

Impactful Design: AgResults' Pay-for-Results Prize Competition Toolkit



February 2021

Foreword

“How do we best structure an advance market commitment for agriculture?” was the crux of the call I got from Rebekah Young, then at Finance Canada, eleven years ago. I had just started working at the Gates Foundation. We discussed how best to incentivize the private sector to solve problems faced by the majority of the poorest people on Earth: smallholder farmers.

The \$152 million AgResults initiative that resulted two years later — with the additional support of the British, Australian, and American aid agencies and facilitated by the World Bank — is unique. It manages to be both a complex multi-donor fund that facilitates multilateral coordination and learning and a very flexible initiative that can turn on a dime based on what we’re seeing that worked or failed. Our Secretariat, run to date by Deloitte, has collected the feedback and facilitated the frank conversations necessary to do this.

In 2016, AgResults launched one of the largest-ever humanitarian prizes, the \$30 million Brucellosis vaccine prize. Four years later, we have more than a dozen competitors striving to design a novel best-in-class vaccine, but we are no more certain if the prize will be claimed by the ten-year finish line. AgResults has had two clearly failed projects, focused on legume seeds in Uganda and biofortified maize in Zambia, and two that have clearly jump-started products critical to smallholders, Aflasafe™ in Nigeria and on-farm storage in Kenya. And in addition to the Brucellosis vaccine prize, there are five ongoing Pay-for-Results efforts: reducing greenhouse gas emissions in Vietnam, improving dairy production in Tanzania, making aquaculture in Indonesia more efficient, enhancing collective crop storage in Senegal, and distributing an improved Foot and Mouth Disease vaccine across East Africa.

From the start, our purpose was to set up AgResults as a learning initiative. Compiling this toolkit is part of that intention. One of the reasons Pay-for-Results mechanisms are not more widely used is that they are admittedly hard to design. And getting the design right is crucial as it is hard to equitably shift competition rules after they are announced.

We humbly recognize that ‘how to’ documents such as this one in the development space can feel dense so we have tried to make these pages engaging. But if you are considering designing a pay-for-performance mechanism, prize, proportional prize, or AMC in the development space, and would like to review anything covered here, we’d love to touch base with you. Please reach out to the AgResults Secretariat or members of the Steering Committee, including me.

Best of luck in your efforts!

Orin Hasson

Orin Hasson
Senior Investment Officer, Bill & Melinda Gates Foundation
AgResults Steering Committee Chair

This Toolkit

This toolkit is a practical guide for agricultural development practitioners who are interested in using Pay-for-Results prize competitions to stimulate new markets for agricultural technologies and engage the private sector to scale new technologies. It draws upon the experience of AgResults, which has designed and implemented prize competitions around the world since 2013. For that reason, this toolkit is primarily intended for people who are familiar with the AgResults model and want a practical guide to follow its approach.

The toolkit contains the following sections

**Concept
Sourcing**

**Analyzing
Feasibility**

**Structuring
Prizes**

**Right-sizing
Prizes**

**Verification &
Project
Management**

As practitioners navigate through the following pages, they will find real-life examples from AgResults' prize competitions (called "Challenge Projects") as well as a recurring academic example that looks at the poultry sector of the fictional country of Ginovia. Definitions of relevant terms are provided throughout. Practitioners will also find a variety of templates and worksheets that they can apply to their programming needs to see how, when, and where prize competitions can be most impactful.

Although AgResults concentrates on agricultural market development, the topics and examples discussed in this toolkit may also be applied to development finance prize competitions in health, energy, finance, and other sectors.

About AgResults

AgResults is a \$152 million collaborative program between the governments of Australia, Canada, the United Kingdom, the United States, and the Bill & Melinda Gates Foundation that funds agricultural Pay-for-Results prize competitions. Since 2013, AgResults has designed and implemented these competitions to incentivize the private sector to overcome specific market barriers and solve food security challenges — particularly for people living in poverty. AgResults competitions fall into one of two categories: 1) prizes that incentivize the Research and Development (R&D) of a new solution or product to address a market failure; and 2) prizes that encourage the development of innovative delivery models and encourage smallholder farmers to adopt an existing product or service at scale.

For more information on AgResults' approach, as well as its current portfolio and suite of learning products, please visit <https://agresults.org/>

CONCEPT SOURCING

The first step of prize design is concept sourcing, in which program designers brainstorm and evaluate potential development challenges to determine if they might be addressed through a prize competition. During concept sourcing, designers weigh donor priorities, population needs, potential development solutions, and potential impacts.

The initial stage of prize design, where prize concepts are identified and sketched out, helps competition designers articulate the program's goals and maximize its chances of achieving the desired outcomes. Identifying important development challenges, structuring feasible and measurable solutions, and understanding the operating environment helps designers avoid investing significant time and resources into a competition that is unlikely to be viable at implementation.

AgResults has created a rigorous and standardized methodology to evaluate and select potential concepts using three steps. Figure 1 on the next page describes these steps in more detail:

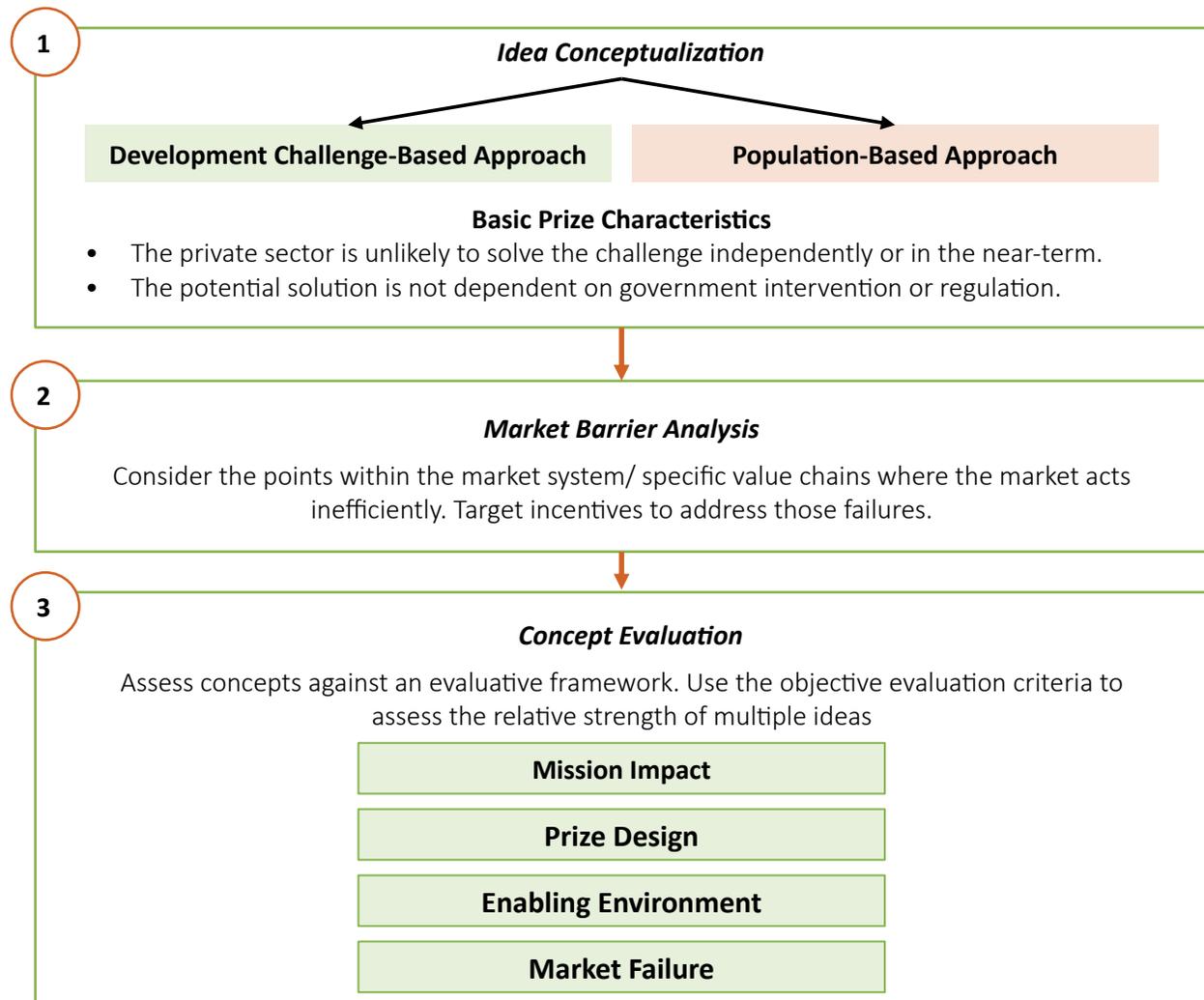


Terms to Know

- **Prize Competition:** A Pay-for-Results pull mechanism where actors must fulfill certain prescribed criteria to receive a monetary prize.
- **Market Failure:** An inefficient distribution of goods and services in a free market.
- **Competitor:** A private sector actor that has a vested interest in working with smallholder farmers and competes to receive a prize.
- **Prize:** A monetary award paid to a competitor if/when their verified results show they have achieved the prescribed criteria.
- **Enabling Conditions:** The regulatory, political, social, and economic realities and trends that shape outcomes in an environment. AgResults aims to leverage prize competitions in environments where the 'enabling environments' are unlikely to inhibit or may even support such an activity.



Figure 1: Concept Sourcing Steps



A Note on Researching Prize Concepts

AgResults uses desk research, expert interviews, and market and demographic data to gather the information needed to develop and evaluate prize concepts against its evaluative framework. **Desk research**, such as government and donor publications, highlight market conditions, government priorities, and common development challenges. **Expert interviews** allow designers to bolster their research and gather insights about the potential viability of the prize concept. Finally, **market and demographic data** help determine the complexity of a challenge and potential scale of a prize to address it. Collectively, these source materials should provide enough information for designers to create and critically evaluate prize concepts at an early stage.

Step 1 Initial Conceptualization

During initial prize conceptualization, designers identify challenges, populations, and value chains that appropriate incentives could address, focusing either on a development challenge or on a target population. AgResults has used two approaches to identify viable opportunities to source prize concepts that catalyze sustainable outcomes: In a ‘Development Challenge Based-Approach’ designers evaluate a known development issue and consider potential solutions as the basis for a prize competition. Used less

often, a ‘Population-Based Approach’ focuses first on analyzing specific geographies or farmer populations and then considers prize competitions that could address relevant market challenges.

