



# Results-Based Financing in Agriculture and Land Administration

Potential and key design considerations for RBF to drive greater results in the sectors

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## LIST OF ACRONYMS

DIB – Development Impact Bond

GDP – Gross Domestic Product

GHG – Greenhouse Gas

GPOBA - Global Partnership on Output-Based Aid

ID – Irrigation Districts

MT – Metric Ton

NGO – Non-Governmental Organization

PBC – Performance-Based Contracts

PBG - Performance-Based Grants

PBL - Performance-Based Loans

PDBD - Performance-Based Debt Buy-Downs

PVA – Pro-Vitamin A

PzBCh – Prize-Based Challenge

RBA - Results-Based Aid

RBF – Results-Based Financing

R&D – Research and Development

USD – US dollars

## INTRODUCTION

Increased investment in agriculture and land administration, resulting in improved agricultural productivity and more secure land rights, are critical to the achievement of Sustainable Development Goals 1, the elimination of poverty, and 2, the elimination of hunger. Agriculture is one of the most important sources of employment and income generation in the world's poorest regions.<sup>1</sup> For example, agriculture employs two-thirds of Africa's poor and accounts for 35% of the continent's GDP.<sup>2</sup> Furthermore, greater agricultural productivity increases food security and incomes of subsistence farmers. This, in addition, increases the availability of products and improves food security for non-farming families. Secure, transferable, and well-understood rights to land and real property in rural areas are not only critical for agriculture but is also critical to business development, property development, and natural resource management. Consequently, improved land rights can also contribute to the SDGs related to the environment.

Several factors constrain the agriculture and land administration sectors including inadequate and insecure access to: (i) quality inputs for production (e.g., land, water, fertilizer, and quality seeds); (ii) knowledge and information (e.g., for farmers - how to maximize utility of land, water resources, and inputs; for public officials - how to manage land records); (iii) infrastructure (e.g., irrigation systems, storage facilities, and roads to bring goods to market); (iv) functioning agricultural and land markets (e.g., with platforms to access market information); and (v) affordable credit and risk management mechanisms (e.g., crop insurance). Furthermore, the agriculture sector is unique in its vulnerability to climate change and international commodity price fluctuations. There are also high degrees of gender inequality in both sectors that exacerbate the aforementioned challenges for women. Despite decades of public and non-governmental organization (NGO) interventions to improve agricultural productivity and land rights, particularly that of smallholder farmers, the impact of many agricultural interventions has fallen short of expectations.<sup>3</sup> Complications arise when interventions are not adapted to local contexts<sup>4</sup> or when efforts are not accompanied by appropriate information and training.<sup>5</sup>

In light of these challenges, international development agencies have begun exploring innovative financing mechanisms that can crowd-in additional resources from the private sector and increase the effectiveness of existing public, philanthropic, and private funding. Results-Based Financing (RBF) is one approach that has been used by donors, development agencies, and governments to drive impact in the delivery of services and ensure value-for-money. Very simply, by tying funding to measurable and previously agreed upon results RBF draws the attention to results and introduces performance incentives in the delivery of services (both at a project or an institutional level). When well-designed this can radically increase the outcomes achieved. For example, in a maternal health program in Rwanda researchers at the World Bank found that the same money channeled through RBF achieved significantly better results than when the program's funding was disbursed based on activities. Institutional deliveries, a key outcome in maternal health, increased by 23% and preventive visits for children aged 2-5 increased by 132%.<sup>6</sup> The field has also explored RBF as a tool to foster innovation and incentivize market shifts. Essentially, by specifying the desired results, providing full discretion to a number of competing providers, and a prize to the winner(s), RBF can set the right incentives to boost the discovery of new solutions and establish sustainable markets for developmentally-beneficial innovations. To date, RBF has been used in nine agriculture programs but has yet to be utilized in the land administration sector.

Like any tool, RBF's effectiveness depends on **where** and **how** it is used. This Sector Note provides an analytical framework for the application of RBF in agriculture and land administration interventions. It aims to provide practitioners in the field with the understanding of where (e.g., for what type of problems, involving what actors) RBF can potentially drive better results and to shed light on some of the key considerations for developing an appropriate design. The insights provided are rooted in this sector's experience through a review of RBF programs and through interviews with experts designing RBF in the agriculture and land administration sectors. The structure is as follows: Section 1 provides a short introduction to RBF; Section 2 outlines some of the sector's relevant characteristics for RBF, focusing on the variety of actors involved; Section 3 discusses the rationale for RBF in driving desired results, grounded on an analysis of key barriers to results and a review of the existing RBF programs in agriculture; and, Section 4 highlights important considerations for an appropriate design as well as mitigation strategies to identified challenges. Finally, the main findings from the analysis are summarized.

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<sup>1</sup> See, for example, DFID & World Bank (2011).

<sup>2</sup> Goyal & Nash (2016).

<sup>3</sup> A Cambell review summarizing evidence from 19 rigorous impact evaluations in sub-Saharan Africa found that agriculture extension service training programs were, on the whole, not resulting in impact on farmers' harvests (Campbell Collaboration n.d.).

<sup>4</sup> World Bank—IEG (2016).

<sup>5</sup> See, for example, the case of maize seeds in Zimbabwe cited in Ministry of Foreign Affairs of the Netherlands (2011).

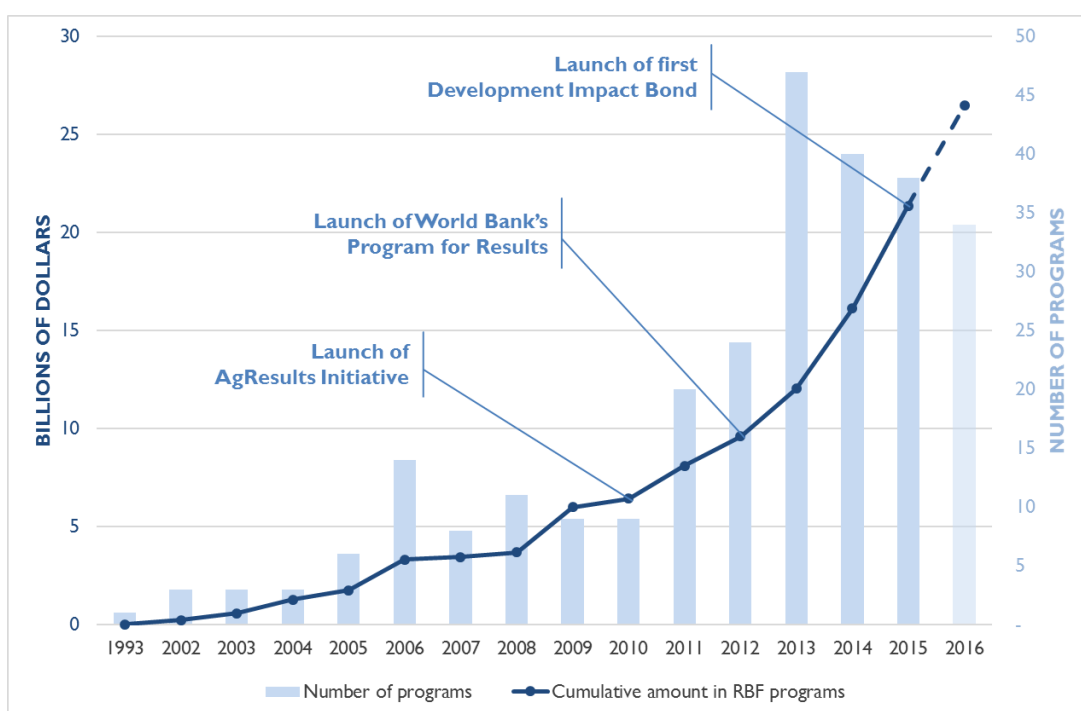
<sup>6</sup> Bashinga *et al.* (2011).

## I. RESULTS-BASED FINANCING

Results-Based Financing (RBF) is a relatively new concept in international development that shifts attention away from traditional, activity-based financing towards results by conditioning the payment to the achievement of measurable and pre-defined results. For example, instead of paying for a training program (i.e., an activity) for the unemployed youth with the expectation that they will thereafter obtain a job, a government could pay the provider for every young person who obtains and retains a formal job as a result of the program (i.e., an outcome).

Since 1993, the global interest in RBF has rapidly increased with more than USD \$26.5 billion committed to RBF contracts in 78 low- and middle-income countries (Figure 1). Notably, the AgResults initiative<sup>7</sup> was launched in 2010, which uses RBF 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.”<sup>8</sup>

Figure 1. Financing tied to results in low- and middle-income countries



Source: The Instiglio RBF Database, April 2017. This database compiles information on RBF programs in low- and middle-income countries, utilizing sources like the World Bank, DFID, USAID, Asian Development Bank, and NORAD.

An increasing number of RBF instruments have been developed and implemented. They all share two characteristics: 1) payment is based on results and 2) the relationship between payment and results is predefined. These instruments can be categorized according to the various partners involved and to whom the risk tied to performance is transferred. Service providers carry the risk in Performance-Based Contracts and Prize-Based Challenges, private investors in Impact Bonds, national governments in Performance-Based Loans and Results-Based Aid, and local governments in Performance-Based Grants (see Appendix I).

<sup>7</sup> AgResults is a US\$ 118 million multilateral initiative incentivizing high impact agricultural innovations in research and delivery to promote global food security, health and nutrition and benefit smallholder farmer. It supports pilot projects that address some of the biggest challenges in global food security and agricultural development. As of March 2017, AgResults was implementing six pilot projects around the world in partnership with the Australian Government, the Bill and Melinda Gates Foundation, the Government of Canada, UK Aid, USAID, and the World Bank.

<sup>8</sup> AgResults (2010).

## 2. INTERVENTIONS AND INCENTIVES IN THE AGRICULTURE AND LAND ADMINISTRATION SECTORS

RBF adds financial incentives to existing structures and interventions, thus it is critical to understand the local context and characteristics of the sectors' interventions, the barriers to results, as well as the existing incentive environment. What are common challenges to the delivery of results in the agriculture and land administration sectors? What motivates organizations, and the actors within them, to deliver results; and how can RBF create greater alignment to increase the productivity and incomes of the poorest and most marginalized farmers?

This section outlines interventions in the agriculture and land administration sectors and highlights common challenges to the delivery of results. It then provides an overview of the actors involved, their interests, and characteristics relevant to RBF.

### INTERVENTIONS IN THE AGRICULTURE AND LAND ADMINISTRATION SECTORS

Interventions can be classified into the following five categories, which will be used as a framework in the next section to analyze the potential added value of RBF:

#### 1. Policy changes and institutional strengthening

Strengthening and expanding property rights administration and enforcement (setting up local offices, hiring and training staff,<sup>9</sup> facilitating the adoption of appropriate technology, and streamlining processes), improving land use planning, developing and implementing new land and property rights legislation, trade negotiation, agricultural labor laws, water management policies, disease and pest monitoring, and subsidies.

#### 2. Research and Development (R&D)

Development of improved products and practices, including: seeds, fertilizers, farming practices, mapping technologies, and land information systems.

#### 3. Market interventions along the value chain

Increase access to agricultural inputs such as seeds and fertilizer, storage facilities, credit, and insurance.

#### 4. Agricultural extension services and media campaigns

Technical assistance/agricultural extension services provided to agricultural producers in person or via a media channel (to encourage the adoption of technologies, inputs, or practices) enable cooperative participation or product certification, provide market information and business planning assistance (to transition from subsistence to small-scale commercial production), and facilitate the use of land registrations systems.

#### 5. Infrastructure investment

Roads, ports, irrigation, water and soil conservation works, product storage, market platforms, and energy.

