European Crop Protection in 2030. Summary of ENDURE Foresight study

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Globalised free market

> The Commodity Market Player

Farmers are important actors in the European economy. They compete on commodity markets.

General context
- Growing world demand for food
- A globalised and free market

European agriculture
- Basic crops for export
- Large farms, homogeneous cropping systems
- Partition of land use: intensive agriculture / conservation and recreation areas

Crop protection
- Best cost/benefit ratio: chemical control
- Ability to detect, monitor and trace residues and to assess impact
- Legally accountable stakeholders

Challenges for research
> Basic knowledge to develop green chemicals
> Sustained efficacy of chemicals
> Efficient indicators of impact
> Dynamics of controversies on health and the environment

Challenges for policy makers
> Fast-track registration for green chemicals
> Environmental objectives fully integrated into agricultural policy

Globalised free market

>The Specialised High-tech Grower

Farmers are part of a successful web of economic activities. They concentrate on specialised high-quality export products.

General context
- Growing world demand for food
- A globalised and free market

European agriculture
- Contributes to the knowledge-based bioeconomy
- Diverse: unique food products, green chemistry, top grade ornamentals, pharmaceuticals...
- Vertical integration: from genotypes to market

Crop protection
- Sophisticated strategies
- Resistant and sanitised plant material
- Controlled conditions
- New technologies for pesticide application

Challenges for research
> Cross-sectoral and multi-disciplinary innovation
> New technologies applied to crop protection
> Ecological engineering

Challenges for policy makers
> Support access to alternatives to pesticides
> Encourage SMEs developing controlled and confined high-tech agriculture

European response to global challenges

> The Sustainable Food Provider

Farmers ensure food self-sufficiency for Europe. They manage reliable and stable production systems.

General context
- Fear of food crises
- Agriculture for domestic consumption

European agriculture
- Europe-wide planned food production
- Crop allocation, minimising pest incidence
- Sustainable management of the resources key to future production

Crop protection
- Systems inherently less vulnerable to pests
- Ecological engineering, exploitation of biodiversity
- Exploitation of synergies between complementary control methods

Challenges for research
> Harnessing ecological processes to stabilise agro-ecosystems
> Modelling and assessing redesigned cropping systems
> Breeding approach: adapt cultivars to systems
> Predicting and limiting evolution of pests

Challenges for policy makers
> Stabilisation policy to promote long-term strategies
> Targeted incentives to support farmers in transition phase

European response to global challenges

> The Energy-saving Producer

Farmers produce food for local consumption in cities as well as the countryside

General context
- Energy conservation affects all sectors
- Policy on transportation of goods and people
- Large concentrated urban centres

European agriculture
- Urban: fruit and vegetable production in micro-farms and industrial units. Vertical agriculture, hydroponic, intensive organic methods
- Rural: arable and bioenergy crops in large farms with livestock integration. Limited use of machinery, no-till practices, reliance on nitrogen fixation

Crop protection
- Urban: zero-pesticide, crop diversity to spread the risk, healthy material and sanitation, resistant varieties, biological control by augmentation
- Rural: targeted use of plant protection products. Rotation, polyculture, relay crops and living mulch against weeds. Resistant varieties against new pests of bioenergy crops

Challenges for research
> Whole-systems approach for an optimal trade-off between minimising energy and reducing pest risk
> Urban: ecological engineering and high-tech
> Rural: development of green pesticides

Challenges for policy makers
> Access to biological control agents

Local development of territoires

>The Community-conscious Farmer

Farmers contribute to the economic attractiveness of* territoires. *Local stakeholders recognise the multiple services they provide

General context
- Europe is no longer a major food exporter
- Foreign income from non-agricultural sectors
- *Territoires* are EU instruments for economic growth

