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A platform for a dialogue to be continued

Forward thinking in agriculture and food

Bernard Hubert, Jacques Brossier, Patrick Caron, Pierre Fabre, Hartwig de Haen, Benoît Labbouz, Michel Petit and Sébastien Treyer

How can agriculture produce food for 9 billion inhabitants in 2050 and achieve the Millennium Development Goals of alleviating poverty, reducing hunger and protecting the environment?

In order to take up these challenges and to design tomorrow's food and agriculture systems, research organizations have to define strategies and options, and public policy makers their priorities from now on, relying on foresight studies.

Various studies have been conducted to assess scenarios for the long-term future of food and agriculture in the world. Each one has its own objectives, methodologies, and results.

Analyzing, comparing and discussing hypotheses, methodologies and results were the objectives of the FI4IAR/CTA seminar "Thinking Forward: assessments, projections and foresights", organized during the GCARD 2010 process. This dialogue, which sometimes led to scientific disputes, proved productive and encouraging. Is it a forum that should be continued in the future?

A process to take advantage of the diversity of studies

A key premise of ARD is that agricultural research influences the future of agriculture, but it can only impact development in the long term. Accordingly, all ARD strategy efforts, including priority setting, are based on explicit or implicit assumptions regarding the future of agriculture and food. In order to design tomorrow's agriculture, public policies and research programs must be based on clearly defined strategies and priorities from now on, relying on foresight studies.

In recent years, studies have been conducted to assess the future of agriculture. The French Initiative for International Agricultural Research (FI4IAR) and the Technical Centre for Agricultural and Rural Co-operation ACP-EU (CTA) decided to take stock of the diversity of approaches, assumptions and methods and to

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Studies reviewed

Assessments

Agriculture for development. World Development Report (WDR) 2008. The World Bank, Washington, DC, USA

Agriculture at a crossroads. Lessons from the IAASTD reports. IAASTD, The World Bank, Washington, DC, USA

SCAR Second Foresight Exercise. Standing Committee on Agricultural Research, European Commission, Brussels, Belgium

Structural Change of Rural Economies and Globalization. **Ruralstruc**. The World Bank, MAEE, MAAP, AFD, CIRAD, IFAD. Washington, DC, USA

Projections

The FAO Outlook to 2030/2050. Production, consumption, resources. FAO, Rome, Italy

Using long-term outlooks to highlight constraints, prioritize investments and evaluate impacts. IMPACT. IFPRI, Washington, DC, USA

Threshold 21, Dynamic modelling for agriculture production, emissions and consumptions. Millennium Institute, Washington, DC, USA

Foresights

The Future of Agriculture and Food in the Mediterranean Countries. Mediterra 2008. CIHEAM, Paris, France

UK Foresight Project on Global Food and Farming Futures. Government Office for Science, London, United Kingdom

Scenarios and Challenges for Feeding the World in 2050. Agrimonde. INRA, CIRAD, Paris-Montpellier, France

identify robust results and methodologies using a comparative analysis.

They invited the authors of the main recent forward looking exercises to introduce their research (see box) to a working group of 30 people: scientists, research managers and decision-makers from ministries, research organizations, private corporations and NGOs, as well as wise people with long experience, broad knowledge and outstanding reputation (see list at the end). Three meetings were organized before and during the GCARD 2010.

"Business as usual" is not acceptable.

The assumptions differ from one exercise to another and according to the mandate and the institution in charge. Depending on their objectives and the end user they are designed for, the studies use different methodologies. The discussion of each presentation allowed the participants to draw lessons regarding convergences, divergences, and points to be further discussed. The expression "controversial dialogue" describes the spirit of the exercise, based on dialogue, i.e. tolerance, mutual respect and the ability to listen attentively, and on controversy, i.e. highlighting and arguing the main differences and oppositions regarding assumptions and methodologies. The diversity of the members guaranteed the relevance of the recommendations.

There was broad consensus that the variety of approaches meant they were more complementary than competing. For some, such as projections and foresights, looking at the future was the primary objective, while for others, such as case assessments (IAASTD or even the 2008 WDR), this was one way to ground their statements. Even in those cases, considerations about the future of agriculture played a critical role, if only to support the main conclusion of the IAASTD report that "business as usual" is not acceptable.

The gap existing between those who opt for quantitative information and those who are convinced that figures cannot capture the complexity of real life is not so big, although some people only trust quantitative data. It is clear, for instance, that baseline data from FAO on arable land in use and available in the future – or irrigated and suitable for irrigation – lead to exploring new perspectives for agricultural technologies and practices, from biotechnologies to 'ecological intensification'. These perspectives rely on scenarios that are based on a variety of variables: investment, farmers' know-how, land tenure systems, available land and uncertain climatic conditions, etc. On the other hand, projections on food consumption for 9 billion people have very different consequences on agricultural production depending on mainstream diets: the share between energy from fat or fast/low carbohydrates; proteins from plants/ruminants/poultry; the liking for dairy products, and for fruits and vegetables, etc. Thus different diet options lead to different patterns of agricultural land uses and farming systems illustrated by a range of scenarios as shown by Agrimonde.

