

# AgResults: Innovation in Research and Delivery

## Concept Note

### I. Objectives and rationale

#### *Rationale*

1. In 2010, 925 million people worldwide experienced chronic hunger<sup>1</sup>. Growing and urbanizing populations are demanding higher-protein foods, placing ever-greater pressure on agricultural land. Cereal yields in developed countries are at 5.1 tons per hectare and unlikely to increase further, while yields in Africa are only 1.2 tons per hectare. More and smarter investment is needed if agriculture is to keep pace with the needs of both the developed and developing world. It is estimated that the investment required to meet the world's food needs in 2050 will be around \$83 billion per year. Most of this investment must come from the private sector but, in many developing countries, markets for agricultural inputs, products and services are either underdeveloped or non-existent; limiting private investment and slowing technological innovation. Private sector agricultural research and development in developing countries accounts for only about two per cent of global spending on agricultural research and development<sup>2</sup>. Publicly-funded research and extension services can play an important role but can neither meet the investment gap nor address all the market failures impeding the establishment of markets for agricultural innovations in developing countries. Against this background, there is an emerging consensus in favor of trialing “pull mechanisms” that use public financing to reward agricultural innovation and, in the process, build sustainable markets for agricultural goods and services that benefit the poor, particularly those engaged in, or consuming the products of, smallholder agriculture.
2. G20 leaders, in the [Toronto Summit Declaration](#) of June 2010, called for the development of “innovative, results-based mechanisms such as advance market commitments to harness the creativity and resources of the private sector in achieving breakthrough innovations in food security and agriculture development in poor countries”<sup>3</sup>. In the [Seoul Development Consensus for Shared Growth](#), they requested relevant international organizations to “examine and recommend potential innovative results-based mechanisms, including ... advance market commitments for enhanced agricultural productivity”. Subsequently, in the November 2011 [Report of the G20 Development Working Group](#) to the G20 summit in Cannes, the concept of “pull mechanisms” for agriculture received its first explicit reference when G20 member countries stated that “to encourage public and private sector investment in agricultural research in developing countries, we support the implementation of the ‘Agriculture Pull Mechanisms’ initiative, and welcome pilots that embrace an innovative, results-based approach such as ‘Advance Market Commitments’ for specific applications”. Bill Gates, in his commissioned report

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<sup>1</sup> FAO, 2010.

<sup>2</sup> IFPRI, 2006.

<sup>3</sup> Annex III, paragraph 24.

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to the Cannes summit, [Innovation with Impact](#), said, “I believe this concept of pull mechanisms has real promise in the agricultural sector”.

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3. In response to these calls, AgResults has been developed by a core group of countries – Canada, the United States, the United Kingdom and Australia – working in partnership with the Bill and Melinda Gates Foundation, the World Bank and a global development advisory firm. Other countries with experience in pull mechanisms, including France, Italy and Mexico, have also provided valuable inputs. AgResults will provide economic incentives to private sector actors in smallholder agriculture to develop and ensure the uptake of innovative technologies with the potential to yield high development impacts. Using pull mechanisms, it will help overcome market failures impeding the establishment of sustainable commercial markets for such technologies, or goods produced by means of them, and thereby achieve substantial and sustained development impacts, manifested in improved food security and food safety, increased smallholder incomes and better health and nutrition. It will call upon the ingenuity and drive of the private sector to identify and execute the most effective and efficient strategies to achieve development outcomes. By linking payments to demonstrated results, it will achieve guaranteed impacts and maximum value for money.

#### *Goal and objectives statement*

4. The goal of AgResults is to enhance food security and food safety, increase smallholder incomes and promote better health and nutrition in developing countries by stimulating private sector agricultural innovation.
5. The objectives of the initiative are twofold:
  - i. To overcome market failures impeding the establishment of sustainable markets for developmentally-beneficial agricultural innovations, by offering results-based economic incentives (“pull” financing) to competing private actors to develop and ensure the uptake of new agricultural technologies; and
  - ii. To test, in this context, the effectiveness and efficiency of pull financing by comparison with alternative “push” approaches to supporting the development and uptake of innovative agricultural technologies.