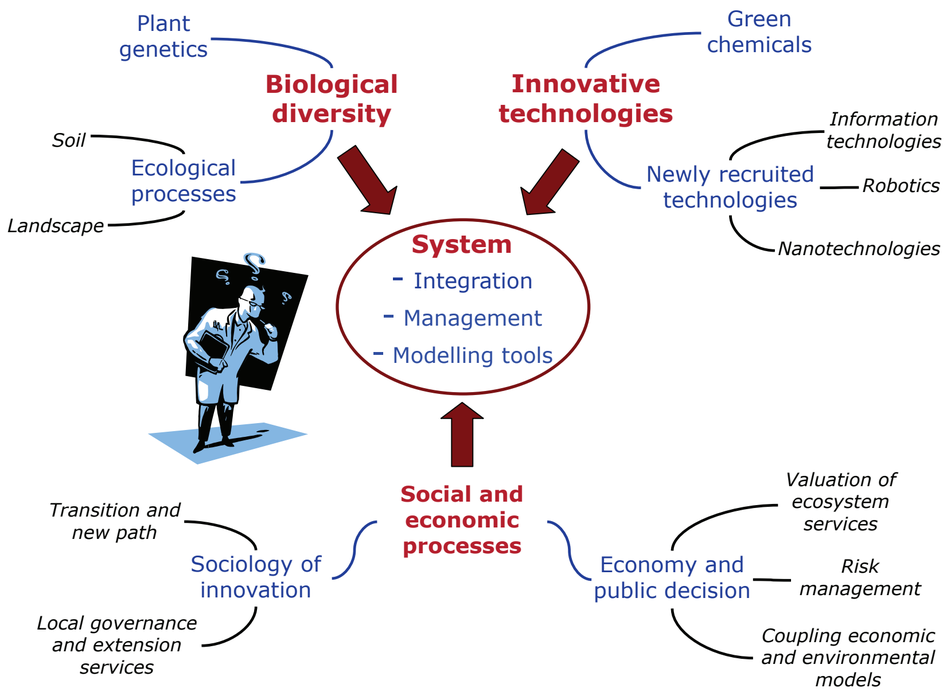
European agriculture
- Farming essential to making *territoires* attractive
- Diversified according to local demands
- Provides multiple services: food, landscape, biodiversity, natural resources, recreation

Crop protection
- Local negotiations determine choice of plant protection strategies
- Natural processes as alternatives to less-acceptable control methods
- Diversity is a tool to manage pest communities

Challenges for research
> Valuation of ecosystem services and design of a remuneration process
> Apply ecological theory to cultivated ecosystems
> Sociology and economics of local stakeholding

Challenges for policy makers
> Recognised ecosystem services
> Informed citizens regarding crop protection issues

How research can contribute



Creating an enabling policy environment

ENDURE sees IPM as a continuously improving process in which innovative solutions are integrated and locally adapted as they emerge and contribute to reducing reliance on pesticides in agricultural systems.

To face the rapid decrease in chemical options, very significant efforts are urgently needed to increase the range of effective and affordable solutions.

This requires a coordinated plan to:

> encourage public and private research on new crop protection technologies and facilitate the regulatory conditions for their availability on the market,

> support multidisciplinary research on whole systems - an emerging field - as a way to design truly innovative IPM strategies,

> develop information, education and recognition of these integrated strategies for the benefit of farmers, advisers and other actors of the food chain, including the general public,

> maintain a momentum at the European level to create synergies from national efforts.

ENDURE stresses the fact that the strict stand taken by the EU on pesticide legislation calls for a parallel, sustained and equally determined action to promote the design and implementation of new solutions in order to develop IPM schemes that contribute to sustainable development while preserving the competitiveness of European

European Network for the Durable Exploitation of Crop Protection Strategies

endure diversifying crop protection

> The European network of excellence ENDURE brings together more than 300 researchers from 18 institutions in 10 European countries to contribute to the development of farming systems less reliant on pesticide use.

18 participants from 10 European countries

> ENDURE aims at:

- Assembling a permanent research community
- Identifying short-term solutions
- Introducing innovative strategies
- Developing a systems approach to generate less vulnerable cropping systems
- Providing scientific support to policy

2 key objectives
Restructuring European research and development on the use of plant protection products
Establishing ENDURE as a world leader in the development and implementation of sustainable pest control strategies

4 integrating themes
SHORT TERM Allowing farmers to respond to new demands while maintaining competitiveness
SYSTEM Developing a holistic approach to sustainable pest management
RESEARCH Building a permanent crop protection research community, with a coherent research strategy
POLICY Contributing to national level implementation of IPM

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endure diversifying crop protection

Food Quality and Safety

ENDURE Foresight study

European Crop Protection in 2030

> The European Parliament has approved new European Union pesticides legislation introducing new regulations on the production and licensing of plant production products and introducing new rules on their use.

> ENDURE, the European Network for the Durable Exploitation of Crop Protection Strategies, has conducted a foresight study that seeks to provide crop protection stakeholders with the tools they need to tackle proactively future challenges. The process has enabled ENDURE to draw up five very different scenarios for European crop protection heading towards the year 2030.

> From these scenarios we intend to discuss what scientific knowledge already exists to satisfy their varied demands, which research areas will need to be strengthened further and which additional measures will be needed to accompany ongoing changes.

This foresight exercise was carried out by researchers from:
AU, University of Aarhus > Denmark
INRA, Institut National de la Recherche Agronomique > France
WUR, Wageningen University > The Netherlands
RRES, Rothamsted Research > United Kingdom
with the contribution of all other ENDURE partners.