



GLOBAL LARGE-SCALE INNOVATION PROGRAMS IN FRANCE

François Houllier, INRA CEO

Meeting of the G20 Agricultural Chief Scientists
Xi'an, 31 May 2016

1/ FRENCH RESEARCH & INNOVATION STRATEGY

From national research strategy
to targeted roadmaps and specific action plans
for food & agricultural research & innovation

2015: PUBLICATION OF THE NATIONAL RESEARCH STRATEGY

- Planned by the National Act on Higher Education & Research of July 2013, aligned with the EU strategy and organized in 10 societal challenges
 - Sober resource management and adaptation to climate change
 - Clean, safe and effective energy
 - Stimulate industrial renewal
 - Health and wellbeing
 - Food security and demographic challenge
 - Mobility and sustainable urban systems
 - Information society and communication
 - Innovative, integrative and adaptive societies
 - Spatial ambition for Europe
 - Liberty and security of Europe, its citizens and its residents



RESEARCH INFRASTRUCTURES: A NATIONAL ROADMAP ALIGNED WITH THE EUROPEAN ROADMAP

- Food & agriculture research is concerned by
 - **Infrastructures in Earth & Environmental Sciences**
 - *Agronomic Resources for Research; Naturalist Collections*
 - *Analysis & Experimentation on Ecosystems; Multi-Environment Plant Phenomics and Simulation*
 - *Integrated Carbon Observation System; Observation of the Critical Zone; Data & Services for Earth Systems*
 - **Infrastructures in Life Sciences**
 - *Biobanks; Transgenesis for animal models; Biological resources for animals*
 - *Genomics; Bioinformatics; Metabolomics*
 - *Industrial Biotechnology Innovation and Synthetic Biology Accelerator*
 - **Research Data Infrastructures**





#AI2025: AGRICULTURE INNOVATION 2025

- Towards an innovation action plan for agriculture
 - Produced at the request of the Ministers for Research and Agriculture by a team of four experts
 - 3 complementary priorities to jointly address competitiveness and sustainability
 - *Systems approaches & climate change*
 - *Technological developments*
 - *Open innovation to bring all actors together*
 - A diversity of innovations (technology-based, social or organizational) is needed for the transition towards agroecology & bioeconomy
 - The need to complete with a plan towards the food S&T component of the agrifood sector

30 R&D&I projects in 9 axes

- *Agroecology*
- *Bioeconomy*
- *Digital Agriculture*
- *Robotics*
- *Genetics & Biotechnologies*
- *Biocontrol*
- *Open Innovation*
- *Economics*
- *Education & Training*

#AI2025: FUTURE ACTIONS

- Strengthen research on agricultural soils, agriculture and climate
 - **Link with the 4‰ initiative**
- Place agriculture at the heart of the National Strategy for Research
 - **Towards interdisciplinary research centres**
 - *on Agriculture & Climate,*
on Systems & Synthetic Biology,
and on Digital Agriculture & Big Data
 - **Launch Biocontrol and Biotechnology programs**
- Develop research and innovation for digital and connected agriculture
- Create Living Labs to promote open innovation in the territories
 - **Agroecology for cropping systems (Limagne)**
 - **Sustainable livestock farming (Britain)**

#FBRI2025: 'FORÊT BOIS RECHERCHE INNOVATION 2025'

- Towards a research & innovation action plan for the forest-based sector
 - At the request of the Ministers for Research, Agriculture, Industry, Housing and Environment
 - With the aim to make proposals to improve the overall performances of the forest-based sector
 - 13 projects grouped in 3 priorities
 - *Strengthening systems approaches connecting forest systems to wood industries*
 - *Developing the present and new uses of wood*
 - *Adapting forests and preparing the future forest resources*