In spite of the growing evidence base for “what works” in agriculture, predicting if an intervention will work in a specific context is challenging. This is due to highly diverse and changing agro-ecological conditions, market conditions, and social factors that determine productive patterns and farmers' behavior. Thus, discretion over activities and organizational capacity are critical to the development and adaptation of locally relevant solutions in the sector.<sup>10</sup> Interventions in land policy are not specific to ecological conditions but do need to be tailored to individual contexts based on local understanding and enforcement of land rights.<sup>11</sup>

Furthermore, external factors like weather, crop disease, and market prices can make results, and especially outcomes, highly variable from year to year. This needs to be considered when paying for results.

### INCENTIVES IN THE AGRICULTURE AND LAND ADMINISTRATION SECTORS

The actors in the agricultural sector include a variety of private, public, and non-profit actors. These include researchers, input suppliers, producers (ranging from smallholder farmers to large-scale producers and multinational corporations),

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<sup>9</sup> Training of public officials is separated from training in agricultural extension services because training of public officials does not require constant iteration after it has been initially tailored to the local context.

<sup>10</sup> Janus and Holzapfel (2016).

<sup>11</sup> World Bank—IEG (2016).

intermediaries, and end consumers. The principal actors in the property rights and land policy sector are government entities.

Government and NGO involvement in agriculture and land administration is motivated by both (a) market failures, such as imperfect information or the inability of private actors to capture the full social value of goods or services (positive externalities) and (b) poverty and inequality concerns.<sup>12</sup> Towards these aims, they either provide public goods directly (e.g., property rights, extension services, and roads) or incentivize private actors to invest in activities with positive externalities.

The complexity of the actors' incentive environment needs to be considered when analyzing the potential of RBF as it influences the effectiveness of additional financial incentives provided under RBF.

**NGOs** are inherently aligned with the objective of improving farmers' productivity and income but (especially small and local NGOs) often lack the capacity, resources or discretion to achieve even greater impact.

**Private sector actors** are chiefly motivated by profits, which means they prefer not to operate in areas with low or negative margins. However, private sector's responsiveness to incentives is commonly high due to their comparatively well-developed performance management systems; and thus, overcoming barriers to market entry could be a matter of providing sufficient financial incentives.<sup>13</sup>

**Governments** share the objective of improving farmers' land rights, productivity, and income. Hence, they may need less significant incentives to change their behavior; however, governments are not unitary actors and competing interests and politicized environments play a role in decision-making and hinder government actors' ability to react to incentives. One example of the politicization of public actors is that expenditure is often used for input subsidies to interest groups rather than to the activities with the highest returns (e.g., R&D) or to the groups with the greatest needs (e.g., smallholder farmers).<sup>14</sup> Moreover, there is not much evidence to support the power of financial incentives to shift government priorities.<sup>15</sup>

While most of the considerations outlined above may be true generally, practitioners wanting to engage a particular actor in RBF should analyze the incentive environment of the specific stakeholders and actors and assess the ability for financial incentives to change the actors' behavior in each case.

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<sup>12</sup> Mogues *et al.* (2012).

<sup>13</sup> UNDP (2006).

<sup>14</sup> EWB (2017), DFID & World Bank (2011).

<sup>15</sup> Perakis & Savedoff (2015).



### 3. POTENTIAL FOR RBF TO DRIVE DESIRED RESULTS IN THE SECTORS

RBF's effectiveness depends on how well suited it is to the problem at hand and its adequate design. This calls for a careful examination of the context in which RBF is being implemented, a strong understanding of the barriers to improved results, and a clear articulation of the channels through which RBF address these barriers.

There are four documented 'drivers' through which RBF can address barriers preventing interventions from achieving their maximum impact.<sup>16</sup>

**1. Drawing attention to results.** You cannot manage what you do not measure.

Tying funding to measured results draws the attention of the organization to what matters and provides the clarity for the organization to actively manage its performance. Especially when complemented by an effective performance management system, this information can be used to adjust activities to maximize results. This driver will most likely be active where specified results are closely related to the desired impact and the RBF mechanism uses a credible verification and evaluation method. A higher frequency of results measurement provides an effective feedback mechanism by enabling the incentivized actor to use this information to improve their performance.

**2. Improving accountability to beneficiaries.** Delivering results requires understanding beneficiaries' needs.

RBF can make actors more accountable to their impact on beneficiaries rather than being accountable for the execution of activities. Many actors experience a mindset shift where the beneficiaries become clients to whom they need to deliver relevant and impactful services. RBF puts beneficiaries at the center of every decision and action. If the specified results are in the interest of beneficiaries (e.g., smallholder farmers) or beneficiaries are directly involved in the assessment of the actor's performance, this driver of impact will likely be active in an RBF program. Further, visibility of results improves the accountability mechanism by increasing the information base of beneficiaries. This helps in lowering their transaction costs when demanding changes and holding the incentivized actor accountable.

**3. Aligning incentives.** What gets rewarded gets done.

By putting some funding at risk or by providing an attractive bonus payment for the achievement of results, RBF ensures actors are financially motivated to work together in an aligned manner to achieve the predefined results.

An important caveat is that this driver may be relevant for some actors but not for others. For instance, if a private actor's incentives are not aligned with purely social objectives but it is responsive to financial incentives, the provision of such incentives can have a significant effect on the social impact of their activities. Conversely, a bureaucratic organization which has many competing priorities may not react to a small financial incentive. Therefore, before relying on financial incentives, it is critical to understand the existing incentive environment; whether the actors will realistically react to such an incentive and what is the required strength of these incentives.

**4. Providing flexibility for local adaptation and improvement.** Improving performance is difficult under constraints.

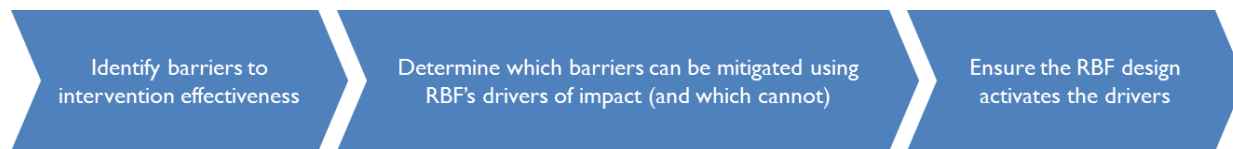
If designed in the right way, RBF provides incentivized actors with the flexibility to experiment, learn, and adapt program design and delivery practices to achieve the specified results. RBF tightens the control over achieving results, allowing funders to relax their control over activities and grant the incentivized actor the flexibility and freedom to pursue a range of strategies to achieve the desired results. This driver may be relevant for some actors but not for others. For example, if decision-makers in an NGO have significant discretion over (and can easily course-correct) their implementation plans, providing discretion as part of the RBF design may have a great impact. On the other hand, a governmental entity that is held to rigid operating guidelines will be unable to leverage additional flexibility.

The relevance and relative influence of these four drivers will depend on barriers to improve results, the actors being incentivized, and the design of the RBF mechanism. Figure 1 outlines the process we recommend to determine where and how to use RBF. All analyses should begin with a diagnosis of the barriers to results. To this end, practitioners should carefully analyze the value chains and/or the intervention's theory of change to identify the underlying causes of market failures or service delivery challenges. Practitioners should identify which drivers of impact might help to improve results. Finally, the RBF mechanism should be designed to activate these drivers.

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<sup>16</sup> Perakis & Savedoff (2015). See Appendix 2 for a more detailed description of each driver.

Figure 2. Process to determine where and how to use RBF



In Table 1, we show an example analysis of the potential for RBF to drive results across the intervention categories identified in Section 2. For the purposes of this Sector Note, common barriers to the delivery of results within each intervention were identified through interviews and a desk review of program completion reports.<sup>17</sup> Next, the potential for RBF to resolve each barrier through the four drivers mentioned previously was analyzed. The analysis is intended to provide an example of the factors considered to inform future analyses rather than provide conclusive recommendations of where RBF should and should not be used.

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<sup>17</sup> The analysis assumes that funding is secured.

Table 1: Potential for RBF to drive greater results in the agriculture and land administration sectors (example analysis)

Intervention types	Common barriers to intervention effectiveness (✓ if RBF can address, X if unlikely)	RBF drivers of improved effectiveness that could resolve selected barriers	Overall potential for RBF
<b>1. Policy changes and institutional strengthening</b>	<ul style="list-style-type: none"> <li>✓ Administrative inefficiencies</li> <li>✓ Low incentive to complete legislative processes</li> <li>✓ Low incentive to adopt new land rights administration approaches or technologies</li> <li>✓ Low incentive to sustain use of new administrative systems after initial adoption</li> <li>✓ Low incentive for quality in development of land use plans</li> <li>✓ Poor design of trainings</li> <li>X Lack of long-term commitments</li> <li>X Poor design of policy</li> <li>X Low legitimacy of national institutions on local level</li> </ul>	<ul style="list-style-type: none"> <li>• Attention to results</li> <li>• Accountability to beneficiaries</li> <li>• Aligning incentives with efficient and impactful governance</li> </ul> <p>However, the effects of incentives in the public sector may be limited.</p>	<b>Low</b>
<b>2. R&amp;D</b>	<ul style="list-style-type: none"> <li>✓ No incentive for private actors to share information, conduct high-risk innovation, or develop technology suited to contexts of marginalized farmers</li> <li>✓ No incentive for publicly funded scientists to produce technology for practical application</li> <li>✓ Incentive for politicians to fund the most politically beneficial R&amp;D organizations rather than the most effective</li> <li>X Shortage of research capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Accountability to beneficiaries</li> <li>• Aligning incentives with applicable technologies for marginalized farmers</li> </ul>	<b>High</b>
<b>3. Market interventions along the value chain</b>	<ul style="list-style-type: none"> <li>✓ No incentive to sell products to the poorest because margins are low or negative</li> <li>✓ No incentive to cover costs of shifting to another product (change in production equipment, marketing)</li> <li>✓ Insufficient incentives or knowledge for farmers to adopt an improved input or practice</li> </ul>	<ul style="list-style-type: none"> <li>• Aligning incentives with results, particularly for the most marginalized</li> </ul> <p>However, the interconnectivity of markets makes successfully incentivizing desired outcomes in markets very difficult.</p>	<b>Medium</b>
<b>4. Agricultural extension services and media campaigns</b>	<ul style="list-style-type: none"> <li>✓ Insufficient adaptation to beneficiary needs</li> <li>✓ Cooperatives do not represent farmer interests</li> <li>X Farmers lack collateral or capacity for debt</li> <li>X Eroded local trust of financial institutions</li> <li>X Political interests</li> </ul>	<ul style="list-style-type: none"> <li>• Attention to results</li> <li>• Accountability to beneficiaries</li> <li>• Aligning the incentives of cooperatives with farmer interests</li> <li>• Providing flexibility to personalize efforts to change farmers' practices</li> </ul>	<b>High</b>
<b>5. Infrastructure investment</b>	<ul style="list-style-type: none"> <li>✓ No incentive for maintenance to be completed to certain quality standards</li> <li>✓ Corruption in contracting</li> <li>X Infrastructure construction delays due to availability of materials, weather, or approvals</li> </ul>	<ul style="list-style-type: none"> <li>• Attention to results</li> <li>• Accountability to beneficiaries</li> <li>• Aligning incentives with quality standards</li> </ul>	<b>High</b>

Sources of common barriers: World Bank – IEG (2013), World Bank – IEG (2016), Misión para la Transformación del Campo (2015), Kremer and Zwane (2005).

## POLICY CHANGES AND INSTITUTIONAL STRENGTHENING

**RBF drivers of improved effectiveness.** Political cycles and competing short-term priorities make it challenging for the public sector to maintain a focus on the most important results.<sup>18</sup> By tying funding for governments to administrative outputs, RBF could align the incentives of the public sector to resolve binding constraints to improved agriculture outcomes and land administration, focus attention on results, and increase accountability. This, in turn, could help resolve administrative inefficiencies, ensure quality policies are implemented in a timely manner, and ensure best practices are adopted and sustained.

