

State of Foresight in the CGIAR

WORKSHOP REPORT¹

University of Aberdeen, 9-10 May 2018



¹ All the workshop presentations are accessible on the ISPC website:

<https://ispc.cgiar.org/meetings-and-events/international-workshop-state-foresight-cgiar/program>

Background and Objectives

The landscape of agricultural research for development (R4D) is evolving rapidly. The world faces new, more complex, and more interrelated challenges, such as: achieving food security in the face of climate change; meeting the growing global demand for agricultural commodities while reducing deforestation, biodiversity loss and water scarcity; creating meaningful employment for a rapidly growing youth population; and producing not only more food, but more nutritious food, in rapidly globalizing agri-food markets serving increasingly urbanized populations. There is pressing need to respond to these new challenges and develop new solutions.

In this context, the ISPC is conducting a comprehensive foresight exercise to inform the strategy of the CGIAR, and to provide context and emerging insights as a basis for system level prioritization of research. Building on its long-term work on Strategy and Trends, the ISPC initiated an independent foresight assessment in 2017, starting with a brainstorming workshop (*April 2017, Naples-Italy*)², with a group of international experts and strategic thinkers on how the futures may look like around grand challenges, global trends and likely disruptions on food and nutrition security (horizon 2050); and how the world is prepared to address them to reach the SDGs and beyond. The outcomes of the workshop will be edited for publication in a book on “*Global Agri-Food Systems to 2050– Threats and Opportunities*”, to be published in 2018.

The second step for the ISPC foresight consisted in a workshop with CGIAR foresight practitioners and selected external experts on the [State of Foresight in the CGIAR](#). Foresight work is currently carried out at all the Centers and Research Programs, with a diversity of approaches, and at disparate scales. The aims of the Aberdeen workshop were to take stock and synthesize the recent foresight activities and findings in the CGIAR, and discuss the conclusions of the independent foresight assessment led by ISPC in 2017 and their implications for the R4D strategies of the CGIAR.

The expected outputs of the workshop were:

- i) *A summary of current state of foresight capacity and focus in the CGIAR;*
- ii) *Group consensus on the key drivers and trends that must be considered in developing foresight work in the CGIAR system;*
- iii) *Plan of action for taking forward foresight work in the CGIAR, including next steps in planning the CGIAR system foresight and scenario building.*

Introduction and Synthesis of ISPC foresight

After welcome opening remarks by Maggie Gill, Chair of the ISPC and Professor Graeme Paton, Head of the School of Biological Sciences (University of Aberdeen), the first session provided background information to participants regarding the CGIAR, ISPC foresight activities and the key objectives of the workshop.

Foresight is a fundamental pillar of the ISPC and an essential function to help understand the context in which the CGIAR operates by analyzing global trends, anticipating change for better planning and constructing pathways from the present to the future; and, identifying future major challenges and priorities for Agricultural R4D.

A first paper by Prabhu Pingali summarized the key findings and outcomes of the independent foresight assessment carried out in 2017 and the Napoli workshop¹. One of the conclusions of this first phase was that the

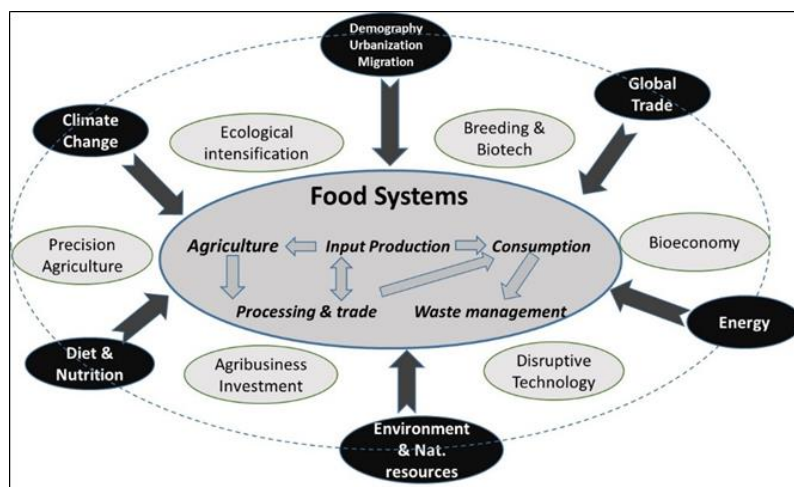
²https://ispc.cgiar.org/sites/default/files/pdf/ispc_workshop_report_global_agrifood_systems.pdf

World is facing a "perfect storm" of global threats and challenges that need new agri-food R&D and policy solutions. Some of the dominant challenges faced by the global community are:

- Rising urbanization, global migration patterns, and the changing demographic structure of rural populations and smallholder farming means that we will have very different profiles of agricultural workers and activities in the future – and this varies considerably by region;
- Changing diets, food systems, and the rapid rise in over-nutrition and the epidemic of non-communicable diseases (NCDs) even as malnutrition rates remain high;
- Global environmental and sustainability challenges, including climate shocks and extreme events, environmental degradation and biodiversity loss;
- Trade integration and the declining competitiveness of developing countries' agriculture;
- Complexity and fragmentation of food systems, role of private industry vs. public investments in supporting the transformation of agri-food systems, and their connections with other sectors;
- Disruptive innovation in science and technology have much potential to increase productivity, but also displace rural workers – which could have serious implications for the poorest.

