



Can pulses efficiently feed the world in a sustainable agriculture?

The FAO international year of pulses in action

Samy Gaiji

Head Agriculture & Extension Unit
FAO





The International Year of Pulses

2016
INTERNATIONAL
YEAR OF PULSES

nutritious seeds for a sustainable future

العربية 中文 English Français Italiano Русский Español

About News Events Resources Recipes Communications Toolkit FAQs Blog

Fact sheet: Pulses and climate change
Climate change has a huge impact on global food production and food security

TIPS
How to get kids to eat pulses

INFOGRAPHIC
HEALTH BENEFITS OF PULSES

VIDEO
A Journey around the world with pulses

Subscribe to our Newsletter

International Year of Pulses 2016

The 68th UN General Assembly declared 2016 the International Year of Pulses (IYP) (A/RES/68/231)

The Food and Agriculture Organization of the United Nations (FAO) has been nominated to facilitate the implementation of the Year in collaboration with Governments, relevant organizations, non-governmental organizations and all other relevant stakeholders.

The IYP 2016 aims to heighten public awareness of the nutritional benefits of pulses as part of sustainable food production aimed towards food security and nutrition. The Year will create a unique opportunity to encourage connections throughout the food chain that would better utilize pulse-based proteins, further global production of pulses, better utilize crop rotations and the challenges in the trade of pulses.

Events List

from: 01/01/2016
to: 31/12/2016

Exposición temporal "2016, Año Internacional de las Legumbres"
Con motivo del Año Internacional de las legumbres, en el Museo de Historia Natural de la Universidad de Santiago de Compostela estará durante todo este 2016 una exposición temporal en la que se muestran más de treinta legumbres diferentes, ordenadas [...]
<http://revistas.usc.es/museohn>
Location: Museo de Historia Natural da Universidade de Santiago de Compostela, Parque Vista Alegre s/n, 15782 Santiago de Compostela, Galicia, Spain

from: 01/05/2016
to: 31/10/2016

Fleurissement annuel 2016 - Avoine
Mises en scène, décors originaux fabriqués à partir de matériaux de récupération dans le but de sensibiliser les habitants, les touristes à l'intérêt des légumineuses et au potentiel qu'elles représentent.
Location: Avoine, Indre et Loire, France

from: 22/05/2016
to: 30/11/2016

Tutti i legumi del mondo negli Orti del MUSE

September 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3

FAO publications

Soils and Pulses - Managing soils for sustainable pulse production - 2016
Pulses are good for food, health and wealth. Pulses also boost soil fertility and sustainability of cropping systems and contribute to climate change adaptation and mitigation by improving soil fertility through biological nitrogen fixation and counterbalance the increase greenhouse gases (GHGs) emission. Efficient management of soils can enhance pulse production...

The School Project - 2016
An illustrated children's comic, which aims to give some information to children about pulses. The characters have a history project about the Neolithic period to hand in for the next day at school and don't know what to do. Their grandmother helps them by showing them how historically and nutritionally...

Pulses: Nutritious seeds for a sustainable future - 2016
The aim of raising global awareness on the multitude of benefits of pulses was integral to the International Year of Pulses. This coffee table book is part guide and part cookbook— informative without being technical. The book provides an overview of pulses, and explains why they are...

<http://www.fao.org/pulses-2016>



What are pulses?

- Pulses are a subgroup of legumes
- They belong to the *Leguminosae* family
- Dry grains which are used for human and animal consumption
 - Common bean (*Phaseolus vulgaris*)
 - Chickpea (*Cicer arietinum*)
 - Lentil (*Lens culinaris*)
 - Cowpea (*Vigna unguiculata*)
 - Pigeon pea (*Cajanus cajan*)

Pulses and sustainable agriculture

- An important attribute of pulses is their **ability to biologically fix nitrogen**
- Some pulses are able to **free soil-bound phosphorous**

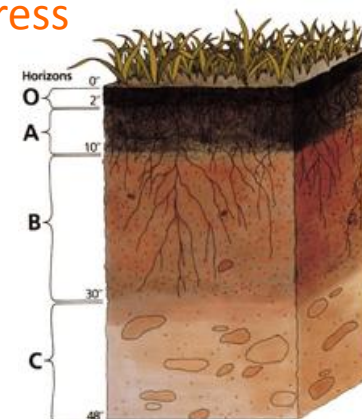
➔ Soil health



- Present of pulses in agro-ecosystems **helps to maintain or increase the vital microbial biomass and activity**