In the land administration sector, RBF could be used to create incentives for the adoption and sustained use of new administrative technologies. For example, by tying a portion of payments to the number of entries or modifications to a new land administration system after a set period. Where the quality of land use plans can be evaluated, RBF could also be used to align incentives of national or local public-sector employees around quality planning.

Depending on the context, Performance-Based Loans (PBLs), Results-Based Aid (RBA), or Performance-Based Debt Buy-Downs (PDBDs) could be utilized to address barriers at the national level or Performance-Based Grants (PBGs) could be utilized to address barriers within sub-national governments.<sup>19</sup>

**Examples.** For example, a PBL has been implemented in Rwanda to support the implementation of the government's nation-wide reform of the agricultural sector. The overall objective of the PBL is "to increase and intensify the productivity of the Rwandan agricultural and livestock sectors and expand the development of value chains."<sup>20</sup> The loan accounts for about 10% of the total budget of the reform and disbursements are tied to increases in average yields of key products, land area protected against erosion, irrigated area, innovations released and adopted by farmers, lending for agriculture, and approval of certain policies.<sup>21</sup> This is intended to align incentives within the government around high-quality and efficient policy reform. After two of the three years of implementation, disbursement reports indicate that all results have been achieved, potentially affecting 7.5 million farmers of which 80% are subsistence farmers.<sup>22</sup> Despite these successes, it is worth noting that the measure of food security, which is not linked to payment, has not improved over the period of the project.<sup>23</sup>

**Potential challenges inhibiting drivers.** Although the Rwandan example shows the potential for RBF to positively impact implementation and whilst demand for PBLs from countries is generally high<sup>24</sup>, there is limited evidence on governments' responses to financial incentives. The public sector has complex internal incentives and unique legal constraints. As noted in Section 2, the agriculture and land administration sectors are highly politicized and some changes, such as altering subsidies or implementing a land formalization strategy, may be politically infeasible. Finally, it is important to note that there are multiple barriers that RBF cannot clearly address, such as the low legitimacy of national institutions at local levels, diminishing commitment over time, or poor policy design. Practitioners are advised to analyze, to the best of their ability, whether incentives established by a proposed RBF mechanism will result in desired behavior changes and if unresolved barriers will pose risks to the impact of RBF.

**Overall potential for RBF.** There have been and will be cases where RBF adds significant value to policy and institutional strengthening interventions by increasing attention to results and accountability to beneficiaries and aligning incentives. However, the complexity of the incentive environment within the public sector results in a relatively low value proposition. Yet, even marginal change within the public sector can have wide-reaching effects; thus, in many cases pursuing RBF may be worth the risk that incentives are not as effective as for other actors.

## R&D

**RBF drivers of improved effectiveness.** RBF could incentivize high-risk innovation, the development of products suited to the poorest, and information sharing; actions which otherwise would not have been in the interest of commercial R&D actors. This can be achieved in the private sector by tying funding for R&D to the development, adoption, and/or impact of agricultural or mapping technologies (e.g., a new animal vaccine or mobile mapping software).

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<sup>18</sup> World Bank (2017).

<sup>19</sup> For applications of PBGs to strengthen institutions in education, see World Bank (2017).

<sup>20</sup> World Bank (2016a).

<sup>21</sup> Ibid.

<sup>22</sup> Ibid.

<sup>23</sup> World Bank (2016b).

<sup>24</sup> More than 52 PBLs had been implemented by the World Bank with more than USD \$ 11.6 billion tied to results.

In the public sector, scientist's and politicians' inherent incentives are often counterproductive to cost-efficient R&D. Scientists are often rewarded for academically interesting rather than applicable work and politicians may fund R&D institutions based on political reasons.<sup>25</sup> RBF could help realign their incentives with result achievement. Further, by tying payments to a result of relevance to farmers, where applicable, RBF could make R&D more accountable to beneficiaries.

A Prize-Based Challenge (PzBCh) for the development, adoption, and/or impact of a new technology may be the most appropriate RBF instrument in these cases. By specifying the desired outcomes, providing full discretion to several competing actors, and a significant prize for the winner(s) PzBChs incentivize outcomes and transfer the risk of failure to the incentivized actors. When well designed, prizes typically attract a high degree of effort that exceed the prize rewarded.

**Examples.** An example of RBF used for the development of a technology, with no adoption requirements, is the global PzBCh implemented by AgResults for the development of a vaccine for the Brucellosis virus, which affects ruminants.<sup>26</sup>

In cases where the efficacy of the new technology or its ability to be adopted by farmers are not clear, prizes could be tied to the ultimate intended outcome of the program rather than the development of the technology alone. In Vietnam, AgResults launched a PzBCh to promote the uptake of innovative technologies to reduce greenhouse gas emissions from rice production and increase yields in rice cultivation. Based on a number of criteria, such as the feasibility of efficacy of the proposed technology, the potential for uptake by smallholder farmers and large-scale rice production areas, and the strengths of proposed partnerships eleven organizations were selected to test their proposed solutions in the first phase of the project. This started in June 2017 and lasts for a year and a half. For this phase, prizes will be awarded based on the reduction in emissions and increases in rice yields. In the second phase of the project, selected technologies will be scaled to smallholder farmers and prizes will be provided based on the reduction in emissions, increases in rice yields, and the number of smallholder farmers utilizing the method successfully.<sup>27</sup> In essence, this RBF mechanism provides a way to integrate R&D and agricultural extension services that could be applied in other cases as pertinent.

**Potential challenges inhibiting drivers.** Setting the financial rewards for a PzBCh such that they encourage innovation at the minimum possible cost is a significant challenge because the cost of developing the innovation is unknown. Further, the value of the rewards must often be much greater than its development costs to compensate participants for the risk of not winning the prize<sup>28</sup>. This depends on the competitiveness of the entire field of participants.

**Overall potential for RBF.** Although challenging, PzBChs can be designed effectively. Overall, PzBChs, and the innovation they inspire, are highly suited to R&D. Further, defining results that are relevant for beneficiaries helps to align all actors' incentives with the results and improve accountability to beneficiaries.

## MARKET INTERVENTIONS ALONG THE VALUE CHAIN

**RBF drivers of improved effectiveness.** By tying funding to units of target products purchased or sold, RBF could shift markets to a more socially-beneficial equilibrium. RBF could be used to influence either of the following:

- *The supply of inputs to farmers.* Through a PBC or PzBCh, a government or donor could provide a bonus to input suppliers tied to the units of target inputs sold in certain geographies or to specific subpopulations. This would compensate for the potentially lower market share or higher cost of serving the marginalized and aligns the suppliers' incentives with socially beneficial outcomes. Similarly, to resolve failures in markets for financial products, a government or donor could guarantee the repayment of smallholder farmers' loans contingent on a minimum number of smallholder farmers reached.<sup>29</sup>
- *The demand for farmers' products.* By providing financial incentives to intermediary buyers tied to units of the target product purchased or sold through a PBC or PzBCh, RBF could motivate these actors to change farmers' behavior and overcome adoption barriers, thus aligning their incentives with social outcomes.

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<sup>25</sup> Kremer and Zwane (2005).

<sup>26</sup> AgResults (2017e).

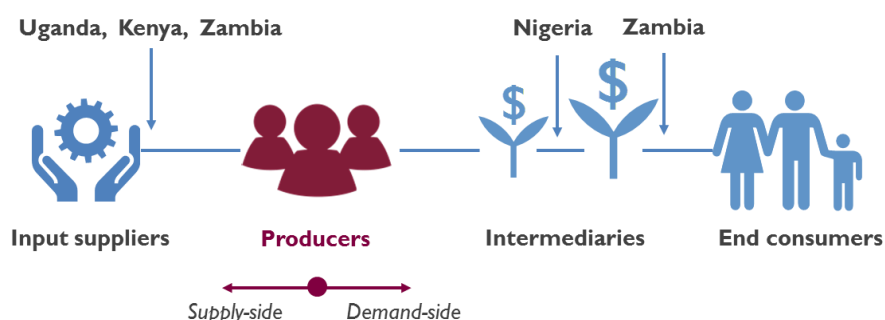
<sup>27</sup> AgResults (2017d).

<sup>28</sup> Deloitte University Press (2014)

<sup>29</sup> GPOBA (2014).

**Examples.** The AgResults pilot projects have utilized various supply- and demand-side incentives to overcome such barriers. **Error! Reference source not found.** shows the point in the value chain where each project intervened. Interventions at other points are also possible, depending on the needs and constraints of the context.

Figure 3. AgResults RBF market interventions along the agriculture value chain



In Uganda, prizes will be awarded to seed companies based on sales of quality-certified bean and soybean seeds to smallholder farmers. This is to incentivize the establishment of a stronger local seed industry and to improve soil health, nutrition, and income of smallholder farmers.<sup>30</sup>

In Kenya, prizes will be awarded based on the cumulative capacity of storage devices sold to reduce post-harvest grain losses in the Rift Valley and Eastern provinces, which in turn is intended to increase incomes and food security among smallholder farmers.<sup>31</sup> The Kenyan project is an instructive example of utilizing RBF to combine incentives for R&D and product adoption. Prior to the RBF implementation, storage solutions were not adapted to the target areas, consumers lacked awareness of the products, and distribution costs to smallholder farmers were prohibitively high. The RBF mechanism not only encourages producers to develop or adapt products to suit their customers, it also creates an incentive for providers to conduct marketing and distribution suited to the context.<sup>32</sup> Notably, the RBF instrument is complemented by grants to producers to conduct marketing campaigns.<sup>33</sup>

In Nigeria, the AgResults pilot project provides demand-side incentives for the adoption of Alfasafe, a new biocontrol technology for aflatoxin contamination. It pays organizations with contract farming arrangements ('aggregators') based on the volume of maize treated with Alfasafe and delivered to collection points. As such, it incentivizes aggregators to encourage and provide technical assistance to smallholder farmers to produce high-Alfasafe maize that is healthy and aflatoxin free.<sup>34</sup>

In Zambia, the AgResults pilot project intervenes in both supply- and demand-side markets to overcome the barriers present. It aims to support the introduction of biofortified provitamin A (PVA) maize into Zambian markets to reduce Vitamin A deficiency among the population. The design includes incentives for both seed companies (based on the amount of PVA maize seeds sold to famers) and commercial millers (based on the amount of PVA maize meal sold to consumers).<sup>35</sup> The need to address both sides of a market may only become evident after piloting an RBF program that addresses only one side (see Box 1).

<sup>30</sup> AgResults (2017c).

<sup>31</sup> AgResults (2017a).

<sup>32</sup> World Bank & Dalberg (2012).

<sup>33</sup> Interview with AgResults, 02/28/17

<sup>34</sup> AgResults (2017).

<sup>35</sup> AgResults (2017b).

### **Box 1: Iterative barrier analysis in Zambia**

The AgResults program in Zambia aims to reduce Vitamin A deficiency by increasing consumption of fortified maize. Initial analysis indicated that the barrier to increased consumption was supply of fortified milled maize. The RBF instrument was designed to help overcome this barrier by providing additional payments to commercial maize millers based on the amount of fortified milled maize sold once all millers had collectively sold beyond a certain threshold.

However, during the pilot, it became evident that the supply of fortified seeds was also a barrier to an effective market, the collaborative incentive scheme was not suited to the market, and the millers were unaccustomed to marketing their products to influence consumption. Public policies, including an export ban on maize, also contributed to a low supply of maize to millers. Furthermore, altering the entire composition of farmers' production, not just the products they sell to millers, is critical to the project's goal of increasing consumption of fortified maize because most of the farmers are subsistence farmers.

Consequently, a supply-side incentive was added to the RBF instrument for seed companies to supply more fortified seeds to farmers. The collective threshold for payments was removed and the threshold for each individual miller was lowered (see Box 6 for further detail). Initial reactions to the redesign are promising: two seed companies have joined the scheme and have surpassed targets as of April 2017 and the number of participating millers doubled from four to eight. Although no millers have reached the minimum thresholds for payment to date, the anticipated production of the following growing season would put them on track.