## II. Pull mechanisms for development

### *Incentives for innovation*

6. Pull mechanisms constitute a particular genus within the broad family of mechanisms that provide incentives for innovation, and pull mechanisms for development constitute a particular species of mechanism within that genus. Pull mechanisms involve the ex post provision of economic incentives for innovation where the aim is to solve a specific, well-defined problem. Pull mechanisms provide rewards for desired results that are extensively specified, without preference as to the market participants, strategies and technologies that might be involved in achieving them. In some cases, they reward individuals in a winner-take-all fashion, or in some other relatively exclusive fashion; in others they reward a more open field of actors commensurate with each actor’s contribution to the achievement of the desired results.

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7. The broad description above encompasses a family of mechanisms that includes such diverse examples as:
  - i. The longitude prize, a reward of up to £20,000 offered by the British government in the eighteenth century for the discovery of a method for the precise determination of a ship's longitude which, though never officially awarded, was effectively won by the clockmaker John Harrison for his invention of the marine chronometer;
  - ii. the \$10 million Ansari X PRIZE, awarded in 2004 to the company Scaled Composites for SpaceShipOne, the first spacecraft designed and built by a private team and capable of carrying three people to 100 kilometers above the earth's surface, twice within two weeks;
  - iii. the \$1.5 billion pilot advance market commitment for pneumococcal vaccines, launched in June 2009 to provide incentives, through per-unit subsidies, for pharmaceutical companies to adapt and produce vaccines, already available in developed countries, for use in developing countries (to date, supply contracts have been awarded to GlaxoSmithKline and Pfizer Inc. and 6.9 million vaccines have been delivered to nine countries);
  - iv. the Haiti Mobile Money Initiative, a partnership between the Bill and Melinda Gates Foundation and the US Agency for International Development (USAID) that will award a total of \$4 million to the first and second operators to launch mobile money services in Haiti (a first-place award of \$2.5 million has been granted to Digicel), and a further \$6 million to participating mobile operators once five million mobile money transactions have been executed, with the latter funding distributed according to each operator's share in the total number of transactions; and
  - v. the market exclusivity element of the US Orphan Drug Act of 1983, which has created strong incentives, beyond normal patent protection, for pharmaceutical companies to develop drugs for rare disorders by allowing them to sell such drugs without competition for seven years (the EU enacted similar legislation in 2000, providing ten years of exclusivity).
8. Push mechanisms, by contrast, involve the ex ante provision of incentives for private sector innovation. They direct incentives to the inputs and processes that are considered likely to be required to achieve desired results. The results may or may not be specified to some degree in advance, but the incentives are not conditional on their achievement. Incentives might be directed to specific private actors, selected competitively on the basis of capability, or to an open field of actors by means of legislative or regulatory concessions. Examples of push mechanisms include:
  - i. the tax concession elements of the US Orphan Drug Act of 1983;
  - ii. enterprise challenge funds, which share risk with selected private sector actors in order to draw them into developing country markets (though not often for innovative ventures) and foster the establishment of commercially viable enterprises that deliver social and economic benefits to poor communities;
  - iii. product development partnerships, such as the PATH Malaria Vaccine Initiative and the Drugs for Neglected Diseases (DNDi) initiative, that draw on public financing and private ingenuity to support the development of pharmaceutical products for the treatment of