Clearly, this diversity of approaches allows for multiple perspectives and provides thought-provoking information, which is helpful for researchers and decision-makers. One important conclusion from the seminar is that such a pluralistic forum based on forward looking approaches was very useful and should be organized again in the future.

Convergences, divergences, and pending debates

The first point of the debates is that all the participants to the working group agree on three main statements, which are very robust messages about our common future:

- Global food availability in 2050 is not so much a production problem as a local food access problem, which turns food security attention to the needs of the poor, urban and rural, and particularly of poor farmers.
- Understanding the situation of poor rural people, in particular farmers, and their perspectives for the future remains a huge challenge for conceptualization, data gathering and assessments, etc.
- Ecosystem degradation and climate change impacts will put more pressure on poor farmers.

Divergences also appeared within the group. Some were related to different worldviews: public vs. private goods or investment, for example. A public or a common good, even if it has been defined by economists, may not mean exactly the same depending on who uses this expression, in which context, from which standpoint and according to either a cultural or a political background. These worldviews do not necessarily need to be reconciled with one another, but their impacts on recommendations and decisions must be studied further.

Another field of divergences relates to the implicit model of farming in the future (if any?): family farming, pluriactivity, agro-business, or new entrepreneurship farms? Does "small-scale farming" actually refer to the concept of "scale" or to other elements, such as types of technological means, skills, outputs, etc.? Will future agricultural systems be diverse? Are there normative models? Other differences are related to the fact that food sovereignty, food security and self-sufficiency do not mean the same depending on the context, the cultural background and the political goals. It is necessary to clarify the use of these terms and their implications in public policies and trade negotiations.

Various points remained pending, and appeared as very relevant fields for further research. The group proposed that research and R&D within Agricultural Knowledge, Science and Technology

Acronyms

AFD, French Development Agency
ARD, Agricultural Research for Development
CIHEAM, Centre International des Hautes Études Agronomiques Méditerranéennes
FAO, Food and Agriculture Organization
GCARD, Global Conference on Agricultural Research for Development
IAASTD, International Assessment of Agricultural Knowledge, Science and Technology for Development
IFAD, International Fund for Agricultural Development
IFPRI, International Food Policy Research Institute
IMPACT, International Model for Policy Analysis of Agricultural Commodities and Trade
MAAP, French Ministry of Food, Agriculture and Fisheries
MAEE, French Ministry of Foreign and European Affairs
NGO, Non-governmental Organization
SCAR, Standing Committee on Agricultural Research
WDR, World Development Report

Systems should be organized around and directed towards the three following areas:

1. Looking beyond the agricultural sector

Who wins and who loses, depending on the pathway chosen?

Agricultural production must be considered to be embedded in the overall structural transformation of economies, taking into account strategies and public choices in terms of political economy.

Agriculture is one sector of the national, regional and global economy. Its development is strongly linked to other activities within the food chain (up to consumers), and to the different occupations that contribute to vibrant rural areas.

Several issues therefore require further analysis and research:

The share of agriculture in the active population and in GDP is generally seen as decreasing in the future. Is it possible to change such a trend? Should this be attempted? This question concerns not only investment in agriculture, but also spatial patterns of development, infrastructure and services in rural areas, and the attractiveness of urban areas, etc.

Reducing losses and waste along the food chain might play a key role in overall and local balances. In particular, what are the means for managing waste at the level of end users?

Future patterns of food consumption, particularly in developing or emerging countries where food habits are changing in a globalized world, and "nutrition transition" issues are important for public health, as well as for defining production priorities. Is there a priority for strong food policy incentives?

Forward thinking is a strategic tool for exploring and anticipating rather than simply adapting to a situation.

Increasing urbanization, which is very likely to occur, will put pressure on not only arable land, but also on food habits, consumption patterns and even political powers. How can urban bias be avoided in policy priorities, e.g. compensating for price variability, incentives for agricultural production, and mastering land tenure and land markets, especially in peri-urban areas?

Energy demand cannot be met by agricultural production only. Investing in R&D for more efficient biofuels may be unavoidable, but it could have adverse effects on the extension of agricultural land (see FAO Outlook). How can the impact of developing second and third generation biofuels and green chemistry be better assessed?

2. Taking into account distributional aspects and development models

Even if global balances are reached in agriculture and food at the global level for 9 billion inhabitants, who wins and who loses, depending on the pathway chosen? The distributional question is a controversial one that needs further investigation.

There is, for instance, a need to clarify the relationship between the increase in income, especially for poor farmers, and the increase in productivity. Nevertheless, if the increase in productivity has to do with agricultural technology, the increase in production depends more on policies and on the role of the other stakeholders in the supply chain than on farmers alone. This requires placing agricultural production within the complexity of food systems in order to understand the value chain, farmers' organizations, the concentration of buyers, retailers, competition regulation, the formation of markets, price instability, etc.