The independent foresight assessment provided a synthesis and in some cases validation of the findings of the numerous foresight exercises that have been conducted in the last few years. However, what clearly differentiates the ISPC foresight from other initiatives is the sharp focus on developing country agricultural systems and on the future prospects for the rural poor. The assessment also identified drivers and key topics that need further elaboration and assessment in terms of their interaction with international research, technical innovation and policy action (Figure 1). Eighteen papers were commissioned and collected in a book on “*Global Agri-Food Systems to 2050 – threats and opportunities*” to be published in 2018.

Figure 1. Key drivers, threats and opportunities of agri-food systems, corresponding to the chapters included in this book.



As a second step in the ISPC foresight work, CGIAR scientists were invited to synthesize and reflect on the current state of foresight in the CGIAR and to further develop the key outcomes of the independent assessment, to provide inputs on the process to help guide future strategies and priority setting of the CGIAR strategic foresight.

Status of Foresight in the GFSF Project and AFS Commodity CRPs

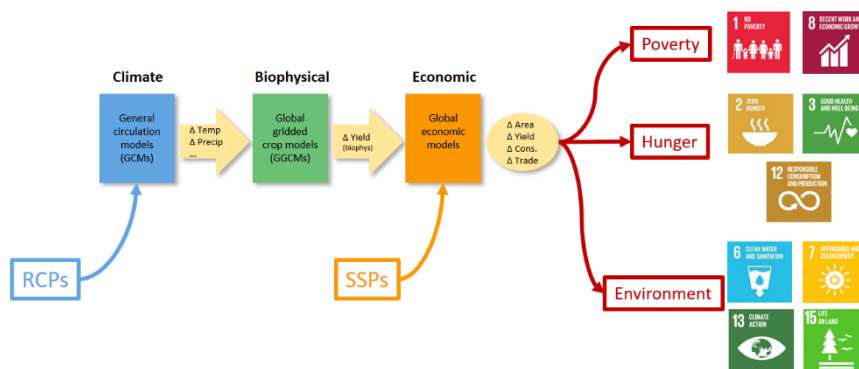
This session consisted of seven paper presentations on the foresight activities being carried out by the agri-food systems CRPs (Rice; Wheat, Maize; Roots, Tubers & Banana; Grain Legumes & Dryland Cereals; Livestock; Fish) in the frame of the Global Futures and Strategic Foresight project³. The project is led by IFPRI but

³ <http://globalfutures.cgiar.org/>

includes all 15 Centers and links with most CRPs. The first paper by Wiebe (IFPRI) presented an overview of the Global Futures & Strategic Foresight project and its overall objectives, which are:

- Improved tools for biophysical and economic modeling;
- Stronger community of practice for scenario analysis and ex ante impact assessment;
- Improved assessments of alternative global futures;
- To inform research, investment and policy decisions in the CGIAR and its partners.

A key institutional contribution of the project is the community of practice for foresight modelling that has been developed across all 15 Centers and most CRPs of the CGIAR. A key analytical result of the project is the ability to compare multiple outcomes relevant for multiple SDGs under various scenarios in a consistent framework⁴, based on modeling alternative futures for agriculture that



Source: Adapted from Nelson et al., *Proceedings of the National Academy of Sciences* (2014)

combine biophysical and socioeconomic drivers and effects (Figure on right side). A detailed list of outcomes and publications of the GFSF project is available on the project [website](#). The paper highlighted gaps, opportunities and challenges of the project, including the need for improving tools and analysis to better integrate land use, livestock, fish, nutrition, gender, and youth dimensions.

A joint paper by Bairagi (IRRI) and Diagne (AfricaRice) described the foresight activities of the Rice AFS CRP. The key research questions addressed include ex-ante assessment of potential economic returns to R&D in C4 rice; impact of agricultural/trade policies on food security, and potential impact of value chain transformations on labor markets. Tools used include models ORYZA and IGRM (IRRI global rice model) / AGRM (Arkansas Global Rice Model) with links to IMPACT and RICEFLOW models. Results focused on two examples: an impact study of C4 Rice in 2050 and the impact of ECOWAS Common External Tariffs (CET) on food and nutrition security in West Africa.

Kruseman (CIMMYT), Frija (ICARDA) and Sika (IITA), presented the activities of Maize and Wheat CRPs. Foresight and targeting activities focused on ex-ante impact assessment, as the analysis at how pipeline technologies fit into farming systems and livelihood strategies and on the impact of research investments. Whereas targeting looks at short term questions of the ‘where, when, what and how’ of technology deployment. The paper discussed five major foresight topics common to both Maize and Wheat CRPs: climate change, changing diets, new emerging pests and diseases, rural transformation, and emerging disruptive technology.

Gotor (BI), Hareau (CIP), Prager (CIAT), and Sika (IITA) presented the activities of RTB on foresight, ex ante and ex post, aligned with PIM, with a strong focus on priority setting. Various modeling tools are used for merging biophysical and economic analysis, demand and production trends, congruence analysis, crop and pest & diseases models, theory of change and impact pathways. Key research questions addressed focus on meeting complex demands with nutritious roots, tubers and bananas value chains, and analyzing synergies and trade-offs between demands for particular RTB commodities and how they are affected by different socioeconomic pathway scenarios and policies.

Sika (IITA), Nedumaran (ICRISAT), Frija (ICARDA) and Alene (IITA) described the main activities on strategic foresight in GLDC, which focus mainly on climate change analysis and priority setting. The three Centers involved combine their expertise in crop & economic modelling and ex-ante technology evaluation of

⁴ Rosegrant et al. 2017.

the various legume and dryland cereal commodities. Examples of key results include analysis of the demand gap of the eight GLDC crops by 2025 in South Asia and S.S. Africa, and global analysis of climate change potential effects on sorghum and groundnut yields in 2050.