➔ Greater resistance and resilience against disturbance and stress

➔ It improves ability of ecosystems to suppress diseases



Pulses and sustainable agriculture

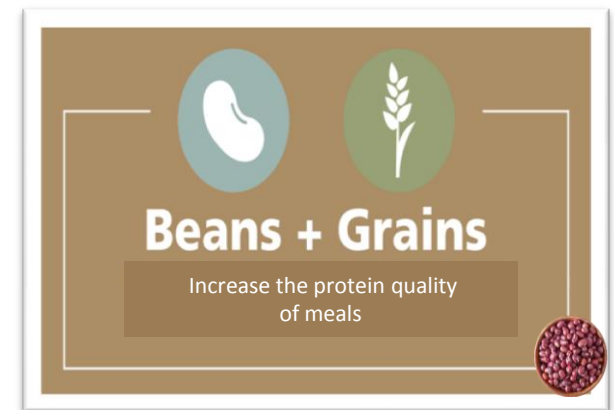
- Pulses are a critical component of multiple cropping systems (e.g., intercropping, crop rotations, agroforestry)
- Multiple cropping systems obviously have greater species diversity
 - ➔ More efficient use of resources
 - ➔ Increases yields
 - ➔ Reduces the risk of overall crop failure
 - ➔ Greater underground utilization efficiency
 - ➔ Improves recycling of nutrients



Pulses and nutrition

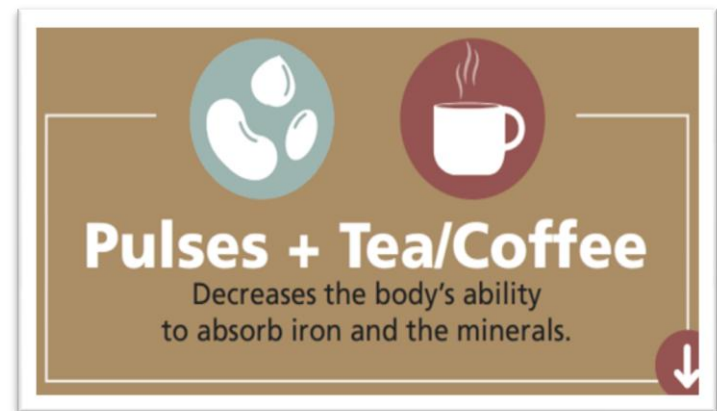
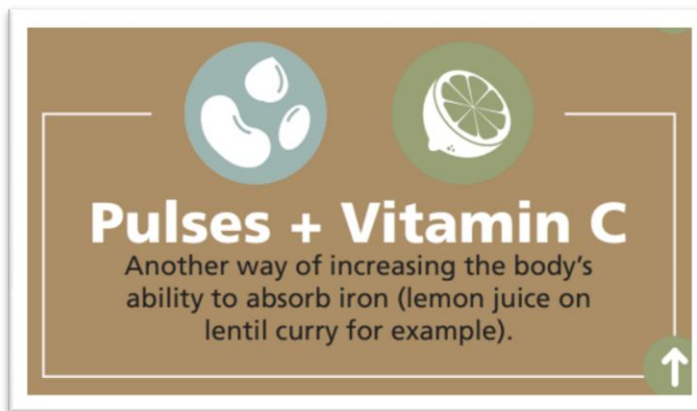
✓ Source of protein

- Pulses contain about **20-25% protein**, i.e. double the content of wheat and triple that of rice. However, protein quality is not as high as that from animal source foods.
- Amino acid composition of pulses is **complementary to that of cereals**: when consumed in combination, these two foods increase the protein quality of meals (e.g. rice and beans)



Pulses and nutrition

- The absorption of “non-haeme” iron in pulses can be increased if the pulse is consumed with certain other foods and nutrients, especially meat or vitamin C.
- Drinking tea or coffee with meals decreases the absorption of the minerals.



Pulses and nutritional benefits

- **High in many B-vitamins** including folate, which is essential to nervous system function and especially important during pregnancy to prevent foetal neural tube defects.
- **High dietary fibre content** – improves stool volume and bowel transit; slows the absorption of lipids and lowers blood cholesterol.
- **Low Glycemic Index** – helps to increase satiety and weight loss and has positive implications particularly for people with type 2 diabetes.



WHAT THE WORLD EATS

- Cereals - Excluding Beer
- Vegetable Oils
- Meat
- Sugar & Sweeteners
- Starchy Roots
- Milk - Excluding Butter
- Vegetables
- Fruits - Excluding Wine
- Alcoholic Beverages
- Pulses
- Other

FAOSTAT.FAO.ORG (2015)

How to eat pulses?

