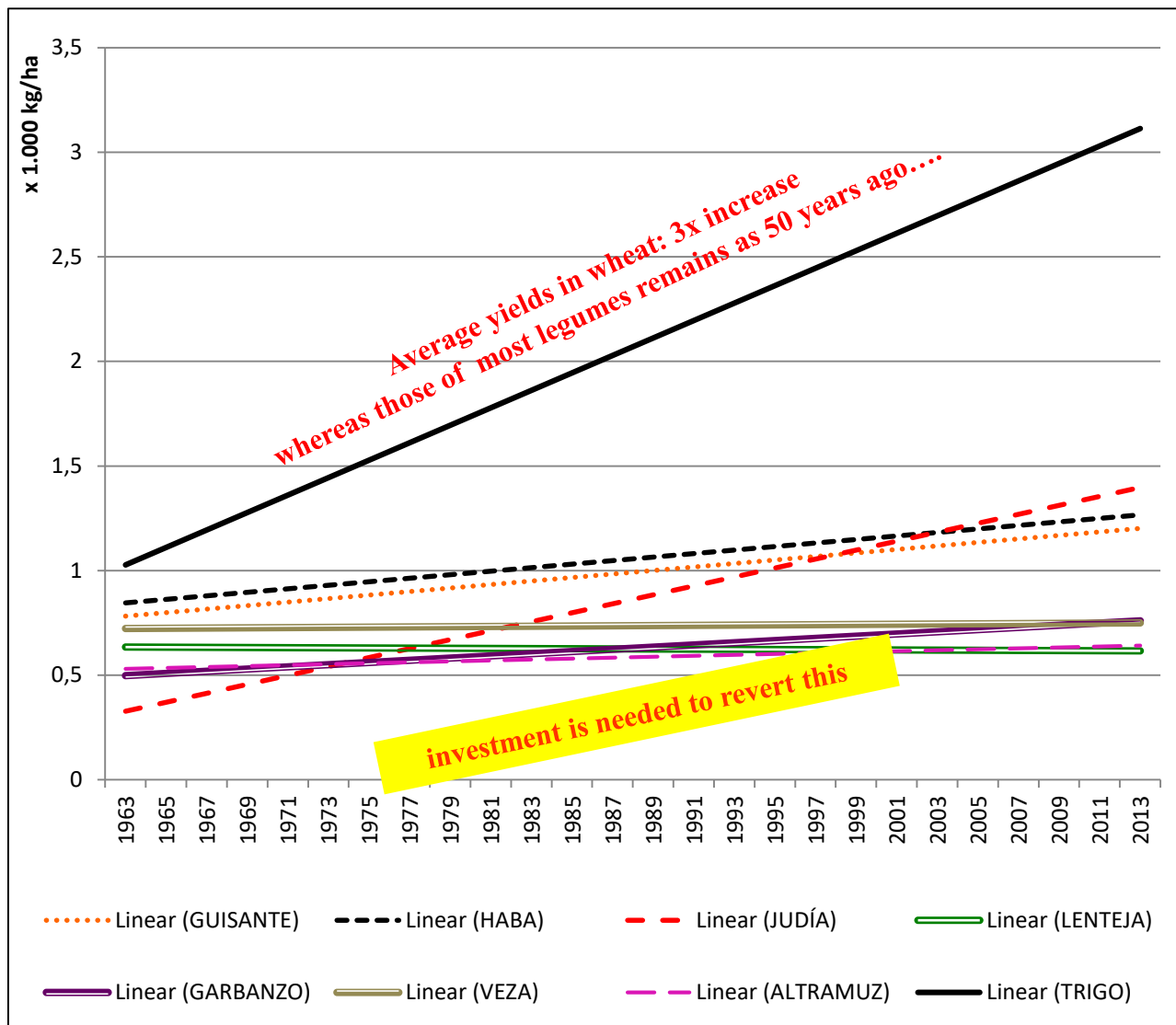
“Instable yields??”