Enahoro and Rich (ILRI) presented the global foresight modelling activities in the Livestock CRP, in collaboration with CIAT and ICARDA. Key questions addressed by the CRP are: Which global drivers have the most significant impacts on livestock production and markets? Which new and applied technologies hold ‘promise’ for improving livestock productivity and production in lower-income countries? Can appropriate investments sustainably raise livestock production in LMICs of interest? What impacts are to be expected on key economic and other indicators? Ex ante impact assessment is analysed under alternative scenarios in terms of productivity, livelihoods, income, diet diversity, nutrient availability, equity, water use, and GHG emissions. Examples of IMPACT results show that dairy, beef and poultry production all increase in 2050 relative to reference case, poultry expands more rapidly in S. Asia than in SS Africa.

Tran and Chan (WorldFish) summarized the foresight activities of the Fish CRP, which focus on building and improving national fish sector models and conducting scenario assessments at sub-national, national, regional and global levels. The questions addressed by the CRP include key drivers affecting fish supply and demand in different geographies, social, environmental and nutrition implications of future fish supply and demand trends, impact of technologies and investment options on fish supply and demand trends, and policies and interventions to address emerging challenges related to Fish.

In the panel discussion, Lenné and Price (external discussants, UK) provided comments and recommendations for the papers presented:

- There is correlation between the CRP foresight with the five key topics identified in the ISPC independent foresight assessment;
- There is considerable opportunity for improved collaborative foresight work across CRPs, and in partnership, e.g. with AgMip.
- There is a need to expand the use of existing dual purpose crops and support further research– the food/feed data.
- Lack of funding and tools/personnel seems to be a big issue across all AFS CRPs. There is a need for further documenting the impact of foresight work. No presentations on the impact of research.
- How are the drivers and challenges addressed by foresight being selected? E.g. why is climate change more important to some CRPs than others?
- Importance of timescale of change– e.g. the long-term trends vs. those of pest and disease work which can move quickly.
- Models – what are key assumptions that are problematic? Where are the weaknesses and strengths of IMPACT and other models (e.g. labor productivity issues) and how well do models deal with heterogeneity?
- Massive policy/political economy issues in commodity trading – is that taken into account in the quantitative foresight work?

General discussion focused on the purpose of quantitative foresight modelling, and the need for a common vision and framework across centers and the overall system; the question of data and data quality, beyond bio-physical relationship (e.g. data on wages, gender and youth); the issue of labor productivity in foresight modelling in the IMPACT model and other models, looking at specific technologies and how they may change inter-household distribution, gender labor productivity etc.

Overall, the session showed evidence of a shared vocabulary and shared ideas and assumptions on the use of foresight in the GFSF project across centers. This also opens the opportunity for exploring the strengths and

limits of foresight modelling tools and highlight areas where there is a need for other approaches to explore multiple plausible futures.

Table 1. Summary of CRP Foresight Activities

CRP/entity	Foresight as FP/ CoA	Use IMPACT	Other models/ tools	Uses
Rice	CoA 1.1	Yes +	ORYZA; IGRM; AGRM	MEL; Prioritization, impact
Maize/wheat	CoA 1.1	Yes ++	AGMIP models	Ex-ante; MEL; climate research, rural transformation, etc.
RTB	CoA 5.1	Yes +	ILCYM, MESH, Farm Design	Prioritization; ex ante Impact assessment.
GLDC	CoA 1.1.	Yes +	Crop & economic models	Prioritization; climate change analysis, etc.
Livestock	FP - Livelihoods	Yes ++	GLW, GLEAM, LSIPT, LD4D, etc.	Climate change and GHGE, dynamics tools, etc.
Fish	CoA 2.3	Yes +	WorldFish fish sector model	Prioritization; scenarios
CCAFS	FP1	Yes ++	GLOBIOM; MAGNET Scenarios	Ex ante and targeting; Scenarios for national strategies governance research, etc.
A4NH	CoA 1.1	-	MAGNET; toolbox linking of models e.g. IMAGE, GLOBIOM, diet optimization)	Food systems approach; global projections on agriculture, climate, food security and nutrition;
WLE	FP5?	-	Scenario development	Water accounting; GW, basin information, etc.
FTA	no	Yes	GLOBIOM ; FarmDesign; MESH; Scenario analysis	Land use; Policy assessment; Ex-ante IA
PIM	FP1	Yes++	Quantitative analysis	Baseline, broad alternative and focal scenarios;
Big Data	-	-	Big data analysis tools	
Genebanks & EIB	-	-		

Status of Foresight in the NRM and Integrated CRPs

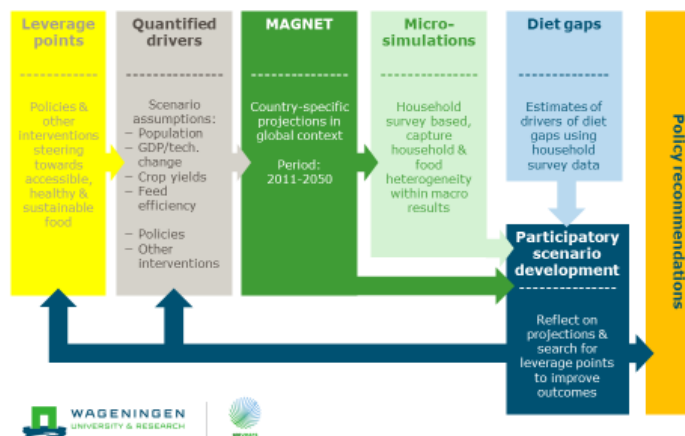
This session consisted of five paper presentations on foresight activities carried out by NRM and integrative CRPs (CCAFS, A4NH, WLE, FTA, and PIM), followed by a panel and general discussion.