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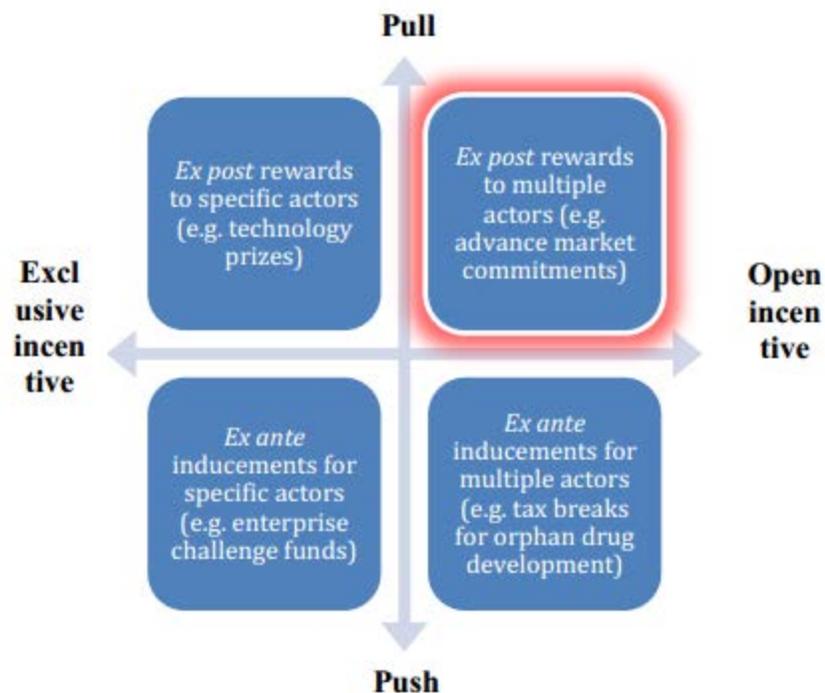
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diseases prevalent in developing countries, with relevant intellectual property rights relinquished by industry partners for specific markets; and

- iv. public-private partnerships for crop improvement such as the golden rice initiative, initially supported by the Rockefeller Foundation and subsequently by governments, Syngenta, the Bill and Melinda Gates Foundation and many other organizations, which aims to make beta-carotene-fortified rice widely available to poor communities in developing countries in order to reduce vitamin A deficiency, subject to the conditions of “humanitarian use” licenses.

#### *Pull mechanisms for development*

9. Given that the family of mechanisms that create incentives for innovation is both large and diverse, and that some mechanisms are more relevant than others from an international development perspective, a clearer focus on pull mechanisms for development can be achieved by situating incentive mechanisms along two dimensions – pull versus push financing, and open versus exclusive incentives – as below in Figure 1. The lower quadrants contain push mechanisms that aim to achieve general results either by funding selected individual actors (left) or by creating a favorable legislative or regulatory environment for multiple actors (right). Payments, or costs, are not tied to specified results. The upper quadrants contain pull mechanisms that aim to achieve specified results either by rewarding one or more front-runners with cash prizes, patent buyouts or marketing exclusivity arrangements (left), or by financially rewarding multiple actors commensurate with their contribution to the achievement of the desired results (right).



**Figure 1:** Incentive mechanisms for innovation

10. From an international development perspective, the mechanisms in the upper-right quadrant will generally be the most relevant, though in some cases they might be combined with other

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mechanisms such as standard prizes (which sit in the upper-left quadrant) for best effect, as in the case of the Haiti Mobile Money Initiative. The term “pull mechanisms for development” will most often be applied in relation to such mechanisms because they link payments, in a commensurate and generally proportional fashion, to the actual impact of an innovation – and because they lay the foundations for a self-sustaining, competitive market for the relevant product. Advance market commitments provide an instance of this: public financing is used to subsidize the cost of drugs not just produced for but also actually demanded by target markets in developing countries – no orders, no subsidies. In the right circumstances, technology prizes or other relatively exclusive arrangements with single actors (which could in some cases link rewards to technology adoption) will also function as pull mechanisms for development. However, the benefits of these arrangements would need to accrue exclusively or primarily to developing countries, and lead toward the establishment of sustainable markets.

### *Overcoming market failures*

11. Pull mechanisms for development, with their emphasis on ends rather than means, are particularly well suited to the task of overcoming market failures impeding the establishment of commercial markets for agricultural innovations in developing countries. There are two major such failures:
  - i. the failure of markets to reflect the social value of (that is, to capture “positive externalities” associated with) such innovations; and
  - ii. imperfect information, which is responsible for low consumer demand for, as well as low public and private investment in, agricultural innovation.

Imperfect competition might be another source of market failure in some situations, where monopolies or oligopolies constitute barriers to entry by new actors. In such cases, patent buyouts – which are in effect delayed technology prizes – might help level the playing field. Coordination failure – the failure of individual market actors to take decisions that, taken together, would make them all better off, owing to an absence of trust or certainty – is also a major challenge in many situations. Pull financing will often be able to play a part here but overcoming coordination failures will normally require a broader range of interlocking measures.