Breakfast / Snacks



Homemade Baked Beans

Meals



Salad (beans, chickpeas and lentils)



Quinoa and rice with lentil stew



Roasted chickpeas



Hummus



Soup (beans)



Fava bean puree

Nutrient profile (per 100g EP)

Pulse	Energy (kcal)	Protein (g)	Fat (g)	CHO (g)	Fiber (g)	Fe (mg)	Zn (mg)	Folate (mcg)
Beans, white, dried ¹	335	22.1	1.50	47.1	16.7	5.70	3.80	395
Cowpea, dried, raw ¹	316	21.2	1.30	47.2	15.3	7.30	4.60	417
Chickpeas, mature seeds, raw ²	378	20.5	6.00	62.9	12.2	4.30	2.80	557
Beans, pinto, mature seeds, raw ²	347	21.4	1.20	62.5	15.5	5.10	2.30	525
Lentil, Green, whole, large, raw ³	360	25.6	1.50	61.6	17.7	6.20	2.41	105
Faba beans, raw ³	312	24.3	2.10	58.3	18.6	3.70	2.40	-
Mung beans, Crystal, raw ³	316	24.5	2.00	56.9	13.7	4.00	2.80	-
Pigeon pea, seeds, raw ³	344	19.0	2.13	64.0	21.3	1.94	2.02	-

Source: ¹West African Food Composition Table, 2012; ²USDA, 2014; ³FAO/INFOODS Food Composition Databases (data not published)

Pulses and food security

- Low food wastage
- Pulses have a long shelf life = lower proportion of food waste at the consumption stage
- Pulses can be stored for long periods without losing their nutritional value increasing the year-round food availability and usability in emergencies and food aid



Pulses and climate change

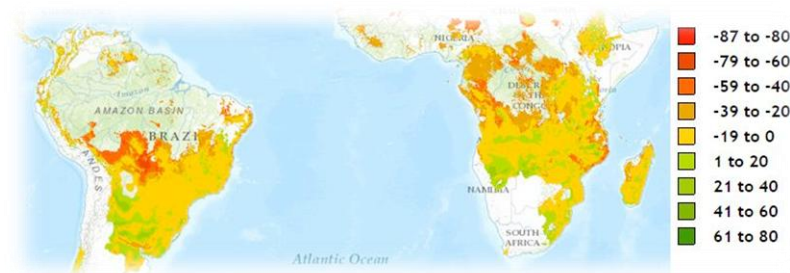
- Pulse species have a broad genetic diversity

→ Improve varieties

- International Center for Tropical Agriculture (CIAT)

→ Heat stress will be the biggest
threat to bean production

→ Improve varieties that can grow
above the crop's "comfort zone"



*Turning down the heat:
breeding beans for a changing climate*

- International Center for Agricultural Research in the Dry Areas (ICARDA) and
Turkish national scientists

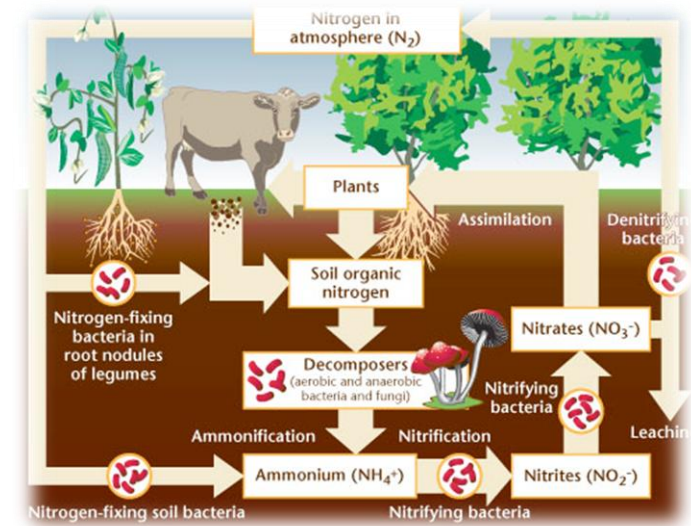
→ Drought-tolerance chickpea variety (e.g. Gokce)