Initial concept sourcing research and analysis occurs rapidly; it’s not meant to be comprehensive. Rather, it enables designers to develop some confidence in the viability of a prize competition while illuminating outstanding research questions. Following this rigorous process to identify and evaluate prize concepts will maximize the likelihood of concept success at implementation.

It Doesn’t Have to be All or Nothing



There are ways incrementally apply prize competitions to development agendas. Organizations might begin concept sourcing by re-imagining traditional programs, by identifying specific challenges to be addressed through prizes, or by developing prize complements to existing programs.

Development Challenge-Based Approach

In the “Development Challenge-Based Approach,” program designers first identify a priority development challenge and potential solutions and then narrow in on the specific population that can benefit from that solution via a prize competition. Competitions developed using this approach can have a range of objectives (see Figure 2), but they always rely on engaging sector experts who understand the challenges and are aware of potential solutions. This challenge could fall within a specific priority sector or industry of interest.

For some development challenges, designers may engage stakeholders directly to identify an existing technological solution that a prize competition could incentivize. For example, in Nigeria, AgResults knew that (1) aflatoxin contamination was a significant issue and (2) a biocontrol technology, Aflasafe™, had been developed to address the problem. With that information, AgResults designed a competition to incentivize Aflasafe™ uptake and reduce aflatoxin contamination. This competition, which focused on scaling adoption of an existing solution, is an example of a delivery-based prize objective (see Figure 2).



Prize concepts usually encompass one of four objectives: research-based prizes, delivery-based prizes, advance market commitments, or outcome-based prizes: **Research-based prizes** typically link prize payments to significant research or solution development advances. **Delivery-based prizes** aim to improve or scale delivery of an existing solution to target populations. **Advanced market commitments** help incentivize market entry to participants by partially subsidizing delivery of a product or solution. **Outcome-based prizes** link payments to the achievement of desired outcomes. In an outcome-based prize, participants often have broad discretion on what solutions they might deliver to beneficiary populations to achieve the desired outcome(s). Although different types of prizes vary in their objectives, they all aim to increase awareness of challenges and solutions, spur private sector action, and stimulate innovation.

Figure 2: Potential Prize Objectives



Example: Research-Based Prize

If there is no known solution or technology, designers can use a prize competition to create a solution. For example, AgResults knew that the *Brucella melitensis* strain of the zoonotic disease Brucellosis significantly impacts farmers who cannot access a safe and suitable vaccine for their animals. Yet no such vaccine exists for farmers in developing countries. To address that challenge, AgResults designed a competition to incentivize the creation of a Brucellosis vaccine for farmers in the developing world — an example of a research-based prize objective.

Example: Outcome-Based Prize

In other cases, rather than incentivize a specific solution such as a vaccine, designers use a prize competition to incentivize a range of solutions to a specific development challenge. Here designers may take a solution-agnostic approach, prioritizing the achievement of outcomes that solve the development challenge rather than focusing on specific solutions. For example, knowing that intensive smallholder rice farming has significantly driven greenhouse gas emissions in Vietnam, AgResults designed a prize competition for the private sector to submit input packages and approaches for consideration that they would sell to smallholder rice farmers to increase yield and decrease emissions. This outcome-based prize objective prioritized solving the development challenge over implementing a particular solution.

Population-Based Approach

The 'Population-Based Approach' begins with identifying key geographies or population groups as well as adverse development outcomes that a potential prize competition could address. In contrast to the development-challenge based approach, this approach starts with identifying a potential beneficiary population first and only then pinpointing specific development challenges that impact a population and possible solutions. Homing in on challenges that affect a certain group enables designers to determine key drivers of those challenges as well as impacted value chains and markets. From there, designers can proceed as they would in a development challenge-based approach, assessing (1) if a known solution exists and a prize can incentivize delivery or (2) if a prize could incentivize the development of a solution.

For example, for the Indonesia Aquaculture Challenge Project, AgResults began with an understanding that the competition would focus on smallholder farmers in Indonesia. With that focus, AgResults evaluated multiple agricultural value chains involving those farmers to identify specific market failures that a prize competition could address. Subsequent primary and secondary research illuminated significant limitations in productivity and profitability across smallholder aquaculture systems as a worthwhile development challenge to address.

After identifying a basic prize concept through either approach described above, designers must gauge their concept against two statements:

1. The private sector is unlikely to solve the challenge independently in the near-term:

If the private sector is already currently or likely to solve the issue in the near-term organically, it does not make sense for donor organizations to invest in a competition to motivate similar private sector activity.

2. The potential solution does not depend on government intervention or regulation.

If a solution or intervention heavily depends on government intervention or regulation, fluctuating policies may impact how willing the private sector is to participate in the competition. Furthermore, this kind of solution might be harder to sustain in the long run.

If a concept still has merit after being evaluated against these two criteria, designers should further investigate the value chains and populations impacted by the prize competition.



Activity Template: Sourcing Your Own Concept

Given what this section has discussed, think of an existing development challenge or population that you want to address. What is a potential prize competition that could solve this challenge? Consider multiple challenges and solutions that may exist or could be incentivized.



Development Challenge/ Population of Interest



Key Prize Development Questions

1

Does a solution or technology already exist to address the challenge or benefit the population of interest?



Key Prize Development Questions

2

If a solution or technology does not exist, could one be created?

3

Is the solution or technology dependent on government or donor intervention?

4

Is the private sector already getting close to solving the problem?

Step 2 Market Analysis

After developing a preliminary design concept, designers should use a systems lens to see how the identified market barrier or breakdown impacts product supply chains or value chains to pinpoint where to intervene. Once designers conduct market analysis and discover current product or market barriers, they can develop a prize to overcome those barriers. Identifying these barriers requires a systemic market analysis such as root cause analysis, barrier analysis, or other methodologies. AgResults typically uses a value chain approach. If the appropriate product solution is already known, a supply chain analysis is more suitable to determine possible intervention points.

Systemic Analyses: If an obvious solution (product or service) does not exist to address the barrier, designers can analyze the market using a systemic lens and appropriate analysis methods to identify overarching key constraints and failures that lead to undesirable outcomes for target beneficiaries. This uncovers value or supply chain breakdowns that a prize competition can target. Designers should look for nodes along the value chain where target populations experience challenges, such as value loss, reduced productivity, or market exclusion. These challenges can stem from information asymmetry, underdeveloped end markets, poor infrastructure, or other inefficiencies. Depending on the market and barriers, designers can use a range of methods to determine appropriate root causes and points of entry for a prize to incentivize change.

Product Supply Chain: If designers want to improve delivery of an existing technology, they can analyze existing product supply chains to identify the market constraints preventing full market development and distribution of that technology. Just because a solution exists does not mean that target beneficiaries are aware of and have access to this solution, especially if they are vulnerable populations such as smallholder farmers. Conducting a supply chain analysis can highlight common market inefficiencies that prevent technology uptake, such as prohibitive costs, lack of economies of scale, limited training, or low consumer awareness.

A Dairy Value Chain Breakdown in Tanzania



Aware that Tanzanian dairy farmers were less productive than those in neighboring countries, AgResults conducted a dairy value chain analysis and discovered this was due to health and genetic limitations: There was low use of high-quality inputs such as vaccines, improved feed, and artificial insemination. Additionally, pest control and delivery networks were weak. The analysis revealed that breakdowns in product distribution and farmer awareness were key drivers of this poor productivity. In response, AgResults geared [the prize competition](#) to incentivize better input delivery and farmer education.

Each market inefficiency that designers identify through product supply chain analysis represents a possible leverage point for a prize. But not all leverage points are created equal: Designers must be discerning in identifying specific market breakdowns that can most significantly impact beneficiaries and that might be addressed via incentives for private sector actors. For example, if a product is very expensive and farmers do not know about it, designers could create a prize that focuses either on finance or awareness challenges. However, a prize that focuses purely on raising awareness may not impact affordability and will likely fail without addressing farmer cost constraints. A more effective prize would focus on finance and awareness challenges together, such as the Nigeria competition described in the text box. By addressing specific market constraints that contribute to other challenges, a prize competition maximizes the likelihood of driving sustainable market transformation.

A Product Supply Chain Breakdown in Nigeria



In Nigeria, AgResults aimed to incentivize the delivery of an existing biocontrol product, Aflasafe™, to farmers to reduce aflatoxin prevalence in maize. Aflasafe™ had been proven effective, but farmers were neither aware of the problem nor the solution – a clear market breakdown. Analysis showed that farmers needed training on proper use of Aflasafe™ proper use and assurance that investing in this input would yield measurable income benefits. AgResults designed the [Nigeria competition](#) to address these key constraints, requiring competitors to train farmers on proper application and creating an incentive that made Aflasafe™ application profitable for farmers.



Activity Template: Market Analysis

Using the prize concept that you developed in the activity above, and using a systemic lens, think about the key market constraints and failures that are currently preventing outcomes. Where in the market do obstacles exist? Is this a product supply issue, or are there barriers at multiple levels throughout a specific value chain? Where could a prize competition be 'situated'?



**Development Challenge/
Population of Interest**



Key Prize Development Questions

1

Market Level:
(i.e., manufacturer)

Key Activities:

Possible Market Breakdown:

2

Market Level:
(i.e., manufacturer)

Key Activities:

Possible Market Breakdown:



**Development Challenge/
Population of Interest**



Key Prize Development Questions

3

Market Level:
(i.e., manufacturer)

Key Activities:

Possible Market Breakdown:

4

Market Level:
(i.e., manufacturer)

Key Activities:

Possible Market Breakdown:

Step 3 Concept Evaluation

After developing an initial prize concept and conducting market analysis, designers should rigorously assess the idea using the criteria below to decide whether to proceed with the design. AgResults has developed a four-part evaluation framework to discern if initial concepts are feasible and merit further investigation:

1. Mission Impact: Does the problem align with mission goals and impact expectations?
2. Prize Design: Is the prize competition design feasible and measurable?
3. Enabling Environment: Are the context and enabling conditions neutral-to-supportive?
4. Market Failure: Is there a market breakdown that a prize competition can fix?

1. Mission Impact: Does the problem align with mission goals and impact expectations?

a. The problem aligns with donor or government goals.

