Case study on one bioeconomy sector:
Ensuring a competitive workforce for plant sector - industry, academia & farmers

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www.plantetp.org
Plants are in the center of global challenges

Climate challenge

Energy challenge

Food demand challenge

Natural resources challenge
What is Plant ETP?
Industry – Academia - Farmers

>7000 Companies (90% SMEs)
European Plant Science Organisation
>220 Research Institutes & Universities

76 Farmers’ Organisations & 40,000 Cooperatives
What is Plant ETP?
Industry – Academia - Farmers

Role: COORDINATION

- Steering Council – Executive Committee - Coordinator
- Equal rights for stakeholders & veto right
- Industry lead
- Working Groups

(Vision paper, June 2004) (Strategic Research Agenda, June 2007)
Plants are at heart of EU competitiveness

Agriculture + Public & Private organisations

- € 700 Billion annual turnover
- 30 Million jobs and 20 % of EU lands
- 15-20 % of annual turnover in R&D

“The future competitiveness of Europe’s agricultural and Ag processing industries will depend on plant genomics, biotechnology and their smart application”

(Plant ETP Vision, June 2004)
Strategic Research Agenda addresses 5 challenges:

- **Product**: Plant-based products (biomass)
- **Sustainable agriculture**: Healthy, safe & sufficient food + feed
- **Research**: Competitive basic research
- **Society**: Consumer choice, good governance
Plants integrate with other sectors of the bioeconomy

Bioeconomy refers to the sustainable production and conversion of biomass into a range of food, health, fibre and industrial products and energy.

Renewable biomass encompasses any biological material as a product in itself or to be used as raw material.

(Source: BECOTEPS White Paper 2011)
Need connected ETPs in the bioeconomy - BECOTEPS

FP7 – BECOTEPS (2009-2011)

www.becoteps.org
2 years intense collaboration (Mar’09-Mar’11)

• “The European Bioeconomy in 2030”: vision & recommendations
• Meetings with stakeholders & policy makers
Integrated approach of Plan(t)s for the Future

- Research Action Plan
- Innovation Action Plan
- Education Action Plan

- Identify needs & bottlenecks
- Identify potential solutions
- Implement at national, EU (e.g. FPs), multinational (e.g. ERA-NETs, JPIs) & global level (e.g. FAO)

(Source: EC Experts Group on ETPs 2009)
Three Action Plans

2010 – 2014

Agree overall purpose of the three Action Plans

WoGr meetings – Three workshops each – stakeholders public consultations

- **Research Action Plan** to improve:
  - Competitiveness and critical scale of European plant research
    - on yield, quality, resource use efficiency and stress resistance
  - Balancing knowledge- and application-driven plant research

- **Education Action Plan** to clarify:
  - Short, mid and long term **skill needs** in plant R&D
  - Short, mid and long term **career opportunities** in the plant sector

- **Innovation Action Plan** to improve:
  - Linkage of market needs and idea generation
  - Flow from idea to marketable product
  - Innovation culture in Europe
ETPs complement the top-down by a bottom-up approach—bringing in industry, farmers and academia—making it happen.

Making Europe more competitive
Research & Innovation contributions from the plant sector in H2020

Most innovative areas in the plant sector in the coming decades
→ 1st Input Plant ETP to H2020
→ Research Action Plan:

**Improve:**
- Resource use efficiency
- Yield (stability) in changing environment
- Nutritious plants for healthy food & feed
- Plant health
- Plants for non-food products
- Horizontal actions
Research Action Plan

Making Europe more competitive
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Education Action Plan

But...

- Who are the plant scientists, plant breeders and farmers of the future?
- Who will be carrying out the necessary research to deliver new plant varieties that meet the needs of farmers and growers?
- Which key plant science skills does the European plant sector need to secure and develop an economically viable future?
- How can higher education institutions provide an optimal education in plant sciences to produce graduates with the knowledge, skills and training relevant to the needs of the plant sector?
Education Action Plan
Goals + Actions in 2012/2013

**Goals:**
*Identify* current/future needs; gaps & how to address
- Shortfalls in skills
- Shortcomings in areas of expertise
- Specific needs in Eastern countries

*Assemble* in the Education Action Plan

*Discuss* this EAP with the responsible policy makers – mainly at national level – to encourage appropriate actions

**Actions in 2012-2013:**
Consultation of plant sector industry, academia, farmers across Europe → information & evidence on needs for the future workforce via **three online questionnaires**
Education Action Plan
The **Industry** survey (end 2012)

**Survey sent to:**
38 national seed associations
47 individual companies across Europe

**Aim: identify potential shortages in**
1. Highly qualified future employees for the breeding and agri R&D industries trained in **state-of-the-art new plant biology**
2. Future employees with strategically important but vulnerable **plant-related skill areas**

**Very good feedback:**
From almost 40 companies across Europe and beyond
Good representation of small, medium and large enterprises (global)
Survey sent to:
Over 220 institutes and universities across Europe
10 National Learned Plant Societies

Aim: academic institutions training plant scientists and/or performing academic research identify potential shortages in:
(1) Expertise/skills essential to provide training
(2) Expertise/skills essential to do research
(3) Academic institutions to better match industries’ needs and training of plant scientist

Very good feedback:
From over 60 academic institutions & National Societies from 19 countries
(ES, UK, FR, IT, PT, RS, NL, DE, CH, DK, SE, IE, PL, AT, BG, HU, SK, NO, CZ)
Education Action Plan
The Farmers survey (2013)

Survey sent to:
57 National Farmers Organisations across Europe involved in training of farmers (school & professional levels)

Aims: identify how to improve farmers’ awareness to bring technologies to the farm gate
- Nb. farmers/yr following professional training programmes
- Nb. of crops (list of crops)
- Average level of scholarship of farmers
- How innovation & new technology is developed in scholarship
- How many times/yr farmers visit demonstration farms
- Contacts with public / private organisations?