2/ FRENCH CONTRIBUTION TO THE FOOD SECURITY CHALLENGE UNDER CLIMATE CHANGE

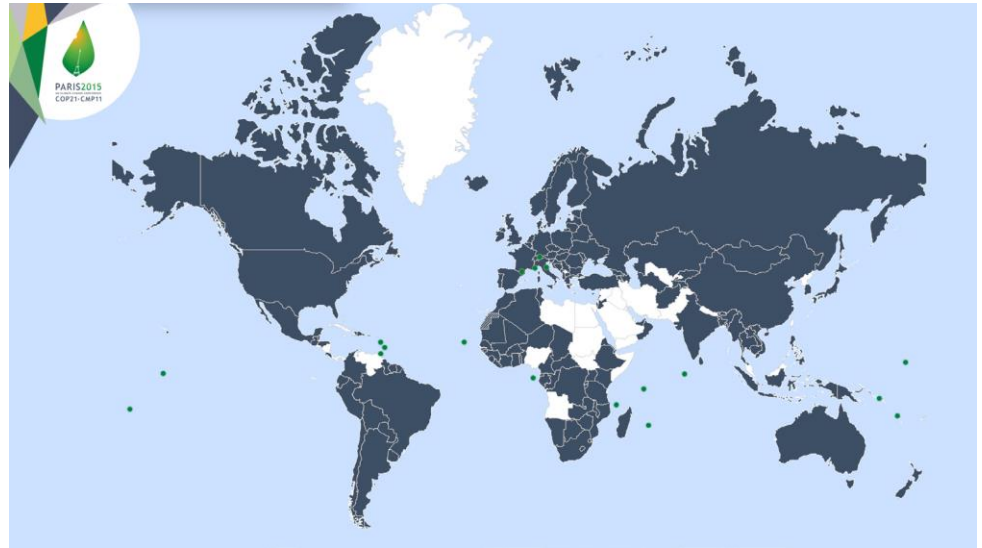
The 4 per 1000 Initiative:
Soils for Food Security & Climate
Foresights on Food Security
About Food Losses & Waste

COP21 & INTENDED NATIONALLY DETERMINED CONTRIBUTIONS



Submissions to date: 160 ; Parties Represented: 188

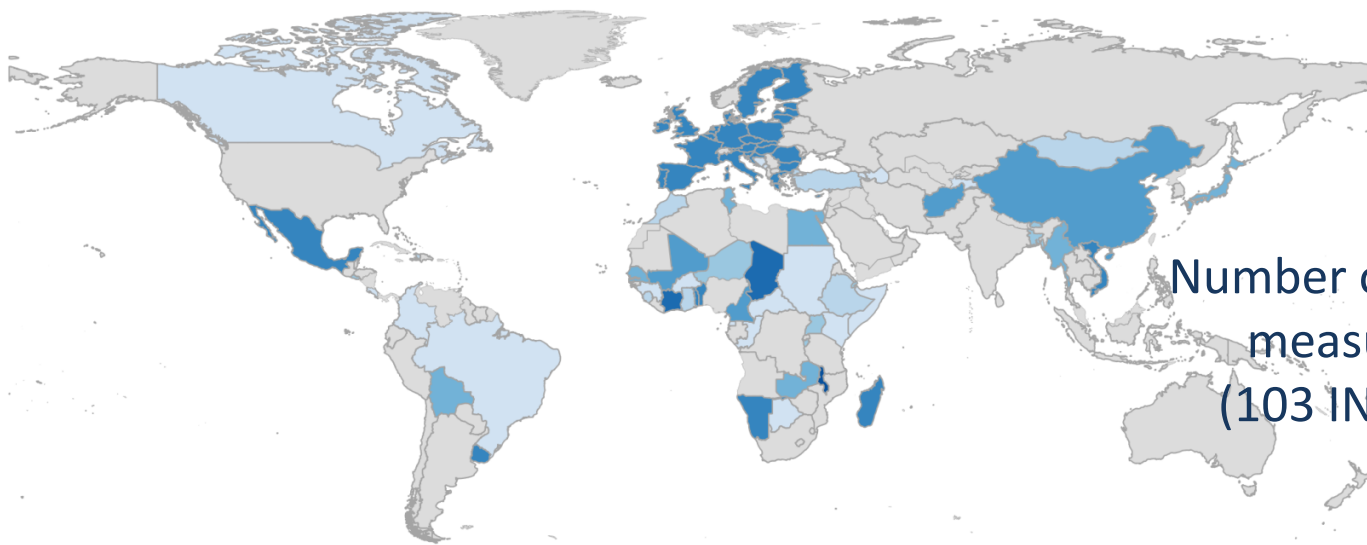
http://unfccc.int/focus/indc_portal/items/8766.php



http://www.diplomatie.gouv.fr/fr/IMG/pdf/fiche_d_analyse_indc_cle0e71a7-1.pdf

- 188 parties committed to reducing their greenhouse gases emissions
 - 97.1 percent of global greenhouse gases emissions in 2011 are covered by INDCs
 - Mitigation at the heart of contributions: emissions control becoming a universal issue
 - Anticipating disasters is also a priority via early warning systems

