

# **Visioning the Future of the CGIAR**

Report of Working Group 1 (Visioning) to the  
Change Steering Team of the CGIAR

June 6, 2008

# 1 Introduction

## **1.1 *Agricultural research and innovation***

Agriculture and natural resources and a well functioning food system have fundamental roles to play in reducing poverty and improving the livelihoods of the poor<sup>1</sup>. Throughout the developing world, rural people face daily challenges of hunger, poverty, ill-health, environmental degradation and gender inequality. As rural and urban communities across the developing world feel the pressure of climate change, high food prices, and environmental and energy crises, so new knowledge and improved technologies, policies and institutions have never been more critical. Global economic and population growth have increased the pressure on food supplies; natural resources are already over-stretched; and further expansion of the agricultural frontier is not a desirable option in most parts of the developing world.

The CGIAR, as a key component of the international agricultural research system, can help overcome these challenges, which have been articulated in statements such as the Millennium Development Goals (MDGs), through a people-centered approach to innovation in agriculture and natural resources management. The CGIAR's research and innovation activities support the ability of the rural poor to sustain and improve their livelihoods, meeting the challenges they face while also keeping food prices affordable to the urban poor.

## **1.2 *The need for change at the CGIAR***

Meanwhile, the world of agricultural research has shifted dramatically. A global agricultural research and knowledge system is emerging, in which the CGIAR is only one player. Specifically, the entry of strong new actors, including private-sector companies and well resourced national or regional organizations, into international agricultural research challenges the role of the CGIAR as a major player in the field. The varied and changing expectations of the national agricultural research programmes with which the CGIAR has traditionally worked necessitate that it reposition itself to maximize interactive synergies with them and with the other actors in the global system. This will require a new modus

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<sup>1</sup> In this paper we use the FAO definition of agriculture, which includes forestry, hunting and fishing, as well as cultivation of crops and livestock production.

operandi and a more strategic approach to the nurturing of partnerships that ensures that respective complementary advantages are exploited.

Thus, unless it changes, the CGIAR risks no longer being perceived as a key provider of solutions to the problems associated with agricultural productivity and natural resource management. At present, CGIAR funding is not increasing in proportion to client needs. If this trend continues, and the CGIAR does not adapt, it will rapidly lose relevance and the contribution of international public goods to agricultural innovation will fall even further short of what is needed.

### **1.3 The opportunity for change**

After nearly two decades of neglect, the role of agriculture and agricultural research in poverty reduction is once again receiving high-level political recognition. The World Development Report<sup>2</sup>, policy statements from the G-8 and EU, and numerous reports from other institutions<sup>3</sup>, together with the current international debates on food prices, climate change and biofuels are focusing attention on issues close to the heart of the CGIAR. There has never been a better time to re-establish the CGIAR's relevance and to generate increased support and funding for its important activities.

In addition, it is clear that the CGIAR has never been more open to change. This is the time to challenge the CGIAR's sacred cows, including multiple governance structures, donor sovereignty and center autonomy, and to take the bold steps needed to reinvigorate the CGIAR. It is for these reasons that the CGIAR has launched a major change initiative.

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<sup>2</sup> World Development Report, 2008: *Agriculture for Development*. The International Bank for Reconstruction and Development/The World Bank, Washington, DC.

<sup>3</sup> International Assessment of Agricultural Science and Technology for Development (2008). Island Press, Washington, DC.

Intergovernmental Panel on Climate Change (2007) *IPCC Fourth Assessment Report: Climate Change*. Cambridge University Press, Cambridge.

Millennium Ecosystem Assessment (2005) *Ecosystems and Human Well-Being: Global Assessment Reports*. Island Press, Washington, DC.

Molden D (ed), 2007. *Water for Food, Water for Lives: A Comprehensive Assessment of Water Management in Agriculture*, Earthscan, London.

## **1.4 The CGIAR change management process**

In early 2008, the CGIAR change management process was initiated. A Change Steering Team (CST) and four Working Groups (WGs) representing stakeholders and shareholders were established to address: 1) visioning and development challenges, 2) strategic partnerships, 3) governance at the center and CGIAR levels, and 4) funding mechanisms.

Working Group 1 (WG1; see Annex 1), Visioning, was tasked to 1) explore and identify the most relevant development goals and challenges for the CGIAR; 2) develop a new vision for the CGIAR and refine its mission, 3) propose a set of measurable strategic objectives for the CGIAR that are closely linked to the development challenges, and 4) provide guidance to the other WGs on developing appropriate business models in support of the revised mission, vision and strategic objectives.

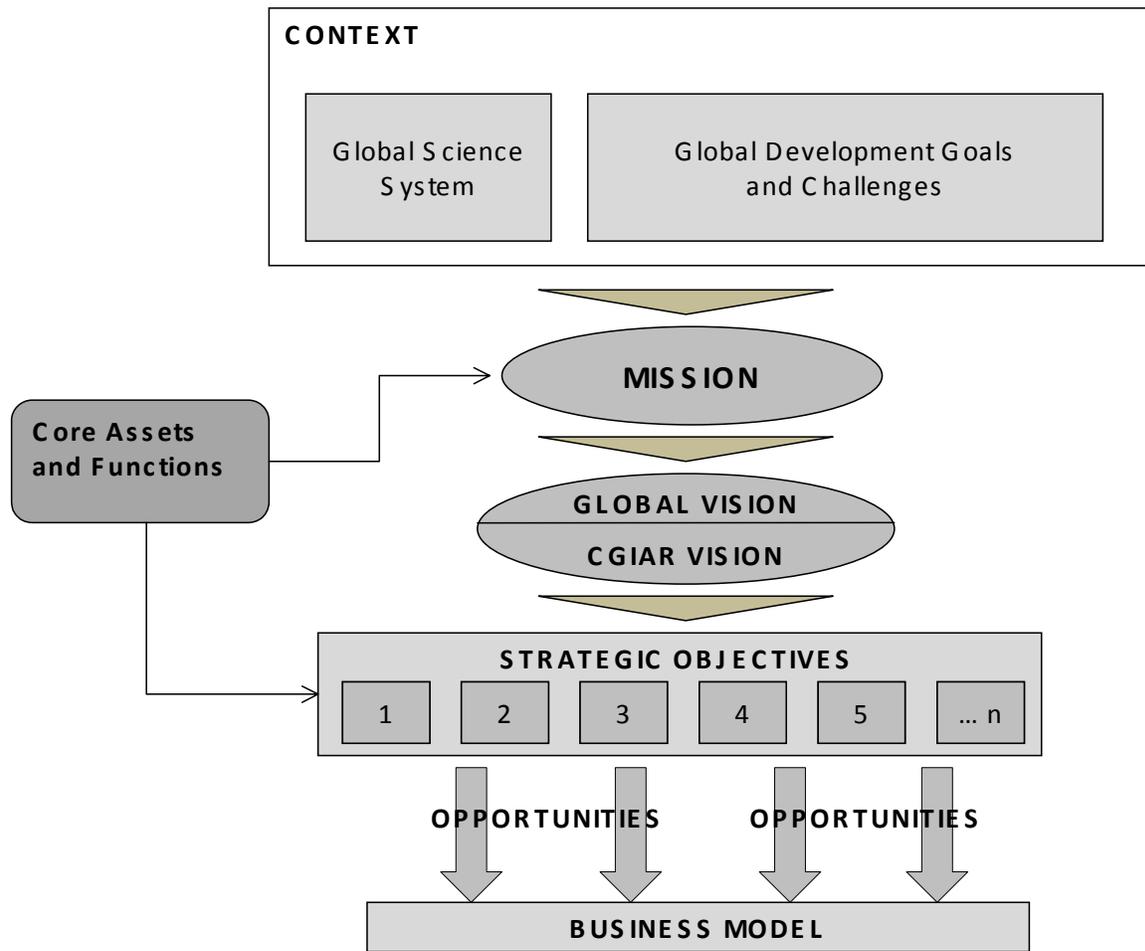
This paper sets out WG1's ideas thus far. The paper reflects the views of WG1 members, with significant inputs from stakeholders and the CST. It is intended to form a basis for further feedback from the CST, the CGIAR Executive Council and other stakeholders. It will enable the other WGs to incorporate more detailed specifications of opportunities and business models as the change management process moves forward.

## **2 Introducing the process and framework**

Over the past three months, through an intensive process of meetings, teleconferencing, document reviews, consultations and e-mail discussions, WG1 has developed a Visioning Framework that captures the global background and context for international agricultural and natural resources research for development, and shows how that context feeds into a CGIAR-specific vision and mission. The WG1 process, launched in Washington on 27–28 February 2008, is described in detail in Annex 2.

The Visioning Framework provides the structure for developing WG1's proposals for the mission, vision, strategic objectives, opportunities and business models of a reinvigorated CGIAR. Through a broad review of existing declarations, studies and documents, WG1 identified a number of global development goals and challenges. Combined with an understanding of the existing global science system, these form the context for the Visioning Framework. In addition, the CGIAR's core assets and functions were identified to provide a point of departure for defining the CGIAR's mission, strategic objectives, and comparative and complementary advantages. These elements are shown in the Visioning Framework in Figure 1 and described in greater detail below.

**Figure 1: The Visioning Framework**



In order to ensure clarity and consistency of the sometimes confusing language around the visioning process, WG1 developed a Glossary of Terms, shown in Table 1.

**Table 1: Visioning: some shared concepts**

Term	Definition
Global Development Goals	The overarching external need(s) the vision should address that are relevant to the CGIAR
Global Development Challenges	The set of specific issues that must be addressed to achieve success in meeting the Global Development Goals
CGIAR Mission	The CGIAR's core values (i.e. its guiding principles) and its core purpose (i.e. its most fundamental reason for being)
Global Vision	A description of what we would like the world to look like in the future
CGIAR Vision	A measurable account of the CGIAR's contribution to addressing Global Development Challenges over the next 15–20 years
Strategic Objectives	Key measurable targets that the CGIAR must achieve to realize the CGIAR Vision and in turn contribute to the Global Vision
Opportunities	Defined areas of work deemed important to achieve the Strategic Objectives and where the CGIAR, working with its partners, has potential comparative and complementary advantages
Business model	A description of how the CGIAR will implement its Strategic Objectives, including partnership requirements and the use of alternative suppliers. Composed of components such as the business concept, funding mechanisms, system governance, partnerships, people requirements, values and beliefs, and indicative activities

### **3 The context**

#### ***3.1 The global science system***

As highlighted in the Visioning Framework, the global science system forms a central part of the context for developing a vision of the CGIAR's future. This system has evolved rapidly in recent decades. The Green Revolution of the 1960s and 1970s stimulated the 'golden years' of rapidly increasing international and national investment in agricultural research and development (R&D). Although investments in R&D produced an average

return of over 40 percent, failures of markets and governance have led to a slowdown in public investment in recent decades. As a result, declining R&D capacity in many developing countries threatens to leave them as 'agricultural technology orphans'.