Designers should first evaluate if the prize concept aligns with donor interests and development goals. For example, if an organization prioritizes better outcomes for youth employment, then designers can assess whether the prize concept either actively improves or does not negatively impact youth employment outcomes. Alignment with donor and government goals will likely increase organizational support and interest in the prize competition in the long run. It is also important to ensure that the program will not conflict with other donor programs in place or in the pipeline.

b. There is potential for significant impact at scale.

Designers should address market failures or development challenges that are common and impact beneficiaries at scale. If the prize competition concept addresses only a few farmers, it may not be the most efficient use of those prize funds. This is doubly true because even successful AgResults competitions typically reach a subset of the total farmer population. For example, while analyzing Indonesia aquaculture value chains, AgResults learned that blue swimming crab farmers struggle to maintain their catch and bring it to market. Thus, a prize could have focused on delivering on-boat refrigeration or steaming solutions. Yet there were only 65,000 blue swimming crab farmers in Indonesia. If the aim is to more widely impact the market system, a prize with this focus may be too narrow.

c. The market failure is clearly defined and understood.

At this stage, designers should have a clearly defined market failure or breakdown leading to inefficient delivery of goods or services that the prize competition aims to alleviate. If that market failure is difficult to define, designers may struggle to develop a prize competition that is specific enough to generate desired outcomes. For example, if designers want to generally increase financial inclusion for farmers but do not pinpoint a specific breakdown that limits farmer finance, then it may be difficult to develop a highly targeted prize competition.

If the private sector is heavily involved in the selected value chain or supply chain and changes to their business models can drive profits and correct the market failure, a prize competition may be appropriate. Conversely, market failures that require restructuring among multiple actors, including government and donor activity, might be better addressed through more traditional development programs. Market failures that prize competitions are best positioned to address include information asymmetries, failures in product delivery or distribution, high costs due to limited economies of scale, or solution development challenges.

2. Prize Design: Is the prize competition design feasible and measurable?

a. The solution milestones are clear and objectively measurable to trigger prize payments.

Prize payments should be paid to participants based on real, measurable results. At this stage of prize development, designers will likely have identified measurable outcomes that might be linked to payment for private sector competition participants. For example, during the Tanzania project concept sourcing, AgResults initially expected to link payment to ‘increases in productivity’ by farmers. It seemed possible to measure production increases and link those changes to payments. However, because farmers were not using specific enough data tracking methods for productivity, AgResults decided to link payments to inputs instead.

Changing Payment Measures



During the design process, selected payment measures may evolve during the design process, as the adjacent [Tanzania example](#) indicates. But it pays to do the thinking early on: Having ideas about possible measurements that link to payment early in the design process will better position the competition for success and impact.

b. The possible prize mechanism is clear and has the potential to be effective.

To the extent possible, designers should understand which products or solutions have been tried in similar contexts previously to avoid replicating failed solutions. For example, in Indonesia, there was some consideration of using aquaculture certification schemes—rules and regulations that guide production activities—to improve fish-farming productivity in Indonesia. Evidence from other similar geographies, however, suggested that the high costs and level of farmer sophistication required to maintain certification led to lack of uptake by farmers. If the program aims to increase uptake of a specific product, designers should be aware of incentives that can create that outcome. The competition might provide direct per-unit subsidies for each unit of the product sold, or they might provide a grand prize to competitors that reach the largest number of beneficiaries with the product.

c. The impact on the target population is measurable.

A strong prize concept should impact the target beneficiary population in easily measurable ways. Broad outcomes such as improved health, cultural perception, or market awareness are difficult to quantify during the lifetime of an AgResults prize competition – typically 4-8 years. But there are ways around this difficulty: In Nigeria, AgResults incentivized the uptake of a biocontrol agent, Aflasafe™, which limits the prevalence of aflatoxins in maize and groundnuts. Decreasing the amount of aflatoxin contamination in maize should reduce negative health outcomes, but that high-level outcome would have been difficult to measure within a four-year project. Instead, AgResults paid prizes to competitors based on how many metric tons of maize they aggregated that were treated with Aflasafe™.

Using Proxy Indicators to Measure Broad Outcomes



Tools such as opinion surveys that measure outcomes like cultural perception or market awareness are often inexact and difficult to confidently link with prize payments. If designers are keen to measure these difficult-to-quantify outcomes, they must use proxy indicators that serve as measurable stand-ins.

The toolkit section on Structuring Prizes provides more information about proxy indicators.

d. The competition offers learning opportunities.

Prize competitions are a newer funding mechanism for the development sector. As such, each new prize competition presents an opportunity for designers, donors, and governments to learn which approaches work, which challenges are most appropriately addressed through prizes, and if prizes can drive lasting market change. Adding to the growing evidence base of competitions may be a donor priority and should be considered. This is particularly important for AgResults, a program which has been explicitly designed to test the viability of prize competitions in development agriculture and their efficacy relative to traditional development programs.

Testing the Efficacy of Prize Competitions



AgResults was explicitly designed to test the viability of prize competitions in development agriculture and competitions' efficacy relative to traditional development programs. This learning agenda actively shapes the initiative's decisions around prize design.

3. Enabling Environment: Are the context and enabling conditions favorable?

a. Both the policy and private sector contexts are favorable. There are no undermining policies such as tariffs or protections that could limit scale.

Because prize competitions are explicitly designed to achieve sustainable market transformation, they rely on a functioning market and market incentives to encourage private firms to act. Enabling conditions, including the economic, political, and regulatory environment, should not impede or should even actively assist the progress of a market-based incentive program. If the private sector struggles to operate in a policy or market environment, it may not respond to incentives or may require overly massive incentives to spur activity. Factors that undermine the enabling environment may include government interventions that prevent markets from fully functioning like high subsidies for specific products, tariffs that limit value chain competitiveness, or prohibitions on private sector activity. Competition designers should regularly monitor changes in the enabling environment so that they are not surprised by policy or market fluctuations that negatively impact the competition.

Favorable Enabling Environment	Undermining Enabling Environment
The Indonesian government has set expansive targets to increase aquaculture production and is actively supportive of the industry. Thus, the AgResults Indonesia project complements existing governmental interest in expanding aquaculture, leading to a favorable enabling environment.	In Zambia , AgResults aimed to incentivize the production and distribution of biofortified maize to reduce the prevalence of Vitamin A deficiency. However, the Zambian government heavily regulated the maize market, keeping traditional yellow maize prices artificially high. Because of the undermining enabling environment, potential competitors were not interested in switching production tactics toward biofortified maize.

b. There are no competing donor initiatives that could impact the market.

Because multiple donor initiatives focused on the same challenge or the same market might temporarily create market conditions that are unsustainable without continued intervention, designing a prize in a market currently impacted by a donor program carries some risks. In this case, a prize may inadvertently incentivize behaviors or technologies that may not continue when the competing donor intervention disappears. In other cases, donor programs may directly compete with a prize competition, making it difficult for competitors to reach populations that are already benefiting from donor intervention. AgResults considered developing a prize to improve poultry production for smallholder farmers in Bangladesh. However, research indicated that previous donor programs had already significantly invested in poultry production and accelerated market development. An AgResults poultry project in Bangladesh would likely have had little impact on further accelerating backyard poultry production, so the design was halted.

Competing donor initiatives may also complicate impact attribution, making it difficult to determine if results were caused by the prize competition or another donor program. For example, AgResults initially planned to implement the Vietnam Greenhouse Gas Emissions Challenge Project in the Mekong River Delta. However, during design, AgResults learned that a large donor program focused on rice production was launching in the same area—which would have made it virtually impossible to determine if changes in farmer behavior were related to the AgResults project or a spillover effect from the donor program. As a result, AgResults shifted the project’s focus to the Red River Delta.

Competing Government Initiatives: Myanmar and Newcastle Disease Vaccine



In 2014, AgResults began designing a prize competition in Myanmar to focus on delivering Newcastle Disease vaccine to farmers involved in backyard chicken production. However, as the design progressed, AgResults learned that the government was planning to launch a program that would offer free Newcastle vaccinations. With this free program, it seemed unlikely that farmers would pay for a vaccine, so private actors would not have a market for their product. Given these competing efforts, AgResults did not move forward with this competition.



3. Market Failure: Is there a market breakdown that a prize competition can fix?

a. The private sector is interested in the market and can participate in the competition.

If the private sector is uninterested in delivering the incentivized solution or would have difficulty reaching target beneficiaries, then they are less likely to engage with the prize competition. Because prize competitions rely on the private sector mobilizing, AgResults has often tried to engage private sector actors that want to expand existing relationships with target beneficiaries. Often, this means incentivizing technologies or solutions that complement existing private sector activities. That way, private sector actors have a dual incentive to participate: They directly profit from the prize, and they can explore opportunities to expand from their traditional business models. But if the market opportunity is unclear, not feasible, or does not align with existing private sector activities, it may be difficult to mobilize those actors. For example, Tanzanian milk processors are interested in providing inputs to farmers to increase dairy productivity. These processors expect to profit from input sales to farmers and related prizes, but also hope to increase their milk supply sources. Increased milk production and sourcing allows them to expand their traditional processing and sales business.

b. Private sector actors can potentially scale inclusive results, especially to include women.

In addition to researching concepts that might scale to address large development challenges, designers should gauge how inclusive those results could be. This helps prevent the prize from negatively affecting marginalized populations. Going one step further, if designers want to improve outcomes specifically for marginalized populations, they could prioritize a prize that will likely improve financial and social outcomes for those groups. Designers could focus on markets or value chains where those groups are or should be involved, or they could try to improve the delivery of solutions to reach those groups. For example, in Zambia, pregnant women and children were disproportionately likely to suffer negative health effects associated with Vitamin A deficiency. Although the prize competition never gained the desired traction in Zambia, the project aimed to deliver a solution that would likely improve outcomes for that vulnerable group.

c. The solution is neither too close to nor too far from market uptake.

If a solution is already beginning to scale, prize funding is probably not needed to stimulate market activity. Conversely, if a solution is too far away from market adoption, then it may be difficult to create reasonable incentives through a competition to stimulate uptake. For example, during the Indonesia prize design, AgResults engaged relatively new peer-to-peer financing companies that invest in aquaculture farms. However, the designers learned that these companies only invest in farms collecting sophisticated production and water quality data — which smallholders in Indonesia rarely do. Until smallholder farmer approaches in Indonesia become much more sophisticated, this kind of solution is too far from market uptake among this beneficiary group.