12. To address the major market failures above, pull mechanisms for development will typically provide payments to multiple, competing private sector actors over a certain period of time conditional on their products meeting certain specifications and achieving a certain level of take-up in the target market. These payments, while generally made direct to firms, effectively operate as a consumption subsidy (because payments are linked to levels of consumption and bring down costs to consumers) that eliminates the gap between the unit price firms must charge to recoup their research and development, production, promotion and distribution costs and the price that consumers, given adequate information on all the benefits of the product, are willing to pay. In essence, pull mechanisms for development seek to overcome a price barrier for consumers while leaving production, marketing and distribution strategies to the private sector. Their use will, however, usually need to be accompanied by other, complementary measures, such as donor-funded public education campaigns on the benefits of a certain type of product (e.g. vitamin A-fortified maize). AgResults might need to invest in various such complementary

measures in order to overcome coordination failures and ensure the success of its pull-financed pilots.

### III. Financing, management and governance

13. AgResults has attracted funding of \$110 million from the governments of Canada, the United Kingdom, the United States, Australia, and from the Bill and Melinda Gates Foundation. The donor contributions are pooled in a Financial Intermediary Fund operated by the World Bank, which will act as Trustee of the initiative. In the first instance, funding will be allocated to three pilots that are well advanced in development (see Section IV). In total, as many as ten pilot programs could be supported.
14. Implementation of AgResults will be overseen by a governing body (Steering Committee) comprising representatives of donor agencies and other individuals they may agree to appoint for specific purposes and periods of time. This body will be responsible for strategic oversight of the initiative, including endorsement of key management decisions such as the appointment of a permanent secretariat and evaluator, and the appointment, on the recommendation of the secretariat, of managing agents for individual pilots. It will approve concepts, business plans and resource envelopes for proposed pilot activities, agree operational policies, and closely monitor the progress of the pilots and the initiative as a whole. Decisions will be reached by consensus. Expert advice will be sought as required.
15. Implementation of AgResults will be managed by a dedicated secretariat supplied by an appropriately-qualified organization, to be selected during the third quarter of 2012. A specialist evaluation advisory body will be selected in parallel, to work in cooperation with the secretariat from the outset. The evaluation advisory body will help the secretariat and the managing agents of individual pilots to develop and execute strong monitoring and evaluation strategies for each pilot, and for the initiative as a whole, so as to ensure that the initiative's performance relative to its goal – including the objective of testing the effectiveness and efficiency of pull financing vis-à-vis push financing – is comprehensively assessed. The evaluation advisory body will also play a role in defining payment triggers for each of the pilot activities, designing associated information collection protocols, and advising on how to ensure robust, independent verification of results claims. Pilot designs, including their monitoring and evaluation strategies, will be subject to rigorous, independent peer review. The initiative as a whole will be subject to independent external evaluation approximately four years after the commencement of the first pilot activity, with a possible follow-up evaluation in a further two to three years.

### IV. Pilot activities

#### *Pilot identification and selection*

16. Following the Toronto G20 summit in June 2010, the Government of Canada launched an initiative development process that strongly engaged several other G20 member countries – the United States, the United Kingdom and Australia – as well as the Bill and Melinda Gates Foundation, the World Bank in an interim secretariat role, and a consulting firm in an advisory role. A steering committee of representatives of the aforementioned countries and organizations was formed to oversee the development of the initiative. An expert advisory group was constituted, along with four thematic groups, to consider pilot activity concepts,

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make recommendations as to which of these best met the initiative's objectives and, for short-listed activities, propose a basic architecture for pull mechanisms. The thematic groups considered potential pilots in the following areas:

- i. increasing yields;
- ii. reducing post-harvest losses;
- iii. improving livestock management; and
- iv. enhancing nutrition.

17. In the process of developing and filtering ideas for potential pilot activities, consultations were undertaken with a diverse group of stakeholders including governments, private companies, non-government organizations, and civil society organizations. By October 2011, 38 pull mechanism concepts had been proposed by 24 experts in the four thematic groups. Through deliberations within the expert advisory group and the steering committee, this initial set of concepts was reduced to five that were considered strongly to merit further consideration:

- i. crop biofortification;
- ii. on-farm grain storage;
- iii. Aflatoxin control;
- iv. livestock vaccination, particularly for Peste des Petits Ruminants (PPR); and
- v. improved fertilizers.