Driven by sharp increases in private R&D spending, the knowledge divide between industrial and developing countries is widening.<sup>4</sup> Including both public and private spending, developing countries invest only one-ninth of the amount industrial countries invest in agricultural R&D (as a share of agricultural GDP).

The nature of science itself is also changing rapidly. Revolutionary advances in biotechnology and information technology are driving productivity growth and market competitiveness, but the benefits have mainly accrued to larger and more commercial farmers. The vast majority of the poor have yet to benefit from such advances.

Meanwhile, the institutional setting for technological innovation is undergoing a parallel evolution. With the development of markets and integrated supply chains, innovation becomes less driven by science (supply side) and more by markets (demand side). Users within and outside agriculture – including farmers, food processors, consumers and market agents – are increasingly important in setting the research agenda.

Agricultural science and technology are also becoming increasingly global, spurred by globalization, privatization and information technology. International cooperation in R&D goes well beyond the CGIAR. Growing capacities in large developing countries with dynamic R&D systems, such as Brazil, China, India and South Africa, are spurring increased South–South cooperation. At the same time however, many smaller countries are lagging behind in agricultural R&D investments and in enhancing their institutional capacities. This is leading to a growing divide between strong and weak national agricultural research systems, which the CGIAR has to address explicitly.

Overall, the emerging global agricultural science and technology system is increasingly complex, heterogeneous and corporate. Although the CGIAR is a major producer of global public goods (see Box 1), it is a small player in terms of resources. However, it can and should play a central role in this system given its global mandate and strong international networks, the global nature of many research challenges and their solutions, and the opportunity to gain from economies of scale and scope. The CGIAR needs to revise its modes of operation in order to engage more effectively with the expanding and

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<sup>4</sup> Pardey, Philip G., Julian Alston, Jenni James, Paul Glewwe, Eran Binenbaum, Terry Hurley, and Stanley Wood (2007) *Science, Technology and Skills*. InSTePP Report, International Science & Technology Practice & Policy, University of Minnesota, St. Paul.

diversifying range of partners, in both the South and the North, that characterize this emerging global agricultural research and knowledge system.

**Box 1: Global public goods: the funding challenge**

The international donor community has shown itself increasingly willing to support programs that have global public good (GPG) characteristics. However, most of the growth in GPG grants has been in the areas of health and environment. Support for agricultural research has been weaker.

Despite the increased interest in funding GPGs, unrestricted funding for the CGIAR, which supports the generation of GPGs, has tended to fall. The mutual benefits that accrue to both developed and developing countries from the pursuit of GPGs offer scope for tapping new funding sources for agricultural R&D beyond conventional aid budgets, including science and technology and environmental ministries in developed countries. Given the urgency and enormity of the global development goals and challenges outlined in this paper, these new sources will need to be pursued vigorously in the years ahead.

**3.2 Global development goals and challenges**

Agricultural growth in developing regions remains fundamental for poverty reduction and food security. Many rural people's livelihoods depend directly on their ability to produce, process and market agricultural products. The targets associated with the first MDG, to halve poverty and hunger by 2015, will not be reached without urgent revitalization of the agricultural sector. At the same time, the sustainability of the agricultural and food sectors, on which all humanity depends for sustenance, relies on sound management of natural resources.

A combination of factors has recently driven food prices to new highs, demonstrating the vulnerability of the poor to food shortages and high prices. Crop productivity growth has slowed dramatically or gone into reverse in parts of the developing world, so that supply has not risen in line with demand, compounding the potential for food shortages and price rises. Substantial investments must be made in agricultural research and innovation if poverty and hunger are to be eradicated in the longer term, and decent livelihoods assured.

Furthermore, improved agricultural systems have crucial roles to play in meeting other development goals highlighted in the MDGs, such as greater environmental sustainability, the promotion of gender equality, reduced child mortality and improved maternal health. Agricultural research must investigate how best to manage the scarce natural resources that affect agricultural production, including water, soils, forests and fisheries. Climate change increases both poor farmers' vulnerability to crop losses and the risks of biodiversity loss, especially when extreme weather events occur more frequently. Research is essential to identify means of adapting agricultural systems to changing environmental conditions, as well as mitigating the contribution to climate change made by specific practices or systems.

Agriculture has great potential to impact on human health, both negatively through, for example, the prevalence of food-borne contaminants such as aflatoxins, and positively through the potential for improved nutrition. Specific systems and practices may severely damage rural people's health, for instance through pesticide misuse and the creation of breeding habitats for disease vectors. Agriculture's close connections with health demand research attention in the pursuit of future improvements in both health and nutrition.

At all levels, these and other crucial development challenges cannot be addressed without a specific focus on empowering women to grasp the opportunities for improving their livelihoods and those of their families. Agriculture is the largest employer of women, and equality cannot advance without greater attention to gender in agriculture.

As a first step towards defining the CGIAR's future role, WG1 sought to identify the goals and challenges that are relevant to the CGIAR as a component of the global science system. As the CGIAR works in the context of global development goals agreed upon by the international community, WG1 first reviewed the major declarations, studies and documents that together represent the global community's view of the development goals and challenges facing the world (see Annex 3).

Based on this review, five fundamental Global Development Goals were identified: to 1) eradicate poverty, 2) eradicate hunger, 3) improve human health and nutrition, 4) enhance and protect natural resources and the environment, and 5) eliminate gender disparities and empower women. As a means of meeting these goals, six Global Development Challenges (GDCs) that the CGIAR's future activities should aim to address, were also identified (Box 2). Together with the existing global science system, these goals and challenges are considered to form the basic context in which to build a vision of the CGIAR's future roles and opportunities.

## **Box 2: Global Development Challenges identified by WG1**

GDC1: Sustainably improving agricultural productivity and adding market value

GDC2: Improving food security for poor and vulnerable people

GDC3: Enhancing access to assets and markets by the poor, especially rural women

GDC4: Conserving, enhancing and sustainably using natural resources and biodiversity

GDC5: Mitigating and adapting to climate change

GDC6: Enhancing the positive synergies between agriculture and health

Besides benefiting the poor in the developing world, research on many global issues, such as crop diseases, climate change, bioenergy policies, and agriculture and health problems, are highly relevant to industrial countries. Investing in such research is thus in their own interest as well as beneficial in the struggle against poverty in the developing world.

## **4 The CGIAR's core assets and functions**

Since 1995 the Global Forum for Agricultural Research (GFAR) has promoted the concept of a global agricultural research-for-development system as a way of rationalizing and synergizing the functions of relevant actors on the basis of their comparative and complementary advantages. Within this system, the CGIAR is widely recognized as having an international mandate and a number of core assets. These core assets provide an important element of the 'initial conditions' for defining the CGIAR's vision and mission, and especially its comparative and complementary advantages in international agricultural and natural resources research. The current core assets of the CGIAR include:

- A group of 64 member countries and organizations committed to addressing global development challenges through international agricultural research for development
- A critical mass of scientists with multidisciplinary knowledge of key agroecosystems
- Extensive global research infrastructure (e.g. research stations representing many agroecosystems)
- Global or regional research networks with strong links to national agricultural research and innovation systems
- Global collections of genetic resources held in trust for the world community
- Global public trust as an 'honest broker', acting in the interests of the world's poor in the global science and policy-making communities.

To position the CGIAR to take on new and emerging challenges, core assets should, of course, be altered in response to several elements in the strategic vision, notably the evolution of other actors in the global agricultural research and knowledge system. However, core assets can only be changed gradually and usually at considerable expense, so that comparative advantages for the medium term are largely determined by initial assets. The CGIAR must constantly adapt to the challenges arising from the rapidly changing context of innovation, policy and institutional change in developing countries. The CGIAR should not therefore be static, but must seek a dynamic comparative and complementary advantage, taking into account the capacities of other actors as they also change and develop.

In addition to the comparative and complementary advantages relating to its core assets, the core functions of the CGIAR should be defined by society's political and social demands at the global and regional levels. WG1 identified six core functions of the CGIAR, highlighting the unique position of the CGIAR in meeting development goals and challenges. These functions define the role the CGIAR should play within the evolving global agricultural research and knowledge system.

**Conducting research for development.** Long-term strategic agricultural research is recognized as a key 'heartland' function of the CGIAR centers and programs, delivering knowledge, technologies and institutional innovations with a focus on poverty reduction, which are essentially global, international or regional public goods. This function underpins the other functions, described below.

**Conserving core collections of germplasm and related knowledge.** The collections of crop and animal germplasm and related passport information, supported by other unique resources such as databases and wider information about the collections, form a core and unique asset of the CGIAR. The value of these assets is likely to increase with growing demands created by, for example, climate change, so that collecting, maintaining, characterizing, enhancing and utilizing these collections will continue to be a core or heartland function of the CGIAR, benefiting many current stakeholders as well as future generations.

**Catalyzing research and innovation.** Based on its research function, the CGIAR is often asked to act as a catalyst, influencing the use of resources and competencies among other actors in support of shared objectives. This may encompass collaboration, brokerage, convening and networking of the different agricultural research actors; facilitating spill-over and scaling-up of technologies; funding mobilization to support agricultural research; and the establishment of regional and global research facilities.

**Raising awareness, including anticipation/foresight.** The CGIAR is in a unique position to provide sound scientific data or studies as a basis for raising awareness among both the public and key decision makers. Given its strong multidisciplinary scientific base, the CGIAR is also well placed to conduct foresight studies on emerging global agricultural development challenges, for example related to climate change, food security shocks and biofuels, signaling the importance of such challenges to policy makers.