AgResults' evaluative framework that assesses a prize's alignment with mission goals, the viability of the prize design, the competition's enabling environment, and the specific targeted market failure helps designers analyze prize concepts and judge each concept's relative strengths. Designers should understand that concepts may perform stronger against some evaluation criteria than others. A concept need not satisfy every single evaluation question to move forward. In general, however, if a concept "scores" poorly against multiple criteria, then the designers should consider adapting or de-prioritizing the design.

Figure 3: AgResults Evaluation of a Sexed Semen Design Concept

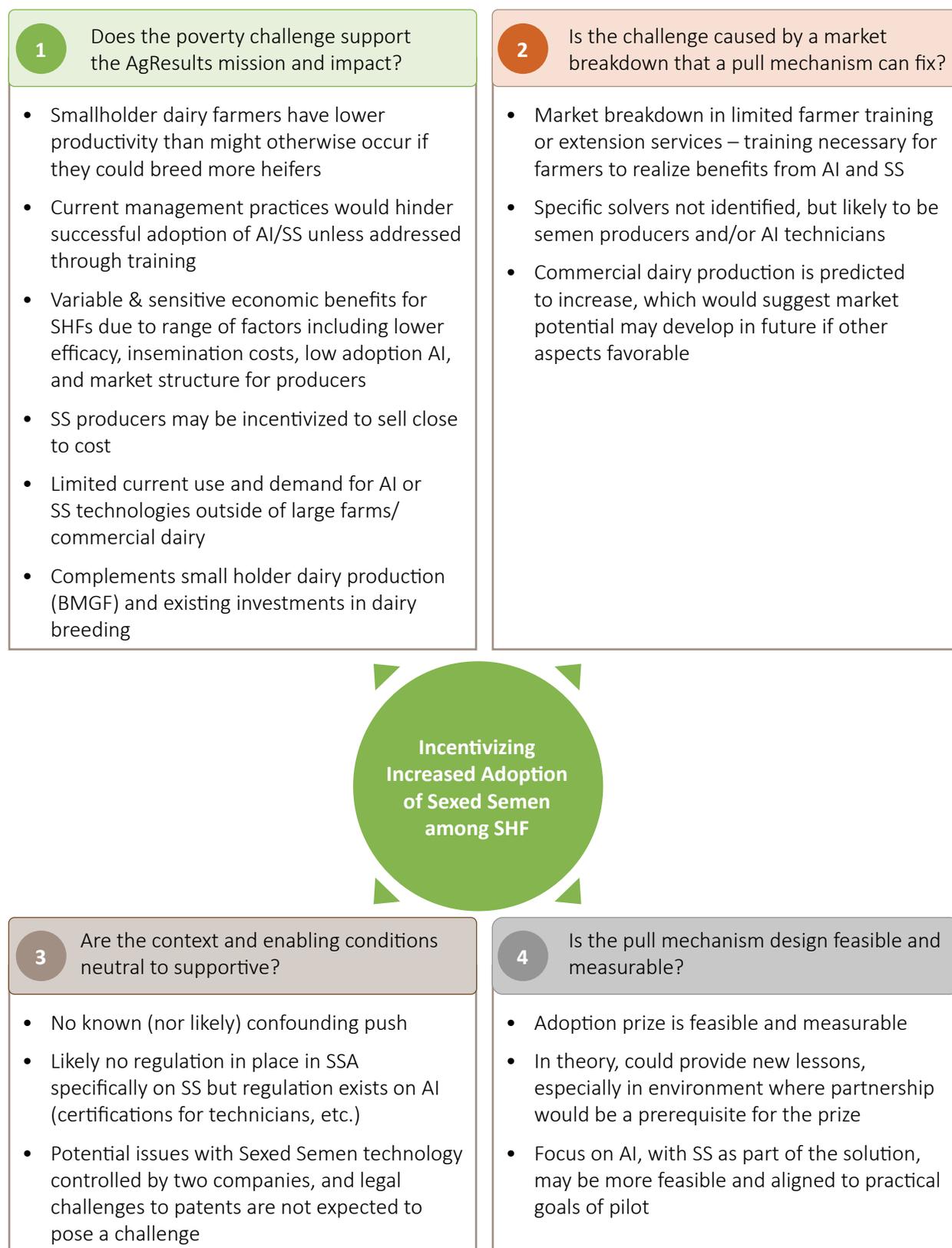


Figure 4: Further Examples of AgResults Evaluations of Past Design Concepts:

	1. Mission Impact	2. Market Failure (with credible solvers)?	3. Enabling Environment	4. Prize Design Feasible? (measurable, verifiable)
Sexed Semen	Medium Uncertain economic benefits to SHF	Maybe/Yes Training necessary for SHF to realize benefits (AI Technician, Semen Producers)	Yes/Medium Uncertain supply of affordable Semen	Yes/Maybe SS/AI servicing, conception rates, heifer rates
Poultry Intensification	High Widespread issue with many potential beneficiaries, including women	Yes Market Access (Vets/input providers, tier 1 and 2 poultry aggregators, impact enterprises)	Medium Government support in target geographies, less developed animal health services	Yes Bird sales, inputs provided, flock size, HH surveys
Dairy Productivity	High Most directly impactful to SHF	Yes/Maybe Lack of Inputs (Types of solvers are unknown)	Strong Dairy an industry of focus	Yes/Maybe Milk aggregation sales and auditing

Activity: Ginovia Poultry Example

Background: In the fictional country of Ginovia, traditional backyard poultry production is marked by high mortality and low productivity. Most smallholder farmers raise small flocks of local chickens for home consumption and emergency income. Yet, as Ginovia increasingly urbanizes and middle-class demand for animal protein increases, farmers could potentially generate more income by selling poultry. Consumers are especially interested in 'local' or 'hybrid' chickens, which are perceived as being more flavorful than broilers produced commercially in neighboring countries.

Ginovia's poultry value chain currently includes small- to medium-sized abattoirs that buy chickens and eggs from farmers for processing and sale. A network of agro-vets and agro-dealers provide limited veterinary inputs to farmers to improve chicken health. Finally, a small but growing number of producers of day-old chicks provide chickens and veterinary care for birds at an early age before selling them to farmers for outgrowth. Some farmers are well-positioned in the value chain, already connected with private sector actors, selling birds to the market, and providing basic veterinary care. Others are less well-connected, providing minimal veterinary care and selling chickens only to neighbors or keeping them for home consumption.

Government Priorities: The government of Ginovia wants to increase animal protein consumption and is particularly interested in strengthening backyard poultry as an environmentally friendly way to achieve those goals. Their 2030 Master Agriculture Plan calls for a doubling of backyard poultry production. Until now, donor activity in Ginovia has focused on other industries, including irrigation systems, the financial sector, and food safety and quality standard enforcement across agriculture and livestock products.

Scenario: Your organization wants to incentivize greater backyard poultry productivity and increase farmer income from poultry production. Possible prize concepts include prizes for inputs of veterinary goods and prizes to buyers for bird purchases from farmers. Based on what you know, conduct a preliminary evaluation of these prize concepts.

Criterion	Considerations
Does the problem align with mission goals and impact expectations?	<ul style="list-style-type: none">• The market failure is clearly defined and understood.<ul style="list-style-type: none">○ A gap exists in poultry production from smallholder farmers despite increasing market demand.○ Farmers are often unwilling to increase their production due to high mortality rates and absent linkages to potential markets.• The problem aligns with donor or government goals.<ul style="list-style-type: none">○ Widespread provision of day-old chicks and veterinary inputs could enable smallholder poultry farmers to increase their productivity.○ With existing consumer demand for local chickens, small poultry farmers could significantly increase their incomes, aligning with AgResults' goal.• There is potential for significant impact at scale.<ul style="list-style-type: none">○ The government of Ginovia wants to double backyard poultry production, which suggests that small poultry farmers could significantly scale their current production.

Continued on Next Page

Activity: Ginovia Poultry Example (continued)

Criterion	Considerations
<p>Is there a market breakdown that a prize can fix?</p>	<ul style="list-style-type: none"> • A solvable identified market failure is present. <ul style="list-style-type: none"> ◦ A prize competition could solve two potential market failures. First, because high mortality rates deter most farmers from increasing flock sizes, it appears that there is limited awareness of or access to quality veterinary inputs. Second, since many farmers sell only to neighbors or keep chickens for home consumption, they are disconnected from other value chain actors and potential end-markets. From these market failures, a prize could increase awareness and availability of veterinary services as well as access to markets, laying the groundwork for a long-term sustainable market. • The solution is potentially attractive to and technically feasible for private sector actors and can be articulated to them. <ul style="list-style-type: none"> ◦ Solutions could include providing veterinary inputs, day-old chicks, and other productivity-increasing inputs that are deemed effective. There are already some actors in this market, but new ones could emerge. • There is potential for private sector to scale inclusive results, especially to include women. <ul style="list-style-type: none"> ◦ Assuming that women are involved in the poultry value chain, the government’s intention to double backyard poultry production suggests that it is possible to scale inclusive results. • The solution is neither too close to nor too far from market uptake. <ul style="list-style-type: none"> ◦ Although some actors are already involved in this market, large gaps in awareness and market connectivity suggest that market adoption would not happen quickly on its own.
<p>Is the prize competition design feasible and measurable?</p>	<ul style="list-style-type: none"> • Solution milestones are clear and objectively measurable to trigger prize payments. <ul style="list-style-type: none"> ◦ A prize measuring the number of birds purchased from farmers or the number of inputs sold to farmers could be easily measurable. • The impact on target population is measurable. <ul style="list-style-type: none"> ◦ The main impact on the target population would be increased income due to bird sales. ◦ Baseline and endline surveys could measure the impact. • The competition offers learning opportunities. <ul style="list-style-type: none"> ◦ This concept could offer learning opportunities on the effectiveness of prize competitions vs. push incentives to drive poultry productivity. It could also provide lessons on how viable prize competitions are in Ginovia.

Are the context and enabling conditions neutral to supportive?

- The policy and private sector context is neutral-to-supportive, and there are no undermining policies like tariffs or protections that could limit scale.
 - o This incentive would align with the government’s interest in increasing backyard poultry production.
 - o Prize designers should still stay apprised of government policy to guard against undermining policies.
- There are no competing donor-funded initiatives that could impact the market.
 - o There are no known competing initiatives.
 - o Prize designers should coordinate with other donors so that any potentially overlapping initiatives complement rather than conflict with this concept.