Even with this additional component added, additional barriers to fortified maize consumption may not be captured—the urban poor, for example, buy wholegrain maize rather than milled maize.

In sum, the identification of market barriers is highly complex. Some barriers may only come to light in the process of piloting a potential solution. Allowing for this form of iterative analysis can help ensure the RBF instrument addresses all market barriers.

Source: Janus and Holzapfel (2016); AgResults (2017f).

**Potential challenges inhibiting drivers.** It is often challenging to design RBF instruments that shift markets because of their potential to distort markets and create negative externalities beyond the scope of the program. If the market shift may create significant detrimental effects in other areas, it may not be worth pursuing.

For instance, an intervention that incentivizes intermediaries to prioritize sales of a new variety of coffee could place the producers of the unimproved variety at a disadvantage, at least in the short-run. If these producers can quickly adapt to produce the new substitute varieties, the shock introduced by the intervention fades away. Conversely, if they cannot produce the new varieties, this could place the producers of the traditional product at a permanent disadvantage.

In addition to the barriers to adaptation of production, practitioners should analyze effects on the substitute and complement markets, intermediary competition, subsequent markets along the value chain, and end-consumer behavior, among other market characteristics.

**Overall potential for RBF.** Although RBF can help to align incentives of market actors, effectively influencing markets without creating external distortions is extremely challenging. As such, we consider it an area where RBF has a moderate value proposition.

## **AGRICULTURAL EXTENSION SERVICES AND MEDIA CAMPAIGNS**

**RBF drivers of improved effectiveness.** By tying funding for agricultural extension services or media campaigns to results (e.g., farmer productivity or number of land titles issued), RBF could increase attention to results and accountability to beneficiaries, as well as align incentives with farmers' needs and allow for iterative tailoring of services and messages to local contexts and beneficiaries' needs.

In agricultural extension services, RBF could increase service providers' focus on outcomes and allow providers discretion in the range of services they provide, thus improving accountability to farmers. Existing efforts to improve accountability of providers by allowing farmers to influence provider contracting did not affect the quality of services<sup>36</sup>. This indicates that ongoing incentives for quality services could help to resolve this barrier.

RBF could also assist the efforts of agricultural extension services indirectly. A common activity of agricultural extension services is to organize farmers into cooperatives; however, farmers are often reluctant to join these associations because they feel their interests are not accurately represented. The public sector could use RBF to facilitate farmer organization

<sup>36</sup> Biltzer (2016).

by paying cooperatives an additional incentive payment based on results that are relevant to farmers. This would improve the alignment of incentives between farmers and cooperatives.

In property rights initiatives, citizens must be educated on the process of land registration and their trust in the system must be developed. This is often conducted through media campaigns. Given that citizens' relationship with their government is so complex, these messages may need to be piloted and redesigned multiple times in each community to achieve results.

Depending on the degree of flexibility, the intensity of incentives, and the upfront funding required by the agricultural extension service provider or media organization, an Impact Bond or a Performance-Based Contract (PBC) would be most applicable (with Impact Bonds being more suitable the higher these requirements).

**Examples.** Programs in Kyrgyzstan and Ethiopia have implemented performance-based salaries and quota-based promotion criteria for agricultural extension workers, respectively.<sup>37</sup>

A Development Impact Bond (DIB) was used in Peru to fund an NGO's efforts to encourage farmers to adopt fungus-resistant seeds and best practices for cocoa and coffee production. Payments to the investors were tied to newly established coffee plots with leaf rust-resistant varieties, increased cocoa bought and sold, improved cocoa yields, and increased coffee supply (see Box 3 for more detail on this DIB).<sup>38</sup>

**Potential challenges inhibiting drivers.** Designing incentives that influence the behavior of agricultural extension service providers, individual agricultural extension workers, or citizens is not easy. In a recent review of efforts to increase the accountability of agricultural extension services<sup>39</sup>, we can provide the following recommendations to ensure the drivers are effective:

- *Tie payments to outcomes rather than outputs.* Tying salaries or promotions to outputs (e.g., the adoption of a technology package) eliminated the incentive for agents to tailor services to farmers' needs, which could also occur in RBF if payments for service providers were tied to similar outputs.
- *Address job satisfaction before, or in addition to, providing financial incentives.* The financial incentives for individual extension agents did not motivate them to provide higher quality services in some cases; rather, other factors of job satisfaction were identified as limiting factors.
- *Involve farmers in defining good services and include special considerations for female farmers.*
- *Consider including fees for farmers to access support as a method to further increase accountability.*

**Overall potential for RBF.** The flexibility in implementation, attention to results, accountability to beneficiaries, and alignment of incentives created by RBF could significantly improve the effectiveness of agricultural extension services and media campaigns.

## INFRASTRUCTURE INVESTMENT

**RBF drivers of improved effectiveness.** RBF has the potential to resolve barriers to quality infrastructure maintenance, infrastructure use, smallholder access to markets, and corruption.

Unlike infrastructure construction contracts, maintenance contracts rarely pay for results. By tying funding to indicators of quality operation, PBCs or PBGs could align incentives between the government and contractors or local governments, create accountability, and bring attention to outcomes in quality maintenance of infrastructure.

RBF could also be used to ensure the effective application of the infrastructure. In an unconditional subsidy program for drip irrigation in Morocco, smallholder farmers used the systems for crops that do not benefit from the technology. RBF could help to resolve this by making subsidy payment conditional on optimal crop selection.<sup>40</sup>

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<sup>37</sup> Ibid.

<sup>38</sup> Belt (2015).

<sup>39</sup> Biltzer (2016).

<sup>40</sup> GPOBA (2014).



In instances where governments are still in the process of planning infrastructure, a PBL, RBA, or PDBD tied to the number of smallholder farmers utilizing the roads could help incentivize the construction of roads that support market access.<sup>41</sup>

There is also some evidence that RBF could help to reduce corruption in contracting as it provides accountability for the delivery of results and because verifying results may be less prone to manipulation than verifying receipts.<sup>42</sup>

**Examples.** PBGs were implemented in China between provincial governments and the entities that regulate irrigation at the district level, the 'Irrigation Districts' (IDs), for the construction and rehabilitation of irrigation infrastructure. Apart from the provincial funding for construction and rehabilitation, IDs collect fees from farmers to cover operations and maintenance. Payments from the provincial government to IDs are tied to the fee collection rate, the timeliness of fee collection, the water distributed, and the quality of maintenance work. The IDs, in turn, incentivize their staff based on the same performance measures. A case study review of the program by the Global Partnership on Output-Based Aid (GPOBA) suggests that RBF contributed to creating "an accountability system that enhanced water use efficiency, water delivery, and financial transparency."<sup>43</sup>

**Potential challenges inhibiting drivers.** As in the case of Morocco, if financial incentive schemes are not designed in conjunction with an enabling environment for use of the infrastructure, the incentive will not result in improved impact.

Further, where incentives to a national government are implemented, the various internal interest groups may make it challenging to create effective incentives.

**Overall potential for RBF.** RBF has high potential to increase the attention to, and align incentives with, results for farmers in infrastructure investments, thus increasing accountability.

## SUMMARY

RBF mechanisms could be used to improve impact in the agriculture and land administration sectors by:

- *Improving the impact and cost-effectiveness of policy change and institutional strengthening efforts, public R&D, agricultural extension services and media campaigns, and infrastructure investments.* By conditioning all or part of the funding to results rather than to activities and inputs, well-designed RBF introduces performance incentives in the delivery of these services.
- *Incentivizing shifts in agricultural production and R&D markets to drive desired results.* By providing financial incentives for desired outcomes, RBF can create the right incentives for private actors to reach a more socially desirable market equilibrium.

However, examples such as the PBC in Zambia demonstrate how challenging it can be to correctly identify all barriers and design RBF to create successful resolutions. Practitioners should carefully analyze the enabling environment and identify other potential barriers, which cannot be or are not addressed by the planned focus of the RBF instrument but may inhibit its success. Partnering with local actors and involving agricultural and land experts will be key to ensure that no binding constraints are overlooked.

Given these potential challenges, we conclude that there is a particularly clear and strong value proposition for the use of RBF in R&D efforts, agricultural extension services and media campaigns, and infrastructure investment. Though the challenges associated with designing effective RBF instruments for policy changes, institutional strengthening, and market interventions can be overcome, the value proposition for RBF in these areas is less evident.

A clear understanding of the barriers to impact, the drivers hypothesized to resolve the barriers, and anticipated challenges will ultimately determine whether RBF is worth pursuing and will guide the design of the mechanism.

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<sup>41</sup> Elliott (2010).

<sup>42</sup> Savedoff (2016).

<sup>43</sup> GPOBA (2014).

## 4. DESIGN CONSIDERATIONS

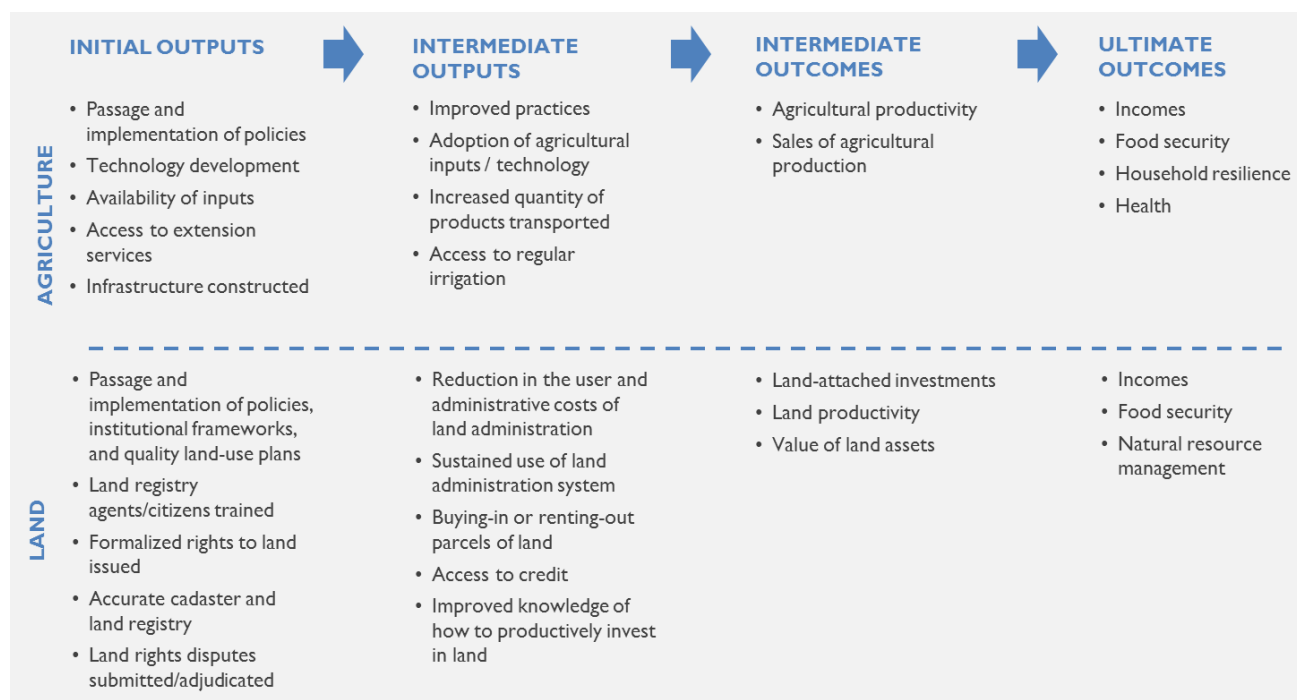
The RBF instrument’s design is critical to achieving its potential benefits. A good design is technically sound, politically acceptable, and administratively feasible. Producing a good design requires a deep understanding of the context and local constraints as well as of how these instruments can contribute to improving the status quo. Below, we outline considerations regarding the selection of payment metrics (the results that are incentivized and paid for) and the design of the payment structure (timing of payment and how payment varies with results achieved on the payment metrics).