COP21 & INDCs (as of 31st December 2015)

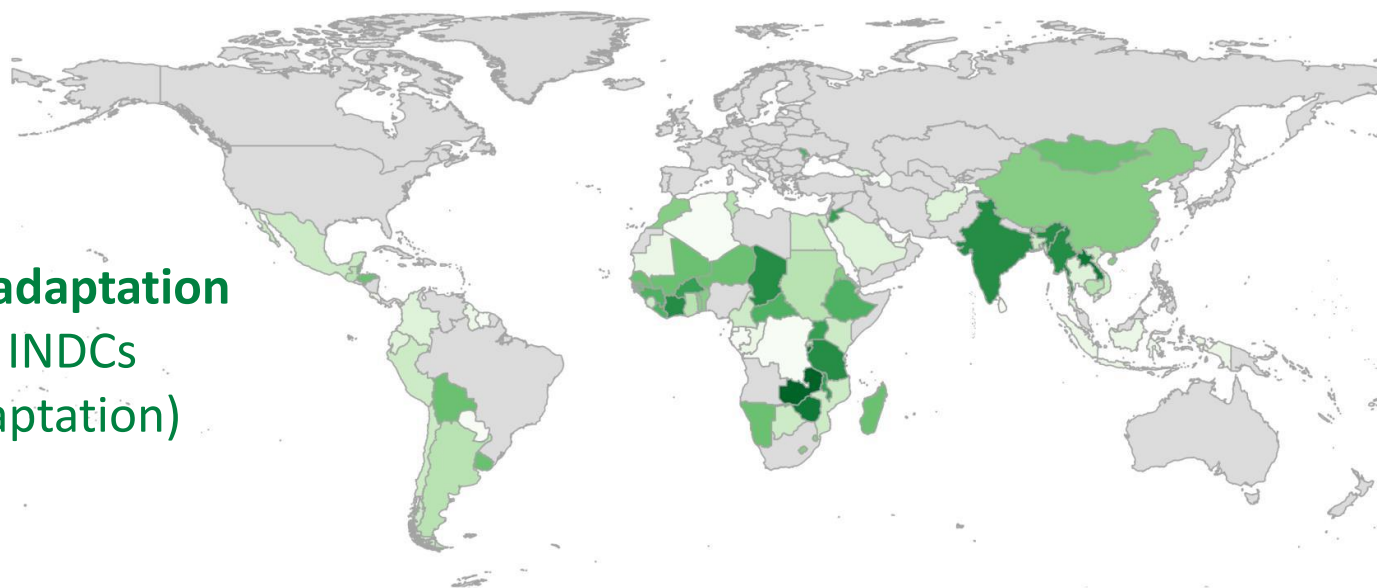


Number of agricultural **mitigation** measures mentioned in INDCs
(103 INDCs mention mitigation)

Number of agricultural mitigation measures mentioned in INDCs

1 2 3 4 5 6 7 8 None or no INDC

Number of agricultural **adaptation** measures mentioned in INDCs
(113 INDCs mention adaptation)



Number of agricultural adaptation measures mentioned in INDCs

1 2 3 4 5 6 7 8 9 10 11 12 None or no INDC

Source: <https://ccafs.cgiar.org/publications/how-countries-plan-address-agricultural-adaptation-and-mitigation#>.

COP21 & 4 PER 1000 INITIATIVE: SOILS FOR FOOD SECURITY AND CLIMATE

- What does 4 per 1000 mean?
 - **To increase by 0.4 %/year the current stock of soil organic Carbon**
- For which purpose?
 - **Improvement of food security by enhancing soil quality & fertility and combating land degradation**
 - *To reduce soil erosion and restore degraded farmlands*
 - *To increase yield*
 - **Adaptation of agriculture to climate disruption**
 - *E.g. better soil water management, reducing crop yield variability*
 - **Mitigation of climate change**
 - *Stopping the current rise in atmospheric CO₂*

KEY DATES OF THE 4 PER 1000 INITIATIVE

- **16-18/03/2015, Montpellier:** Climate Smart Agriculture Global Science Conference
- **7-10/07/2015, Paris:** Side event of the International Conference “Our common future under Climate Change” (CGIAR, INRA, CIRAD, IRD)
- **16/09/2015, Paris:** High level meeting, OECD & French government : “Agriculture and agricultural soils facing climate change and food security challenges: public policies and practices”
- **30/11/2015, Paris:** High Level meeting organized by CGIAR, INRA, CIRAD, IRD (invited: CAAS, WUR, GRA, EMBRAPA, EU commission, WASCAL, World Bank,...)
- **1/12/2015, Paris:** Kick-off meeting at COP21
 - One out of the six initiatives of the agricultural component of the Lima Paris Agenda for Action
- **10/12/2015, Paris:** Carbon sequestration and agriculture, side event COP21
- **28/04/2016, Meknes:** What should be the governance and roadmap for the 4 per 1000: Soils for Food Security and the Climate Initiative?