18. The AgResults secretariat conducted further work in early 2012 to elaborate the above pilot ideas. Based on this work, the steering committee determined that three of the pilot proposals – maize market interventions in sub-Saharan Africa relating to crop biofortification, on-farm crop storage and Aflatoxin control – were at a sufficiently advanced stage of readiness that detailed business plans (essentially blueprints for implementation) should be requested for each. Further development of the fourth and fifth pilot ideas – relating to livestock vaccination and improved fertilizers – will be undertaken during the second half of 2012.

19. In order to develop detailed business plans for the first three of the above pilots, the AgResults secretariat formed pilot-specific teams to undertake fuller market analysis, research, and stakeholder consultation so as to further refine pilot operating models and pull mechanism incentive structures, and inform decisions on the selection of potential pilot participants. This involved extensive in-country consultation and research. In addition, the pilot-specific teams consulted impact evaluation experts in order to form preliminary views on how best to incorporate an evaluation lens into the design of each pilot.

#### *Initial pilots*

20. Following are brief descriptions of the three pilots currently in the business plan development phase, relating to on-farm crop storage, crop biofortification and Aflatoxin control. In each case, a brief overview is provided, followed by a description of the pull mechanism, a rationale for its design, and a summary of the intended development impact and market development results. It should be noted that pilot design is an ongoing process and that the final pilots may differ in important respects from the models outlined below. Each of the pilots described, subject to governing body approval, is expected to run for four years.

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21. **On-farm crop storage.** Post-harvest losses of grain are extensive and a major threat to food security in developing countries. This problem is particularly acute in sub-Saharan Africa, where on-farm storage solutions are either not widely available or poorly adapted to local needs, with inadequate protection against insects and pests that consume stored crops. Overall post-harvest losses in Sub-Saharan Africa are estimated at 13.5 percent of the total value of grain production, or \$1.6 billion per year. These post-harvest losses occur at a number of different levels of the value chain – in the field, in the process of drying, shelling or transporting produce, as well as in the store. Moreover, insufficient on-farm storage solutions lead farmers to sell immediately after harvest and receive lower prices when the market is flooded with grain. Research suggests that the difference in price between selling at the farm gate during harvest time and buying back from the retail market just months later is around \$150–200 per metric ton (\$14–18 per 90kg bag). Improved smallholder access to effective storage solutions could therefore lead to a meaningful economic benefit.
22. The on-farm crop storage pilot will focus on Kenya, a nation reliant on grain production, and on maize in particular, as maize is grown by 96 percent of Kenya’s eight million smallholder farmers and is a crucial staple of food security in many developing countries. The pilot aims to stimulate improved food security through the widespread adoption of improved on-farm post-harvest grain storage systems to (i) reduce smallholder expenditure on staple grains in non-harvest periods and (ii) lower post-harvest crop losses suffered by smallholder farmers. To meet these objectives, the pilot will offer economic incentives for storage capacity sold and technology innovation in two target regions: Uasin Gishu, Baringo, Nandi, Trans Nzoia, Nakuru, Kericho, Bomet, Laikipia, Trans Mara counties (Rift Valley) and; Machakos, Makueni and Kitui Counties (Eastern Province) of Kenya. [In the Rift Valley, the pilot will have two components: (i) a standard performance grant of \$750,000 offered to participating storage providers that meet pre-specified milestones for storage sales to smallholders and (ii) a shared proportional grant of \$1 million offered to the participants based upon their proportional contribution in storage capacity over the three and one half year pilot timeframe.] In Eastern Province, the pilot will be designed to catalyze innovation specifically for on-farm crop storage solutions that are resistant to the Larger Grain Borer (LGB) pest, as this region was identified as experiencing the greatest incidence of LGB outbreaks owing to its arid climate. This part of the pilot would feature a proportional prize of \$3 million allocated to participating storage providers in proportion to their sales of LGB-proof storage solutions. In both parts of the pilot, it is expected that between three and five storage solution providers would participate.
23. The pilot has three primary objectives. The first is to increase the economic welfare of smallholders through improved access to enhanced storage solutions that minimize crop losses and enable smallholders to store maize throughout the year. The second is to help catalyze a sustainable long-term market for storage solutions in Kenya, with the potential for spillovers as the cost of smallholder-specific storage solutions falls through economies of scale. The third is to test an innovative approach to engaging the private sector to serve smallholder needs, with potential future applicability to the delivery of other goods and services to smallholders.
24. The pilot is designed to encourage private sector participants to develop innovations in on-farm crop storage technology, while addressing a range of issues faced by smallholders in accessing appropriate storage solutions. It will be “technology-agnostic” with the goal of promoting any form of effective storage solution that is suitable for the Kenyan market. The pilot design has been grounded in an extensive process of market research and stakeholder consultation to understand both the unmet need among smallholders and the potential engagement of private