Wrap-Up: Concept sourcing, the first step in the prize design process, involves designers brainstorming and evaluating potential development challenges to determine if a prize competition is best suited to address the given market failure. A rigorous process comprising initial conceptualization, appropriate market analysis, and concept evaluation allows designers to assess multiple prize concepts against an objective rubric and determine which ideas merit further investigation.

Concept sourcing allows designers to develop and evaluate the strength of multiple prize concept ideas before proceeding with prize design. Designers should begin this process by focusing on a specific population or development challenge and assessing impacted value chains to identify market constraints and breakdowns. Those constraints and breakdowns represent leverage points where a designer might insert incentives to encourage more effective and inclusive markets.

With a basic concept developed, designers can evaluate if their prize concept addresses a clear market failure, aligns with organizational goals, is measurable and feasible, and would be implemented in a neutral-to-supportive regulatory environment. This evaluative framework allows designers to assess multiple ideas against an objective rubric and determine the relative strength of each.

Concept sourcing will not answer all research questions. Research should highlight questions that later design phases must address, but it should also be robust enough that designers are fairly confident that a prize concept could succeed and that it merits continued investigation.

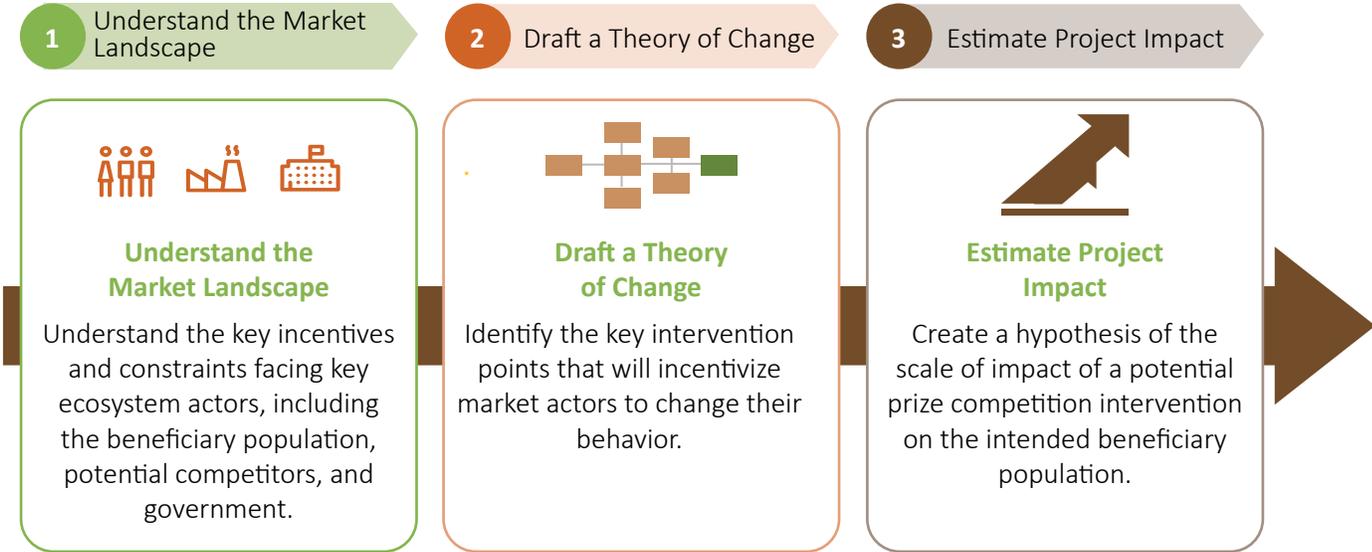
ANALYZING FEASIBILITY

During the second phase of prize design, prize designers should perform an in-depth feasibility analysis to assess the concept’s viability. Here, designers conduct research on relevant market systems, specifically focusing on understanding target beneficiaries, government and donor activities, and key private sector actors. This research allows designers to (1) articulate a theory of change to project how a prize competition can achieve systemic change and (2) reasonably estimate impacts for the proposed competition.

During the feasibility analysis, designers aim to demonstrate that the envisioned competition can potentially transform the market system by properly incentivizing interested private sector actors to deliver improved outcomes to target beneficiaries. Designers conduct extensive research to better understand the development challenge and the ecosystem of actors who could improve outcomes for target beneficiaries. This enables designers to fully understand the prize’s operating context, the key market constraints and failures, and what levers to pull to create desired outcomes. The feasibility analysis also helps identify a prize structure, prize size, and verification approach while estimating possible impacts.

Figure 5: Steps to Analyze the Feasibility of Potential Prizes

AgResults analyzes the feasibility of potential prizes using three steps:



Research Methods

Like concept sourcing, analyzing feasibility is best conducted using a mixed methods research approach that begins with desk research — including academic literature and donor and government reports — and expert interviews and proceeds to field engagement of market actors.

Initial desk research: Initial desk research of literature surrounding the targeted development challenge helps designers better understand the market failure. This research highlights causes of that market failure as well as attempted solutions and strategies.

Expert interviews: Through expert interviews, designers can validate desk research findings and gather expert feedback of potential solutions and their feasibility.

Field engagement of market actors: Designers should directly engage market actors such as potential private sector competitors, beneficiaries (farmers), NGOs, and national and local government officials. Field visits and conversations with market actors reveal the causes of market failure, the difficulties that the private sector faces in addressing the challenge, the enabling environment, and potential competitor interest in proposed solutions and participation. Such findings show designers the feasibility of a potential design concept.

What Works Best: Field Visits

AgResults has found that field visits to targeted geographies to conduct interviews with in-country market actors works best to understand their interests and motives.

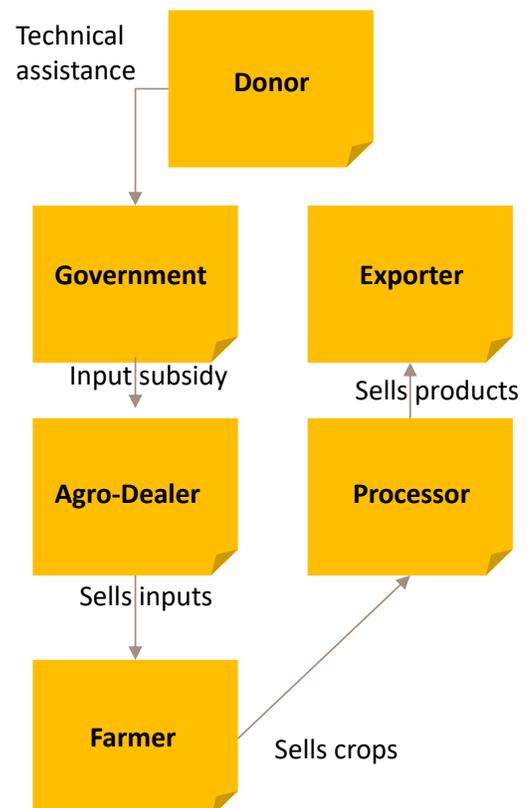


Step 1 Understand the Market Landscape

To begin the feasibility analysis, designers must conduct in-depth research on key ecosystem actors to learn about market failures, stakeholder motives and relationships, and appropriate points of intervention. At this stage of prize design, designers likely have a basic understanding of prospective program goals, target populations, impacted value chains, and possible private sector stakeholders. Now is when designers should develop a deeper understanding of target beneficiaries, potential private sector competitors and how they might profit, and relevant government and donor entities — as well as other relevant actors. Designers should consider developing an ecosystem map (see Figure 6) that explicitly identifies the key actors and their relationships.

Target Beneficiaries: Designers need to research target beneficiaries' economics, demographics, relationships with the market, and interest in potential prize competition solutions. By understanding these nuances, designers can decide what is possible in a prize competition. For example, if research suggests that beneficiary populations have little experience with complex financial tools and designers want to deliver finance solutions, the competition needs to incentivize the delivery of simple and easy-to-understand finance interventions.

Figure 6: Mapping the Ecosystem





- **Beneficiary Production Activities and Scale:** Designers must understand how beneficiaries create value in the market or in a given value chain. For AgResults, this typically means understanding farmer production activities, timelines, and volumes. Designers can conduct research to understand the technologies and tools that farmers use or do not use as well as the labor demands and sophistication level of production. As designers learn more, they can identify issues limiting efficiency or profitability and position interventions to target key market breakdowns.



- **Beneficiary Economics in a Value Chain or Production Activity:** Through interviews and desk research, designers should learn the economic realities of prospective beneficiaries. Understanding incomes and common expenses helps designers discover beneficiaries' current tradeoffs and investments and gain insights into areas of potential investment. In Indonesia, AgResults initially considered incentivizing certification schemes to improve productivity and quality among aquaculture farmers. Yet, farmer economic analysis showed that certification was quite costly, even with significant prize incentives. Realizing this, AgResults pivoted away from certification as a potential prize concept to focus on more affordable technologies, such as pond aerators and automatic feeders.



- **Existing Market Relationships:** By mapping relationships between beneficiaries and other market actors, program designers can identify where market access or support is breaking down and affecting beneficiaries. Understanding current market relationships also allows designers to identify potential actors that are well-positioned to provide solutions and services to beneficiaries through a prize competition.

What Works Best: Build on Existing Relationships

Through its experience designing prizes, AgResults has learned that it is generally easier to deliver new services or technologies by engaging market actors that already have existing, trusting relationships with target beneficiaries.



- **Interest in and Awareness of Solutions:** Designers should determine if beneficiaries know about and/or are interested in proposed solutions because this will impact project design, participation, and impact. If farmers are potentially interested in but unaware of a solution, designers could include incentives that compel competitors to generate greater awareness of the solution. Alternatively, if farmers are aware of and interested in an existing solution, then the prize should address barriers to adoption rather than awareness. For example, in Tanzania, farmers are aware that key dairy inputs enhance productivity, but affordability and poorly developed distribution networks have limited farmer uptake. The AgResults Tanzania design tried to account for those barriers by encouraging competitors to reduce input costs and develop distribution networks. Finally, if farmers are generally uninterested in a solution even if it is available and affordable, then designers might incentivize other technologies or solutions that could more effectively impact beneficiary populations.

Researching these topics gives designers a more complete picture of the constraints that impact beneficiaries and of possible opportunities for prize-based engagement. Designers can use this learning to better understand why proposed solutions have not yet scaled, if solutions are affordable or even helpful to target populations, and what beneficiary behaviors impact solution delivery. For example, while AgResults was designing the Senegal prize, feasibility research revealed two things: First, farmers in francophone West Africa had low awareness of on-farm storage technologies. Second, demands for liquidity resulted in farmers selling crops at harvest rather than storing for sale at a higher price during non-peak seasons. With this knowledge, the designers shifted their focus from on-farm storage technologies to group storage solutions with a finance component, allowing farmers to store crops and obtain cash in tandem. This fuller picture of beneficiary needs and constraints shows how they might relate to the proposed prize competition.