Vervoort (CCAFS and Univ. Utrecht) presented the CCAFS scenarios project, for using scenarios to formulate national policies and strategies. The project is stakeholder-driven, policy focused, and involves about 240 partner organisations worldwide (WRI, FAO, UNEP, World Bank, regional economic bodies, national governments, NGOs, private sector, academia). CCAFS uses scenarios for policy and investment guidance

across seven global regions; it has generated five key outcomes and many are in progress. The RE-IMAGINE project is addressing three main questions: i) How can we connect climate foresight and climate governance research? ii) How can we understand climate foresight as a governance intervention? iii) How can climate governance research enhance the capacity of foresight processes to imagine diverse, pluralistic climate futures? (see Vervoort and Gupta. 2018. *Current Opinion in Environmental Sustainability* 31:104-111).

Kuiper and Achterbosch (Wageningen Economic Research) presented a summary of foresight work in A4NH and CCAFS by WER. The group is following a food systems approach searching for leverage points to promote accessible, healthy and sustainable food. Using the MAGNET model for global projections on agriculture/biobased /climate, food security and nutrition as well as country-specific assessments. The methodology used in A4NH foresight work combines MAGNET microsimulations based on quantified drivers, with analysis of diet gaps and participatory scenario development for designing policy recommendations (Figure in right side). This approach makes it possible to address multiple objectives in a single consistent framework and offers an opportunity to experiment with different incentives and drivers.

Methodology (example for A4NH-F1)

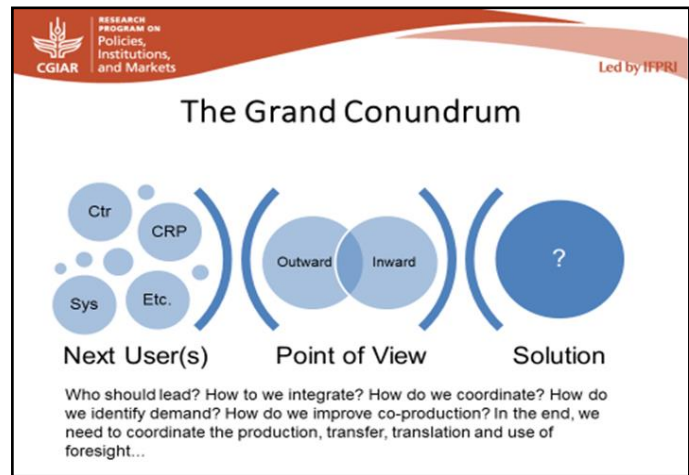


Wiberg (IWMI) presented a short summary of the WLE/IWMI futures activities, which encompass several objectives at various spatial and time scales, going from global, to regional and local scale. For example, an analysis of groundwater and food security at global and regional scale shows that the largest challenges for water overdraft are in South Asia, where ending groundwater overdraft would result in a decline in irrigated production, a rise in world prices, and in hunger (Zhu et al., 2018). Authors conclude that social impacts of ending overdraft need mitigation strategies. The project also uses stakeholder-based scenario development. Numerous local activities and solutions of WLE are presented including the analysis of solar groundwater pumping suitability mapping, wastewater reuse and recycling business cases, water innovation technologies, rural-urban food systems (hubs, value chains, waste), groundwater futures in Africa, models for transboundary cooperation, etc. However, the paper stresses the current challenges of managing a disparate, disconnected project information and lack of consistent tools, data, or methods for foresight work across the program. Opportunities exist in harmonizing baseline data collection efforts (including big data), and developing consistent interfaces to the data, toolkits, and generated knowledge.

Terheggen (ICRAF) presented a summary of FTA's foresight activities, which focus largely on the effects of land use and climate change on ecosystems, in connection with policy options. Policy assessment examples include long-term outcomes of forest restoration on ecosystem services, food security and livelihoods, and land use and change scenarios measuring biodiversity, carbon emissions and economic benefits. Commodity-based activities include the analysis of the effects of Nationally Determined Contribution (NDC) policy implementation under various scenarios and ex ante assessments of policies for the oil palm sector on deforestation and analysis of likely sectoral oil palm policy scenarios on ecosystem functions.

Prager (CIAT) presented a summary of PIM CRP activities. The PIM approach to strategic foresight relies on integrated, multidisciplinary and generally quantitative strategies, based on analyses spanning baseline scenarios, broad alternative scenarios, and focal scenarios (e.g., investment in a specific technology). Key foresight results of PIM and GFSF will be reported in a forthcoming special issue of *Global Food Security* journal.

PIM has been the major supporter and protagonist of quantitative strategic foresight in the CGIAR. A critical question that arises is the appropriate balance of support for CGIAR foresight by the different CRPs, to reflect both their individual and collective interests. Hence the paper highlighted gaps, opportunities and challenges of the project and the ‘*Grand Conundrum*’ which consists in the need for a better coordination of the production, transfer and use of foresight in the CGIAR (Figure in right side).



In the panel discussion, Anderson (Univ. Washington) and Obersteiner (IIASA) provided several comments and recommendations for the papers presented:

- CRP and CGIAR centre foresight seem to combine two distinct streams and audiences and possible competitors for funding; which may need to be integrated.
- Tyranny of the dashboard – data are mostly presented as national averages; whereas the focus on smallholders implies data in the tail of a distribution not representative of the national average. The strength and comparative advantage of CGIAR lies in the ability of dealing with heterogeneity and ground truthing at national and sub- national level.
- Importance of data quality in modeling and quantitative foresight analysis; e.g. data on shadow wage of women.
- Grand conundrum – one objective of the foresight exercise should be to establish a community of practice. It is important to have open curated data, open modelling, and modularity of different tools and approaches. Need for a modular user platform?
- There are three dimensions of integrated foresight assessments: space, sectors, and time. For spatial dimension, an important question is how to use local results to inform global analyses. For sectors, there is great focus on production but not really on the commodity chains – the work is not very specific to the value chains, and knowledge of market operations and dynamics is not strong.
- Importance of risk and uncertainty: for investment decisions and the overall theory of change, risk narrative is very important; and risk modelling needs to be part of the suite of tools.
- The CGIAR should do more work on radical/disruptive technologies, not only incremental improvements.

