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« Future of farming in Europe and Plants for the future »

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Future of farming in Europe and Plants for the future

-What is a Technology Platform ?

-What is at stake for the European Agriculture ?

-How can Plant Genomics be useful for Farmers ?

- What is « Plant for the Future » ?

What is a Technology Platform ?

What is a technology Platform ?

- **Policy objectives**
  - **Lisbon and Barcelona Councils**
    - **The UE in 2010 = knowledge economy the most competitive in the world.**
    - **Increase R § D investment : 3 % GDP, of which 2/3 from private sector.**
  - **Positive impact on other policies**
    - **Regulations, norms and standards, safety, economic measures,**
    - **Skills and training needs, creation of networks and associations, …**
  - **Investment concentration**
    - **Contribution to competitiveness through mobilizing research and innovation effort, facilitating the emergence of lead markets in Europe.**

What is a technology Platform ?

- **A common framework for stakeholders**
  - **Research, industry, public authorities, policy makers, financial world, consumers, civil society, …**
  - **Common vision about a technology.**
  - **Strategic research agenda and action plan.**
  - **Identification of the legal and regulatory conditions needed to implement the agenda.**
  - **Mobilization of a critical mass of research and innovation capacities.**
  - **Mobilization of public and private funds, at European, National and Regional levels.**
  - **Includes also teaching, training, communication, dissemination aspects.**

What is at stake for the EuropeanAgriculture in the next decades ?

What is at stake for the European Agriculture ?

- **Agriculture: to build a European sustainable agriculture**
  - **To ensure the economic viability of the European agriculture: competitiveness (productivity, reduction of costs,…), production of goods and services requested by society, …**
  - **To reduce the negative impacts of agriculture on environment (pollutions due to fertilizers and pesticides, water and energy consumption,…) and to increase the positive impacts (capture and storage of greenhouse gases, landscapes, biodiversity, development of less favoured areas of EU, …).**
  - **To set up production systems socially acceptable for farmers (income, working conditions, integration in the rural environment,…) and citizens (subsidies).**

What is at stake for the European Agriculture ?

- **Food: the challenge of quantity**
  - **Forecasted world population in 2050 = 9 billion**
  - **95% of the population increase in developing countries**
  - **Increase of the average food consumption (# + 250 kcal/person/day in 2030 vs 1997/99)**

→ the demand will dramatically grow

e.g. : need to produce 1 billion tonnes cereals more in 2030,

- **At acceptable cost**
- **On which soils ?**

→ Which role for the European Agriculture ?

What is at stake for the European Agriculture ?

- **Food: to answer consumers demand**
  - **Aging population in the EU**
  - **Lifestyle changes**

  → Growing awareness for nutrition issues and healthy food.

  e.g. Demand for plants containing more essential nutrients;
  Interactions between food and cardio-vascular diseases, obesity, …

  - **Food crisis (BSE, dioxine, …)**

  → Growind demand for safe and quality food

  e.g. Reduction of chemical residues, toxins, …
  More tasty and flavoured food.

  - **Food chain requirements**

  → Demand for agricultural products fiting with the « technological qualities » required, and for traceability.

What is at stake for the European Agriculture ?

- **Feed: to develop the European protein production**
  - **To produce a high quality and low cost animal feed by development of European protein sources**

    e.g. - grain legumes (good source of proteins for animal feed and human diet, while being environment-friendly),

    - better use oil crops proteins,

    - increase of proteins and essential amino-acids contents in cereals.

What is at stake for the European Agriculture ?

- **Bio-energy: to produce renewable energies at acceptable costs**
  - **World energy consumption is expected to rise more than 50% in the first decades of the 21th century**
  - **Forecasted depletion of fossil reserves in the future**
  - **Aim of the EU to dissociate economic growth and environmental impact**
  - **International commitment for reducing GHG (Kyoto)**

→ Increased demand for renewable energy

What is at stake for the European Agriculture ?

- **Bio-materials: the challenge of waste**
  - **To remedy the mounting waste problem**

  → Increased demand for biodegradable paper, plastics, polymers, lubricants, surfactants, solvents, fibres, …

  → Which competition in the future for land use in the EU (food vs non-food uses) ?

How can Plant Genomics be useful for Farmers ?

How can plant genomics be useful for farmers ?

Preliminary thought :

- **What will happen if an important technological gap is setting up between the EU and other major agricultural countries ?**

- **What would be the cost for EU for giving up property or use of genomics innovations ?**
  With which consequences for farmers ?

- **These innovations shall not restrict the farmer's liberty to choose his production system (conventional, integrated, organic, …)**

How can plant genomics be useful for farmers ?

- **Species and varieties able to contribute to the identified needs and challenges (improvement of currently used crops, diversification with new crops, or reconversion of crops (e.g. tobacco)):**
  - **With relevant features to adress consumer, farmer and food chain requirements: quality (nutrient contents, taste, flavour, …), yield, harvestability, storability and processability.**
  - **Adapted to climate stresses (including the need to adapt to climate change): adaptation to temperature increase, reduction of water use, yield stability, …**

How can plant genomics be useful for farmers ?

- **Species and varieties (2)**
  - **<u>Needing less fertilizer</u>: reduction of fertilizers inputs.**
  - **<u>Tolerant/Resistant to biotic stresses</u> (diseases, pests, …), including those due to climate change (new distribution of pests and diseases): reduction of pesticides inputs and some mycotoxins content.**
  - **<u>GM plants with reduced gene flow</u>: biological solutions for co-existence issue.**

How can plant genomics be useful for farmers ?