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on-farm crop storage providers. Potential participants include both incumbent and emerging storage technology providers, and the parallel pilot tracks in the Rift Valley and Eastern provinces in Kenya have been designed to generate innovations in both on-farm storage adoption and technology. In addition, the performance based grant amounts are set at levels to compensate participants for incremental costs in three categories: (i) research and development costs associated with product innovation, (ii) marketing and distribution costs for reaching individual smallholders and (iii) value created for the farmer through the use of storage solutions. These incentives have been calibrated to encourage meaningful participation among on-farm storage providers, while delivering development impact to smallholders.

25. **Biofortification.** The “hidden hunger” caused by a diet lacking in essential nutrients is often overlooked. Poor quality diets characterized by a high intake of staples that are energy-intensive but lacking in essential micronutrients like iron, zinc, vitamin A, and iodine can lead to a number of different forms of malnutrition. Issues like vitamin A deficiency (VAD), for instance, lead to significant health problems in developing countries, with up to half a million children going blind every year due to VAD. Vitamin A-deficient children also face a higher risk of illness and stunting. This problem can be widespread at a country level and is particularly acute in sub-Saharan Africa. For example, in Zambia the government's National Food and Nutrition Commission reports that more than half of under-five children are affected by Vitamin A deficiency. A high-potential solution to this problem is the biofortification of staple crop grains with micronutrients. While the technological solutions for biofortification exist, there is an unmet need for the development of approaches that generate sustained demand for biofortified foods among consumers in developing countries.
26. The biofortification pilot aims to support the rollout of ProVitamin A (PVA) maize in Zambia by stimulating the grain market for the new hybrid varieties of maize through incentives aimed at industrial millers. While the developer of PVA maize, the non-profit organization HarvestPlus, already has push-financed programs aimed at introducing new seed varieties into the market and supporting smallholder adoption, the AgResults pilot will aim to stimulate long-term demand for new PVA maize products in mainstream secondary markets. Pull mechanism incentives will be provided through a three-stage process: (i) a prequalification stage will select between five and seven millers for further participation, (ii) per unit subsidies will be offered to prequalified millers that source, produce, distribute and sell PVA maize products according to pre-specified standards, and (iii) annual proportional prizes will be awarded to millers who continue successfully to sell PVA maize products past established targets. A \$35-50,000 grant is being considered for prequalified millers to offset initial marketing costs and awards in the \$3–4 million range are being considered for incentives in stages two and three. The pilot has three primary objectives. The first is to extend the health impact of the new PVA maize varieties through expanding consumption beyond smallholder households to all consumers of industrially-milled maize meal in the country. The second is to create a sustainable market for new varieties through stimulating consumer demand and creating formal secondary markets (primarily in urban areas) for smallholder producers to sell a proportion of their grain. The third is to learn from the use of pull mechanisms to support the introduction of new products. If successful, the biofortification pilot will have established a new model for stimulating sustainable demand for new products, a model that could be used in future biofortified seed introductions and in other development contexts.
27. The design of the biofortification pilot has been underpinned by extensive market analysis and in-country research and consultation. In discussions with HarvestPlus it was agreed that while

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HarvestPlus's existing programming will drive registration, initial multiplication and adoption of new hybrid varieties, there was a gap in stimulating urban demand to anchor the product in the formal grain market. Analysis of the grain market suggested that industrial millers were the only actors in the maize market that are able to source product at scale and influence demand for the new varieties. There are currently between 35 and 40 industrial millers in Zambia who collectively process approximately 900,000 metric tons of maize meal annually (equivalent to about 60 per cent of domestic maize consumption). Analysis suggests that the milling industry is highly competitive with a number of new entrants over the past five years and stiff competition for market share, often based on product branding and differentiation. Incentives have been designed to suit the competitive dynamics of the market, creating competition between millers and a collective interest in embedding new PVA maize varieties as a mainstream product for the long term.