**Support for policy and decision making.** Developing and implementing better policies and overcoming policy failures are critical for ensuring the beneficial impact of research on the livelihoods of the poor. Analyses and predictions of demand and supply, trade flows, and public investment in agriculture and rural services aid our understanding of the consequences of different policies and decisions. There is increasing demand from decision makers at global, regional and national levels for dedicated decision support systems and tools to facilitate evidence-based policy formulation. Policy research to develop such systems and tools and apply them in studies on specific issues is therefore a 'heartland' function of the CGIAR.

**Capacity development.** The CGIAR's capacity development function contributes to the global agricultural research and knowledge system by training people and supporting institutional development, enhancing the synergies among national agricultural research systems and the CGIAR in the process.

## 5 Mission and Vision<sup>5</sup>

As outlined in the Visioning Framework, the Global Development Goals, Global Development Challenges and the global science system provide the context for the future development of the CGIAR, while the CGIAR's core assets and functions partly determine its strategies, opportunities and roles in agricultural research for development. The Mission and Vision statements draw on these bases in order to articulate the direction of the CGIAR.

The Visioning Framework for the CGIAR shown in Figure 1 comprises the CGIAR Mission, a Global Vision and a CGIAR-specific vision.

The CGIAR mission aims to reflect the CGIAR's core values and purpose – its guiding principles and fundamental reason for being. It emphasizes the contribution the CGIAR

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<sup>5</sup> The Mission and Vision will evolve as the change management process moves forward.

makes to global development goals and challenges, compared to other organizations that are also working towards the same goals.

#### **CGIAR Mission**

To be the proactive and forward-looking global leader, catalyst and partner of choice in the conduct of international agricultural research for development, harnessing human ingenuity and innovation, leading to the empowerment of the poor, especially women, to overcome poverty, hunger and ill-health and to sustainably manage and enhance natural resources in the face of climatic and socio-economic change.

The Global Vision describes how the CGIAR would like the world to look in the future, once it has made its contribution.

#### **Global Vision**

A world free of poverty and hunger, supported by healthy and resilient ecosystems.

Finally, the CGIAR Vision reflects the CGIAR's contribution to addressing the Global Development Challenges over the next 15–20 years.

#### **CGIAR Vision**

To reduce poverty and hunger, improve human health and nutrition, and enhance ecosystem resilience through high-quality international agricultural research, partnership and leadership.

## **6 From vision to operations**

### **6.1 Strategic Objectives**

The Strategic Objectives (SOs) identified by WG1 can be linked to key measurable targets that the CGIAR must achieve in order to realize its Vision and, in turn, contribute to the Global Vision. Based on the development and science context discussed in Section 3, and the core assets and functions of the CGIAR outlined in Section 4, the SOs are intended to turn the CGIAR Vision into a set of operations that can be clearly understood and assessed by the CGIAR itself and its partners<sup>6</sup>.

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<sup>6</sup> We note that there is a great deal of consistency between the results of this approach and the current System Priorities, but with some new areas and some different areas highlighted.

The SOs were developed from the Global Goals and Challenges identified in Section 3.2 of this paper by devising actionable objective statements related to each goal that would allow the CGIAR, in collaboration with its partners and other actors, to make measurable contributions to the goals and challenges through an impact pathway, as described in more detail later in this section (see Box 3).

**Box 3: ...And then there were three**

Initially, WG1 identified eight SOs (detailed in Annex 2) to respond to the Vision and Global Development Challenges. The eight can be summarized as follows: 1) increasing yields of food staples; 2) diversifying into high-value products; 3) conserving natural resources and biodiversity; 4) reducing greenhouse gas emissions; 5) making food and agricultural systems safer and more nutritious; 6) enabling women's participation and advancement; 7) facilitating an enabling policy and institutional environment; and 8) fostering global coalition on international agricultural research for development. In order to achieve tighter focus, WG1 and the CST engaged in an iterative process of discussion and refinement. As a result, diversification into high-value products was dropped as a separate objective, but policy and institutional issues associated with high-value crops were retained in the policy SO. In recognition of the fact that SOs 6 and 7, on gender and on fostering a coalition, are cross-cutting, these issues were also dropped as separate SOs, leading to a set of five SOs for presentation at the Change Management Retreat in Ottawa in May 2008. At the retreat, the five Strategic Objectives (set out below) were further refined to form the three presented in this paper by recognizing that the first three SOs reflect the core business of the CGIAR while the new elements of SO4 and SO5 could be integrated in SO1 and SO2.

SO1: Accelerate sustainable increases in yields of food staples

SO2: Conserve, enhance and sustainably use natural resources and agricultural biodiversity

SO3: Facilitate institutional innovations and an enabling policy environment to support pro-poor agricultural growth and gender equity

SO4: Improve availability of safe, nutritious food and healthy production environments

SO5: Improve mitigation and adaptation to climate change in agricultural systems

The three SOs proposed for the CGIAR, as stated below, start from a recognition that the CGIAR focuses on people, especially the poor, women and the marginalized. The CGIAR will mobilize science and technology to meet the following three objectives:

### **FOOD FOR PEOPLE**

- Create and accelerate sustainable increases in the productivity and production of healthy food by and for the poor

### **ENVIRONMENT FOR PEOPLE**

- Conserve, enhance and sustainably use natural resources and biodiversity to improve the livelihoods of the poor in response to climate change and other factors

### **POLICIES FOR PEOPLE**

- Promote policy and institutional change that will stimulate agricultural growth and equity to benefit the poor, especially rural women and other disadvantaged groups.

A number of elements were recognized as applying to all SOs. In order to avoid the need for constant restatement, these universal elements are shown in Box 4.

#### **Box 4: Elements applying to all Strategic Objectives**

- Agriculture includes crops, livestock, fisheries, hunting and forestry (as per the FAO definition of agriculture)
- Food refers to cereals, roots and tubers, oilseeds, and pulses, as well as animal products and fish
- High-value crops, including fruits and vegetables, coffee, cocoa, tea and biofuel crops, are excluded under SO1 on improving food productivity, as the CGIAR is not seen as a leader with comparative advantage in these areas; however, the CGIAR will contribute under SO3 to research on policy and institutional issues associated with these crops.
- The SOs focus on developing countries (as defined by the UN system)
- The SOs focus on the poor, both producers and rural and urban consumers. The rural poor include smallholders and wage laborers
- The SOs focus on promoting sustainable production systems
- Gender enters as a key opportunity with measurable indicators under each SO
- The CGIAR's new ways of doing business, related to its core functions and to be elaborated in the business models, will be embedded in all SOs, with measurable indicators

The SOs are intended to be limited in number, mutually exclusive (to the extent possible) yet collectively comprehensive. That is, the opportunities under one SO should overlap minimally with the opportunities under other SOs; at the same time, the SOs should together describe the essential international agricultural research portfolio needed to meet

the key Global Development Challenges (see Box 2, in Section 3). Time-frames for achieving the SOs will vary, according, for example, to how much work has already been completed in some areas.

## ***6.2 Impact pathways and partnerships***

The three SOs all contribute, in cross-cutting ways, to the vision of a world free of hunger and poverty, enjoying improved health and nutrition, and with more productive and resilient ecosystems. Increased productivity (SO1) will not only increase food availability but also raise farm incomes at the same time as reducing prices for poor consumers. It must be achieved by using resources efficiently and improving the health of the ecosystems on which food production depends, including the atmosphere, which is affected by greenhouse gases (SO2). Technical solutions intended to increase productivity cannot take root without an enabling policy environment and institutions that encourage women, as well as men, to participate and contribute (SO3). SO1 also covers healthy food, containing higher levels of micronutrients and lower levels of food-borne diseases. At the same time, the production of life-sustaining food must not come at the expense of producers' health. Poor farmers need the skills and tools to adapt to changing markets as well as to an unpredictable and changing climate (SO3). Small-scale farmers need support in linking to expanding markets for high-value products, including meat and milk, fish, fruits and vegetables (SO3) as well as ecosystem services (SO2).

The impact pathways through which the SOs contribute to achieving the CGIAR Vision necessitate complementary actions by partners as well as a conducive policy environment, neither of which can be guaranteed by the CGIAR. Development-oriented research by the CGIAR produces scientific outputs that are international public goods; when adapted to local conditions by national partners in agricultural innovation systems, these goods lead to outcomes, such as the adoption of new technology or the formulation of new policies, and support to better institutions that can result in widespread economic, social and/or environmental benefits. Ultimately these contribute to the global goals outlined earlier.

Thus the CGIAR recognizes that it must position its research and related activities so that these have relevance to its R&D partners, and that this begins at the research planning stage. There must be joint planning and ownership of all research, with clarity of roles and responsibilities. Each partner's comparative and complementary advantages need to be harnessed within the research-for-innovation system if the ultimate development goals and challenges are to be successfully addressed. The conduct of high-quality long-term international scientific research and the resulting generation of knowledge outputs and intermediate outcomes is a necessary but not a sufficient condition for achieving this. The

CGIAR must catalyze and respond to others in this endeavor if research is to be transformed into development outcomes and impacts. This is what separates a 'mission-oriented' institution from an academic one. The CGIAR does not have primary responsibility for, or comparative advantage in, the actual delivery of development outcomes and impacts. However it does have a responsibility to ensure its research strategies and priorities align with those of its R&D partners, so that interactive synergies ensue and the resultant joint outputs are eagerly sought after and acted upon by partners along the various impact pathways, leading to measurable impacts that can be subsequently documented.

Impact pathways will differ for the three SOs and their components in each region, as will the combination of R&D partners most likely to ensure successful development outcomes and impacts. Sometimes the CGIAR will be primarily involved in the research, while in other cases the emphasis may be more in catalyzing others and in raising awareness. The precise balance will emerge as the business models are articulated with partners at the global and regional levels. The essential point, as the World Development Report (2007, p.170) indicates, is that in contrast to the Green Revolution GPG era, the CGIAR will be operating in an environment where

"Collective action and partnerships involving a variety of actors in an innovation systems framework are emerging as important. Such a framework recognizes multiple sources of innovation, and multiple actors as developers and users of technologies, in a two-way (nonlinear) interaction. Such systems have many advantages. They can pool complementary assets such as intellectual property, genetic resources and research tools. They can reap economies of scale and scope. They can facilitate technology transfers through arrangements with private input distributors. They can promote integrated value chains. And they can foster mechanisms to express consumer and farmer demands for technology and product traits."