**Yields (kg/ha) for wheat and faba bean since 1961 till 2013 in South Europe**

(Villegas-Fernández & Rubiales, 2015)

# Legume investment has been neglected in benefit of other crops that have been better incorporated to “modern agriculture”:



## Spain

### Annual yield gain (Kg/ha/year)

Pea 8

Faba bean 9

Common bean 22

Lentil 0

Chickpea 5

Vetch 1

Lupin 2

**Wheat 52**

# Legumes were are not "cool": "the food of the poor"

However, we are watching a change in consumers perception due to health and environmental concerns:

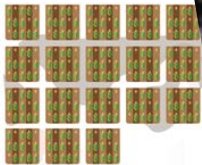
legumes area becoming trendy!!



1 KG DE PROTEÍNA DE JUDÍAS



x18



PARA PRODUCIR 1 KG DE PROTEÍNA DE TERNERA HACEN FALTA 18 VECES MÁS SUPERFICIE DE TIERRA



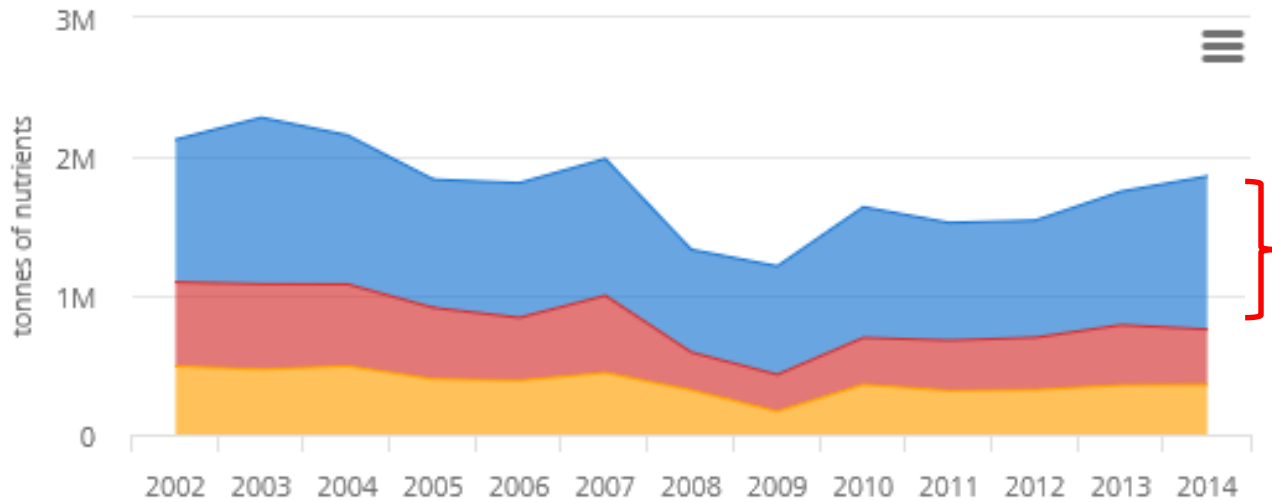
Aitor Sánchez  
Dietista-Nutricionista  
www.midietacojea.com

**CreatiVegan** www.creativegan.net





## Fertilizers in Spain 2002-2014 FAO



● Spain  
Nitrogen Fertilizers (N total nutrients)

● Spain  
Potash Fertilizers (K20 total nutrients)

● Spain  
Phosphate Fertilizers (P205 total nutrients)

*1 M tons/year of N  
80% imported*

Legumes are not "cool"???

plant base foods are trendy!!!

In last decade the inclusion of pulse ingredients in new products **increased 5x** and there is room for more growth



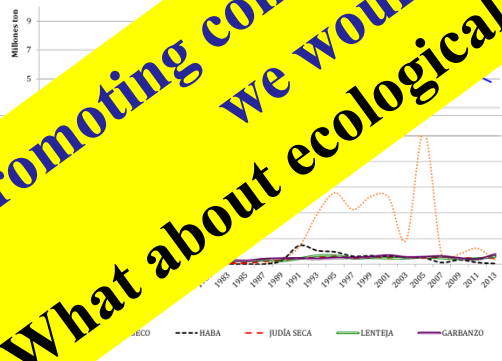
“The Future of Food Is Plant-Based”

<https://t.co/v72w31jQrd>

# Increasing consumption will solve the problem?

Consumption is today much lower than before,  
STILL, we import about el 60 -85% of the food legumes that we eat in Spain from international markets  
that can not be covered by national productions (it is ch...)