28. **Aflatoxin control.** Aflatoxin contamination is a global problem. Aflatoxin is a potent carcinogen produced by a species of *Aspergillus* fungi, most commonly found in maize and groundnuts. The UN Food and Agriculture Organization estimates that Aflatoxin affects up to 25 per cent of the world's produce, with harmful health effects and negative economic consequences. Chronic ingestion of Aflatoxin contributes to increased risk of liver cancer in both humans and animals, and is associated with immune-system suppression and stunted growth in children. In addition, concerns about Aflatoxin, among other contaminants, have greatly reduced demand for grain exports from developing countries. New regulations in the EU alone have cost African traders an estimated \$400 million annually in lost export revenue. Aflatoxin contamination is particularly threatening to the poorest and most vulnerable smallholders who consume much of the food they produce, and this problem can be substantial at a country level. For example, an estimated 40 to 60 per cent of Nigeria's maize had unacceptably high levels of Aflatoxin in 2010. While there is currently some effective mitigation of Aflatoxin contamination in developing countries, a range of barriers holds back the adoption of promising solutions that have been shown to control Aflatoxin more broadly.
29. The Aflatoxin control pilot will provide incentives for smallholder farmer adoption of a particularly promising Aflatoxin biocontrol technology called Aflasafe™. This technology has been shown to reduce Aflatoxin contamination of maize grain by between 80 and 99 per cent in field tests in Nigeria, and the pilot will focus on demonstrating a successful model for increasing smallholder adoption of an Aflatoxin biocontrol. The pilot will focus on maize in Nigeria, as the country is the largest producer and consumer of maize on the African continent, and is furthest along in registering Aflasafe™ as a biocontrol product. The pilot aims to address persistent barriers to the widespread adoption of biocontrol technology by Nigerian smallholders through a premium per-unit payment for maize that is verified to contain a high prevalence of Aflasafe™ (a strong predictor of low Aflatoxin levels) at designated maize collection points. Participating smallholders will be eligible for a premium of approximately five per cent above the market price of maize. Target participants in the pull mechanism program are aggregators of maize farming arrangements that involve smallholders in Nigeria. Initial participants in the program would include two major input suppliers, Premier and Maslaha Seeds, that currently work with thousands of smallholder maize farmers (0.5–5.0 hectares per farmer). These and other organizations, including some large maize processors and farmer cooperative societies, are well-positioned to provide support to smallholder farmers in the form of access to key inputs to production and some technical extension services, while also acting as the main buyers of the farmers' output. In the first year of the pilot, the pull mechanism would involve a minimum of

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2,500 contract farmers. In subsequent years, the program would involve additional farmers, linked to a variety of participating organizations.

30. Successfully delivered, this pilot will achieve sustained health benefits for populations across Nigeria by controlling the level of Aflatoxin contamination in maize. In addition, the premium per-ton payment for high-Aflasafe™ maize will give participating smallholders a powerful incentive to increase yields, supported by improved access to yield-enhancing inputs and downstream market linkages through the pull mechanism managing agent. To the extent that this increases smallholder yields, the pilot will enhance smallholder economic well-being, making the long-run control of Aflatoxin among smallholders more economically viable. In addition, because the problem of Aflatoxin contamination disproportionately affects the poor and vulnerable in a number of developing countries, the pilot aims to establish a new market-driven model for Aflatoxin control that can be adopted elsewhere. There will be a strong learning element aimed at understanding the drivers of Aflasafe™ adoption, the results of which could be generalized to development interventions in other contexts involving new product introductions.
31. While Aflasafe™ has been shown to reduce significantly Aflatoxin contamination, the up-front cost of the product and the absence of an established market for Aflatoxin-free maize have made Aflasafe™ adoption prohibitively expensive for smallholders. The pilot has therefore been designed to make adoption of this Aflatoxin control technology more economically attractive to smallholders by setting a per-ton award that reflects market participants' expectations about the premium that is likely to exist for Aflatoxin-free maize when the market has been further developed. Finally, because smallholders and their families bear the brunt of the health burden of Aflatoxin contamination, the pilot incentive structure and verification protocols are designed to ensure that smallholders and their families benefit from reduced levels of Aflatoxin in maize consumed at home, in addition to the incremental economic benefit they receive from selling Aflatoxin-free maize in downstream markets.

