

This brief series was developed in preparation for the Foresight Breakout Session of the Global Conference on Agricultural Research for Development (GCARD 2012) and the Global Foresight Hub¹. The briefs were written to communicate to a wider audience, such as policy makers, civil society organizations, researchers, and funders. The briefs were classified into three categories: Future Studies, Regional Update, and Visioning.

Foresight prompts researchers in pest management to look beyond research

Marco Barzman, ENDURE

Based on: “European Crop Protection in 2030”, coordinated by Emilie Labussière, Marco Barzman and Pierre Ricci and carried out by a working group from the ENDURE network². Published by INRA, September 2010.

Times are changing for pest management in Europe. Stronger societal demands are putting pressure on farmers to reduce their reliance on pesticides. As a result, new legislation on pesticides recently came into force. The diversity of available pesticides has been significantly reduced and their use is increasingly restricted. Many in the crop protection community now wonder about the future of pest management. ENDURE, a European network of universities, research centers and extension groups, conducted a foresight study to provide crop protection stakeholders with the tools they need to proactively respond. The study identifies research needed to develop new solutions based on biological diversity, harmless chemicals, new technologies such as information and communications technology, nanotechnology and robotics, and economics, political sciences and the social dimension of innovation. But the study poses a new challenge to researchers: When building contrasting scenarios, researchers realized that the key drivers determining future crop protection strategies actually lie outside their traditional sphere of influence. To respond to the challenge, they need to engage with stakeholders outside research.

Foresight as a tool to address multiple demands

In 2006, the European Union initiated a legislative package that was passed into law in 2009 which increased restrictions on the range of available pesticides as well as on their use. In this context, ENDURE was launched to investigate how crop production in Europe could reduce its use of pesticides and adapt to the new constraints.

In 2008, researchers in ENDURE decided to carry out a foresight study with contrasting scenarios to serve as a tool to identify research priorities concerning the future management of pests in Europe while taking into account societal demands on health and the environment. But the interests of concerned stakeholders don't always converge. Consumer and environmental protection groups continue to raise concerns about food safety, the safety of pesticide users and bystanders, water quality and biodiversity. Farmer groups worry about their shrinking toolbox. Pesticide as well as biological control agent manufacturers and distributors believe they have a responsible role to play in developing sustainable solutions. Faced with this diversity, ENDURE participants also sought to produce a tool that would facilitate constructive discussion among researchers, policy advisers and other stakeholders on the sensitive pesticide issue.

“European Crop Protection in 2030” explores the scientific breakthroughs needed to engage European stakeholders in coordinating and developing alternative systems to respond to the impetus driven by the new legislative landscape.

¹<http://www.egfar.org/our-work/shaping-future-together/global-foresight-hub>

² ENDURE is a European network of 14 institutional partners in ten European countries providing information, tools and services to scientists, policy and farm advisers and trainers who wish to make pest management more sustainable. <http://www.endure-network.eu/>

Study methods

Foresight building was a collective qualitative exercise that aimed to generate contrasting scenarios exploring future options. Under the guidance of a facilitator with foresight experience, a multidisciplinary core group of ten researchers from ENDURE regularly met to construct five contrasting scenarios. The core group included researchers from agronomy, entomology, plant pathology, weed sciences, social sciences and economics. The initial exercise defined the scope of the “system” under scrutiny, including variables of interests and underlying assumptions. Much time was then devoted to describing possible contexts based on combinations of variables including the relationship of Europe to the global market, the role of agriculture within the European economy, European policies on health and the environment, and the organization and strategies of stakeholders. Finally, the group agreed on a set of combinations giving rise to five contrasting scenarios. Efforts were made to make each scenario appear as a logical, credible and realistic narrative without associating any with a value judgement. In other words, no scenario was made to be a priori more or less desirable than any other.

The importance of involving stakeholders

Mid-way through the process, once scenarios had reached a presentable form, the foresight group presented the scenarios in a series of workshops to a variety of audiences including representatives of environmentalist non-governmental organizations, consumers, farmers, farm advisory services, the pesticide and biological control industry, the EU and national policy advisers and researchers from southern and eastern Europe. Initial discussions with stakeholders identified a northern and western Europe bias, which required the latter group to be addressed. Scenario presentation was followed by a group discussion, and stakeholder input was integrated into the study. It led authors to write a chapter specifically on the demands and strategies of crop protection stakeholders. The process also meant finding terminology and ways of phrasing certain concepts acceptable to both environmentalists and the pesticide industry. As a result of holding a workshop with southern and eastern European researchers, authors also added a chapter on regional adaptations and critiques of the scenarios where specificities due to significantly different types of cropping systems and cultural sensitivities could emerge.

Lessons from the scenarios

The five contrasting scenarios which emerged can be examined either as a whole set or individually to reflect on each one separately.

Taken separately and from the point of view of researchers, each scenario points to research efforts in specific areas where innovation is required, depending on contextual priorities. If priority is placed on:

- European agriculture competing on the global market with basic commodity crops, then research is needed on developing radically new low-impact “green chemicals” and on reducing their undesired effects. Here, farmers are legally accountable for any measurable impact caused by pesticides.
- European agriculture competing on the global market with specialized high value-added agricultural products, then research is needed on controlling the agrosystem and developing high-tech solutions. Farmers in this scenario are technological innovators who are part of a successful web of economic activities.
- ensuring food self-sufficiency in Europe, then research is needed on making the most of ecological processes and creating robust agro-ecosystems to stabilize and diversify production. Farmers are recognized and appreciated as food providers.
- providing food at a low energy cost, then research is needed on zero-pesticide crop protection in urban farming and minimizing energy inputs in the management of pests in large rural farms less reliant on synthetic nitrogen. Farmers produce food for local consumption and must find compromises between minimizing energy inputs and reducing yield losses due to pests.
- ensuring that agriculture satisfies multiple local demands, then research is needed on using ecological and landscape processes, coordinating multiple local stakeholders and developing economic compensation mechanisms. Farmers are locally recognized for the multiple services they provide and their contribution to the economic attractiveness of their community.