Competitors: Similarly, designers should develop a detailed understanding of potential competitors, typically private sector actors that already interact with target beneficiaries and could profit by achieving the prize’s objectives. Based on the project context and goals, multiple types of actors could be competitors. For example, in Tanzania, AgResults incentivized the delivery of inputs that increase dairy productivity. Both milk processors and agro-dealers have expressed interest in participating: Milk processors hope to profit by providing farmers with inputs, increasing the milk supply from which they can purchase, and agro-dealers want to expand their traditional input supply businesses. Understanding market actors and their beneficiary relationships helps designers determine how viable they are as competitors and their potential motivations.

Key research topics for possible competitors may include:



- **Interest in the Competition:** Competitor analysis begins with designers exploring the landscape of potential competitors, their interest in serving the market and target beneficiaries, and their interest in participating in a prize. Desk research or expert engagement can illustrate the scope of potential competitors, and direct conversations with these actors can gauge interest and demonstrate how they may approach a competition.



- **Product Portfolios and Customer Populations:** Designers should learn potential competitors’ business activities (offered products and/or services, current and/or potential customers). Businesses will likely enter a prize competition only if meeting competition objectives aligns with their existing capabilities, complements their existing business, and does not stray too far from their current customer focus. For example, a prize incentivizing the development of an animal vaccine may attract competitors that have already developed similar vaccines, but it may be less attractive to a company that is already profitable developing human vaccines. Likewise, by analyzing a competitor’s current and target customers, designers can gauge if competitors can achieve prize objectives without diverging too far from their existing business model. For example, if the same animal vaccine company described above sells mainly to larger groups such as national governments and multi-donor organizations, they may struggle to participate in a competition aimed at direct distribution to farmers—unless they partner with an organization that has local distribution channels.



- **Market Barriers and Constraints:** As part of the competitor analysis, designers should assess the constraints that competitors face in reaching target beneficiaries. Identifying these barriers teaches designers why prospective competitors are not already delivering solutions to target beneficiaries. Keep in mind that a prize competition can address some of these barriers, while others—such as a non-conducive business environment—is best addressed through other interventions. For AgResults’ Kenya prize, which incentivized the distribution of on-farm storage technologies, key market barriers included immature supply chains for storage devices and lack of customer awareness of the benefits of on-farm storage technologies to limit post-harvest loss. Once AgResults learned about these barriers, it could create a more effective prize.

Market Barriers

Market barriers include prohibitive per-unit or customer acquisition costs, research and development costs, supply chain and distribution immaturity in target geographies, an inhospitable business environment, or lack of target customer awareness or training.



- **Potential Prize Economics:** Designers should also understand how profitable a prize-incentivized product or solution is for the private sector. If a potential competitor is already delivering the prize solution or a similar product on a limited basis, designers can use that information to estimate their fixed and variable costs as well as revenue for that technology. Designers can eventually use these profit estimates to inform the prize size and to gauge if a competition could develop a sustainable market for a solution. For example, a business may expect to see a reliable marginal profit (variable cost subtracted from revenue) for a product, but a high fixed cost such as initial research or capital expenditure may prevent the business from developing that product. In this case, a prize that can reduce fixed costs could encourage product development and sustainable delivery since the business would continue to see marginal profit for the product even after the prize competition ends. If designers want to boost sustainability, they could consider how well a competitor can create economies of scale in solution delivery or efficient distribution networks that reduce costs

Conversations with potential competitors highlight their interest in serving target beneficiaries and participating in a competition, their current products and customer base, barriers they face, and their potential profit from participating in a prize.

Tip: Weighing Interview Responses

Keep in mind that competitors have a vested financial interest in a prize competition launch, so designers should weigh interview responses against findings from objective analysis and external expert input.



Government: In addition to beneficiaries and competitors, designers should understand how governments can affect competition viability based on their policies toward a market segment or target beneficiaries. Policies around funding, taxation, and product regulation could increase the chance of success or make the competition redundant or ineffective. AgResults carefully analyzes the policy and regulatory environment surrounding a potential prize concept and aims to implement only when government policies are neutral-to-supportive (either do not address or do support the issue). For each research topic below, designers should consider the enabling environment's current state as well as potential shifts that may affect a prize competition.

Key research topics in government engagement and analysis may include:

- **Development Challenge Awareness and Objectives:** Understanding government awareness of and interest in the targeted development challenge allows designers to anticipate if the government will erect barriers to the competition's success. By directly engaging with stakeholders or analyzing policy or strategy documents, designers can register government support or approval for a prize's approach while still in the design process. If the government is already aware of and acting upon the development challenge through policy, it's key to see if government goals align with the competition's planned objectives. Likewise, designers should gauge how potential shifts in policy could affect these objectives. Understanding the current regulatory environment and emerging trends in policy can help designers mitigate potential risks to prizes.

Governmental Approach to Aquaculture in Indonesia

While designing the Indonesia aquaculture prize, AgResults analyzed the Indonesia government's aquaculture strategy, which called for farmers to increase their productivity rather than increasing how much land they used. This policy aligned with the prize concept, which aimed to incentivize inputs to increase productivity and prevent the environmental degradation of further land conversion for smallholder aquaculture use.



- **Regulation and Taxation:** Government taxation or subsidies can profoundly shift the potential success of a prize competition so it's important for designers to understand these elements. Regulations that inhibit a competition include taxes on business activities that disincentivize them from entering markets, subsidies with similar objectives to the prize competition that affect marginal incentives or impact market sustainability, or subsidies to competing products and solutions that may make the prize solution unviable. For example, a tariff on consumer goods in a country may increase costs for consumers and make the adoption of a new product or technology more expensive. Alternatively, if during a competition, a government introduces a subsidy on the incentivized technology, the prize may overpay competitors and compromise long-term market sustainability.

Conflicting Government Seed Policies in Uganda

In Uganda, government manipulation of prices and a lack of regulation encouraged the production of counterfeit seeds. Because of this, AgResults wanted to create [a competition to incentivize the production and marketing of improved legume seeds](#). The prize design pushed for a new private sector-led seed certification scheme. However, the government ultimately supported a different approach, so the competition had no reliable method to verify seed quality. Due to the conflicting governmental approach that limited participation, AgResults ultimately had to close the project early.



- **Competing Grant Activities:** In addition to regulation and price manipulation, designers should learn about any government or donor support of market actors through “push” mechanisms. These mechanisms, which can include grants to private sector actors or direct government ownership of businesses, could complicate a prize competition by heavily subsidizing a good or service and undercutting the private market or by allowing the government or donors to “pick winners.” For example, if a donor already provides grants to a competitor, this competitor may be better positioned over others to win a prize. Although competing grant activities do not always signal trouble, they may create perceptions of unfairness that could hurt project participation and perceptions of legitimacy. In cases where a “push” activity could clash with a competition, designers could adjust the target geographies or timelines to not overlap with the government or donor activity. For example, if the government is conducting a pilot in the capital region of a country, prize designers could target other regions or time the competition to start after the pilot ends.

Competing Sources of Funding in Kenya

For [AgResults' on-farm storage competition in Kenya](#), one potential competitor, the Purdue Improved Crop Storage (PICS) initiative, was partially funded by the Gates Foundation. Although other competitors hesitated because PICS was already receiving donor funding, it ultimately did not prevent them from joining the competition.



- **Potential Synergies:** Equally important, designers must explore potential synergies where aligning with government activity or regulations could drive success and save costs. Prize designers can and should leverage lessons learned from government or donor activity to improve market sustainability or private sector development. For example, if a government piloted the distribution of an innovative farming input in a specific geography, a competition could build on the higher awareness of the input by incentivizing the private sector to increase distribution of this input in another geography. Alternatively, designers could create a prize that capitalizes on new government regulations, lowering barriers to market entry.

Aligning with Current Vaccine Registration Processes

The [AgResults Foot-and-Mouth Disease \(FMD\) prize](#), which incentivized animal vaccine manufacturers to develop and distribute high-quality FMD vaccines tailored to East Africa, benefited from new multi-country vaccination registration processes that accelerated manufacturer access to multiple markets. This multi-country registration option helped competitors get their vaccines to market faster and gave them a larger market in which to sell. Without the multi-country registration process in place, manufacturers would have to go through lengthy country specific registration processes. Consequently, AgResults may have needed to make the incentives significantly larger.



As this section illustrates, government and donor activity may inhibit the success of a prize competition, but it can also encourage collaboration and coordination. When designers are analyzing governmental effect on a prize, they must consider the current state as well as potential future changes.



Market Analysis: Ginovia Poultry Example

In the fictional country of Ginovia, traditional backyard poultry production is marked by high mortality and low productivity. Most smallholders raise small flocks of local chickens for home consumption and emergency income. As Ginovia increasingly urbanizes and middle-class demand for animal protein increases, farmers could potentially generate more income by selling poultry. Consumers are especially interested in 'local' or 'hybrid' chickens, which are being more flavorful than broilers produced commercially in neighboring countries.

Ginovia's poultry value chain currently includes small to medium-sized abattoirs that buy chickens and eggs from farmers for processing and sale. A network of agro-vets and agro-dealers provides limited veterinary inputs to farmers to improve chicken health. Finally, a small but growing number of producers of day-old chicks provides chickens and veterinary care for birds at an early age before selling them to farmers for outgrowth. Some farmers are well-positioned in the value chain and already connected with these private sector actors, selling birds to the market and providing basic veterinary care. Others are less well-connected, providing minimal veterinary care and selling chickens only to neighbors or keeping them for home consumption.

The government of Ginovia wants to increase animal protein consumption and is interested in backyard poultry as an environmentally friendly way to achieve those consumption goals. Their 2030 Master Agriculture Plan calls for a doubling of backyard poultry production.