Cross-cutting Themes and Platforms

This session consisted of two paper presentations on foresight activities carried out by the Big Data platform and the other cross-cutting themes and platforms, followed by a panel and general discussion.

Kruseman (CIMMYT) described the objectives of the Big Data platform and its foresight activities. The platform aims at harnessing the capabilities of Big Data to accelerate and enhance the impact of international agricultural R4D. Given the critical importance of data in foresight, the platform provides data for ex-ante impact assessment analysis and quantitative foresight modelling, aspiring to make CGIAR data findable, accessible, interoperable and reusable. It also builds communities of practice around the consortium for spatial information, ontologies, data driven agronomy, crop modeling, socio-economic data, and livestock data for decisions. The platform also aims at playing a key role in harnessing the potential of new technologies, including smart cheap sensors, internet of things, and precision agriculture for small holders. Overall, the Platform for Big Data in Agriculture offers the possibilities to harness the capabilities of Big Data to enhance

the efficiency and effectiveness of foresight research and ex-ante impact assessment across CRPs, CGIAR centers, and their partners.

Gardiner (CGIAR SMO) presented activities of the Genebanks and Excellence in Breeding (EiB) Platforms relevant to CGIAR foresight. The policy module of Genebanks is important for CGIAR positioning and continuing germplasm exchange, as it links to a number of international initiatives under the frameworks of the International Treaty on Plant Genetic Resources for Food and Agriculture, CBD, Nagoya Protocol. It also keeps regular contacts with representatives of other stakeholder groups including the seed industry, civil society, farmers' organizations, national focal points for the two agreements, and others.

The EiB platform was developed as a follow-up action on the ISPC foresight report on Biotechnology in the CGIAR (Nov 2014). It aims at improving coordination and collaboration across the CGIAR system for building a critical mass in biotechnology research, developing effective data capability, and helping CGIAR crop breeding programs modernize and upgrade following and in relation to Breeding Program Assessment Tool (BPAT) assessments. A major focus activity of the platform is the development of tools and methods (GOBii, genetic diversity estimations) working with global suppliers and industry partners, which would probably require foresight analysis to define and fine-tune the long-term strategies of the CGIAR in crop improvement.

In the panel discussion, Gitz (CIFOR/FTA) and Woodhill (Oxford Uni.) provided several comments and recommendations for the papers presented:

- Because of the time lag between breeding directions and investments and results on the ground (10-15 up to 20 years), foresight can help anticipate and formulate future demand and explicit the constraints towards implementation. Critical element of anticipating the decisions of stakeholders, given current margins of manoeuvre in breeding, and emerging issues and technology ruptures (to inform decisions that need to be made now for the future).
- There is will across the CGIAR to share data and information and to harmonize it, realizing the value of the multiplicity of CGIAR work. One role of the Big Data platform could be to help identify trends and correlations. How can big data help detect emerging issues, trends and unexpected links.
- Both Genebank and EiB platforms deal with public-private sector interactions. CGIAR may be able to leverage foresight in a way to help identify its comparative advantages –Is foresight another realm where the private sector has to be considered?
- Can CGIAR build a common and general approach to managing and exchanging data? What would be the standards for data exchange, access etc.
- An important challenge for the sectoral and project based foresight exercise is the lack of information on the big picture drivers. Is there possibility of using common scenarios (e.g., IPCC scenarios).
- Foresight can be seen as a binding object in CGIAR, to help clarify the decision-making processes. Need to think about foresight as a governance process as well as an analytical process.
- In Big Data activities, what parameters would allow an analysis of likely outcomes (big wins)?; and How does visualization contribute to those outcomes?
- The Genebanks platform and activities would very much benefit from a foresight process, to further develop long-term strategies.

Day-1 Summing Up and Panel Discussion

Five panellists discussed the overall messages from Day-1 presentations, panels and discussions. Some of the key messages can be summarized as follows:

- There has been recent progress of working on foresight across the CGIAR centers and cross CRPs, as can be documented by the outputs of the GFSF project, CCAFS scenarios program and other CRP activities. Foresight can be a binding factor within the CGIAR and with partners, including decision/policy makers. But there is a need to build a framework of processes and a common foresight

framework of approaches, and an environment to facilitate collaboration and constructing a common vision (ISPC role?).

- There is growing demand for foresight in the CG for many reasons including: long-term development demands (SDGs, NDCs. BaU, alternative, aspirational pathways); the need for coherence and consistency both internally and vis a vis CGIAR partners; opportunity to strengthen the position of the CGIAR in the global research and development agenda; and to help develop a stronger narrative on the future of agriculture and food systems.
- There is some correlation between the current CRP foresight work and the 5 themes identified in the ISPC Independent assessment. But most of the CGIAR foresight work is still very sectoral, commodity-based, and/or project based. The discussion shows the need for more comprehensive agricultural foresight, rural and agricultural transformations (with all key drivers and important dimensions) but also to link it clearly within economy wide structural transformations foresight.
- Models and tools: current CGIAR foresight focus on quantitative tools and potential to use qualitative tools (e.g. scenarios). An important question is how to build overall coherence, and what methodological framework to combine all approaches used?
- The foresight community of practice foresight and modularity of tools can help resolve the issue of buy-in by users and policy makers and provide opportunity for clarification and harmonizing scenarios.
- Importance of managing risk and uncertainty, and further develop tools for risk analysis. There is also a risk that decisions by policy-makers are based on simple / misleading indicators such as GDP – rather than understanding the full complexity of agri-food systems.