### SELECTION OF PAYMENT METRICS

The selection of adequate payment metrics is a key determinant of success of any RBF instrument. Metrics should draw the attention to what matters (e.g., closely tied to the barriers to improved results), provide the right incentives and discretion to achieve results, and enhance the accountability of the incentivized actor(s). Poorly chosen metrics may undermine the success of the instrument by, for example, introducing perverse incentives or limiting the actor’s ability to innovate.

There are a variety of results that can be paid for in agriculture and land administration from initial outputs (such as technology development or land titles issued) and intermediate outputs (such as improved knowledge, the adoption of certain agricultural inputs, or access to credit) to intermediate outcomes (such as increased land productivity or sales of agricultural production) or ultimate outcomes (such as income, food security, and household resilience).

Figure 2: Typical Results Chains for Agriculture and Land Administration Interventions



In assessing the suitability of results to serve as payment metrics practitioners should consider the following four criteria:

**I. Closely related to the ultimate objective.** Payment metrics should be closely related to the ultimate objective; to provide the incentives and the space for the incentivized actors to prioritize what matters to achieve the ultimate objective.

This is particularly crucial in environments characterized by high complexity and heterogeneity (e.g., varying agro-ecological conditions, traditional farming practices, cultural norms, needs and tastes, market conditions) and which compel the discovery and adaption of innovations to the local context. Paying for ultimate outcomes not only incentivizes actors to analyze the local context and address all binding constraints to the ultimate objective, but

typically also grants them the required discretion to experiment, learn, and adapt their approaches, yielding the most cost-effective way of achieving results. Conversely, paying for outputs that are further away from the ultimate objective (e.g., development of a technology or improved efficiency of land registration services) risks overlooking important constraints to real impact (e.g., low adoption rates by farmers or lack of awareness among citizens of their land rights). It also reduces the chances of discovering more cost-effective and sustainable solutions (e.g., solutions that consider the capacity) and is more prone to introducing perverse incentives (see below). Paying for outputs is therefore usually only suitable in contexts where the complete set of outputs to achieve the desired objective is well-known; where a strong causal linkage between outputs and the ultimate objective exists.

For example, in agriculture, low adoption rates of new and improved technologies are a key factor limiting productivity improvements,<sup>44</sup> underlining the importance of paying for outcomes instead of outputs. Paying for the adoption rate or for improvements in productivity (in the case of R&D) would not only act as a “market test” of adoption by farmers but would also incentivize R&D actors to work with and incentivize other actors in the subsequent supply chain.<sup>45</sup>

Where paying for outcomes is not feasible due to their high sensitivity to external factors or measurement issues (see below), Janus and Holzapfel (2016) recommend paying for outputs – such as the adoption rate – in combination with metrics that estimate the impact of adoption on yields, as measured in experimental plots or on-farm trials. Such a strategy could be effective if the following considerations are taken into account: i) farmers must have the knowledge to use the technology adequately and ii) effects on the yields should be measured in environments that are very similar to the context in which farmers work.<sup>46</sup>

**2. Manageable control.** The selection of payment metrics should balance the benefits of transferring more performance risk to the incentivized actor with the costs of the associated risk premium. Metrics usually transfer less risk the less sensitive they are to external factors and the more they are a direct result of the actors’ actions.

Transferring performance risk associated with factors that actors can influence at least partly (e.g., demand side risk, knowledge of land rights) may incentivize them to take desired actions (e.g., stimulating demand through targeted marketing strategies or public awareness campaigns) by taking advantage of local information in a way that funders would not be able to do. However, caution against the type of risks transferred is recommended. A limited degree of control over achieving results (e.g., due to multiple binding barriers or external factors such as weather) may undermine the effectiveness of the incentives as additional efforts undertaken by the actor may not result in greater performance.

In assessing the degree of control an actor has over the achievement of results, practitioners may consider the period for additional efforts to materialize into results. Especially since agricultural interventions can have a lengthy feedback loop. For example, in Sub-Saharan Africa, most smallholder farmers depend on rain fed agriculture, which means they only harvest during the rainy season (usually once or twice per year). Thus, a single year may not suffice for providers to test their interventions, learn, and introduce variations to achieve greater results. Interventions at the policy level (e.g., land use reforms) will usually also require longer time frames to detect changes in outcomes. Where flexibility is assumed to be a key driver of success, both payment metrics and the duration of the RBF contract are important design considerations. Most RBF programs in agriculture have a duration of 4 years or more.<sup>47</sup>

In agriculture, external factors (e.g., weather, crop disease, and market prices) can make results, especially outcomes, highly variable from year to year. Designers of RBF instruments should consult with agricultural experts to account for these factors in setting targets. They should further assess the

**Box 2: Lessons from the Peruvian DIB**

While the targets on newly established coffee plots, cocoa bought and sold, and coffee supply metrics were achieved to either 75% or 100%, the DIB failed to achieve the minimum threshold for payments (50% of the target) on the cocoa yield metric due to:

- a) Inaccuracies – overly high baseline values resulting in overly ambitious targets;
- b) The outbreak of a pest that had devastating impact on cocoa productivity in 2015;
- c) Short duration: given a duration of less than a year (until October 2015) and the harvest cycle, the fertilization program which was set up in 2015 could only have the desired impact on yields in 2016.

Source: Belt (2015).

<sup>44</sup> Kremer and Zwane (2005).

<sup>45</sup> Ibid.

<sup>46</sup> Kremer and Zwane (2005) note that while an improved cowpea seed seemed promising in a controlled environment, it did not translate well to the mixed cropping environment in which farmers worked.

<sup>47</sup> See Annex 3: RBF projects in Agriculture.

availability of outputs that are less sensitive to these factors and/or consider adjusting targets in case of their manifestation. Quasi-experimental or experimental impact evaluation methods can also control for the effects of external factors on results but may not be affordable or feasible in all cases.

**3. Objective, and easy to measure and verify.** The payment metric should be simple to understand, low-cost, and easy to measure and verify.

For incentives to work, it is essential that the incentivized actor understands the metric. Therefore, a limited number of simple metrics is recommended to draw attention to what matters most.

Moreover, both the data and the method used to measure the metric should be objective and reliable to ensure that the right results are being paid for. Issues such as response bias, measurement errors, and the availability, accessibility and quality of (administrative) data should be considered in defining payment metrics. Further, it may be infeasible to measure certain outcomes because they are not detectable within the contract duration.

To illustrate these criteria, Box 3 discusses the advantages and disadvantages of two different methods to measure crop yields.

<b>Box 3: Measuring crop yields</b>		
	<b>Pros</b>	<b>Cons</b>
<i>Crop Cuts</i>	<ul style="list-style-type: none"> <li>Commonly regarded as the most objective/reliable method for estimating crop yields.</li> </ul>	<ul style="list-style-type: none"> <li>Both time and labor intensive/expensive.</li> <li>Still contains bias (e.g., for small, irregularly sized plots with uneven plant density; which is the case for most smallholder farmers in Sub-Saharan Africa).</li> </ul>
<i>Farmer Recall</i>	<ul style="list-style-type: none"> <li>Cost-effective.</li> <li>In some contexts, evidence suggests it can be as, if not more, accurate than crop cuts.</li> </ul>	<ul style="list-style-type: none"> <li>Recall bias.</li> </ul>

**4. Minimizing perverse incentives.** The payment metric should minimize the risk of creating undesirable effects such as i) cream skimming, where the incentivized actor focuses on the subgroup of the population most likely to achieve the highest results in the absence of the intervention<sup>48</sup> or ii) leading the actor to shift her efforts towards improving a metric with no, or little, impact on the ultimate objective.

Examples of this include:

- Fertilizer use:* Paying for the amount of fertilizer sold may exacerbate existing suppliers' incentives to target those farmers with the greatest demand for fertilizer (e.g., given their size of landholding). This could be a desirable effect in the short term where fertilizer price was the main barrier to increased use and whereby stimulating demand would lead to a drop in prices that is ultimately beneficial for all farmers. However, this could also be undesirable if the goal were to impact the most marginalized farmers by tackling specific barriers they faced (e.g., access to finance, knowledge). Paying for the number of farmers who bought a minimum quantity of fertilizer appropriate for the smallest farms could, on the other hand, reduce existing incentives to focus on the farmers with the greatest demand. In addition, this may prevent exacerbating incentives of overselling fertilizer to farmers with little or no impact on yield improvements.

<sup>48</sup> Cream skimming differs from productive management to maximize impacts in that targeting beneficiaries that would benefit most from the intervention is productively strategic, while targeting beneficiaries who would have benefited most regardless of the intervention is counterproductive.

- *Yield improvements*: While yield improvement is an important metric to capture, paying for it directly can lead to perverse behaviors as it does not factor in the incremental cost to the farmer of achieving that yield improvement. This may incentivize suppliers to encourage farmers to spend more on inputs than the additional yield is worth to the farmer.
- *Technology adoption*: Paying service providers for improvements in technology adoption rates can incentivize a focus on short-term solutions (e.g., giving away technologies for free or at a reduced price) instead of tackling the underlying barriers to technology adoption (e.g., access to finance). For example, in the storage capacity pilot project in Kenya, sales prices must cover the cost of production to count for the final prize.<sup>49</sup> Furthermore, since sales to donors and public organizations that distribute storage devices to farmers are not eligible, the pilot is likely to incentivize a focus on smallholder farmers and the development of effective distribution and marketing strategies.<sup>50</sup>
- *Land titles/certificates*: Where payment metrics only capture one dimension of the desired result (e.g., number of land titles/certificates afforded) and leave other dimensions unconsidered (e.g., to whom land titles were afforded or if they were afforded based on sufficient consultation/investigation), the incentivized actor will likely reallocate their effort to the incentivized payment metrics and away from the non-incentivized dimensions. This could exacerbate inequalities in the land formalization process, economic and physical displacement, or land disputes.

The risk of cream-skimming is highest where the target population contains significant heterogeneity in terms of their characteristics that affect the cost of achieving expected results. A careful selection and definition of payment metrics or paying for causal results (see Box 4.) can mitigate this risk. A narrow definition of the target population or assigning different prices to subgroups of the target population can also reduce the risk of cream-skimming or be used to target improved outcomes for socially vulnerable groups.

#### **Box 4: Design strategies to mitigate the risk of cream skimming or target socially vulnerable groups**

- 1. Paying for causal results** (the results that are attributable to a program or service. E.g., extension services) using an impact evaluation can reduce the risk of cream skimming. Without an impact evaluation, the beneficiary population may be different from the intended population of interest. For example, a provider may cream skim more motivated farmers or farmers who already have a good skillset or knowledge. The provider would then claim payment for the improvements in productivity of these farmers even though they would likely do better even without the program. With an impact evaluation the provider can still select beneficiaries but, if the impact evaluation is designed and implemented well, the only thing that is paid for is the causal impact of the provider's program on the population. However, rigorous impact evaluations are usually very costly and finding an adequate control group may not always be possible, for example if a program is nation-wide.
- 2. Assigning different prices to subgroups of the target population** can be used to incentivize and enable providers to focus their support on certain subgroups of interest (e.g., women or marginalized groups). Differential pricing should be considered if the target population contains significant heterogeneity that affects either the cost or the benefits of achieving results. If results are paid at the same price across the entire target population, providers have an incentive to target those individuals easiest to impact. From a cost perspective, differential pricing can be used to ensure that payments accurately reflect the marginal cost of achieving results across different population segments. Alternately, from a benefit perspective, differential pricing can incentivize providers to focus on achieving results for the subgroup of the population which offers the highest benefits. To determine benefits, designers may want to incorporate equity considerations as benefits may not only arise from efficiency gains but also from reducing gender or other forms of inequality. However, successful differential pricing generally requires creating beneficiary subgroups that are relatively homogenous in relation to the costs faced by providers in achieving results. This necessitates the identification of observable characteristics and, thus, access to relevant data. Differential pricing also increases the complexity of the design and should be considered if the associated burdens and costs do not comprise the design or implementation.