As a result, the range of partners for the CGIAR in the future will be much more varied than in the past, and will include not only traditional partners such as national research programmes, advanced research institutes (ARIs), international agencies and the UN, but also newer ones such as private-sector companies, other ARIs, development agencies, non-government organizations (NGOs), civil society organizations (CSOs) and producer organizations, both in developing and developed countries. These must be carefully identified to minimize the transaction costs and maximize strategic interactive synergies, a task admittedly easier said than done.

### **3.3 Themes, opportunities, indicators and functions**

Based on the three SOs, Table 2 was developed in embryo by adding the following elements to each SO:

**Notional indicators.** These are measurable indicators of intermediate outcomes along the research-for-development impact pathway. The indicators shown are examples only and are very incomplete. Much more work will be needed in the development of the business models to refine the indicators with inputs from experts in the relevant fields. The indicators may also vary by region, as key opportunities vary. They will be developed using the SMART framework – that is, the indicators will be Specific, Measurable, Attainable, Relevant and Timely.

**Key opportunities.** These are defined areas of work needed to achieve the SO where the CGIAR, working together with partners, has a comparative and complementary advantage (see below). These areas should be further refined and prioritized as part of the development of the business models and in consultation with regional stakeholders, as key opportunities will vary by region.

**Major players and the CGIAR's advantages.** The next two columns highlight the existing and potential major players for a key opportunity, and the CGIAR's comparative and complementary advantages, based on its current or future core assets and its mission.

**Core functions.** The six functions of the CGIAR are used to highlight no more than three priority functions that the CGIAR could play for each key opportunity.

**Themes.** Each SO has two themes, one a 'heartland' theme with renewed emphasis and focus and the second a 'new' theme responsive to the new areas where the CGIAR can make a major contribution.

WG1 has made a start in filling out the elements of Table 2 relating to key opportunities, notional indicators, major players, the CGIAR's comparative and complementary advantages and its functions at the global level. However, this is a demanding task which should be completed by experts in consultation with stakeholders while maintaining a focus on poverty reduction. In many cases, there are strong regional specificities that should be taken into account. Research outputs consisting of new technologies, other products (e.g. models), policies, institutions, processes and practices, developed with research partners, will need to be adapted and adopted by users through interactions in national innovation systems. Partnerships and comparative and complementary advantages will be key in determining specific research agendas.

This table should therefore be seen as the beginning of a process, rather than a product that is ready for in-depth scrutiny. The Science Council has agreed to provide further refinement to the table, which will then form the basis for regional stakeholder consultations to enhance and improve each element with regional specificities. A more fully fleshed out version of Table 2 will serve as an important input to the business model planning.

**Table 2: Strategic objectives, notional indicators and key opportunities**

Strategic objective	Themes	Notional indicators (for discussion/refinement)	Suggested key opportunities (for discussion)	Current major players (research/development partners)	CGIAR advantages (for discussion)	CGIAR functions that support key opportunities (for discussion)
<b>Food for people</b>  <b>1. Create and accelerate sustainable increases in productivity and production of healthy food by and for the poor</b>	Heartland: 1(a) Increased productivity  <i>(Important ongoing work!)</i>	<ul style="list-style-type: none"> <li>Yield increases of food staples per unit of land (by region)</li> <li>Resource use efficiency (e.g. water, nutrients and fossil fuels)</li> <li>Yield stability</li> <li>A narrowing of gender disparities in the adoption of new technologies</li> </ul>	Genetic improvement to push out the yield frontier and improve yield stability (abiotic and biotic stresses)	CGIAR NARIs Private sector	Germplasm collection Networks Expertise Strong IPG	Research Germplasm collection
			Development of a global commons of molecular tools and techniques to harness advanced science (including proprietary tools) for the poor	ARIs (e.g. PIPRA, AGBIOS) Private sector CGIAR	Strong IPG Honest broker	Catalyzing Capacity
			Sustainable intensification through on-farm management and policy and institutional change (input systems, innovation systems, etc.) with a special focus on reducing fossil fuel use	NARIs CGIAR NGOs	Systems perspective Networks Policy expertise	Research Capacity Support to decision making
			Methods for empowering users in technology development and uptake, especially women	CGIAR Some NGOs Donor projects	Strong IPG Networks	Research Awareness raising Capacity
			Development of improved livestock vaccines and other animal disease control technologies and methods	ARIs Private sector	Strong IPG	Research Capacity
	New: 1(b) Safe, nutritious food <i>(New dimension!)</i>	<ul style="list-style-type: none"> <li>Production of bio-fortified crops (Zn, Fe, Vitamin A)</li> <li>Incidence of food-borne diseases</li> <li>Incidence of zoonotic diseases</li> <li>Number of households achieving food security</li> <li>Number of women and children eating more nutritious diets</li> </ul>	Biofortification of crop varieties	CGIAR ARIs Private sector	Strong IPG Germplasm collection	Research Catalyzing
			Development of safer food systems and management practices (e.g. pesticides, aflatoxins)	ARIs Private sector WHO FAO	Networks Strong IPG in some cases Integrated research approach to human health	Research Awareness raising Anticipation
			More nutritious diets, to improve women's and children's health in particular and to improve food security	NGOs CGIAR	Networks Policy expertise	Catalyzing Awareness raising Policy and support to decision making

Strategic objective	Themes	Notional indicators (for discussion/refinement)	Suggested key opportunities (for discussion)	Current major players (research/development partners)	CGIAR advantages (for discussion)	CGIAR functions that support key opportunities (for discussion)
<b>Environments for people</b>  <b>2. Conserve, enhance and sustainably use natural resources and biodiversity to improve the livelihoods of the poor in response to climate change and other factors</b>	Heartland: 2(a) Sustainable ecosystems and biodiversity conservation  <i>(Important ongoing work!)</i>	<ul style="list-style-type: none"> <li>• Conservation and use of increased range of genetic resources and related information systems by public and private breeding programs</li> <li>• Increased latent diversity in cultivated species</li> <li>• More 'crop per drop' trends in soil health and land degradation indicators at benchmark sites in at-risk agro-ecosystems</li> <li>• Improved gender equity in access to and control of benefits from natural resources</li> </ul>	Augmentation, conservation, characterization and dissemination of germplasm collections of crops, indigenous livestock and aquatic animals	CGIAR  GCDT  FAO	Strong IPG  Honest broker	Germplasm collection  Research  Catalyzing
			Gender-responsive policies, institutions and technologies for sustainably managing land, water, pastures, forest and aquatic resources at ecosystem levels to deliver agricultural products and/or environmental services	Many players, global to local	Networks Databases and models	Catalyzing Support to decision making Awareness and anticipation
	New: 2(b) Climate change mitigation and adaption <i>(New dimension!)</i>	<ul style="list-style-type: none"> <li>• New crop varieties made available for adapting to climate change stresses</li> <li>• Adoption of conservation tillage</li> <li>• Numbers of smallholders participating in carbon financing programs for reducing deforestation</li> <li>• Land area and livestock covered by methane and nitrous oxide emissions reduction programs</li> <li>• Rate of deforestation attributed to land use changes (i.e. agriculture)</li> </ul>	Improving resilience of key at-risk ecosystems to shocks and ability to adapt to climate change	Many players, global to local	Germplasm Networks Databases and models	Research Catalyzing Anticipation Awareness raising
			Institutional innovations for smallholders, both women and men, enabling them to access carbon sequestration funds and so reduce deforestation and improve soil management	International organizations NGOs Donor projects projects	Forestry and land use expertise	Research Support to decision making Catalyzing
			Technologies to reduce nitrous oxide and methane emissions from crops and livestock	ARIs	Crop and livestock expertise	Research Catalyzing Anticipation

Strategic objective	Themes	Notional indicators (for discussion/refinement)	Suggested key opportunities (for discussion)	Current major players (research/development partners)	CGIAR advantages (for discussion)	CGIAR functions that support key opportunities (for discussion)
<b>Policies for people</b>  <b>3. Promote policy and institutional change that will stimulate agricultural growth and equity to benefit the poor, especially rural women and other disadvantaged groups</b>	Heartland: 3(a) Policy and institutional innovation <i>(Important ongoing work!)</i>	<ul style="list-style-type: none"> <li>Indices of policy distortions</li> <li>Investments in core public goods (R&amp;D, rural roads, water etc.) as a share of agricultural GDP</li> <li>National and rural governance indicators</li> <li>Transaction costs (and their reduction) in value chains</li> <li>Impact assessment results of policies for food and nutrition security</li> </ul>	Trade, price, and public investment policies	MFIs, OECD Sub-regional organizations National governments	Models Databases	Research Awareness raising Support to decision making
			Rural institutions and governance	MFIs, FAO CGIAR NARIS	Networks Analysis capacity	Research Awareness raising Support to decision making
			Institutional innovations to build assets and empowerment, with a special focus on women	MFIs NGOs National governments	Networks	Research Awareness raising Support to decision making
			Policy and institutional innovations to connect smallholders to markets and facilitate diversification	National governments Donor projects NGOs Private sector	Expertise Databases	Research Support to decision making Awareness raising
	New: 3(b) Gender equity <i>(New dimension!)</i>	<ul style="list-style-type: none"> <li>Increased availability of gender-disaggregated data for decision making in agriculture for CGIAR and partners</li> <li>Increased number of women participating in agricultural science in CGIAR and partner institutions, and advancing to leadership positions</li> <li>Increased capacity and expertise to develop and implement gender-responsive agricultural innovations, especially for smallholders</li> <li>Increased understanding of complex gender issues, risks, and opportunities in agriculture</li> <li>Integration of gender-related indicators in CGIAR performance evaluation and reward systems (systemwide and leadership)</li> </ul>	Collection, monitoring, and analysis of gender-disaggregated data	CGIAR  NGOs (e.g. ICRW)	Expertise Networks Databases (e.g. IFPRI-ASTI)	Support to decision making Awareness raising
			Mainstreaming of women's participation in agricultural innovation systems at global, national and local levels	CGIAR Donor projects	Expertise Networks Databases	Catalyzing Awareness raising Support to decision making
			Development of capacity to conduct and deliver gender-responsive research and leadership training for women agricultural scientists/professionals/ extension workers	CGIAR (e.g. G&D, PRGA, CAPRI) NGOs	Expertise Networks	Capacity strengthening
			Research on gender issues in agriculture in different developing country contexts	CGIAR NGOs FAO/World Bank	Expertise Networks	Research Catalyzing Support to decision making

**Acronyms:**

ARI – Advanced Research Institute

CAPRI – CGIAR Systemwide Program on Collective Action and Property Rights

G&D – Gender & Diversity Program of the CGIAR

ICRW – International Center for Research on Women

IPG – International Public Goods

FAO – Food and Agriculture Organization of the United Nations

GCDT – Global Crop Diversity Trust

MFI – Multilateral Finance Institution

NARI – National Agricultural Research Institute

NGO – Non-government Organization

PIPRA – Public Intellectual Property Resource for Agriculture

PRGA – CGIAR Systemwide Program on Participatory Research and Gender Analysis

WHO – World Health Organization

## 7 Business models

A business model describes the added value that an organization offers, as well as what is required for creating this value through work with its partners<sup>7</sup>. The CGIAR's business models should flow from its strategic objectives: how the CGIAR sees the world, what it wants to do, with whom, and how it moves from mission to vision to outputs, outcomes and impacts. In short, the CGIAR's business models should describe how it and its partners organize themselves to carry out their missions.