COP21 & 4 PER 1000 INITIATIVE: SOILS FOR FOOD SECURITY AND CLIMATE

- What kind of actions?
 - **A multi-actor platform**
 - *Sharing information & good practices, designing joint projects & policies, ...*
 - **A system for collective project expertise**
 - *A set of reference criteria compliant with the Initiative's principles and goals*
 - **A framework in order to facilitate project funding and promotion**
 - **An international cooperative scientific research programme**
 - *Better understanding of biogeochemical processes and of the mutiscale determinants and consequences of organic carbon sequestration in soils*
 - *Mapping the potential for organic carbon sequestration in soils*
 - *Defining and assessing multiscale agronomic and forestry strategies (incl. incentives measures)*
 - *Straightforward methods for monitoring changes in soil carbon content*
 - **A digital resource centre on topics related to the initiative**

COP21 & 4 PER 1000 INITIATIVE: SOILS FOR FOOD SECURITY AND CLIMATE

- Which governance?
 - An undertaking by over 160 organisations (countries, multilateral organizations, farming associations, NGOs, private companies, research organizations, ...) to “to put in place a formal governance structure through an inclusive and transparent process, guaranteeing fair participation by the various stakeholders and taking into consideration the need to collaborate with existing, relevant initiatives by seeking synergies with them on soil health issues, wherever possible.”
 - Proposed bodies (as discussed in Meknes)
 - *A consortium of public bodies*
 - *A forum of all voluntary actors*
 - *A Scientific and Technical Committee*
 - *A Secretariat*
 - The need to align with other related initiatives
 - *E.g. the Global Soil Partnership, the Global Research Alliance, ...*