Box 1. What is it for?

- Value added - what are the benefits of foresight work to donors?
Return to investment – e.g. *role of scenarios in enhancing dialogue*
- Need a **theory of change for CG foresight** – need to understand context in which research results will be used
- Long-term goals defined at country level (SDGs, NDCs) - use of foresight to develop strategies - Agriculture at center of global challenges
- Developing **reference scenarios for food and agriculture?**
- How to position CGIAR in food and agriculture foresight? Who's going to be around the table? (e.g. IPCC vs. IAASTD)
- **Grand conundrum** – foresight to establish a community of practice
- **Foresight cycles** in the CGIAR Business plan?

Box 2. Who is it for (end users)?

Not same mechanisms and modus operandi for all users.

- Value of foresight and impact assessment in long term sustainability of funding – LT capacity of delivering.
- Foresight as a **public good** for CGIAR and beyond - ISPC has a remit to look outside the CGIAR - Link with other foresight initiatives?
- **PPP**: Importance of the private sector as a partner in foresight
- **Time frames** – short, medium and long term views have different audiences - what should CG do and what should be outsourced?
- **CGIAR comparative advantage** – capacity to combine foresight and ground-truthing at national and sub-national levels and ability to deal with heterogeneity.

Additional gaps and challenges identified in day-1:

- Analysis of labor productivity issues with existing modeling tools
- Land use, social issues, and business models
- Need more work on dual purpose crops – food/feed data
- Scale issue - How to go from global/national – to local level and integrate markets and trade?
- Need to integrate natural resource constraints.
- How do we organize the foresight work in system - do we need one common place for it?
- Target & data: Smallholders - left hand tails get buried into national average data; *e.g., where do we get data on wages; women's and youth?*
- Resources – risk of loss of capacity for foresight work (4 scenarios for foresight work - GFSF)

Day-2 Working Groups: Way Forward in CGIAR Foresight

The second day of the workshop was entirely dedicated to working group discussions on the way forward in CGIAR foresight, building on the proceedings of day-1 and the outcomes of the ISPC independent foresight assessment (Figure in right side).

The main outcomes of the discussions are summarized below.

WG1 (methodology):

Q1: what are the questions that system level foresight should address and what is our expected impact pathway?

- Is there a clear demand for foresight within the system?
- Is there a clear sense of the TOC within the system? How does foresight affect change within the system? Do we understand those pathways?
- There has been disconnect between robust evidence (e.g. ex-ante impact assessment) and resulting resource allocation. The system-level TOC is linked to external uses. How can the system level foresight assist stakeholders?
- Are investments mostly at the national level? Do we build from the tool outward or from the national or other demand inward (information chain)? The CGIAR has a global mandate that filters down to the national level but would not start with national level?
- Building a TOC is a more comfortable exercise, but there should not be disconnect between the internal and external uses. TOC could be shared with stakeholders.
- Should we talk about theories of change and pathways rather than a singular ToC?
- Need to focus on how foresight is incorporated into organizational decision making at multiple levels.
- There appears to be a nudge to broaden the thinking beyond agriculture. If the TOC is fully articulated we would understand how to fold this into the process.

Q2: use of foresight.

- The potential uses are both within the system, national level and other stakeholders. Understanding who we are co-producing with and for is important. Is there an overlap in the system that serves multiple uses, stakeholders?
- CRPs are global integrating programs – 4 integrating PIM, FTA. CCAFS, A4NH were seen as the programs to integrate. This has generated big influences on global agenda in nutrition, climate, etc.
- System level foresight should be thinking beyond this; for instance, where are the other policy grouping that the system could have an impact on (e.g., energy, water?). How could system level foresight identify these activities?
- There is a need to improve tools and not be restricted by current tools when we think of strategic foresight.

WORKING GROUPS – way forward in CGIAR Foresight

WG1: Methodology

1. What are the main questions that system level foresight should address and what is our expected impact pathway?
2. What is potential use of current CGIAR foresight work in system level foresight? (Tools and approaches)
3. what are gaps in current CGIAR foresight in relation to building foresight capacity for system?

WG2: Process and steps for building system level scenarios

1. What are the key drivers that we need to consider for building common scenarios?
2. What steps and processes would be needed to get there, building on stages 1 and 2 of ISC foresight?

- Should the SMB be the users of the foresight coming from the centers and their role is to convince SC and ISPC's role would be to challenge? This could increase SMB buy-in.
- Could the foresight exercise have a business purpose?
- CGIAR can provide international public non-nationally driven independent foresight; providing centers means when interacting with stakeholders. Approach to understand how stakeholders are changing the environment (including PS).

Q3: gaps.

- There is a gap in system management's use of foresight. How foresight is used from ISPC up to SMB and SC. No central tool available to make choices. Having a ToC requires identifying users though division of labor can change.
- On interaction with society: centers need to explain their work to the public and possible consequences. Society wants to know what the CGIAR thinks about the future and their role (e.g. GM, Genebanks, etc.)
- On researchers: need for a change of mindset. CGIAR centers/researchers are often supply-driven, as they strive to apply their tools; foresight has the role to make this more demand-driven. But there is also a need for the system to have some academic freedom to be able to attract the best.
- How to differentiate how different constituents will incorporate foresight in their thinking.
- Major gap is the absence of a business intelligence unit/comparative advantage analysis in the CGIAR. Could be established within the ISPC? But what would be the mechanism for this to happen?
- Some skills and functions for which the CGIAR does not have the capacity to do (eco-futurism).