Even worse for feed: Soya case study: the... feed concentrates did not results in increase  
cultiv... dependence on imports



By promoting consumption but not acting at the production level,  
we would be just promoting imports!!!  
What about ecological services? What about rural economies?

# Major limitations for legume cultivation/breeding:

Relatively low **yield potential-stability**

Numerous species multiplying breeder's investments

**Breeding priorities:** genetic resources, proper phenotyping, selection (MAS)

- **Grower satisfaction:**

Good yield, disease resistance, lodging, herbicide tolerance, high prize

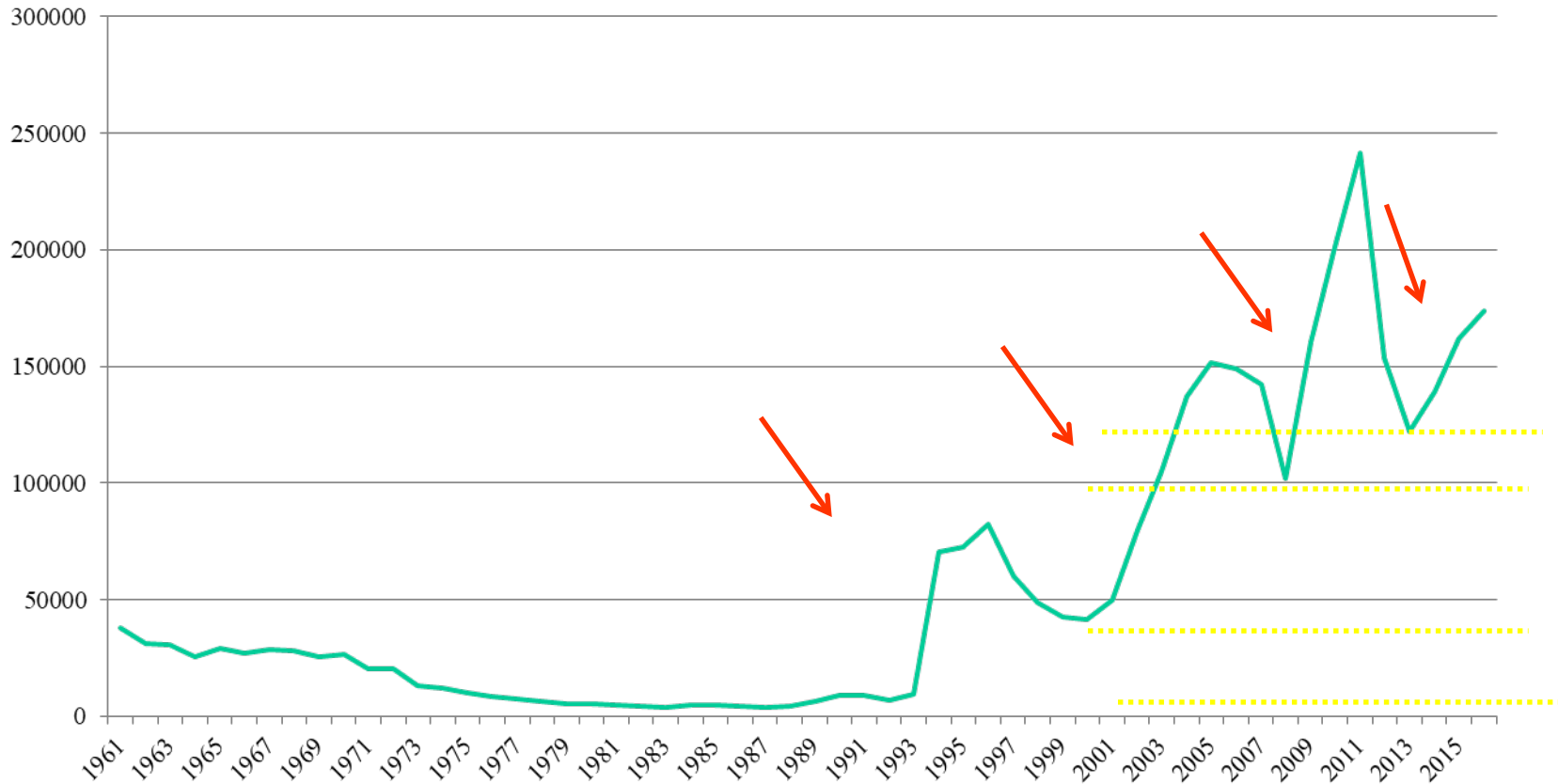
- **Consumer satisfaction**

colour, size, appearance, nutrition, ..... low cost



# Will EU subsidies solve the problem?

## dry pea in Spain as an example



# Awareness at EU level on the need of a “PLANT PROTEIN” strategy



Ref. Ares(2018)1292232 - 08/03/2018

## Workshop on "Research & Innovation in Plant Proteins"

Brussels, 24 & 25 April 2018

Venue: Rue Philippe Le Bon 3, 1000 Brussels (Room 3.37)

### AGENDA - DRAFT

Tuesday 24 April

14:00 – 14:30	Introduction (DG AGRI)
14:30 – 15:30	<b>Keynote</b> Moderateur DG AGRI
30 min	<b>Research challenges for protein crops</b> D. Rubiales (CSIC)
30 min	General discussion

**Actions should be noticed soon: let's start with the Green Deal**

## Even greater global awareness:

### Upcoming Publication



# TEN-YEAR PULSE RESEARCH STRATEGY

**Pulses receive globally <1% of resources for research**

**target: increase this to 10%**

*The Ten-Year Research Strategy report will be used to set an agenda for global discussion and mobilize champions to advocate for accelerated pulse research investments.*

#### Organizing Author

**Dr. Shoba Sivasankar**, Director, CGIAR Research Program on Grain Legumes, ICRISAT

Lead Author – Breeding and genetics for improved productivity and resilience

**Dr. Noel Ellis**, ICRISAT (retired)

Lead Author – Pulses in integrated crop systems and agricultural landscapes

**Dr. Robin Buruchara**, Director of the Pan Africa Bean Research Alliance, CGIAR-CIAT

Lead Author – Integration of pulses into food systems