Box 5 outlines relevant considerations for selecting payment metrics related to improved land property rights.

<sup>49</sup> Dalberg (2012).

<sup>50</sup> Ibid.

### Box 5: Payment metrics in land – Paying for land titles as a proxy for improved property rights

Land titles are a key factor for investment in agriculture as well as in businesses and property development more broadly. Land titles also stimulate land markets (with long term effects on poverty reduction) by improving farmer's access to formal credit, facilitating land transactions, and reducing expropriation risks (Banerjee *et al.* [2002], Besley [1995], Feder [1988], Deininger and Feder [2010]). Possible payment metrics for RBF interventions in the land governance sector include the number of titles issued, the percentage increase in formalized smallholder estates, or the number of hectares formalized.

These metrics would be **easy to measure and verify** and within the actors' **manageable control** as long as the internal management in the cadaster and land registry is keeping land records, monitoring the process of land titling, and has adequate management systems.

However, in some contexts, land titles are not necessarily **closely related to the ultimate objective** as they only account for *de jure* property rights (property rights on paper) rather than *de facto* property rights (local informal recognition of property). Depending on the legal context of the country or region, *de jure* land rights can be achieved before ensuring *de facto* tenure. *De facto* land rights are often garnered by investing in fixed assets – such as fences, wells, machines – or long term productive assets, such as fruit trees. Giving *de jure* land titles where *de facto* property rights and institutions are weak could lead to situations with little progress as land titles may have little or no value to the locals who still face uncertainty in their property rights despite being titled. This has happened in conflict contexts like Guatemala and Colombia (World Bank - IEG [2016], Deininger [2002]). As such, *de jure* property rights may not be a sufficient condition to improve overall land tenure. Payment metrics that are correlated with enhanced *de facto* property rights (e.g., increased investment in fixed assets, increased access to irrigation and roads, improved productivity, improved savings, or institutional variables such as land disputes resolved or reduction in average time to resolve a land dispute) may be more closely related to the ultimate objective and incentivize actors to focus on barriers to greater investment (beyond land titles).

Furthermore, paying for land titles afforded in contexts where they depend on some *de facto* property rights could further exacerbate inequalities in the land formalization process. It would create incentives to target the richest farmers – who are more likely to be able to make the investments to enhance *de facto* property rights. This risk of **perverse incentives** could be mitigated through a careful definition of the target population (female farmers or farmers with an income below a certain threshold) and through close monitoring to avoid situations of large landholders using smallholder figureheads. Finally, since land titling can conflict with traditional and collective tenants, a careful analysis of the local context will be required for metric selection.

## DESIGN OF THE PAYMENT STRUCTURE

Where the payment metrics define the results that are paid for, the payment structure specifies the timing of payment and how payment varies with results achieved on the payment metrics. The payment structure is an important design component in defining the nature and strength of the financial incentives provided and the payment risk transferred to the incentivized actor.

The payment structure includes, among other elements, the total payment tied to results, the payment function (i.e., the payment as a function of the results achieved), and the targets. Below, general RBF design considerations are outlined, which could facilitate quality future applications of RBF in agriculture and land administration programs. Lessons learned from the nine existing RBF programs in agriculture are also incorporated.

### **Total payment tied to results**

The total payment tied to results determines the intensity of the incentives and, in cases where the payment does not only represent a bonus, the risk transferred to the incentivized actors. From an effectiveness perspective, incentives should be large enough to encourage progress and induce the desired behavior change but they should not be so large as to undermine intrinsic motivation or amplify perverse incentives. Therefore, attention should be paid to how the financial incentives will interact with the existing incentive environment. From a funders' perspective, the total payment should not exceed the total benefits generated and should ensure value-for-money. This requires understanding the funder's objective function and the readiness of alternative options.

The calculation of the total payment could either be cost-driven (i.e., taking the cost of delivering expected results and adding a certain percentage to account for the risk transferred) or benefit-driven (i.e., taking a percentage of the total

social value that would be gained from the successful delivery of results). Using a combination of these approaches can help expand the understanding of the various factors that affect prices and incentives.

Furthermore, where RBF funds the provision of a program or service a decision needs to be made as to how much of the total funding will be tied to results. In Impact Bonds, generally 100% of the funding is tied to results, whereas in Performance-Based Contracts usually only a portion of funding is conditioned to results. Consideration should be given to the ability of the incentivized actor to pre-finance a portion of the program (or access other financial funds) as well as to the following four factors:

1. **Capacity of the incentivized actor to manage performance.** *All else equal*, the amount of funding tied to results should decrease the lower the degree of manageable control.
2. **Risk preferences.** It is important to consider the different appetites for risk and rewards across incentivized actors as well as their capacity to absorb risks. *All else equal*, the size of the funding tied to results should decrease with the provider's risk aversion.
3. **The broader incentive environment.** Consider other financial and non-financial incentives such as intrinsic motivation and social norms as well as how the incentives are perceived by the actor (e.g., reward for good performance or sanction for not delivering results). *All else equal*, the amount of funding tied to results should increase the more responsive the actor's effort is to an increase in the intensity of incentives.<sup>51</sup>
4. **Uncertainty about perverse incentives.** In cases where there is uncertainty about the level of perverse incentives created by the payment metrics and other design features, a higher portion of funding tied to results may magnify the existing distortions.<sup>52</sup> *All else equal*, the higher the possible perverse incentives caused, the smaller the performance-based component should be.

### **Payment function**

Next, depending on the RBF instrument chosen, there are different options for allocating the total payment to the level of results achieved (payment function).

1. **Prize-Based Challenges** differ from other RBF instruments with respect to the payment function in that the total payment (a prize) is rewarded to a number of competing actors. Hence, payment depends on the actors' relative performance. The competition among participants reduces the need for selecting organizations with the required capacity and can be used to resolve imperfect information regarding the best solution approach. The prize can either be awarded to the best innovation(s) developed in a pre-defined time ('winner(s)-take-all prize') or can be distributed proportionally to the competing actors according to their relative performance ('proportional prize'). Proportional prizes are an interesting mechanism where multiple actors can succeed to a varying degree and where the goal is to create a competitive, self-sustaining market – as the entry of strong actors into the competition does not necessarily discourage other actors from entering. A proportional prize is also more suitable where the expected level of results is difficult to determine as it does not require pre-specified targets.<sup>53</sup> In fact, 2 out of 6 projects of the AgResults initiative use a proportional prize.
2. **Other RBF instruments** can either pay a fixed price for each unit of results achieved ('per unit payments') or a fixed amount conditional on achieving a certain threshold ('threshold payments'). Per unit payments reward the incentivized actor for incremental progress made, while threshold payments provide strong incentives to improve results around the threshold but may be ineffective if the threshold is set either too high or too low.

Table 2 summarizes various payment functions and further discusses their respective advantages and disadvantages.

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<sup>51</sup> Heinrich & Marschke (2010).

<sup>52</sup> Sturgess & Cumming (2011). Heinrich & Marschke (2010).

<sup>53</sup> Master (2012).

Table 2: Overview and discussion of different payment functions

	(1) Per unit payments	(2) Threshold payments	(3) Proportional prize	(4) Winner(s)-take-all prize
<b>Description</b>	Pays a fixed price for each unit of results achieved.	Pays a fixed amount conditional on achieving a certain threshold.	Pays a fixed prize that is distributed proportionally to competing actors according to their relative performance. <sup>54</sup>	Pays a fixed prize to the best innovation(s) or actor who first presents an innovation that meets requirements.
<b>Competition among actors</b>	No		Yes	
<b>Target</b>	Pre-specified	Pre-specified	To be discovered	Pre-specified
<b>Example</b>	\$ 2 for each kilogram of seeds sold (max. payment: \$ 200).	\$ 100 for selling over 50 kilograms of seeds (no payment or full payment).	\$ 3m distributed proportionally according to the amount of seeds sold.	\$ 1m for the first actor presenting a seed that meets requirements.
<b>Discussion</b>	<p>Rewards incremental progress made on the selected metrics.</p> <p>Sometimes a higher price per unit is provided at different result levels to account, for example, for diminishing returns to effort exerted.</p> <p>A maximum threshold beyond which no further payment is made is key to protect the outcome payer against unlimited payment.</p>	<p>Provides strong incentives to improve results around the threshold but may be ineffective if the threshold is set either too high or too low.</p> <p>Payments conditional on thresholds introduce a higher level of risk for the actors, as a small change in the performance can make a huge difference in the payment.</p> <p>These payment functions are less appropriate the lower the actors' manageable control.</p> <p>Therefore, payment functions with thresholds are less advisable in agriculture, where external factors make results highly variable.</p>	<p>Competition among participating actors reduces the need for selecting organizations with the required capacity and resolves issues of imperfect information regarding the best approach.</p> <p>Interesting mechanisms where multiple actors can succeed to a varying degree and where the goal is to create a competitive market.</p> <p>Advantages compared to (4):</p> <ul style="list-style-type: none"> <li>• Strong actors do not necessarily discourage potentially promising actors from entering;</li> <li>• Reduces risk of too low or too high targets since competition pushes actors to gain a greater market share, thus increasing market size;</li> <li>• If tied to adoption rates or productivity increases, it increases downward accountability to farmers (through demand).</li> </ul> <p>Disadvantage compared to (1) or (2):</p> <ul style="list-style-type: none"> <li>• Increases uncertainty over final payout for competing actors (and thus potentially the # of actors willing to participate), as actors not only need to assess their ability to generate results but also how other actors will perform.</li> </ul>	<p>Better suited to financing the development of breakthrough technologies – compared to (3) – because only the first actor to develop the technology is relevant.</p> <p>A winner-takes-all prize encourages actors to not disseminate any insights from their research for as long as possible to have an advantage in the next round.</p> <p>Milestone prizes may help to reveal information but also increase uncertainty and risk for participating actors.</p>

Source: Master (2012), Kremer and Zwane (2005), Sheremeta *et al* (2010).

In addition, the different payment functions could also include a **minimum threshold** below which no payment is made. A minimum threshold at the individual level may make sense where there is a minimum cost-effectiveness required to create a sustainable market. The design could also include a collective minimum threshold that would incentivize participating actors to cooperate and reach a result level necessary for creating a self-sustaining, competitive market

<sup>54</sup> Similar to a per unit payment with the price per unit being a function of the total prize and the total performance achieved.



(new market equilibrium). However, a collective threshold also increases the risk transferred to actors as there is uncertainty around the contributions from other actors (see Box 6).

#### **Box 6: RBF design calibration in Zambia**

The AgResults program in Zambia aims to support the introduction of fortified maize into Zambian markets by providing incentives to seed companies and commercial millers (see Box 2).

**The initial design** provided incentives to commercial maize millers in the form of a proportional prize that was contingent upon the achievement of a collective minimum threshold of fortified maize meal sold. This design introduced uncertainty for millers in two ways: (1) The per unit payment received by each miller depended not only on the amount sold on their own, but also on the total amount sold by all participating millers; (2) AgResults found that millers were reluctant to invest in the promotion of fortified maize given the uncertainty of whether contributions by other millers would be sufficient to reach the collective threshold.

**In the revised design** payments depend solely on the individual sales of each miller. There is an individual minimum threshold below which no payment is made. This minimum threshold increases over time (as does the maximum threshold beyond which no payment is made) to incentivize higher sales in each period. In addition, the per-unit payment increases with the total amount of sales (within set threshold ranges) to incentivize millers to increase the amount of fortified maize meal sold (in addition to economies of scale, which should provide them with a minimum incentive to increase sales even in the absence of the increasing per-unit payments).

Source: Janus & Holzapfel (2016), AgResults (2017f).