WG1 (process):

Q1. Drivers of change - issues for the CGIAR system to focus on

- o Demand change (Dietary change on production systems; Malnutrition: undernourishment and overweight)
- o Rural transformation (structural change, demographic change)
- o Long-term roll of small-scale agriculture in global food security (Informal/formal market mix, scale of operation for viable livelihoods)
- o Disruptive technology
- o Environment/Natural Resources degradation (Water competition/security,...)
- o Trade

CG system Operational Drivers/Risks

- o Changes in R&D provision: Public-Private balance (privatization of advisory services); National-International balance (moving toward national); Shift from 'Western World' to East; Short-term time horizon; Reduction in Social Justice
- o Geopolitics: Globalization-Fragmentation; Changing Power Balances
- o Disruptive Technology: Big Data; Artificial Intelligence; Automation

Q 2. Process for building common scenarios

- o Identifying the audience(s): who is it for? why are we doing it? What representation is needed from that audience? How often? Building capacity of the audience
- o What are the key strategic questions: Time frame; Spatial scale; Sectoral scale; Consultation across the CGIAR on needs and gaps; Regional consultation?
- o Describe Future Visions/Scenarios: Small-holder ag in food security for example; Possible scenarios and uncertainties that bracket the issues.

- Are there robust wins across scenarios? Reviewing the State of the Art: To what extent do we use existing foresight exercises? Data review – fit for purpose (scale and resolution/accuracy). Tool review/development - Ensure that tools we use are fit for our portfolio; Identifying gaps
- Choice of appropriate tools: Qualitative/Quantitative mix
- Do the analysis – Methodology: Modular framework development? Participatory development process? Filling data gaps – defining data products, setting standards/protocols
- Select relevant outputs: Strategic guidance at CGIAR system level at periodic intervals; Horizon scanning for the CG system; Strategic guidance for stakeholders/constituents/clients at all levels.
- Sector level guidance: Framework for doing foresight in the CG; Open-source, common, modular, reusable platform.
- Operational requirements: Organization/Coordination; Guidelines on information sharing; Capacity building for development and use of the framework

Conclusions and Key Messages

A large amount of quantitative foresight analysis is already being done in the CGIAR, much of it by the community of practice that has been developed through the Global Futures and Strategic Foresight project. But existing work tends to focus on the needs of individual Centers and CRPs rather than the System as a whole. An opportunity exists to strengthen and expand this work to better address the needs of the CGIAR System and its partners.

System level foresight has the potential to identify how differing assumptions about the direction and impact of drivers within and external to agriculture and food systems might lead to various plausible futures, and the implications these would have for potential impacts of agricultural research. This, in turn, will better inform priority setting across the CGIAR research portfolio by providing added insights to the potential risks and rewards of various research activities.

A key output should be a set of scenarios of plausible futures in which the outputs of the CGIAR system would be applied, which can provide a basis for enhancing the capacity of the system to deliver impacts under changing conditions and uncertainty. Another key output will be greater understanding throughout the system and its funders of the varying assumptions that underlie the theories of change and impact pathways of the research activities in the portfolio, allowing for better coordination amongst them. The research outputs and intelligence gathered by the coordinated process feeds into the broader ISPC process and facilitates looks beyond current constraints.

In order to be successful, buy-in would be a critical element of the entire process. A formal mechanism for facilitating coordination will be a critical element in generating buy-in. This should be a formalized “framework” (possibly similar to a platform). A formalized infrastructure has the critical advantage of offering a space that is highly harmonized and integrative across CRPs, centers, research topics, and system level goals.

One advantage of a formal foresight infrastructure within the CGIAR would be the ability to pool different foresight analyses from different centers and CRPs and raising these specific and focal analyses to the system level while also putting them in the context of a broader series of potential scenarios. If a formal infrastructure was to exist, it would ideally address emerging issues more generally, i.e., analysis of new drivers (new technology), horizon scanning, and drawing from broader research communities (both within individual countries and abroad).

One way to think about the role and structure of an integrating framework would be to approach it from the perspective of the drivers. It becomes very important to classify drivers and better understand their relation to the systems in which we work as well as the research areas addressed by the CGIAR. One very important set of drivers that needs to be addressed (not previously mentioned) are the human behavioral and cultural drivers. Likewise, we need to be very well aware of advancing tipping points and potential cascading failure that can

result as well as potential positive outcomes. Ultimately understanding dynamics of slower vs. more rapid changes becomes critical as our ability to respond to different time constraints will depend on the problem space in which we're working. Finally, we must understand that our work will be designed and able to influence some drivers and not others. Foresight can play a vital role in positioning CGIAR research outcomes relative to the problems which we can effectively address.