FORESIGHT STUDIES FOR ADDRESSING SCIENTIFIC QUESTIONS AND SOCIETAL CHALLENGES



AGRIMONDE-TERRA

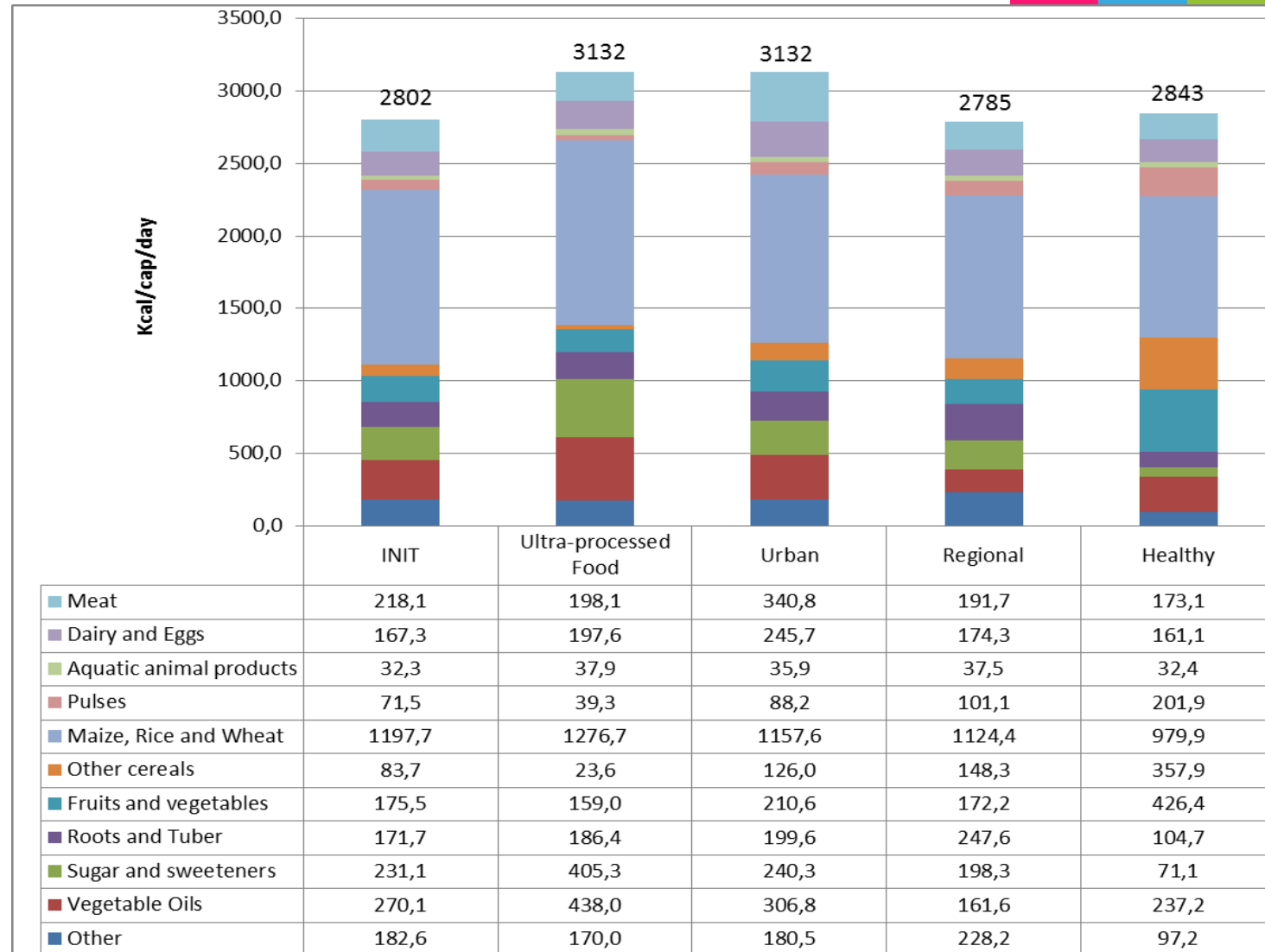
Land Use and Food security in 2050





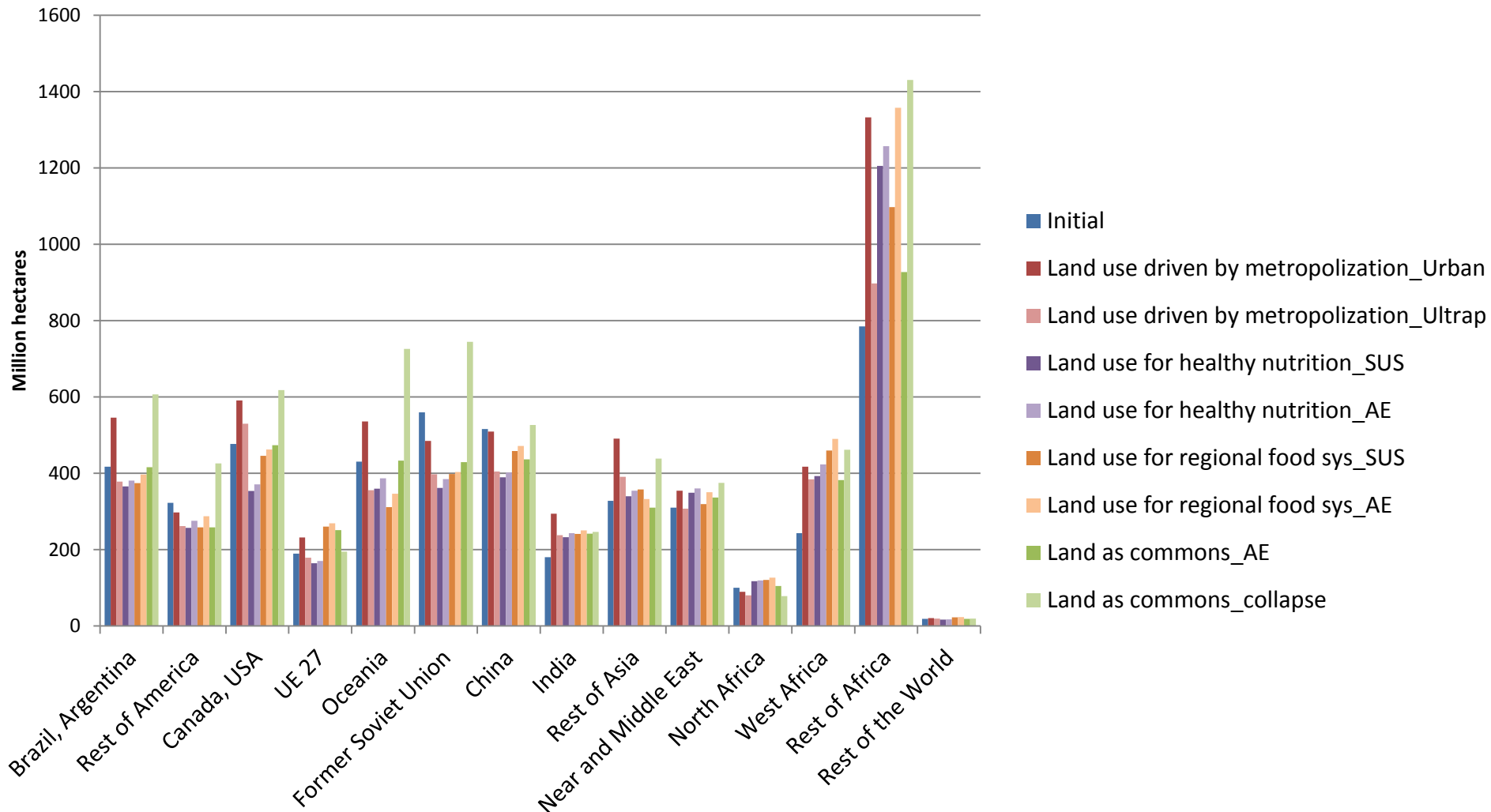