→ Withstood severe drought in Turkey

→ Accounts for more than 80% of chickpea production in Turkey

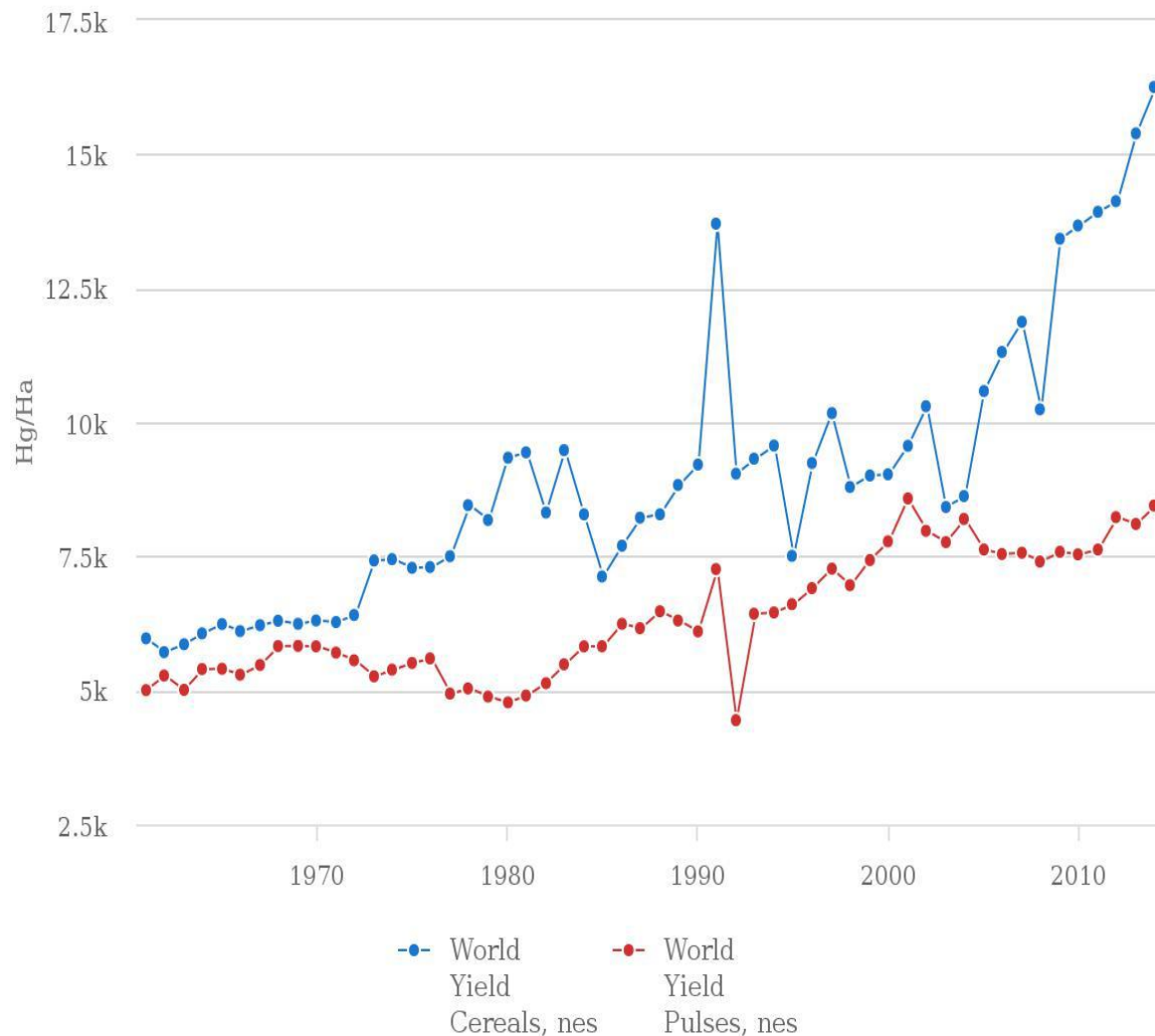
Pulses and climate change

- Manufacture of fertilizers
 - ➔ Energy intensive
 - ➔ Emits green house gasses
 - ➔ Overuse might be detrimental
 - ➔ Pulses can reduce the use of fertilizer



- Pulses often promote higher rates of accumulation of soil carbon than cereals and grasses

Major constraint for adoption: low yield = low income



But funding for pulse research is low:

- **Global:** 175 M USD/year (China not included) or 0.55% of the global spending on agricultural R&D (2008);
- **CGIAR:** 59.7 M USD/year or 11% of total expenditure (2002-06);
- **USA:** 16.8 M USD/year or 0.1% of total expenditure on crop research.



A special thanks to:

Teodardo Calles

Andrea Sonnino

Fernanda Grande

Morgane Fialon

Anna Vincent

Maria Xipsiti

Ramani WijesinhaBettoni

Ruth Charrondiere