WG1's work assumes that the origin of the CGIAR system lies in the realization that science, technology and research are key drivers of development. Indeed, the gap between science leaders and laggards is even greater than the more widely cited gap between rich and poor countries<sup>8</sup>. This has given rise to the field of development research (meaning research for development rather than research on development).

The CGIAR's business models should therefore ensure that its research products are generated with the intention that they will be used to realize the CGIAR's strategic objectives and hence its vision. The elements of the business models should reflect the CGIAR's research priorities, partnerships, governance structure and financing, as well as its human resources.

An outline of the requirements for the business models is shown in Table 3. This table provides some broad guidance from WG1 on possible key criteria to be considered in the development of the business models in the near future. The CST, as well as the Chairs of the WGs on Partnerships, Finance and Governance, have already reviewed this table, which was provided as a basis for discussion at the Ottawa Change Management Retreat and also serves as a basis for future work by the other WGs.

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<sup>7</sup> Osterwalder, A.; Y. Pigneur, and C. Tucci (2005) *Clarifying business models: origins, present and future of the concept*. Communications of the Association for Information Systems 15. [online] <http://www.businessmodeldesign.com>

<sup>8</sup> Sagasti, F. (2004) *Knowledge and Innovation for Development: The Sisyphus Challenge of the 21st Century*. Edward Elgar Pub: London, UK.

Pardey, P.G., Beintema, N., Dehmer, S. and Wood, S. (2006) *Agricultural Research: A Growing Global Divide?* Food Policy Report No. 17, International Food Policy Research Institute (IFPRI), Washington D.C., USA.

UNESCO (2005) *World Science Report*, UNESCO: Paris, France.

Wagner et al. (2001) *Science and Technology Collaboration: Building Capacity in Developing Countries?* RAND Corporation [online] <http://www.rand.org/publications>

**Table 3: Operationalizing the Vision: Guidance for the business model**

<b>Business model criteria</b>	<b>Guidance from WG1</b>	<b>Accountability</b>
<b>Research agenda</b>	<ul style="list-style-type: none"> <li>▪ Ensure that the focus of the CGIAR research portfolio includes climate change, gender and human health linkages, in addition to the current heartland focus areas</li> <li>▪ Require that all research activities conducted by the centers should support the CGIAR's vision</li> <li>▪ Determine the right research focus for synergy between the CGIAR's components (e.g. each center does not have to address all the elements of the vision)</li> <li>▪ Establish a framework for determining priorities among the key opportunities, on a regional basis</li> </ul>	Science Council in collaboration with WG 1
<b>System governance</b>	<ul style="list-style-type: none"> <li>▪ Recommend a governance system that closely ties the strategic objectives to performance measurement and accountability</li> <li>▪ Consider the research areas implied by the vision to determine how to streamline the CGIAR</li> <li>▪ Identify opportunities for collaboration among centers and with other key stakeholders</li> <li>▪ Ensure that the pro-poor focus of the vision is translated into the CGIAR's structure</li> <li>▪ Recommend appropriate mechanisms for performing each of the core functions as outlined in this paper</li> </ul>	WG 3 – Governance

Business model criteria	Guidance from WG1	Accountability
<b>Funding mechanisms</b>	<ul style="list-style-type: none"> <li>▪ Consider which new sources of funding are available based on the new research agenda and CGIAR structure</li> <li>▪ Determine how best to anticipate areas of high opportunity according to the CGIAR's strengths</li> <li>▪ Propose a system for determining the resources needed for each key opportunity to reach its stated objectives within its defined timeline</li> <li>▪ Recommend how to limit/eliminate restricted project funding that does not support the CGIAR's vision and research agenda</li> </ul>	WG 4 – Funding
<b>Partnerships</b>	<ul style="list-style-type: none"> <li>▪ Consider how the core functions should affect the system's partnerships</li> <li>▪ Determine how strategic partnerships can support the new research agenda, and develop operational guidelines in relation to these</li> <li>▪ Analyze ways in which the CGIAR can contribute to the global innovation process while integrating the contributions of different partners</li> <li>▪ Ensure that the CGIAR's partnership structure matches the pro-poor focus of its vision</li> </ul>	WG 2 – Partnerships
<b>People requirements</b>	<ul style="list-style-type: none"> <li>▪ Ensure the CGIAR has the appropriate incentive and reward systems to attract the best talent to: <ul style="list-style-type: none"> <li>▪ Address the new research agenda</li> <li>▪ Perform the core functions as outlined in this paper</li> <li>▪ Close the gender gap, promote excellence and increase women's and young people's opportunities</li> </ul> </li> </ul>	TBD

## 8 Concluding remarks

The process of Visioning the Future of the CGIAR has come a long way since the launch of the change management process in Washington in February 2008. WG 1 has drawn together a variety of information, resources and insights to identify specific Global Development Goals, Global Development Challenges and the Core Assets and Functions of the CGIAR, providing a basis for repositioning the CGIAR within a changing global agricultural research and knowledge system. Based on these elements, the group has also developed the CGIAR Mission, the Global Vision and the CGIAR Vision, together with a comprehensive set of strategic objectives that have been discussed extensively at the Change Management Retreat and at the Executive Council meeting in Ottawa in May 2008.

This work brings a number of new elements to the change process and to the CGIAR. First, the CGIAR Mission and Vision provide clear guidance to the CGIAR and to outsiders as to the CGIAR's core values and purpose and to how the CGIAR will contribute to a Global Vision, shared by many partners, of a world free of poverty and hunger, supported by healthy and resilient ecosystems. The vision and mission, together with the strategic objectives, articulate how the CGIAR brings together agricultural and natural resource science and technology with a people-oriented and pro-poor focus – a characteristic of the system that differentiates it from other research suppliers.

The strategic objectives integrate the CGIAR's strong emphasis on key traditional or 'heartland' themes with issues that are becoming increasingly important for the future: human health, climate change and gender equity. The strategic objectives are being linked to key opportunities and associated with measurable, time-bound indicators that will help to assess the progress of the CGIAR's work in a way that has not been possible in the past.

The proposed business models will directly link funding, governance and partnership reform to programmatic change and focus in a comprehensive fashion that has not been attempted in the past. The business models will encompass the CGIAR's research, governance structure, funding mechanisms, partnerships and human resource requirements and will indicate the organizational structure needed to implement the strategic objectives.

Table 2 outlines the further work needed to define the key research opportunities that will contribute to realization of the objectives and the vision. Once these key opportunities have been elaborated, with input from the Science Council, the CST and other WGs, they will need to

be prioritized, on a regional basis, and linked to measurable indicators and potential funding sources through the business models. Regional and expert stakeholder consultations will provide further refinement.

WG1 has brought a new element to the discussions by explicitly considering the core functions of the CGIAR and how they relate to key research opportunities and partners. For each key opportunity, the CGIAR functions, comparative and complementary advantages, and major players will need to be defined on a regional basis.

In a short period, WG 1 has made significant progress in meeting the mandate that it was given at the start of the change management process. Working with a system-oriented mindset, in an atmosphere of mutual trust and empathy, has proved an effective approach. The WG believes this paper provides a solid basis for planning the future of the CGIAR.

# **Annexes to “Visioning the Future of the CGIAR”**

Report of Working Group 1 (Visioning) to the  
Change Steering Team of the CGIAR

June 5, 2008

## Annex 1: Working Group members and terms of reference

Jean Lebel (Chair)	IDRC, Canada
Derek Byerlee	World Bank
Eliseo Contini	EMBRAPA, Brazil
Ruben Echeverria	CGIAR Science Council Secretariat
Amelia Goh	CGIAR Gender & Diversity Program
Xiaoyue Hou	CGIAR Secretariat
Monica Idinoba	CIFOR
Jean-Luc Khalifaoui	EIARD
Miriam Kinyua	Moi Univeristy, Kenya
Martin Kropff	Wageningen University and Research Center, Netherlands
Mangala Rai	ICAR, India
Jim Ryan	SPIA/CGIAR Science Council
Takuji Sasaki	NIAS, Japan
Meredith Soule	USAID/CGIAR Secretariat
Joachim von Braun	IFPRI
Funing Zhong	Nanjing Agricultural University, China

### ***Working Group terms of reference***

#### ***As set by the Change Steering Team***

- Create clarity, shared understanding and alignment around the CG visioning and goals, while not “reinventing” the CGIAR’s mission
- Identify and develop major research challenges/themes that bridge to the Millennium Development Goals (MDGs)