AGRIMONDE-TERRA FORESIGHT: WORLD FOOD SECURITY & LAND USE IN 2050

- World food contrasted diet scenarios in 2050





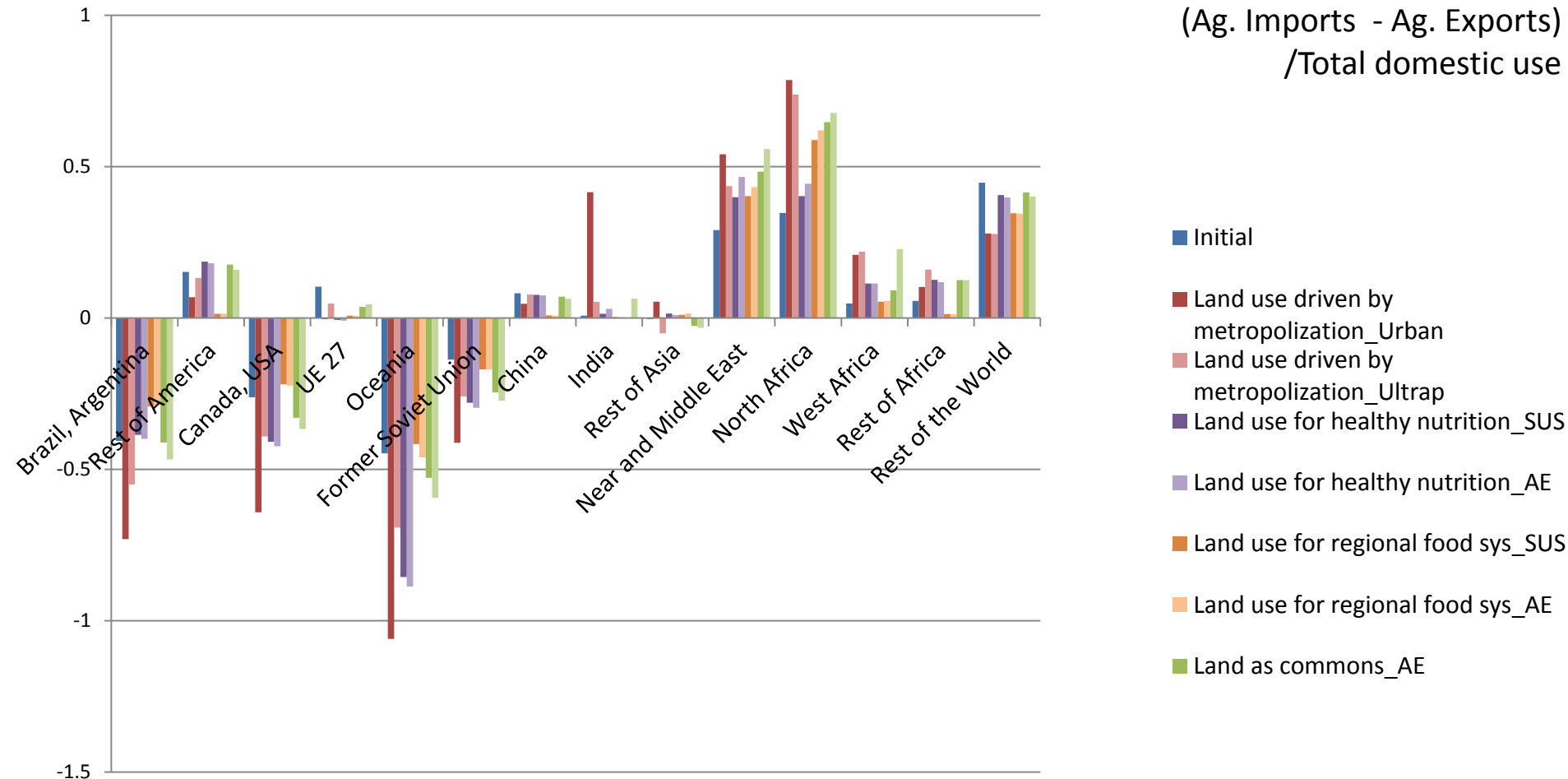
Agricultural land use as a consequence of diet scenarios and of the changes in agricultural practices