**Dr. Carol Henry**, Associate Professor of Nutrition and Diet, University of Saskatchewan

#### Coordinating Author

**Dr. Christine Negra**, Principal, Versant Vision

Lead Author – Integration across agricultural, nutritional and social sciences

**Dr. Diego Rubiales**, Professor, Spanish National Research Council, Institute for Sustainable Agriculture

Lead Author – Spatially-explicit analyses related to local and global challenges

**Dr. Jeet Singh Sandhu**, Deputy Director General, Indian Council of Agricultural Research, Division of Crop Science

The UN Food and Agriculture Organization has declared 2016 the International Year of Pulses (IYP) to encourage connections throughout the food chain that would better utilize pulse-based proteins, further global production of pulses, increase the efficiency of crop rotations, and address trade challenges. The International Year creates a unique moment to showcase transformative research investments that would allow pulse crops to deliver on their full potential as a critical player in the global food system.

With funding support by the International Development Research Council (IDRC) of Canada, this initiative is led by Emerging Ag, Inc. on behalf of the Global Pulse Confederation, which has sponsored a wide array of activities for the International Year of Pulses. It is motivated by the large gap between the potential of pulse crops for meeting global sustainability challenges and the current capacity to seize this potential.



<https://pulses.org/future-of-food/10-year-research-strategy>

## The success histories of Australia and Canada

**Australia:** almost a dessert (WA), poor soils

**Saskatchewan:** short growing season: snow from October till April

**NO tradition of legume cultivation neither consumption!**

**Grain growers were interested in having a legume in the rotation to improve soil fertility and were able to get organized to start legume programs starting from zero...**

**Today, they are the larger producers and exporters**

*Pulse Canadá*

*GRDC- Pulse Australia*

**Producers fund the research,  
They establish the priorities and monitor the progress**



## Recent EU research projects covering (partly) legume breeding activities

FP7

medi<sup>es</sup>



Legume Futures



H2020



Is this sufficient? Will this impact the legume industry?  
What else is needed?

At present Europe exports science but imports legumes