#### ***Amendments as presented by the Working Group:***

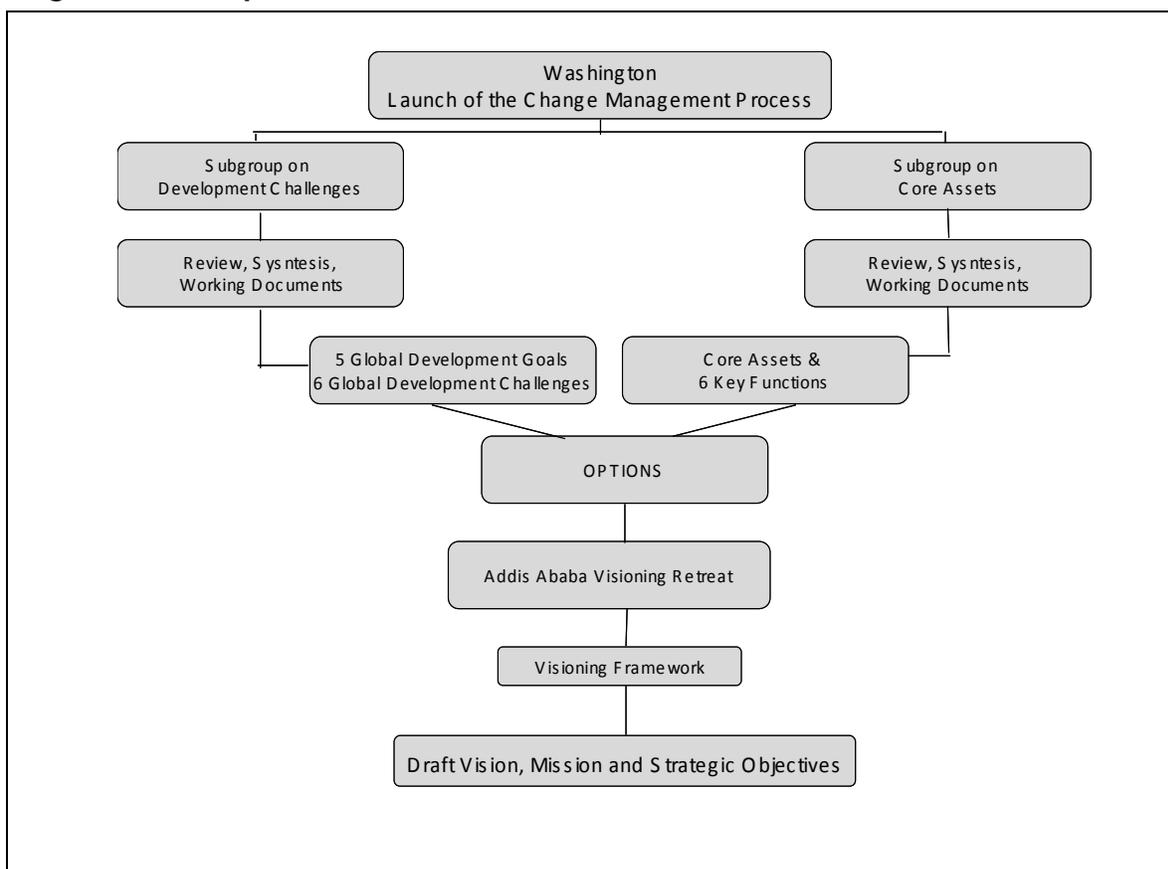
- Recommend a vision for the CGIAR and its impact on the agricultural landscape
- Review the external landscape to identify development challenges, assess our current capabilities and assets, and develop options as to how we are uniquely able to meet those challenges
- Primarily focus on the vision and only adjust the mission if it doesn’t serve the vision
- Recommend where we stand in the research-for-development continuum
- Recommend how to position the CGIAR
- Leverage existing research

## Annex 2: The process

The change management process was launched in Washington on 27 and 28 February 2008. A Change Steering Team (CST) and four Working Groups (WGs) were established to examine the issues surrounding Visioning, Partnerships, Governance and Funding Mechanisms. Working Group 1 (WG1) was given the task of Visioning the Future of the CGIAR, with the Terms of Reference shown in Annex 1.

The process followed by WG1 is outlined in Figure A1, below.

**Figure A1: The process to date**



Following the launch of the process, WG1 established two sub-groups to identify:

- Development Challenges
- Core Assets

The CST and WG1 met for a stakeholder consultation process, followed by a 1-day Visioning Retreat in Addis Ababa on 3–4 April 2008. Discussions were held in break-out and plenary sessions on the global development goals and challenges, and on the CGIAR's assets and competencies within each of the challenges.

Following the retreat, WG1 developed a Visioning Framework in order to capture the global background and context for the development of the proposed CGIAR Mission, Visions and strategic objectives. This Annex summarizes the process followed by WG1 in identifying the Development Challenges and Core Assets upon which the Mission, Visions and strategic objectives are based.

### ***Global development goals and global development challenges***

In looking at global development goals and challenges with potential relevance to the CGIAR, as expressed by the international community, WG1 took a broad view of the landscape by reviewing major declarations, studies, and documents and categorizing them according to the approach taken for defining the goal or challenge. A list of the documents reviewed can be found in Annex 3. Three types of approaches were noted:

1. Type 1: Normative approaches (prescriptive, derived from norms, declarations, set goals, rights to achieve, sometimes with a set timeline).
2. Type 2: Positive approaches (descriptive, based on outlooks, scenarios, threat analyses, comparisons with desired developments).
3. Type 3: Political economy approaches (mega trends analyses, visionaries' perspectives, big thinkers' and opinion leaders' perspectives, mixes of positive and normative).

A matrix of global challenges was developed which categorized the studies and statements according to the three approaches. Table A1 summarizes the types of challenges found under the three approaches.

**Table A1: Global goals and challenges derived from statements and studies**

<b>Normative Approaches</b>	<b>Positive Approaches</b>	<b>Political Economy Approaches</b>
Right to food; Eradicate hunger; Achieve food security; Combat malnutrition	Food security; Ensure global and local food supplies; Address micronutrient deficiencies;	Ensuring food security in light of rising food and energy prices; Hunger; Malnutrition; Biofortification
Improve human health; Control major diseases		Diseases
Eradicate poverty; Improve rural livelihoods; Reduce inequality	Poverty reduction; Build assets of small farmers;	Meeting basic needs of the poor; Overcoming poverty
Reverse loss of and conserve and manage natural/environmental resources; Protect biodiversity	Sustainable land management; Desertification; Deforestation	Competition for land and water and earth's productivity;
Access to safe drinking water; Improved water management and sanitation	Water security; Efficient water use; Sustainable water management	Water and sanitation
Combat climate change	Climate change adaptation and mitigation	Global warming
Increase agricultural production	Targeted investments in agricultural knowledge, science and technology; Raise agricultural production while protecting the environment	Accelerating scientific and technological breakthroughs;
Sustainable development	Sustainable development	Sustainable growth
Good governance		
Trade liberalization	New policies, regulatory frameworks, and international agreements	Subsidies and trade barriers
	Biofuel production and agriculture-energy linkages	Growing energy demands; Energy/environment dilemma
	Population increases and changes in eating habits	
	Conflicts and security; Refugees and immigration	Conflicts
		Women and development

This review was used to suggest a set of global goals and challenges relevant to the future of the CGIAR. A number of goals and challenges were deemed to form an important part of the context for the CGIAR but to not be the goals and challenges that the CGIAR itself

should directly work on. These included population growth, refugees and migration, conflicts, access to safe drinking water, good governance outside the agricultural sector, etc.

A set of four goals was proposed, which were 'collapsed' to three by agreement of the entire WG: 1) Eradicate poverty; 2) Eradicate hunger and improve health; and 3) Enhance and protect natural resources. The fourth goal had been Improve human health, as a stand-alone. Under these three goals, a total of six global development challenges (GDCs) relevant to the CGIAR were elucidated, shown in Box A1 below. These were subsequently edited lightly to form the version appearing in the main text of this paper.

#### **Box A1: Global development challenges**

GDC1: Improving agricultural productivity and market value in sustainable ways

GDC2: Improving food security

GDC3: Enhancing empowerment and access to assets and markets by the poor, especially rural women

GDC4: Conserving, enhancing, and sustainably using natural resources and biodiversity

GDC5: Mitigating and adapting to climate change

GDC6: Enhancing the positive synergies between agriculture and health

For the Addis Ababa visioning retreat, WG1 grouped the six challenges under the three goals and discussed these under the headings:

- Implied global development challenges relevant to the CGIAR
- Key opportunities for the CGIAR
- Major players
- Comparative/complementary advantages of the CGIAR
- Roles and functions
- Geographic specificity
- Current emphasis and gaps to be filled
- Business model

Small groups were formed to discuss these headings in detail. The outcome of this extensive and useful input was that the 6 challenges are considered relevant, but that they cut across the three goals. Therefore, the three goals as a separate construct were dropped and replaced by five Global Development Goals shown in Box A2 below, defined as the overarching external needs that form the basis of the vision and that are relevant to the CGIAR.

## **Box A2: Global development goals**

- 1) Eradicate poverty
- 2) Eradicate hunger
- 3) Improve human health and nutrition
- 4) Enhance and protect natural resources and the environment
- 5) Eliminate gender disparities and empower women

## ***Core assets and functions of the CGIAR***

The second sub-group was tasked with identifying the Core Assets of the CGIAR, which were broadly defined as its:

- Sixty-four member countries and organizations committed to addressing global development challenges through international agricultural research
- Critical mass of multidisciplinary scientific human resources
- Global research infrastructure (e.g. research stations representing many agroecologies)
- Global research networks with especially links to national research programs
- Global collections of genetic resources
- Global public trust as an "honest broker", acting in the interests of the world's poor.

These assets comprise two sets:

1. The Core Competencies of the CGIAR centers, in the areas of the five System Priorities
2. The current and potential five Key Roles and Functions of the CGIAR within the global ARD system compared to those of other agricultural research-for-development (ARD) providers.

These two sets of Core Assets should apply complementarily for a given development challenge, at a given global, international or regional level, if the CGIAR is to engage as a problem-solving institution.

## **CGIAR's core competencies**

During 2005, the Science Council led an exhaustive process of participatory information gathering, analysis, synthesis and debate, through which a set of 20 research priorities emerged, organized within 5 priority areas, shown in Box A3:

### **Box A3: CGIAR research priorities**

1. Sustaining biodiversity for current and future generations;
2. Producing more and better food at lower cost through genetic improvements;
3. Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products;
4. Poverty alleviation and sustainable management of water, land, and forest resources; and
5. Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger

During the Addis Ababa retreat, a debate took place on how to consider these five System Priorities in the ongoing change exercise. There was a consensus that the CGIAR's assets have enabled the centers to develop core competencies in the area of these five priorities:

- Conservation of genetic diversity of agricultural crop and animal species
- Genetic improvement of food crops especially relevant to the poor
- Knowledge and tools for better management of natural resources in developing countries
- Policies and institutional innovations relating to alleviation of poverty and hunger.