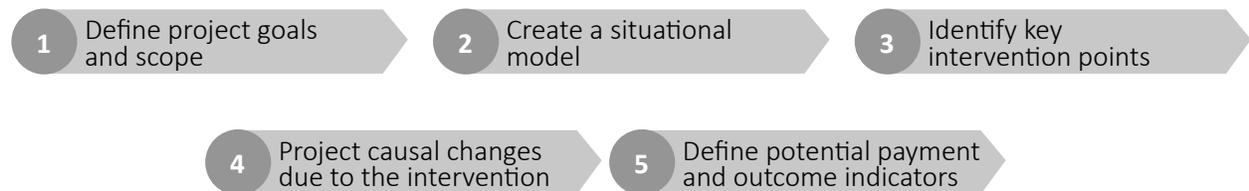
At present, farmers rarely increase their flock sizes or devote significant resources to veterinary care due to high mortality rates and difficulty getting their chickens to market in larger scale.

Scenario: Your organization wants to create a solution that incentivizes greater backyard poultry productivity and increases farmer income from poultry production. Possible prize concepts include prizes for inputs of veterinary goods and prizes to buyers for bird purchases from farmers. Based on what you know, analyze the three main categories of actors to understand the market landscape.

Actor Type	Considerations
Beneficiaries	<ul style="list-style-type: none">• Beneficiaries have low awareness of productivity-increasing solutions such as veterinary care and day-old chicks.• A lack of capital to invest and limited connection to potential poultry buyers, both of which could increase the chance of return on investment, are the main barriers that prevent farmers from investing in improved inputs.• Given that some farmers already engage in these practices, productivity-increasing solutions could be affordable to a large population of farmers.
Competitors	<ul style="list-style-type: none">• Competitors could include the agro-vets and agro-dealers that sell veterinary inputs and sellers of day-old chicks.• Abattoirs would likely buy the bird from farmers. Some abattoirs may participate in the competition by establishing contracts with farmers to provide inputs and buy back grown birds.
Government	<ul style="list-style-type: none">• The government seems to understand the challenge of backyard poultry productivity.• There do not seem to be conflicting government subsidies or donor activity that could compete with a potential prize competition.

Step 2 Draft a Theory of Change (ToC)

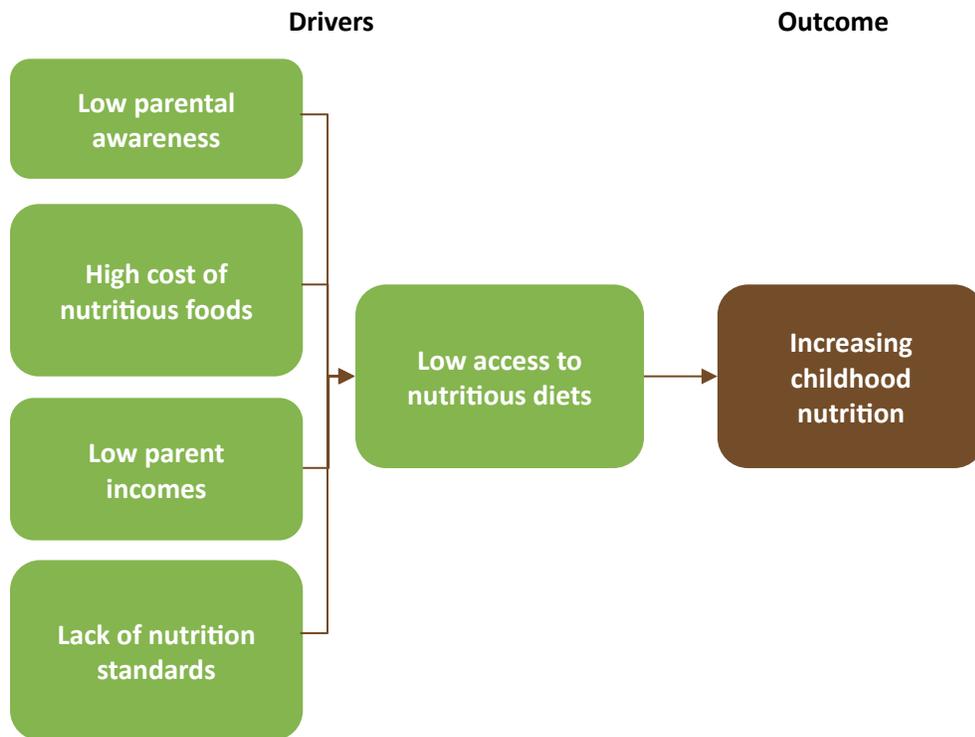
With a better understanding of the market, designers can draft a Theory of Change (ToC) to articulate the assumptions and linkages that could enable a prize to change the market system. A ToC requires designers to understand the market system, why current outcomes exist, and how interventions can lead to desired outcomes. The ToC consolidates all the market research and analysis, establishing the intervention points and causal linkages that could drive prize success. A clear ToC helps designers to closely validate and pressure-test each assumption and causal relationship in the mapped market system before determining a more detailed prize structure. Although there are many approaches to drafting a ToC, AgResults has commonly used a five-step approach: With a better understanding of the market, designers can draft a Theory of Change (ToC) to articulate the assumptions and linkages that could enable a prize to change the market system. A ToC requires designers to understand the market system, why current outcomes exist, and how interventions can lead to desired outcomes. The ToC consolidates all the market research and analysis, establishing the intervention points and causal linkages that could drive prize success. A clear ToC helps designers to closely validate and pressure-test each assumption and causal relationship in the mapped market system before determining a more detailed prize structure. Although there are many approaches to drafting a ToC, AgResults has commonly used a five-step approach:



- 1. Define project goals and scope:** Designers must first articulate the project’s high-level impacts, which should align with the designers’ original objectives for implementing a prize competition. AgResults’ primary intended impacts include sustainably reducing food insecurity, improving household nutrition and health, and increasing farmer income.
- 2. Create a situational model:** A situational model represents the current drivers and causal relationships that prevent the intended impacts and outcomes. Drivers are factors — human actions or economic, cultural, political, or institutional elements — that allow or prevent outcomes. The situational model shows how each driver is causally linked; drivers may cause other drivers or may directly lead to adverse outcomes.

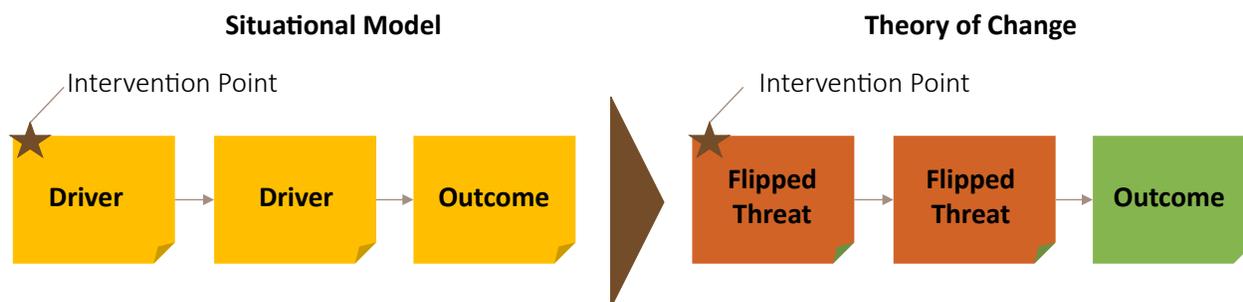
Designers should draw the situational model “backward,” starting with the drivers that most directly create adverse outcomes and moving to the drivers that in turn affect those drivers. For example, if a project aims to “increase childhood nutrition”, the most direct driver that adversely affects childhood nutrition may be “low access to nutritious diets.” In this case, there may be multiple drivers that influence access to nutrition, including “high cost of nutritious foods,” “low parent incomes,” “low parent awareness of nutritious foods,” and “lack of government childhood nutrition standards in schools.” Although a competition would probably not address every possible driver, designers should still consider each potential driver that it could change.

Figure 7: Example Situational Model: Childhood Nutrition



In this model, the most directly linked driver that impacts childhood nutrition is ‘low access to nutritious diets.’ Low access to nutritious diets is impacted by parental awareness, cost, incomes, and nutrition standards. A prize competition that improves childhood nutrition would likely have to use interventions that increase access to nutritious diets, including awareness raising efforts, cost reductions, or improved standards.

Figure 8: Converting a Situational Model to a Theory of Change



3. Identify key intervention points: As they study the drivers in the situational model, designers should determine the intervention point(s) where the prize competition could flip or positively influence the driver, creating a causal chain that could lead to a positive outcome. Each intervention point stems from the designers’ preliminary understanding of how the prize could address current market constraints and barriers. Designers must distinguish between key intervention points, which a prize competition could reasonably change, and “stickier” drivers that may be difficult to transform through a prize, such as cultural attitudes or government regulation. Revisiting the childhood nutrition example, a prize competition could target the driver of low parental awareness of the benefits of nutritious foods. In contrast, the “stickier” driver of government nutrition standards may be tougher to target via a competition.

Tip: How to “Flip” a Driver

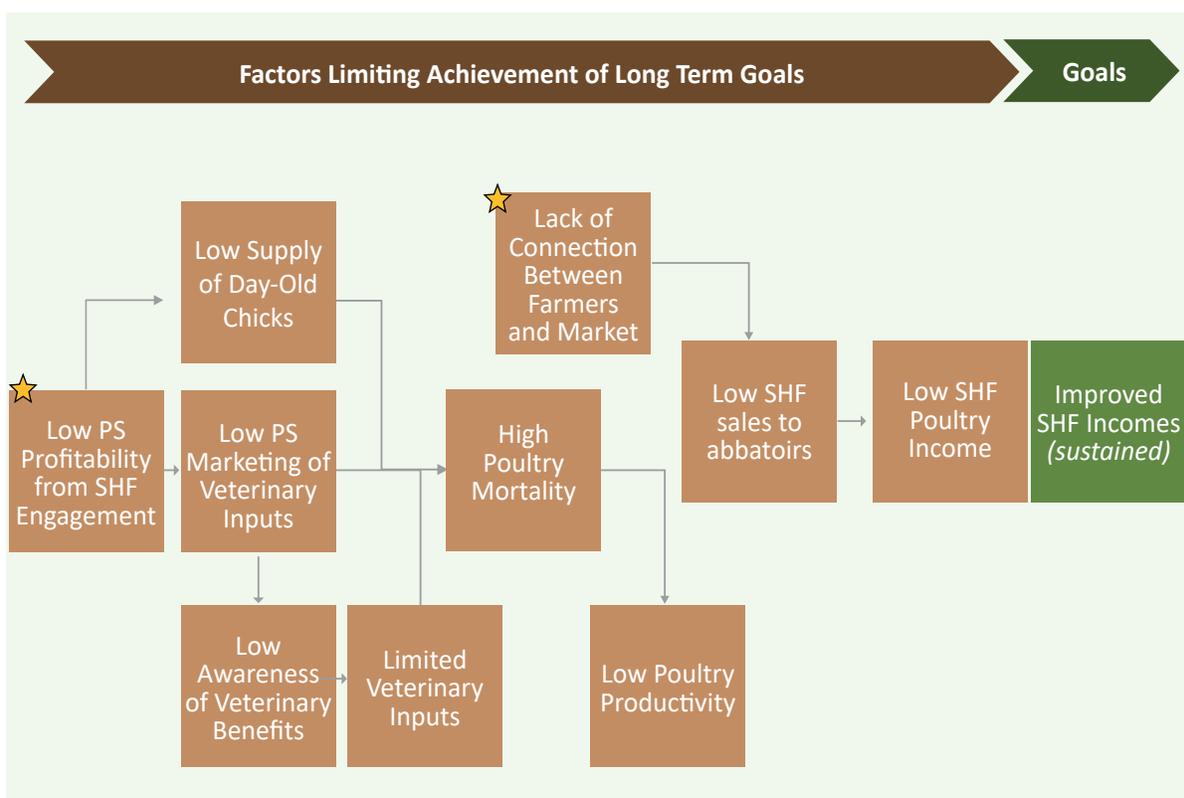
For example, if “low awareness” is a driver, a successful prize competition could flip that driver to “improved awareness.”