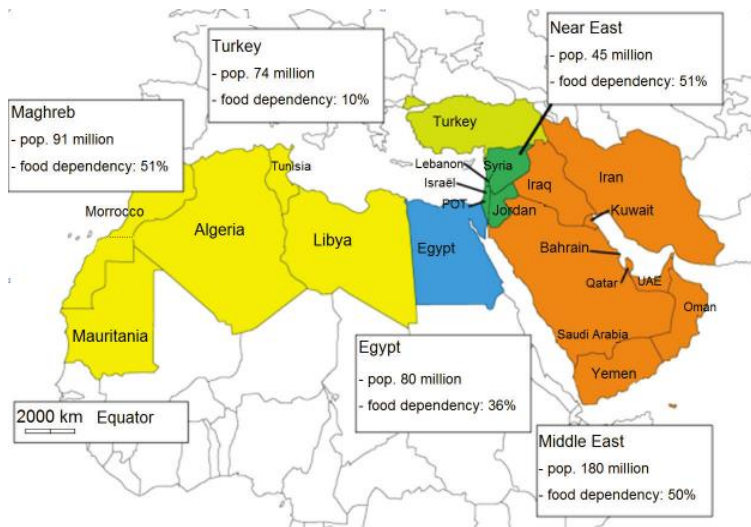
Consequences on the trade of agricultural & food products