### **Targets**

Where the payment structure requires setting a target in terms of the expected level of results (payment function option [1] or [2]), the level at which targets are set determines the risk transferred to the incentivized actors and the intensity of the incentives provided. Through a review of RBF programs in agriculture, the following key lessons learned were identified:

- 1. Accuracy of baseline values.** Usually targets are set taking into account the level of results at baseline. To avoid setting unrealistic high targets designers need to assess the validity of baseline data and consider any exceptional events that may have influenced results at baseline causing either values that are exceptionally high or low. In the Development Impact Bond in Peru, overestimation of baseline values for the cocoa yield metric (400kg/ha) led to underperformance relative to targets (600kg/ha).<sup>55</sup> This was exacerbated by a minimum threshold; payments would only be made if a minimum of 20% of the beneficiaries achieved the target. While the overly optimistic baseline levels would have, in any case, affected the performance on this metric, a formulation of the metric in terms of the average increase in cocoa yields (with or without thresholds) may have resulted in at least some payment. In the AgResults program in Vietnam, full representative household surveys of baseline agricultural practices and indicators were undertaken in both growing seasons to ensure the baseline was not biased based on the site of baseline measurement. AgResults also recommends seeking feedback from various stakeholders to verify the baseline.<sup>56</sup>
- 2. Sensitivity to external factors.** Designers of RBF instruments should consult with agricultural experts to account for the high variability in external factors in setting targets and should consider adjusting targets if these occur. The Performance-Based Loan in Rwanda uses an interesting mechanism. Under normal conditions, an increase in average crop yields of 75% of the target will trigger the full payment attached to the payment metric. However, if either crop or yield insurance payouts are made during the respective year, the 75% threshold will be lowered to 40% effectively reducing the target set.<sup>57</sup>

As mentioned before, the design of the RBF instrument is critical to unlock the full potential of RBF. If the RBF is not designed well, poor program results cannot be attributed to the instrument. Importantly,

#### **Box 7: Using impact evaluations to mitigate the risk of external factors**

Impact evaluation methods aim to isolate the effect of a program from other factors that may influence the results of interest. Therefore, setting targets based on the results attributable to the program (causal impact) may be an interesting mechanism to overcome the challenge of external factors. However, paying for causal results does not protect against external factors that influence the effectiveness of the program. For example, if fertilizer is only effective with a minimum level of rainfall, then a drought could undermine the effectiveness of the fertilizer.

<sup>55</sup> Belt (2015).

<sup>56</sup> AgResults (2017g).

<sup>57</sup> World Bank (2014).

practitioners need to tailor the design to the identified barriers to results and to the drivers of impact discussed in Section 3. Different design features are critical to activate these drivers. For example, the total payment amount must be sufficient to induce a behavior change in the incentivized actor if financial incentives are hypothesized to be the key driver to achieve greater impact. This is less relevant if attention or discretion over activities are the hypothesized drivers of impact. In fact, tying a large amount of the total funding to results may even impede the actors' willingness to innovate in their approach since they do not want to take on risk in their cash flows. This is especially if the duration of the contract or the selection of payment metrics does not provide enough room to learn from failures and to find more effective ways to deliver the desirable results.

## 5. CONCLUSION

**The potential for RBF to improve the cost-effectiveness of interventions in the agriculture and land administration sectors is case-specific. Detailed analysis of the barriers to improved results, both for beneficiaries and for existing interventions, are required.** RBF can help to overcome these barriers through four mechanisms: (i) by focusing attention on results, (ii) aligning incentives of actors around result achievement, (iii) allowing for flexibility in methods to achieve results, and (iv) increasing accountability to beneficiaries. These ‘drivers of impact’ will have varying effects on each actor and intervention, thus practitioners will need to analyze the potential for the drivers to resolve the existing barriers in each case.

**An overview analysis of common barriers to successful interventions in the sectors indicates that there is particularly high potential for RBF to add value to R&D efforts, agricultural extension services and media campaigns, and infrastructure investment.**

Public and private R&D institutions experience many incentives that do not maximize the efficient development of products that are useful for land registry agents or farmers, particularly smallholder farmers. An RBF instrument such as a Prize-Based Challenge could provide productive incentives, encourage effort beyond the price of the prize, and allow flexibility for public researchers that may have been constrained otherwise.

Similarly, funders of agricultural extension services have long struggled to improve the accountability of services to the farmers they serve and, consequently, the impact of their services. RBF, through a Performance-Based Contract for example, could focus the attention of the organization on results, increase accountability to beneficiaries, and allow providers discretion to tailor services to farmers’ individual needs. The ability to customize services is particularly important in agriculture, where technologies and practices to improve productivity are highly contextual. RBF could similarly allow for flexibility and iterating of media campaigns to change citizen’s behaviors by convincing them to adopt agricultural practices or changing perceptions of land administration practices.

RBF also has strong potential to improve cost-effectiveness in the delivery and maintenance of infrastructure relevant to the agriculture sector. A Performance-Based Contract for road or irrigation maintenance, for example, could focus attention on results and put in place incentives for quality maintenance, thus increasing functionality and accountability to beneficiaries.

**Although there are cases of successful implementation of RBF to improve institutional effectiveness in government and to influence markets (and future potential), it is likely to be much more challenging to create effective incentive environments for these types of interventions.**

RBF could help to overcome administrative inefficiencies in national or sub-national governments by increasing actors’ focus on results and accountability to beneficiaries. The ability of RBF to facilitate administrative efficiency is likely the most relevant application of RBF for land policy and administration where efficient and accurate management of land cadasters and registries is critical. Although RBF may be able to increase public sector actors’ incentive to achieve impact in the sector, the public sector is often subject to complex and intersecting incentives and legal restrictions that may nullify the added value of RBF.

For interventions in private markets along the value chain in agriculture, an RBF such as a Prize-Based Challenge could help to shift the incentives of private actors to propel them to pursue publicly beneficial activities. However, effects on market equilibriums are difficult to predict and it may be prohibitively challenging to identify the correct incentives. In either case, practitioners are advised to analyze whether actors are able to react to incentives.

**The design of the RBF instrument needs to be tailored to the intervention, the barriers identified, and the characteristics of the incentivized actors as well as to the underlying assumptions of how RBF will drive greater results.** Selecting the right payment metrics is critical for every RBF but is particularly important in the agriculture sector due to its high heterogeneity and vulnerability to external factors and in the land administration sector because of the potential perverse incentives. Practitioners will need to carefully assess the trade-off between metrics that are within reasonable control of the incentivized actors, on the one hand, and those that provide the discretion and incentives to innovate and adapt their approaches to the local context, on the other. Finally, RBF design often takes place in contexts of high uncertainty: environments change, new information is discovered, political will shifts, and social norms change. Just as RBF offers actors greater flexibility to respond and adjust to the changing environment, so too must RBF instruments respond and adjust. Piloting the design at a small scale and/or with a moderate level of incentives

and complexity will help identify bottlenecks and calibrate the design for larger scale implementation. This will ultimately build resilient instruments that channel money towards greater impact and cost-effectiveness.

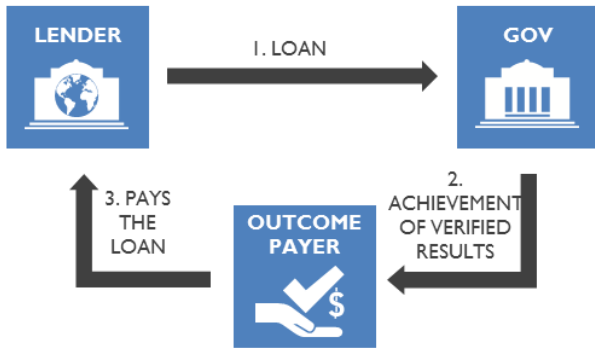
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# APPENDIX I: RBF INSTRUMENTS

## RISK TRANSFERRED TO CENTRAL GOVERNMENT

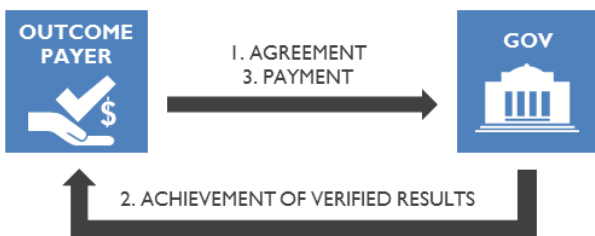
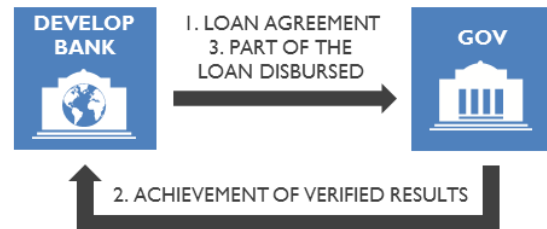


### PERFORMANCE BASED DEBT BUY DOWN (PDBD)

A lender (multilateral agency) gives a loan to a government. An outcome payer (foundation, or multilateral agency) pays part or the whole loan on behalf of the government if predefined results are achieved.

### PERFORMANCE BASED LOAN (PBL) (or Program for Results)

A government receives a loan commitment from a development bank (e.g. World Bank), with disbursements being conditioned based on achieving predefined results.



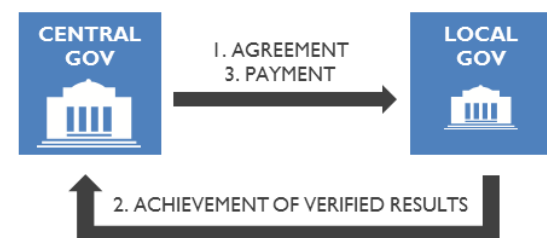
### CASH ON DELIVERY (COD) / RESULTS BASED AID (RBA)

An outcome payer (foreign government, foundation, or multilateral agency) awards resources to a government if certain predefined results are met.

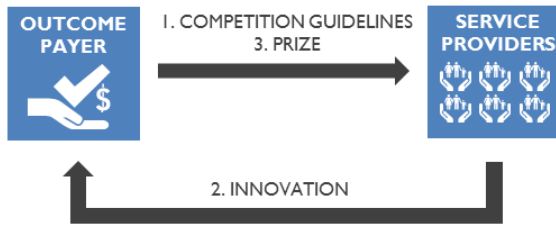
## RISK TRANSFERRED TO LOCAL GOVERNMENTS

### PERFORMANCE BASED GRANT (PBG)

The central government awards resources to a local government if certain predefined results are met.



## RISK TRANSFERRED TO SERVICE PROVIDERS

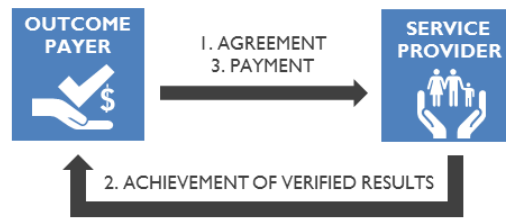


### PRIZE BASED CHALLENGES (PzBCh)

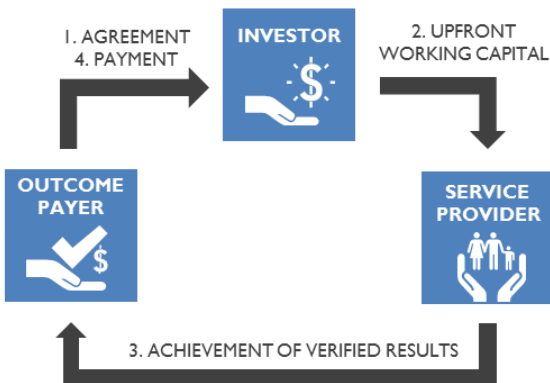
An outcome payer (government, foundation, or multilateral agency) opens a competition to unlock innovation in desired social outcomes. Innovators have a predefined time to send their developed innovations. The best one receives the prize.

### PERFORMANCE BASED CONTRACT (PBC)

An outcome payer (a government, foundation, or multilateral agency) conditions part of its payment to a service provider based on the achievement of predefined outcomes. Usually only a small proportion of the total funding is conditioned upon results to reduce the need for working capital to implement the program.