Non-research stakeholders tended to adopt an ideological position relative to the scenarios, distinguishing the ones that seemed the most desirable to them from those that they thought ought to be avoided. In this situation, such stakeholders could use the scenarios to reflect on the actions needed to either favor desired scenarios or prevent the development of undesirable ones.

The scenarios can also be taken as one whole set of possible scenarios that are different but not mutually exclusive, i.e. that could coexist. With this approach, more general messages emerge. The set of scenarios shows that in all cases, the challenge to research, extension and policy is to balance agricultural activity with increasing health and environmental demands. They show that “business as usual” is not a viable option. Even in the scenario where crop protection remains based on pesticides, radically new types of chemicals and ways of controlling impact need to be developed. It is easy to envision that, in fact, just as contrasting agricultural production systems currently coexist in Europe, the five scenarios will indeed coexist in some form in the future, and that such diversity may be an asset for Europe. In this case, the question posed regards the research, policy and stakeholder coordination efforts needed to ensure sustained coexistence.

New challenges

Several challenges emerged from both the foresight content and process. It was a relatively well-accepted exercise for researchers to identify the sorts of knowledge and technology developments required in the biophysical sciences. However, it soon became evident that such developments, although needed, would not be sufficient to move farmers and other stakeholders out of the present “locked-in” situation based on chemical control. “Locked-in” refers to a situation where multiple actors find themselves compelled to remain on a single development path due to their inter-relatedness and the institutionalization of practices and values. The analysis of the social researchers led the foresight group to realize that over the last 50 years, farmers, farm advisers, researchers, input producers and distributors, crop collectors and processors, retailers, consumers and policy makers have become highly interdependent. They have gradually adjusted to each other to create a coherent but locked-in system. In order to allow for more sustainable solutions, these stakeholders now need to engage in coordinated changes. A shared vision of possible alternative coherent systems is a prerequisite to such change, and the foresight study has an important role to play in this respect. The scenarios can be used to expose inter-relationships, to foster dialogue, and collaborations, and build a new consensus. Release from lock-in would require knowledge sharing, interactions between public and private research, planned links between the supply chain and retail sectors, local coordination and the involvement of government as well as a better understanding of the social processes involved in transitions towards new systems. Researchers would need to take on a new role and engage with other sectors.

With respect to public policy, another challenge for researchers in crop protection also emerged from the study. The key influence of broader contextual variables made it obvious to the group that crop protection is embedded within a production system that depends on factors well beyond the farm and well beyond the traditional sphere of influence of researchers in crop protection. Some regard policies directly affecting crop protection. They include new regulations more favorable to low-risk biopesticides and biological control agents, or the introduction of criteria favoring the registration of new resistant cultivars for diversity. Others are apparently far removed from the world of plant protection, such as the prices of agricultural goods, land tenure, availability of labor or farm size. Such factors can limit or open up options in crop protection. Increased stability in farm-gate prices of agricultural goods favors long-term strategies, giving a better chance that sustainability goals may be taken into account. Land ownership, in contrast to leasing, favors long-term investment and longer-term strategizing. Availability of affordable agricultural labor favors labor-intensive approaches, some of which may represent desirable alternatives to chemical-intensive solutions. Farm size also affects crop protection practices. For example, recent increases in pesticide use in Denmark are the result of reduced flexibility in crop protection strategies because of increases in the size of individual farms.

The study shows that many of the driving forces impacting crop protection are outside and beyond the sphere of influence of the crop protection world itself. These regard macro-economic choices affecting the role of European agriculture on the world market or the place that Europe wishes to give to local development. It will be up to researchers to pass messages on to the pertinent decision makers that public policies discussed in terms of broad economic objectives affecting agriculture also have consequences in terms of the health and environmental sustainability of future crop protection strategies.

Impact of the study

It became clear to foresight builders that the study had become a powerful tool to engage in constructive debate among stakeholders with conflicting points of view. When the foresight study was completed, ENDURE participants received a number of requests to present it in national arenas in Denmark, France, Germany, Italy and the Netherlands and among research, farm adviser, policy and industry audiences. The scenarios also attracted attention from more local actors such as regionally based farm advisory groups. The workshops served to create new linkages between researchers and other stakeholders. A comprehensive multi-audience book was produced and is available online on the ENDURE website at <http://bit.ly/NAPkPr>.

Within ENDURE, it is widely believed that stakeholder involvement in building the foresight study as well as the presentation and discussions of the completed study were useful in constructively contributing to the ongoing debate on pesticides and maintaining the momentum on the development of integrated pest management in Europe. It also became clear that this European study initially designed for European use could actually apply to other parts of the world. The scenarios pose questions on how to reconcile health and environmental concerns with export-oriented agriculture, food production for food self-sufficiency, energy-saving farming, or multi-functional agriculture, which are doubtless applicable beyond Europe.



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Contact information:

Author of the brief Marco Barzman (Marco.Barzman@grignon.inra.fr). The Brief series coordinator Robin Bourgeois (Robin.Bourgeois@fao.org).

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