## V. Learning and evaluation

32. Pull mechanisms are relatively new development tools. Ultimately, the goal of AgResults, and the individual pilots under it, is to use pull mechanisms to enhance food security and safety, increase smallholder incomes and promote better health and nutrition in developing countries. However, in evaluating the pilots and the initiative as a whole, it will be necessary to consider fully the initiative's goal and specific objectives, as set out in paragraphs 4 and 5. This entails not only measuring development impacts but also assessing, as far as is possible, how effective and efficient pull mechanisms are by comparison with more traditional approaches – and also reaching conclusions on how best to structure them for maximum impact, scalability and replicability. Without a strong base of evidence on all these points, it is unlikely that the transformative potential of agricultural pull mechanisms for development will be fully realized.
33. Donor-funded interventions in support of enterprise and market-development pose particular evaluation challenges. Because AgResults seeks to help build sustainable markets on the basis of agricultural innovations, the evaluation process must include consideration of the initiative's impact on business and market development, in addition to its impact on smallholder farmers, consumers and their communities. Rigorous evaluation has seldom been used for this purpose; AgResults provides an opportunity significantly to strengthen the existing evidence base. As part

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of this process, the applicability of the existing [evaluation standard](#) devised by the Donor Committee for Enterprise Development will be considered.

34. In evaluating individual AgResults pilots after four years of implementation, four critical questions will need to be addressed, as follows.
- i. What evidence exists that the pilot has been able to stimulate a supply response from private sector investors in innovative agricultural technologies?
  - ii. What evidence exists that the pilot has been able to increase the uptake of innovative technologies by smallholders and, where relevant, the demand for related products from poor consumers?
  - iii. What evidence exists that the impacts of the pilot (measured in terms of both market activity and development outcomes) will be sustained in the medium- to long-term (at least two years after the end of the initiative)?
  - iv. What evidence exists as to the scalability and replicability of any effects, and as to the cost-effectiveness of the pilot?

In answering each of the above questions, evaluators will need to assess, as far as is possible, how the pilots have fared relative to two alternative scenarios: a no-intervention scenario and a scenario in which similar impacts were pursued by means of alternative mechanisms.

35. The pilots will also be monitored and evaluated with respect to their impacts on relevant development indicators in poor communities, in the same way as any development intervention. Most of this activity will be undertaken at the level of pilot managing agents. However, such impacts will on the whole not be surprising – it is not hard, for example, to predict the impacts of great vitamin A intake, reduced post-harvest losses and reduced Aflatoxin contamination in specific geographic areas. The primary purpose of evaluation in relation to the AgResults initiative will be, as indicated above, to yield credible information about the value of agricultural pull mechanisms, as mechanisms, and lessons about their design.
36. The evaluation advisory body referred to in paragraph 15 will bear ultimate responsibility for defining a compelling and coherent impact evaluation framework for the initiative as a whole, as well as monitoring and evaluation strategies for individual pilots. Working with the secretariat and pilot managing agents, this body will articulate a core set of indicators that allow for the consistent measurement and comparison of impacts across pilots, and for the comparison of the impacts and cost-effectiveness of AgResults pilots with those of more traditional development interventions. It will, throughout the life of the initiative, ensure that a coherent evaluation approach and methodology is applied across all pilots.
37. The evaluation advisory body will, in all pilots, take care to ensure that evaluation strategies do not create disincentives for private sector engagement. For example, it is not anticipated that randomized controlled trials would be appropriate for any of the three initial pilots. Nevertheless, it is expected that evaluations will be undertaken using the best possible study design, including in each case a clear theory of change and results framework, and using carefully defined, defensible counterfactuals. Wherever possible (including for the pilots still to be designed), experimental or quasi-experimental designs will be used so as to support credible impact attribution statements.

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