Annex I. Agenda

Time	Topics	Chair / Speakers
Wednesday 8:30 – 9:30	Session 1 – Introduction – Synthesis of ISPC foresight <ul style="list-style-type: none"> Welcome - <i>Maggie Gill and Graeme Paton</i> Synthesis of the ISPC independent foresight exercise (<i>Prabhu Pingali & Rachid Serraj</i>) Q&A – Discussion 	Maggie Gill & Prabhu Pingali
9:30 – 10:15	Session 2 – Status of foresight in the GFSF Project and AFS commodity CRPs (10 min ea + discussion) <ul style="list-style-type: none"> GFSF Project synthesis (<i>Keith Wiebe</i>) Rice (<i>Subir Bairagi & Mandiaye Diagne</i>) Maize & Wheat (<i>Gideon Kruseman & Aymen Frija</i>) Roots, Tubers & Banana (<i>Elisabetta Gotor & Guy Hareau</i>) 	Keith Wiebe
10:15 – 10:45	<i>BREAK</i>	
10:45 – 12:00	Session 2 – cont’ed <ul style="list-style-type: none"> GLDC (<i>S. Nedumaran & Sika Gbegbelegbe</i>) Livestock (<i>Karl Rich</i>) Fish (<i>Chan Chin Yee</i>) Discussion (<i>Discussants: Jill Lenne; Adam Price</i>) 	
12:00 – 13:00	<i>LUNCH</i>	
13:00 – 14:30	Session 3 – NRM & iCRPs (10 min ea +discussion) <ul style="list-style-type: none"> Climate Change (<i>P. Thornton/ Joost Vervoort - via Skype</i>) Nutrition & Health (<i>Marijke Kuiper</i>) Land, Water & Ecosystems (<i>David Wiberg</i>) Forests, Trees & Agroforestry (<i>Anne Terheggen & Pablo Pacheco</i>) Policies, Institutions, & Markets (<i>Steve Prager</i>) Discussion (<i>Discussants: Michael Obersteiner; Leigh Anderson</i>) 	Philip Thornton
14:30 – 15:00	<i>BREAK</i>	
15:00 – 16:00	Session 4 – Cross-cutting themes & platforms <ul style="list-style-type: none"> Big Data (<i>Gideon Kruseman</i>) Other Platforms (Genebanks & EiB) and cross-cutting themes (<i>Peter Gardiner</i>) Discussion (<i>Discussants: Vincent Gitz, Jim Woodhill</i>) 	Leslie Lipper
16:00 – 17:30	Session 5 – Summing up & panel discussion Panellists: <i>Philip Thornton; Keith Wiebe; Vincent Gitz; Maggie Gill</i> <ul style="list-style-type: none"> Key messages, pooling together from all Day-1 presentations Comments on foresight approaches, areas and themes covered; potential synergies and gaps. 	Prabhu Pingali

DAY 2		
Thursday	Session 6 – Planning the way forward in CGIAR Foresight	Maggie Gill
8:30 – 9:00	Highlights from Day1 - <i>Rachid Serraj</i>	
9:00 – 10:30	<ul style="list-style-type: none"> • WG Discussion (Breakout Groups) <ul style="list-style-type: none"> - G1: <i>Methodology: does the ISPC foresight exercise indicate any major gaps in current CGIAR foresight and projection work (e.g. Comparative advantage)?</i> - G2: <i>Major trends and drivers that must be considered in developing CGIAR system foresight; what should we consider in scenarios?</i> 	ALL
10:30 – 11:00	<i>BREAK</i>	
11:00 – 12:00	Reporting and general discussion	
12:00 – 13:00	<i>LUNCH</i>	
13:00 – 14:30	Session 6 (cont'ed)– Draft of Workshop Outputs (2 Groups) <ol style="list-style-type: none"> a) <i>Current state of CGIAR foresight work and gaps that need to be addressed</i> b) <i>Major trends/drivers to be considered in foresight for CGIAR system</i> c) <i>Linking foresight to prioritization at system level and other levels, e.g. CRPs, Centers, national partners, donors, etc.</i> d) <i>Plan of work and next steps needed to build CGIAR system level foresight.</i> 	ALL
14:30 – 16:00	<ul style="list-style-type: none"> • Reporting and general conclusions – Next steps 	Prabhu Pingali & Rachid Serraj

Annex II - List of Participants

Name	Affiliation / Role
1. Subir Bairagi	IRRI & Rice
Mandiaye Diagne	AfricaRice & Rice
2. Karl Rich	ILRI & Livestock
Aymen Frija	ICARDA & Wheat & other dryland crops
3. Sika Gbegbelegbe	IITA & GLDC
4. Elisabetta Gotor	Bioersity & RTB
5. Guy Hareau	CIP & RTB and others
6. Gideon Kruseman	CIMMYT, Maize & Wheat
7. Marijke Kuiper	WUR & A4NH
8. S. Nedumaran	ICRISAT & GLDC
9. Steve Prager	CIAT & PIM
10. Anne Terheggen	ICRAF & FTA
11. Chan Chin Yee	WorldFish & Fish
12. Joost Vervoort (via Skype)	Utrecht Univ. & CCAFS
13. David Wiberg	IWMI & WLE
14. Vincent Gitz	CRP Representative
15. Leigh Anderson	Univ. Washington - Discussant
16. Marco Ferroni	Chair CGIAR SMB - Discussant
17. Peter Gardiner	CGIAR SMO - Discussant
18. Jill Lenne	Consultant - Discussant
19. Michael Obersteiner	IASA - Discussant
20. Adam Price	Univ. Aberdeen - Discussant
Patrick Webb	<i>Tufts Univ. & ISPC Council - Discussant</i>
21. Jim Woodhill	Univ. Oxford - Discussant
22. Lakshmi Krishnan	ISPC Secretariat
23. Maggie Gill	Planning Group & ISPC Chair
24. Leslie Lipper	Planning Group & ISPC Secretariat
Pablo Pacheco	<i>Planning Group; CIFOR & FTA</i>
25. Prabhu Pingali	Planning Group; Cornell Univ. & ISPC
26. Rachid Serraj	Planning Group & ISPC
27. Philip Thornton	Planning Group & CCAFS
28. Keith Wiebe	Planning Group, IFPRI & PIM