Only two responses:
From Germany and Italy
Not sufficient to provide a representative picture of farmers’ needs
Three major action points to address
→ help ensuring an appropriately qualified & skilled future workforce for the plant sector

I. Growing a sustainable workforce for the plant sector

II. Fostering the future of the plant sector through research and training

III. Increasing public appreciation of the plant sector

The 3 action plans will be published together by end of 2014
Who do companies need?

Our companies sell innovation and for that, they need:

- Low-, mid- and high educated people in green sciences
- Managers
- ...and in supply technologies (like greenhouses)
- ...and in logistics
- A well equipped (public) knowledge based
  - Professors
  - Post-docs
  - PhD, MSc, BSc students
  - Well educated supportive staff in the labs
  - ...and in mathematics and so on
What goes wrong?

A young student has to make a choice
What goes wrong?

A young student has to make a choice

→ Happens early in education process: school already!
Other major concerns

- Students not sufficiently aware of fundamental (classical) breeding techniques & basic knowledge of plants

- Huge potential offered by research and training in new biology approaches to be balanced with acquiring fundamental skills in e.g. plant physiology, breeding, cytology & biochemistry

- In view of expansion of plant breeding activities in Eastern Europe: strong need to raise levels of training & education in those countries
I. Growing a Sustainable Workforce

Main recommendations – DRAFT EAP

- **Concrete measures** to prepare future workforce: *ensure we can meet needs* associated with sustainable agricultural production

  - Ensure plant science courses offer students opportunity to access education & training in **classical & new biology**
  - Encourage **interdisciplinary culture** to build & combine knowledge (plant science and management)
  - Encourage ‘**clustering**’ of plant science disciplines (classical & new biology) amongst universities and at regional & national levels → make better use of existing structures

**Example:**

*A regional cluster: Bioeconomy Science Centre, North Rhine-Westphalia, Germany*
II. Fostering future of plant sector through Research & Training – Draft EAP

Major concerns

- Universities & academic institutions increasingly under pressure to contribute to training the future plant sector workforce AND also carrying out pioneering research on plants
- Disproportionate amount of funding in biochemical research compared to plant science research (usually only 1-5% of biology goes to plant science)
- Students lack awareness of career prospects both in industry & research
- Postgraduates trained towards a career in plant sector by integrating industry related topics within education programmes

Example of clustering of institutes and partnering with industries: *Transnational public/private cooperation: Nordic Plant Improvement Network*
II. Fostering future through Research & Training – Main recommendations

**Improve funding & support** for plant science research and education across all its components (basic – applied research; KT; innovation) AND across range of disciplines (new biology to classical)

- **Stimulate cooperation between academia & industry** in education & training
- **Incentives** to attract and retain high calibre students (e.g. Marie-Curie, Erasmus)
- **Urge employers to promote career opportunities**
- **Boost rural development** by attracting highly skilled workers
- **Facilitate knowledge exchange** via improved mechanisms for effective communication between end-users (e.g. farmers) & research community
  - Promote greater awareness of **practical needs** of industry and farmers to academia (e.g. engage further in education content in universities)
  - Promote greater awareness of **benefits of research developments** to farmers
Poorly recognized that production of sufficient & safe food in a sustainable manner requires state-of-the-art research in plant science and a strong agricultural industry (incl. farmers & coop.)

Key Recommendations

- Encourage all stakeholders to engage with the public to raise awareness of plants and improve their attractiveness
- Through outreach for education, inspire students to take an interest in plant science education & training (starts at school)
- Through ‘inreach’ initiatives, encourage undergraduate students to choose plant science modules and projects at undergraduate and graduate levels
As a specific example of outreach
Linking European plant sector to the world

2nd International Fascination of Plants Day
- Over 1,000 events in 54 countries –
Purpose of the FoPD

- Promote plant sciences, both to the general public, but also politicians and research councils
- Create an interest in plant sciences - on the decline around the world
- Promote photosynthesis as the most important chemical process in the world
  - we could not be here without it
Examples of Activities
Join the FoPd 2015!
More farmers and companies!
Food Science & Technology sector organise events!

Fascination of Plants Day
May 18th 2015


www.plantday12.eu
European Technology Platforms in Bioeconomy

Conclusions: Make it happen!

Always

Address bioeconomy as a web, at least as chains - and in there:

- complement top-down with bottom-up approaches at all steps from strategy dev. to implementation (ETPs officially recognized in Horizon 2020)

Equally strong support of each component – basic & applied research, knowledge transfer, innovation framework, communication – education - outreach

Moving from notes to music!

Thank you for your attention