## RISK TRANSFERRED TO INVESTORS & SERVICE PROVIDERS



### IMPACT BONDS (SIBs & DIBs)

An outcome payer conditions all its payment based on desired outcomes, with an investor providing upfront working capital to the service provider. The investor receives a return only if outcomes are achieved. In a Social Impact Bond (SIB), the outcome payer is a government, while in a Development Impact Bond (DIB) the outcome payer is a donor – such as a foundation or multilateral development agency.



## APPENDIX 2: DRIVERS OF IMPACT



### Drawing attention to outcomes

Paying for results requires measuring results. People have limited capacity to absorb information<sup>2</sup> and, thus, act on the limited information available to them (often information on activities performed). By making results visible and tying funding to them, the achievement of results becomes a tangible signal and draws the attention of the service provider to what matters. Especially when complemented by an improved performance management system, this information reaches the service provider, provides an effective feedback mechanism and allows him to adjust activities towards achieving greater impact.



### Aligning incentives with beneficiary welfare

This mechanism relies on the premise of the well-known principal-agent model, in which the service provider (the agent) focuses its effort only on what it is paid for, which – under traditional funding schemes – usually only include inputs or activities. By putting some of the funding at risk, or by providing an attractive bonus payment for the achievement of results, RBF ensures that the objectives of funders (the principal) and providers are well aligned. The financial incentives induce a behavior change and the provider exerts more effort towards achieving the results to satisfy its pecuniary interests.



### Providing flexibility to achieve results

Funders often have an idea of what they think is the best intervention for achieving a desired result (resulting in rigid requirements in terms of the intervention design), but service provider on the ground may possess local knowledge. As such, service providers may be better positioned to monitor the changing needs of the target population or the occurrence of external factors, allowing them to devise or adapt their solutions accordingly. If designed in the right way, RBF creates opportunities for learning and adaptation. By shifting the focus on outcomes, and away from activities and processes, RBF grants providers the flexibility and freedom to pursue a range of strategies to achieve results. Providers are enabled to experiment, learn and adapt delivery models to the local and changing context, allowing them to operate with greater success.



### Improving accountability to beneficiaries

Accountability can flow in multiple directions and can be around activities and inputs or around outcomes. Traditional funding creates accountability of the provider towards the funder (and often around inputs/activities), which can disrupt the relationship between the provider and the beneficiaries, who receive the effects of the intervention. By tying funding to results on beneficiaries, it forces providers to deliver activities that more directly meet beneficiaries needs, not funder's needs and the provider becomes accountable to delivering results. Visibility of results improves accountability mechanisms because the providers' impact on the lives of beneficiaries becomes known, lowering the transaction costs of beneficiaries (and funders) in demanding changes and holding the provider accountable.

## APPENDIX 3: RBF PROJECTS IN AGRICULTURE

Table 3: AgResults Projects

Location	Objective	RBF Instrument	Parties	Duration	Financial Size	Payment Metrics	Payment structure
Nigeria	The project aims to incentivize organizations with contract farming arrangements (aggregators) to work with smallholder maize farmers to adopt Aflasafe, a new biocontrol technology for aflatoxin contamination.	Performance-Based Contract	Aggregators (service providers), AgResults (outcome payer)	5 years	\$12,680,000	- Number of kilograms of maize treated with Aflasafe collected by maize aggregators and delivered to designated collection points.	\$18.75 for every metric ton of high-Aflasafe maize that is delivered to designated collection point (a premium of 13%-17% depending on the price of maize).
Kenya	The project aims to address post-harvest losses by facilitating the development, marketing and distribution of on-farm storage solutions to small farmers. The pilot focuses on storage of maize and other grains in Kenya.	Prize-Based Challenge	Storage Companies (service providers), AgResults (outcome payer)	2015-2019, 4 years	\$7,750,000	- Verified sales of approved storage devices beyond a minimum 21,000 MT of Useful Life Adjusted Storage threshold.	<p><b>Rift Valley:</b></p> <ul style="list-style-type: none"> <li>- <b>Mid-pilot payment:</b> the first five service providers to reach a 21,000 MT threshold of storage devices sold to smallholder farmers are eligible for a \$750,000 grant.</li> <li>- <b>End-pilot payment:</b> implementers that sell storage devices beyond the 21,000 MT threshold share a \$1 million prize. The prize is proportionally distributed according to sales.</li> </ul> <p><b>Eastern Region:</b></p> <ul style="list-style-type: none"> <li>- <b>End-pilot payment,</b> service providers that sell storage devices above the 21,000 MT threshold share a \$3 million prize, for Large Grain Borer proof devices. The prize is proportionally distributed according to sales.</li> </ul>
Uganda	The project aims to boost the production of and improve Ugandan smallholder farmers' access to government certified and quality legume seed varieties via seed-company sales incentives.	Prize-Based Challenge	Seed companies (service providers), AgResults (outcome payer)	2017-2021, 6 years	\$1,600,000 (not including access to cold storage provided unconditionally to seed companies)	- Volume of improved/certified seeds sold	Prizes are awarded to seed companies annually equivalent to 20% of their sales of certified seeds above a pre-specified growth rate threshold and up to 20% of growth relative to the prior year.
Zambia	This project aims to support the introduction of biofortified provitamin A (PVA) maize into Zambian markets by providing incentives to seed companies and commercial millers. This strategy will help reduce Vitamin A deficiency.	Performance-Based Contract	Ag Results (outcome payer), seed companies & millers (service providers)	2016-2020, 5 years	\$7,000,000	- MT of biofortified PVA maize meal sold by millers - MT of PVA maize seeds sold to farmers by seed companies	Millers/seed companies receive annual payments that consist of two parts: i) a base threshold payment and ii) a payment per unit sold beyond the threshold. Both the base threshold payment and unit price increase as more maize meal/seeds are sold within a given year. The range of prizes changes year-to-year.

Location	Objective	RBF Instrument	Parties	Duration	Financial Size	Payment Metrics	Payment structure
Vietnam	The project aims to identify and scale the most effective approaches for reducing greenhouse gas (GHG) emissions from rice production and increasing yields in rice cultivation.	Prize-Based Challenge	Implementers and researchers (service providers), AgResults (outcome payer)	2017-2021, 4 years	\$3,335,000	<ul style="list-style-type: none"> <li>- Reduced GHG emissions per rice field</li> <li>- Increase in yields in rice cultivation.</li> <li>- Number of smallholder farmers reached</li> <li>- Repeated use of the solution</li> </ul>	<p><b>Phase I: Test Solutions</b>  <u>Interim prize:</u> \$55,000 are distributed proportionally across ranked implementers.  <u>Milestone prize:</u> Top 3 performers in reducing GHG and increasing yields receive a prize:  1st = \$50,000  2nd = \$30,000  3rd = \$20,000</p> <p><b>Phase II: Scale up</b>  <u>Interim prize:</u> \$500,000 (per growing season) distributed proportionally across ranked implementers who surpass baselines for reductions in GHG emissions and rice yields.  <u>Grand prize:</u> Top implementers for: most smallholder farmers reached, repeated use of solutions, reduction in GHG, yield increase, receive a prize:  1st = \$750,000  2nd = \$400,000  3rd = \$200,000</p>
Global	This project aims to develop a safe, low-cost, and efficacious vaccine for Brucellosis	Prize-Based Challenge	AgResults (Outcome payer), Selected Vaccine companies (Service Providers)	2016-2026, 10 years	\$30,000,000	<ul style="list-style-type: none"> <li>(1) Application phase: best 10 applications,</li> <li>(2) Solving phase: first 4 solvers that complete efficacy studies that demonstrate a successful test of a vaccine and meet requirements,</li> <li>(3) Final phase: first registered vaccine that meets the minimum viable product requirements<sup>58</sup> plus reward for providers that meet one of the best in class criteria<sup>59</sup>.</li> </ul>	<p>- Milestone payments:  (1) best 10 applications (\$100,000 for each winner),  (2) first 4 solvers to meet requirements (\$1 million each),  (3) \$ 20 million grand prize (first company that registers vaccine that meets minimum viable product requirements) + \$5 million for meeting any one of the best in class criteria.</p>

Source: AgResults website, Janus and Holzapfel (2016).

<sup>58</sup> Considerations for the minimum viable product include: efficacy (effective against B.melitensis in sheep or goats with potential for a second target species), safe for pregnant animals (less than 5% abortion rate), efficacious (protects more than 80% of animals), affordability (for smallholder farmers, including a sufficiently low cost of manufacturing)

<sup>59</sup> Best-in-class criteria include: cross-species protection, maximum human and animal safety, thermo-resistance (effective at 45°C for three weeks), curative/therapeutic effect on infected animals.

Table 4: RBF programs in agriculture, other

Location	Objective	RBF Instrument	Parties	Duration	Financial Size	Payment Metrics	Payment structure
Rwanda	The project aims to increase and intensify the productivity of the Rwandan agricultural and livestock sectors and expand the development of value chains	Performance-Based Loan	World Bank & DFID (outcome payers), Rwandan Central government & Ministry of Agriculture (recipient)	2013-2017, 4 years	\$144,000,000	<ol style="list-style-type: none"> <li>1. Increase in average yields for key food crop (cassava), export crop (coffee) and milk per cow</li> <li>2. Increases in land protected against soil erosion according to agreed technical standards</li> <li>3. Increase of irrigated area in hillsides and marshlands</li> <li>4. # of innovation technologies released and adopted by farmers</li> <li>5. % increase in agricultural finance lending</li> <li>6. Updated Gender Sensitive MIS Framework and Action Plan</li> <li>7. Approval of seeds policy, fertilizer policy and agriculture finance policy</li> </ol>	Structured to provide strong incentives to achieve 75% of the targets (= 100% disbursement) and reduce risk by rewarding small improvements (proportional disbursement) Exogenous factors: For the outcome indicator (increase in yields) targets are reduced if exogenous factors (e.g., weather events) trigger crop or yields insurance payouts (in this case a 40% achievement will trigger full disbursement)
Peru	The project aims to increase Cocoa bean & coffee production, quality and productivity for the indigenous producers in the Peruvian amazon	Development Impact Bond	Schmidt Family Foundation (US) (investor), Rainforest Foundation UK (service provider), Common Fund for Commodities (CFC) (Outcome payer)	2015, 1 year	\$110,000	<p>60% of KE members increased supply by at least 20%. (Outcome)</p> <p>60% of KE members improve cocoa yield to 600 kg/ha. (Outcome)</p> <p>At least 35 tons of cocoa bought and sold during program (Outcome)</p> <p>At end of project 40 producers have 0.5 ha of newly established coffee plots with leaf rust-resistant varieties (Output)</p>	Payment weight of 25% given evenly to each of the four metrics. Payment amounts per metric: 100% of the target = \$27,500 75% - 99% of the target = \$20,625 50% - 74% of the target = \$13,750 below 50% of the target = \$0
China	The project aims to improve the efficiency of irrigation services in the North China plain (Nanyao and Bayi) by improving and maintaining infrastructure.	Performance-Based Grant	Government of the P.R. of China, Provincial Government of Hebei (Outcome payers), Irrigation Districts (ID) (recipient)	1988 - onwards	Undisclosed	<p>Payment metrics are in 8 areas:</p> <ol style="list-style-type: none"> <li>1. Irrigation efficiency</li> <li>2. Proportion of structures that are functional</li> <li>3. Balance of income and expenditures</li> <li>4. Total water use</li> <li>5. Irrigated area</li> <li>6. Water use efficiency</li> <li>7. Irrigation schedule</li> <li>8. Crop yields obtained</li> </ol>	The performance of all target metrics, relative to the agreed targets, is evaluated on a scale of 1-100 (100 being target completion). The provincial government rewards the ID by providing funds for construction and maintenance, exclusively.

Source: World Bank (2016), GPOBA (2014), Belt (2015), Janus and Holzapfel (2016).