These core competencies are considered to encompass all the research and development competencies of the CGIAR.

### **CGIAR's key functions**

Since 1995, GFAR has been developing the concept of a global Agricultural Research for Development (ARD) system, in which the CGIAR plays a pre-eminent role. This is an attempt to rationalize and synergize ARD actors' roles based on their comparative and complementary advantages.

As an international public body, the CGIAR's roles are defined by the political and social demands of society at the global and regional levels. The CGIAR can be expected to fulfil five types of functions in the global ARD system<sup>9</sup>, along with the two fundamental functions of the sciences – namely, ontological and innovation functions shown in Box A4 below.

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<sup>9</sup> Additional functions could be considered, e.g. knowledge integration function.

#### **Box A4: Innovation and ontological functions of science**

**Innovation functions:** Science plays a role in providing knowledge and technologies that change the world. Innovation functions include:

- Research function
- Catalyzing function

**Ontological function:** Science plays a role in making the world intelligible and workable. Ontological functions include:

- Anticipation function
- Awareness-raising function
- Support-for-decision-making function

The CGIAR's involvement in these five functions of science was assessed, and its unique potential to contribute was identified.

#### ***Research function***

This is the classical function of research institutions: to develop knowledge and technologies.

#### *Current involvement of the CGIAR:*

CGIAR centers play a recognized key role in strategic research to deliver ARD knowledge and technologies, which are essentially GPDs, IPGs or RPGs<sup>10</sup>, ultimately translated into ARD innovations that support its mandate. This function is based on the core competencies of the CGIAR (see Section 2)

#### *Recommendation for future involvement of the CGIAR:*

This function is the core business of the CGIAR and forms the basis for the four following functions. It is recommended that the CGIAR maintain its current high level of involvement, with the necessary dynamic adjustment to tackle new and evolving challenges at the global and regional levels, and become more flexible in order to adapt its role at the regional level according to the diversity of ARD partners in and between the regions.

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<sup>10</sup> GPD, IPG and RPG = Global, International and Regional Public Goods

See J. Ryan - International Public goods and CGIAR niche in the R for D continuum: Operationalizing concepts. In Positioning the CGIAR in the Research for Development Continuum. CGIAR Science Council. 2006

## ***Catalyzing function***

Based on the research function, there is strong demand on the CGIAR on the part of ARD actors at the global and regional levels to play a catalyzing role that fosters agricultural research for development and its impacts.

This catalyzing function encompasses different dimensions:

- The brokerage and networking sub-function: the capacity of the CGIAR to bring together, mobilize and synergize current and new public and private research actors from developing, emerging and developed countries.
- The spill-over and scaling-up sub-function: the capacity of the CGIAR to transfer and adapt ARD technologies developed in and for a given location or environment to other locations or environments<sup>11</sup>.
- The funding mobilization sub-function: the capacity of the CGIAR to mobilize funding for ARD from CGIAR members, foundations and agencies to support the activities of various ARD providers, not only the CGIAR. The new Challenge Programs illustrate this function well.
- The convening sub-function: the capacity of the CGIAR to set up and manage regional and global technical facilities that are available for use by all ARD actors (e.g. the Biosciences Eastern and Central Africa Platform hosted by ILRI).
- The capacity development sub-function: the capacity of the CGIAR to contribute to the global agricultural knowledge system by training individuals and strengthening institutions in both the South and the North.

### *Current involvement of the CGIAR:*

The CGIAR is already significantly involved in the catalyzing function.

### *Recommendation for future involvement of the CGIAR:*

Despite the strong existing involvement, there is a consensus among all ARD actors that the CGIAR is in a unique position to play a much more active role in catalyzing ARD activities.

It is recommended that the CGIAR significantly increases its involvement in the four dimensions of the catalyzing function, and in particular in networking and brokerage. The CGIAR should move toward the implementation of the new concept of third-generation universities, aiming eventually to become a pillar of their ARD activities. It is recommended to make this one of the first priorities in the change process.

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<sup>11</sup> See J. Ryan - International Public goods and CGIAR niche in the R for D continuum: Operationalizing concepts. In Positioning the CGIAR in the Research for Development Continuum. CGIAR Science Council. .2006

For the capacity development sub-function, it is recommended that the CGIAR explore the potential of distance learning approaches that can link research and applied research institutions and the private sector.

The future involvement of the CGIAR in the catalyzing function should be kept sharply focused on ARD, to avoid driving the CGIAR away from its core business.

### ***Anticipation function***

There is a growing demand on the part of decision makers for researchers to foresee the future state of the world, its key issues and challenges. Foresight studies are therefore taking an increasing share of research activities. A milestone in this evolution has been the Millennium Ecosystem Assessment, conducted in 2005, which directly influenced and continues to influence the ARD agenda. The increasing demand to anticipate the effects of global climate change will bring more impetus to this function.

#### *Current involvement of the CGIAR:*

With the exception of IFPRI, the CGIAR centers' current involvement in foresight studies is limited, or at least lacks international visibility.

#### *Recommendation for future involvement of the CGIAR:*

A number of emerging challenges with uncertain future impacts on the world directly relate to agriculture in developing and emerging countries. The CGIAR is in a unique position to develop foresight studies on these challenges.

### ***Awareness-raising function***

Science and its communicators play an increasingly important function of awareness raising for policy and decision makers and also, more broadly, for the public. Awareness raising is clearly a way to increase the impact of research.

#### *Current involvement of the CGIAR:*

The CGIAR is currently significantly involved at system and center levels in awareness-raising activities and is internationally recognized for its efficiency in this function.

#### *Recommendation for future involvement of the CGIAR:*

Many critical development issues at the global level are directly related to agriculture in developing and emerging countries. The CGIAR is in a unique position to conduct the research and other activities needed to raise awareness among the public and policy and decision makers.

It is recommended that the CGIAR continue to play a significant role in awareness raising at the global level, in partnership with leaders such as the World Bank, FAO and IPCC, and significant other actors like GFAR. To this end, the CGIAR should define a clear awareness-raising strategy, identifying the topics, the targets, its role and potential partners.

**Support for decision making function**

Decision support tools usually take the form of models that allow a situation to be represented and the consequences of different decisions to be simulated.

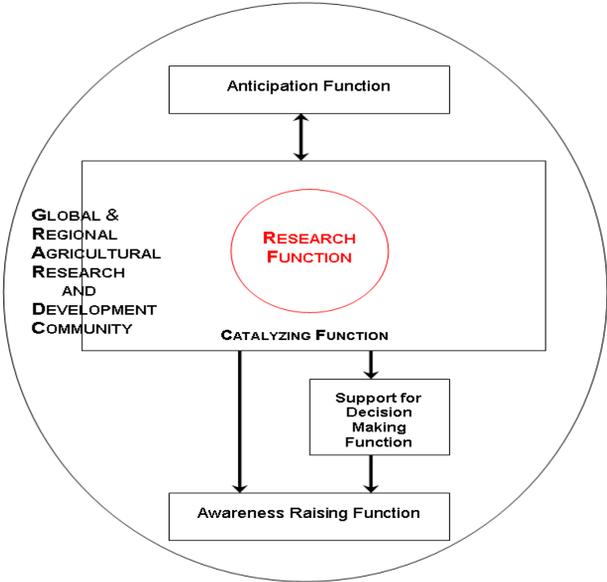
*Current involvement of the CGIAR:*

CGIAR centers' support for decision making is currently limited. Interesting initiatives have been developed in the past by the CGIAR, in particular in collaboration with advanced research institutions, but with limited impacts due to a lack of adoption by stakeholders.

*Recommendation for future involvement of the CGIAR:*

Given increasing multilateralism in international decision making processes related to agricultural issues (e.g. trade between developing and developed countries), there is increasing demand from decision makers at the global and regional levels for dedicated decision support systems and tools. Since the CGIAR is significantly involved in the research disciplines that are necessary for the development of these tools, and because it can develop processes in which all stakeholders are involved in an innovation system approach, it is in a unique position to play an important role.

The figure below shows how these different functions are articulated.



## ***Developing the Vision, Mission and strategic objectives***

As outlined in the Visioning Framework, the global development goals and challenges, together with the global science system, provide the context for the future development of the CGIAR. The core assets and functions partially determine the strategies and opportunities open to the CGIAR. The Mission and Vision statements draw on these bases, in order to articulate the future direction of the CGIAR.

The strategic objectives (SOs) introduced in the Visioning Framework provide key measurable targets that the CGIAR must meet in order to realize the CGIAR vision and, in turn, contribute to the global vision. By considering the development goals and challenges, in combination with the contribution that the CGIAR could make towards achieving the goals and vision (as expressed in its core assets, functions and mission), WG1 initially developed a set of eight SOs. Each of these SOs contributes to one or more of the six global development challenges, as shown in Table A2.

**Table A2: Strategic objectives and the Global Development Challenges**

	Strategic objectives	Global Development Challenge addressed					
		GDC 1	GDC 2	GDC 3	GDC 4	GDC 5	GDC 6
1	<b>SO 1:</b> Accelerate the increase in yields of food staples in the face of climate change and stagnant productivity growth.	++	++	+	+	+	+
2	<b>SO 2:</b> Increase producer incomes through diversification into high value products.	++	+	+			+
3	<b>SO 3:</b> Conserve, enhance and sustainably use natural resources and agricultural biodiversity.	+		+	++		
4	<b>SO 4:</b> Reduce greenhouse gas emission in major at-risk agro-ecosystems.				+	++	
5	<b>SO 5:</b> Make food and agricultural systems safer and more nutritious.	+	+	+			++
6	<b>SO 6:</b> Enable women's proportionate participation and advancement in all levels of agricultural and support systems.	+	+	++	+	+	+
7	<b>SO 7:</b> Facilitate an enabling policy and institutional environment to support pro-poor agricultural growth.	+	+	+	+	+	+
8	<b>SO 8:</b> Foster a global coalition on international agricultural research for development	++	++	++	++	++	++

**Legend:**

- GDC 1      Improving agricultural productivity and market value in sustainable ways.
- GDC 2      Improving food security
- GDC 3      Enhancing empowerment and access to assets and markets by the poor, especially rural women
- GDC 4      Conserving, enhancing and sustainably using natural resources and biodiversity
- GDC 5      Mitigating and adapting to climate change
- GDC 6      Enhancing the positive synergies between agriculture and health
- ++          Major linkage
- +            Secondary linkage
- Blank        Minor or no linkage

In this process, a given SO may relate to several global development challenges. Thus, for example, SO1 (Accelerate the increase in yields of food staples) contributes most directly to GDC1 (Improving agricultural productivity) and GDC2 (Improving food security). But SO1 may also involve technologies that are developed with women farmers and will enhance their access to assets (GDC3). Increasing resource-use efficiency can contribute to the conservation of natural resources (GDC4), while genetic improvement for drought-tolerance will assist in adaptation to climate change (GDC5). Increasing yields through greater input efficiency may also improve human health through potential reductions in pesticide use (GDC6).