(Ag. Imports - Ag. Exports)
/Total domestic use

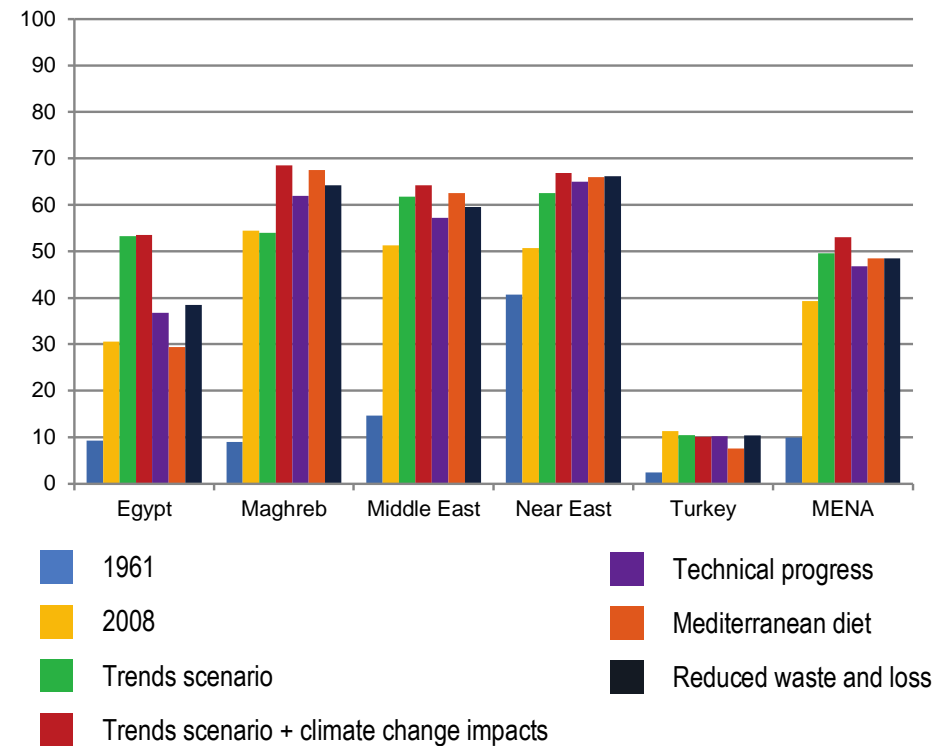


Agrimonde-Terra International Conference: Paris, 2016 June 24

ADDRESSING AGRICULTURAL IMPORT DEPENDENCE IN THE MIDDLE EAST & NORTH AFRICA THROUGH THE YEAR 2050



- Agricultural imports could reach 53% to 70% (depending on countries)
- Dependence to imports could be \pm stabilized only by playing on all levers (diet, FLW, technologies, ...)



Net import dependence of the MENA region and its five sub-regions in 1961, in 2008, and in 2050 for each projected scenario (share (%) of net imports within total domestic consumption, in kilocalories)

REGARDING FOOD LOSSES & WASTE

- Commitment to contribute to the MACS FLW platform as led by Germany



Revue **CIAg Agriculture** **CIAg Alimentation** CIAg Environnement

Accueil • CIAg Alimentation • Réduire les pertes agricoles et alimentaires

Leviers pour réduire les pertes agricoles et alimentaires : comprendre, quantifier et analyser



© Jean Weber, Inra

Ce colloque est la 9ème édition du pilier "Alimentation" des Carrefours de l'Innovation Agronomique, il a eu lieu le 26 novembre 2015



LEVIER DE RÉDUCTION DES PERTES ET GASPILLAGES ALIMENTAIRES DANS DIVERS CONTEXTES D'ÉVOLUTION URBAINE

RÉSUMÉ D'ÉTUDE - MAI 2016



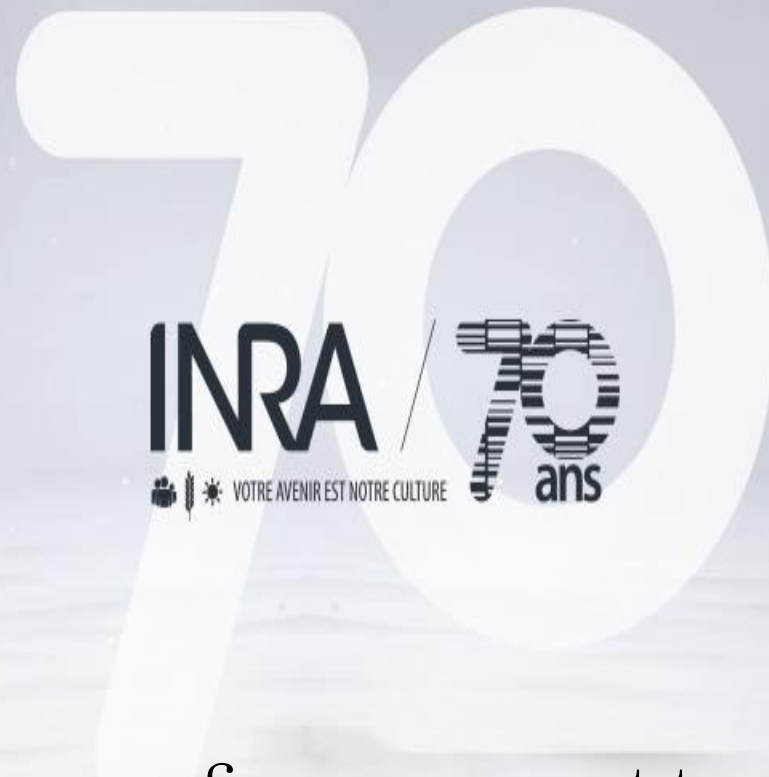
CIAg Alimentation

- Allergies, intolérances et hypersensibilités alimentaires
- Réduire les pertes agricoles et alimentaires
- Biodiversité des ferments
- Phytomicronutriments

1946-2016: “FROM FEEDING FRANCE TO NURTURING THE PLANET”

70ans.inra.fr/en





Thank you for your attention