There is a need to improve knowledge regarding the diversity of small-scale farmers and their constraints and opportunities, and to tailor research to their specific needs (e.g. orphan crops). The relative roles of private and public research to satisfy those needs must be assessed.

R&D and extension require steady investment over time (not just in response to crises). Who will finance this? The mechanisms of aid from donors must be studied further in order to ensure that they can be rooted in the coherence with overall development strategies. How can roles be balanced between public interventions and private strategies?

Investment strategies would benefit from a better understanding of future labor issues in agriculture and other sectors, of pluriactivity in rural areas, and of the role of migration to towns and abroad. They would also benefit from a better understanding of the cooperative movement, and of local leadership and institutions for the use of these investments.

3. Changing the paradigm for agriculture

If "business as usual" is not an option, there is a need for new approaches to productivity that are still the object of discussion:

Resilience vs. productivity? Does resilience mean maintaining adaptation capacities in an uncertain future? How does this translate from socio-economic and biophysical viewpoints? Can we limit ourselves to technical change, productivity, and sustainable agriculture, etc., or should we address broader issues such as the role of agriculture in increasing income for poor farmers taking into account their other activities? On the whole, do we deal with increasing yields or incomes? Or both? And how?

Biomass productivity vs. multi-functionality? How do we assess performance? For example, what are "better seeds" for the future: more productive varieties? Plants that are more resistant to disease? More flexible to climate uncertainties? More resilient? Easy to produce at farm or community level? Seeds of a single and stable variety or a population set of seeds from the same species?

Targeting poverty alleviation vs. decreasing vulnerability? What makes small farmers so sensitive to the risks of adverse weather events, climate uncertainty, unstable markets and

A few words about...

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dependency on external inputs that they leave agriculture to join the masses of poor daily workers in rural areas or cities? How can we break such vicious circles?

From these discussions, the group acknowledges that deep changes in the organization of agricultural knowledge, science and technology are needed. The issue is not only that of changing the institutions' strategic priorities. There is an urgent need to think differently and to take into account:

A plurality of paradigms and "niche research": we must maintain a range of scientific approaches, paradigms, concepts and methodologies in order to develop research on more and more complex issues; the "ecology of research" must take into account that emerging drivers could "break the rules" and provide alternatives to the system, as suggested in the SCAR2 Exercise.

Local knowledge: mobilizing and combining local and scientific knowledge, particularly for resource management issues which are often very site-specific.

The diversity of research skills: two questions illustrate this issue. Can we assess the relative roles of private and public research against those needs? In some cases could competition and peer review procedures have adverse effects on this diversity?

The sustainable intensification of agriculture could constitute a huge research agenda. Developing such an agenda would bring new technological alternatives to the mainstream day-to-day "research business" and would require to take into consideration different research and local experiments, which are currently considered as marginal.

Setting up a permanent forum to help forward thinking

The arguments that were developed during the 2010 GCARD process proved useful. Such a "controversial dialogue" indicates which road to follow and helps set challenge hierarchies according to a range of specific situations (social, geographical, historical, etc.).

From the hierarchy of stakes, a strategic framework and research priorities can be set, according to the goals, skills and means of each research organization and to the demand expressed by stakeholders (farmers, donors, consumers, NGOs, etc.), sensitive to disruptive options in science.

Forward thinking provides public goods and is a strategic tool for exploring and anticipating rather than simply adapting to a situation. We propose to create a global and permanent forum for forward thinking, i.e. a place to introduce and debate alternative visions for the future. This forum would take into consideration a variety of approaches and organizations and would ensure effective monitoring of the follow-up.

Diversity – of stakeholders and approaches – is critical. The credibility and legitimacy of such a forum are based on the participation of all stakeholders involved. The diversity of approaches makes it easier to grasp multidimensional and complex issues. It helps us to imagine alternative futures scenarios and to debate the desirability, consequences, winners and losers of these scenarios. Combining quantitative analyses with qualitative arguments proves useful to exploring a broader scope. To help decision-makers, it is necessary to develop a set of scenarios to be compared (a baseline scenario as reference for policy options and contrasted scenarios to expose policy options). Different scenarios can be examined to identify seeds of change to be further investigated. This makes it possible to: alert on an emerging issue; shed new light on the present situation; produce new data; change research priorities, etc.; and explore how to change the thinking perspective.

A global framework for forward thinking will present and debate alternative methods and visions for the future. It will mobilize various approaches and organizations. It will develop capacities for monitoring the resulting actions. **It will increase the chances that today's decisions actually address the needs and widen the options of future generations.** ■

FI4IAR and CTA initiated a dialogue between the authors of 10 long-term outlook works, senior scientists and stakeholders, involved in the future of agriculture and food. Two workshops were organized: in Paris (26 January 2010) and in Wageningen (25-26 February 2010). Each study was presented and discussed. A third meeting was held during the GCARD in Montpellier (30 March) to debate the conclusions with a broader audience. The main points were presented at the GCARD plenary. All the presentations are available on the FI4IAR (IFRAI in French) website: www.gip-ifrai.fr

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