The link to the identified global development challenges is clearly an essential part of the context for developing the SOs. However, at this stage in the process it was considered more helpful to focus on the SOs themselves as the means by which the CGIAR Vision and Mission could be put into operation. On the basis of the eight SOs, a range of other key elements were compiled, including notional indicators, key opportunities, major players, comparative advantage of the CGIAR and core functions. These are shown in Table A3 below.

Following review of this proposal by the CST, it was decided to reduce the number of SOs to a maximum of five. A further round of consensus building and discussion considered the manner in which the SOs related to the CGIAR Mission and Vision, and to the global development challenges identified by WG1. In reducing the SOs from eight to five, the WG aimed to create a balance between the core, traditional elements in the original SO1, SO2 and SO3, and the newer, more forward-looking objectives encapsulated by SO4, SO5 and SO6. A new set of six strategic objectives was drawn up, which were subsequently reduced to the three presented in the main report.

**Table A3: The original eight strategic objectives, notional indicators and key opportunities.**

Strategic Objective	Notional Indicators	Key Opportunities (to be further refined)	Major players (research/ development partners)	CGIAR comparative advantage	CGIAR functions which support key opportunities
<p>1. Accelerate the increase in yields of food staples in the face of climate change and stagnant productivity growth.</p>	<ul style="list-style-type: none"> <li>• Yield increases of food staples per unit of land and labor (by region)</li> <li>• Resource use efficiency— e.g. water, nutrients and fossil fuels</li> <li>• Yield stability</li> </ul>	<p>1.1 Genetic improvement to push out the yield frontier and improve yield stability (abiotic and biotic stresses)</p>	<p>CGIAR NARS Private Sector</p>	<p>Germplasm collection Networks Expertise Strong IPG</p>	<p>Research Germplasm collection</p>
		<p>1.2 Developing a global commons of molecular tools and techniques to harness advanced science (including proprietary tools), for the poor</p>	<p>CGIAR? ARIs (PIPRA) BIOS Private Sector</p>	<p>Strong IPG Honest Broker</p>	<p>Catalyzing</p>
		<p>1.3 Sustainable intensification through on-farm management and institutional innovations and policies (input systems, innovation systems, etc) in both low- and high-potential areas</p>	<p>NARS CGIAR NGOs</p>	<p>Systems perspective Networks Policy expertise?</p>	<p>Research Capacity Support to decision making?</p>
		<p>1.4 Technologies to reduce fossil energy use in agriculture (e.g., N-fixation)</p>	<p>NGOs ARIs</p>	<p>Strong IPG</p>	<p>Research Catalyzing</p>

Strategic Objective	Notional Indicators	Key Opportunities (to be further refined)	Major players (research/ development partners)	CGIAR comparative advantage	CGIAR functions which support key opportunities
2. Increase producer incomes through diversification into high-value products.	<ul style="list-style-type: none"> <li>Number of producers with higher incomes from growing new high-value and value-added products (horticulture, livestock, fish and forest products, organics etc).</li> </ul>	2.1 Development of new breeds and sustainable and safe production practices for high-value products for local and global markets	CGIAR AVRDC NARs Private Sector	Strong IPG Livestock, fish and forest expertise etc.	Catalyzing Research Capacity
		2.2 Policies and institutional innovations to connect smallholders to markets and facilitate diversification	National governments Regional Development Organizations NGOs Private Sector	Market and policy analysis expertise Farm and rural databases	Conserving knowledge Support to decision making Awareness raising
3. Conserve, enhance and sustainably use natural resources and agricultural biodiversity	<ul style="list-style-type: none"> <li>Conservation and use of increased range of genetic resources and information systems by public and private national breeding systems</li> <li>Increased latent diversity in cultivated species</li> <li>Rate of deforestation attributed to land use changes (i.e., agriculture)</li> <li>More “crop per drop” Trends in soil health and land degradation indicators at benchmark sites in at-risk agro-ecosystems</li> </ul>	3.1 Augmenting, safeguarding, characterizing and disseminating germplasm collections of crops, indigenous livestock and aquatic animals	CGIAR GCDT	Strong IPG Honest Broker	Germplasm collection Catalyzing
		3.2 Policies, institutions and technologies for sustainably managing land, water, pastures, forest and aquatic resources at ecosystem levels to deliver agricultural products and/or environmental services	Many players global to local	Networks Databases and models	Catalyzing Support to decision making Anticipation and Awareness
		3.3 Improving resilience of key at-risk ecosystems to shocks and ability to adapt to climate change	Many players global to local	Networks Databases and models	Catalyzing Support to decision making Anticipation and Awareness

Strategic Objective	Notional Indicators	Key Opportunities (to be further refined)	Major players (research/ development partners)	CGIAR comparative advantage	CGIAR functions which support key opportunities
4. Reduce greenhouse gas emissions in major at-risk agro-ecosystems	<ul style="list-style-type: none"> <li>• Adoption of conservation tillage</li> <li>• Numbers of smallholders participating in carbon financing programs for reducing deforestation</li> <li>• Land area and livestock participating in methane and nitrous oxide emissions reduction program</li> </ul>	4.1 Institutional innovations for smallholder access to carbon sequestration funds to reduce deforestation and improve soil management	International organizations NGOs Donor projects	Forestry and land use expertise	Research Support to decision making Catalyzing
		4.2 Technologies to reduce nitrous oxide and methane emissions from crops and livestock	ARIs	Crop and livestock expertise	Research Catalyzing Anticipation
5. Make food and agricultural systems safer and more nutritious	<ul style="list-style-type: none"> <li>• Production of biofortified crops (Zn, Fe, Vitamin A)</li> <li>• Incidence of food-borne diseases</li> <li>• Incidence of zoonotic diseases</li> </ul>	5.1 Biofortification of crop varieties	CGIAR ARIs NGOs Private Sector	Strong IPG Germplasm collection	Research Catalyzing
		5.2 Developing safer food systems and management practices (e.g., pesticides, aflatoxins)	ARIs Private sector WHO FAO	Networks Strong IPG in some cases Integrated research approach to human health	Research Awareness raising Anticipation

Strategic Objective	Notional Indicators	Key Opportunities (to be further refined)	Major players (research/ development partners)	CGIAR comparative advantage	CGIAR functions which support key opportunities
6. Enable women's participation and advancement in all levels of agricultural and support systems.	<ul style="list-style-type: none"> <li>• An increase from the current baseline of the number of women participating in agricultural policy making, research and development, training and extension</li> <li>• A narrowing of gender disparities in the adoption of new technologies</li> </ul>	6.1 Enhancing gender-responsive technology development and access to services by smallholders	CGIAR Limited NGOs Donor projects	Strong IPG Networks	Research Awareness Raising Capacity
		6.2 Mainstreaming women's participation in agricultural innovation systems at global, national and local levels (IARCs, NAIS, advisory services)	CGIAR Donor projects	Expertise Networks Databases	Catalyzing Awareness raising Support to decision making
7. Facilitate an enabling policy and institutional environment to support pro-poor agricultural growth	<ul style="list-style-type: none"> <li>• Index of policy distortions (nominal rate of assistance)</li> <li>• Investments in core public goods (R&amp;D, rural roads, etc ) as a share of Agricultural GDP</li> <li>• Rural governance indicators</li> </ul>	7.1 Trade, price, and public investment policies	WTO (Sub-)regional organizations National governments	Models Databases	Awareness raising Support to decision making
		7.2 Rural institutions and governance	CGIAR NARS	Networks Analysis capacity	Awareness raising Support to decision making
		7.3 Empowerment and access to assets	National governments NGOs	Data systems Analysis capacity	Awareness raising Support to decision making
		7.4 Facilitation of agricultural policy reform	National governments (Sub-)regional organizations UN System (FAO, WFP, IFAD, WHO, World Bank, UNICEF)	Data systems Models Analysis capacity	Awareness raising Support to decision making

Strategic Objective	Notional Indicators	Key Opportunities (to be further refined)	Major players (research/ development partners)	CGIAR comparative advantage	CGIAR functions which support key opportunities
8. Foster a global coalition on international agricultural research for development	<ul style="list-style-type: none"> <li>• Catalyze: Increase in the number of agricultural research players and multi-stakeholder agricultural research arrangements; and increase in funding to agricultural research actors</li> <li>• Capacity strengthening: Development of individual and institutional agricultural research capabilities in developing countries</li> <li>• Anticipation and awareness raising: public and decision makers more aware of current and future Global Development Challenges</li> <li>• Decision making: Increase in the number of decision support systems and tools related to agriculture</li> </ul>	8.1 Development of innovative international South-North agricultural research and training platforms and coordinated initiatives	Southern and Northern ARIs  GFAR  World Bank  FAO  IPCC	Strong scientific and technical bases  Recognized as the only relevant global broker  Influential international voice in agricultural R&D	Catalyzing  Capacity strengthening
		8.2 Setting up of an international fund for agricultural research and development			
		8.3 Development of specific research and information initiatives dedicated to serving the public and decision makers			Support to decision making  Awareness building

## Annex 3: Documents reviewed

### Documents and websites consulted in overview of Global Development Challenges

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7. Human Development Report 2007/2008  
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8. World Development Report 2008: Agriculture for Development  
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<http://www.gatesfoundation.org/GlobalDevelopment>
18. Judith Rodin, President of the Rockefeller Foundation, Remarks delivered at the AAAS 2008 Annual Meeting, Feb. 15, 2008  
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