- **Species and varieties (2)**
  - **New crop plants**
    - **Which can be used efficiently as an energy source**
    - **Which can be grown to produce renewable materials or pharmaceuticals**

→ better use of biodiversity; increasing knowledge in physiology; interactions between genomics, physiology, ecology and agronomy; …

How can plant genomics be useful for farmers ?

- **Diagnosis and crop management tools:**
  - **Early knowledge of variety's features: to choose the well adapted varieties in a given environment.**
  - **Monitoring of the plants nutrients needs.**
  - **Monitoring of the plants water needs.**
  - **Monitoring of the plant's health.**
  - **Identification of pathogenic agents (virus, fungi, bacteria, …).**
  - **Early assessment of the yield potential.**
  - **Early assessment of crop quality characteristics.**

→ Reduction of inputs uses and early assessment of yield and quality

→ Transcriptomic and metabolomic researches (microarray, …); agroclimatic models integrating genetic data.

How can plant genomics be useful for farmers ?

- **Tools for traceability:**
  - **Origin attestation.**
  - **Certification.**
  - **Fraud control.**

  → analysis, detection and quantification tools.

- **Improvement of processes:**
  - **Improvement of conversion process (biofuel production).**

How can plant genomics be useful for farmers ?

- **Technologies for using greater parts of plants:**
  - **To use fruit, stem, leaf,…**
  - **To develop products and by-products.**

  → increase of outlets and reduction of costs.

  → While taking care of organic matter returning to the soils !

What is « Plant for the future » ?

What is « Plant for the future » ?

- **European Council (March 2003) recommended the creation of Technology Platforms.**
  Suggestion, among others, in the area of plant genomics.

- **Other existing or planned platforms (22 in July 2004):**
  - **Hydrogen and Fuel Cells**
  - **Nanoelectronics**
  - **Water Supply and Sanitation**
  - **Aeronautics**
  - **Steel**
  - **Global Livestock Development**
  - **…**

What is « Plant for the future » ?

- **Plant genomics and biotechnology represent a high potential of innovation and economic growth for Agriculture and Agro-food Industry.**
  - **The Agro-food Industry = 600 billion € annual turnover,**
    = 2.6 million jobs (excluding farmers) (3rd largest employer)
    = 45 billion € excess / export
- **Great potential interest also for Society and Consumers**
  - **cf. challenges previously mentionned: food, bio-energy, bio-materials, environment.**

What is « Plant for the future » ?

- **But tremendous controversy about these technologies, reflected in the EU regulations.**

- **Decrease of research funding in Europe in the past few years: risk for the EU to fall behind its major competitors (USA, Japan, China).**

- **Relocation of private research activities and investments outside the EU.**

- **99.5% of GM crops are grown outside the EU.**

→ **Need for a concerted action on the part of all stakeholders to meet the future Bio-Economy.**

What is « Plant for the future » ?

- **1st preparatory meeting organised by the Commission: July 2003.**
  - **Research (EPSO),**
  - **Industry (seeds, biotechnologies, agro-food),**
  - **Consumers (BEUC),**
  - **Farmers (COPA – COGECA),**
  - **Financial world (BEI).**

→ The Commission proposes that EPSO and EuropaBio set up the TP on Plant genomics.

What is « Plant for the future » ?

- **First stage: May 2004, a « vision paper » is ready and signed by a group of Personalities.**
  - **Among others: Commissioner P. Busquin, P. Pagesse (COGECA) and R. Serra Arias (COPA).**
- **Press conference on the « vision paper »: 24th of June 2004.**

What is « Plant for the future » ?

- **<u>« Vision paper » - Strategic priorities.</u>**

  Improving the safe exploitation of the genetic diversity in plants to:

  - **Produce better quality, healthy, affordable, diverse food (…)**
  - **Bring about environmental and agricultural sustainability, including biomaterials, bioenergy and renewable ressources.**
  - **Enhance the competitiveness of European agriculture, industry and forestry.**

What is « Plant for the future » ?

- **« Vision paper » - Main activities**

  To meet its strategic priorities, Plant for the Future should focus on:

  - **Developping and implementing a pertinent long-term research agenda (…).**
  - **Enhancing the transparency of the R § D effort at the regional, national and European levels.**
  - **Promoting a coherent policy and supportive regulatory environment.**
  - **Adressing public concerns and developping societal consensus based on a mutual understanding among stakeholders.**

What is « Plant for the future » ?

- **Second stage: implementation of the « vision paper » (EC financial support – 3 years since June 2004)**
  - **Advisory council (group of Personalities): political support and recommendations to the Platform.**
  - **Steering committee (group in charge of the « vision paper » preparation): ensure the implementation of the « vision paper »; support activities and recommendations among stakeholders.**
  - **Mirror groups (Council, Parliament, Commission): ensure support of these institutions for implementation of recommendations at EU, national and regional levels.**
  - **Secretariat: Epso and Europabio.**
  - **Working groups (experts): Basic research, Sustainability, Products (food and non-food), Horizontal issues (regulations, public perception, communication, training, …).**

What is « Plant for the future » ?

- **Working groups objective**
  - **Drafts of Strategic research agenda (2025) and Action plan (2010) ready in February 2005.**
  - **Final agendas will be established after consultation at Member states and EU (EP, EC) level (2006).**

What is « Plant for the future » ?

- **Conclusion**
  - **The Technology Platform « Plants for the Future » represents a great hope for the stakeholders involved.**
  - **The success of this endeavour could allow the European Union to remain competitive in the field of Plant Genomics and Biotechnologies.**
  - **The TP should get over potential difficulties:**
    - **To set up a strategic research agenda supported by all stakeholders,**
    - **To build an action plan with sufficient means (public and private),**
    - **To get a societal and political support, allowing ambitious investments to preserve the future EU competitiveness in this field and in related economic activities.**