Situational Model and Intervention Points: Ginovia Poultry Example

Let's return to the Ginovia example. The high-level situational model below shows the drivers that prevent farmer incomes from increasing, based on the challenges and barriers outlined in the previous activity box. Ginovia designers determine that two key drivers that could be intervention points are (1) the low private sector profitability of poultry sales and (2) the lack of connection between poultry farmers and the market. The designers believe that a prize incentive could increase private sector profitability, encouraging them to invest in marketing to smallholder farmers and creating market connections for those farmers.

Factors Limiting SHF Poultry Income

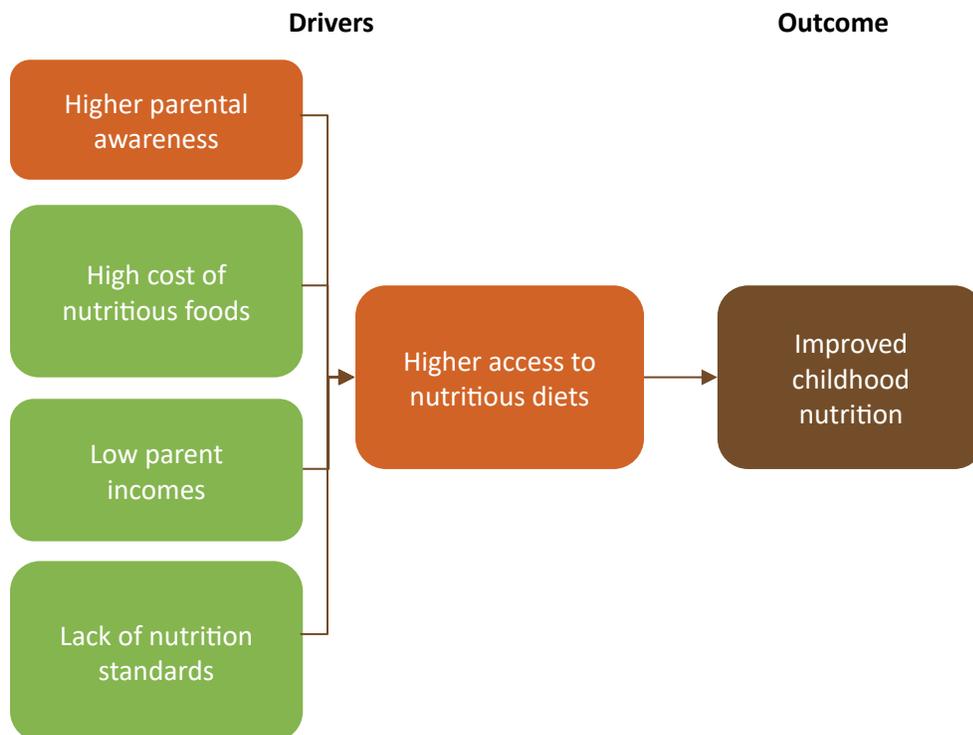


Key



- 4. Project causal changes due to intervention:** After identifying key intervention points, designers should outline how interventions could improve outcomes within the situational model. This step transforms the situational model into a Theory of Change, defining the logic of how specific, targeted interventions will drive broader impact. To build the ToC, designers flip the driver at the key intervention point(s), displaying how the intended intervention affects the driver. Returning to the same nutrition example, a prize competition could impact parental awareness of nutritious foods by flipping the “low parental awareness of nutritious foods” driver to “improved’ or ‘high’ awareness of nutritious foods.” The ToC should then project the flipped driver’s causal effect on the other drivers. As the graphic shows, “improved parental awareness of nutritious foods” could drive “increased access for children to nutritious diets,” leading to the intended outcome, “improved childhood nutrition,” shown in green. Assessing how a flipped driver impacts other drivers allows designers to continually validate the ToC, working with market actors and gathering evidence to ensure that the projected causal relationships are legitimate.

Figure 9: Example: Childhood Nutrition



- 5. Define potential payment and outcome indicators:** After articulating the ToC with causally linked drivers that lead to intended outcomes and impacts, designers can determine the competition’s potential payment and verification indicators. In the childhood nutrition example, the volume of nutritious dietary inputs sold by competitors could be a payment indicator. Designers could measure this indicator, which is directly linked to the program’s intervention, through competitor sales receipts. In contrast, the rate of childhood stunting or obesity in the target population, representing a higher-level measure of childhood nutrition, could be a potential outcome indicator. Such an indicator could determine if the prize achieved the impact articulated in the ToC.

Payment and Outcome Indicators

A **payment indicator** is an outcome or result that the competition can measure. Competitor progress against the payment indicator determines prize payments.

An **outcome indicator** determines if the competition achieved its goals.

Two later sections in this toolkit, “Structuring Prizes” and “Prize Verification and Management” covers developing payment and verification indicators in detail. Designers should enter those later design phases with at least a preliminary idea of potential indicators.



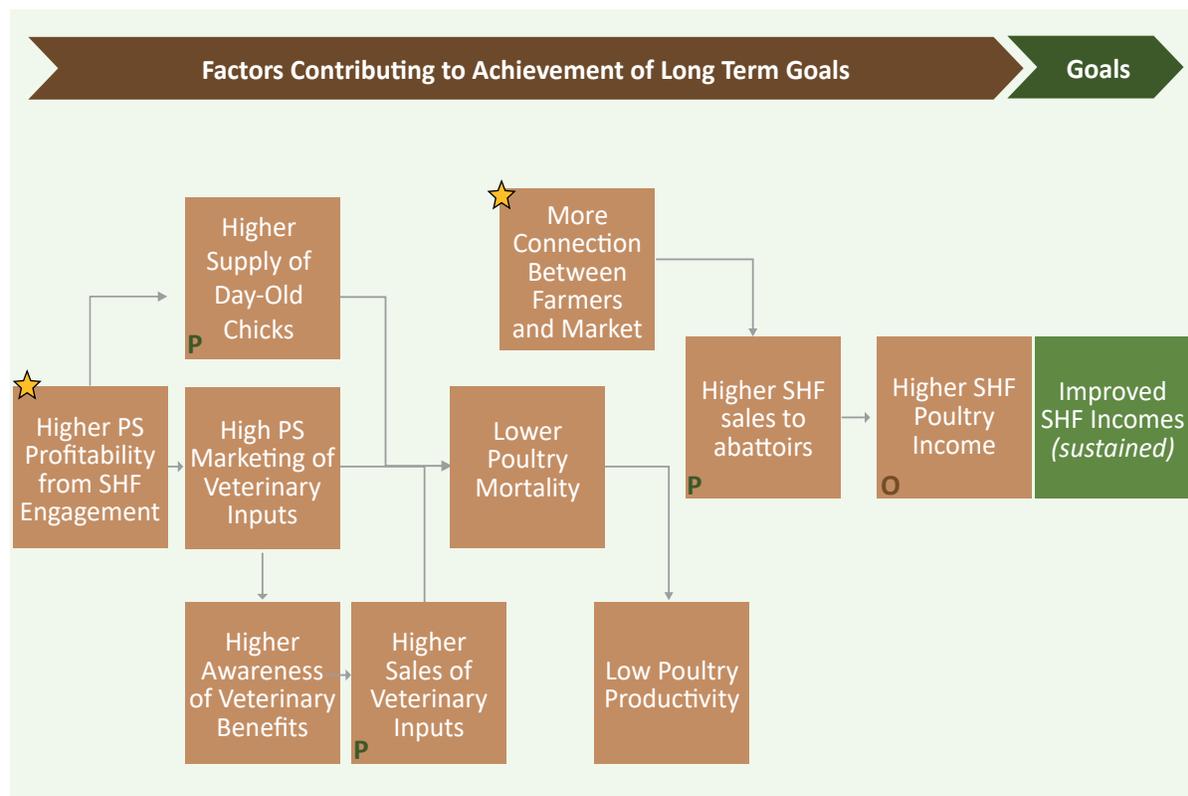
AgResults’ approach to developing a Theory of Change is one of many approaches; prize designers may prefer to use another ToC approach commonly used by their organization. Regardless of how, the ToC should outline the prize competition’s ultimate goals; the point(s) in the current system where the competition would influence a change through an intervention; the causal linkages that enables the intervention to achieve program goals; and the indicators that could determine prize payment and measure impact.



Theory of Change and Preliminary Indicators: Ginovia Poultry Example

Based on the intervention points in the situational model for the Ginovia case study, the designers flip each driver to show how the prize competition could increase poultry productivity and connect farmers to the market, ultimately increasing incomes. The designers include three potential payment indicators: 1) sales of veterinary inputs; 2) sales of day-old chicks (easily verifiable through sales receipts but less closely linked to smallholder income); and 3) smallholder poultry sales to abattoirs (more closely linked to smallholder income but may encourage competitors to target larger farmers who sell more birds). The designers hypothesize that the smallholder income gains through the competition will be the outcome indicator

Factors Contributing SHF Poultry Income



Key

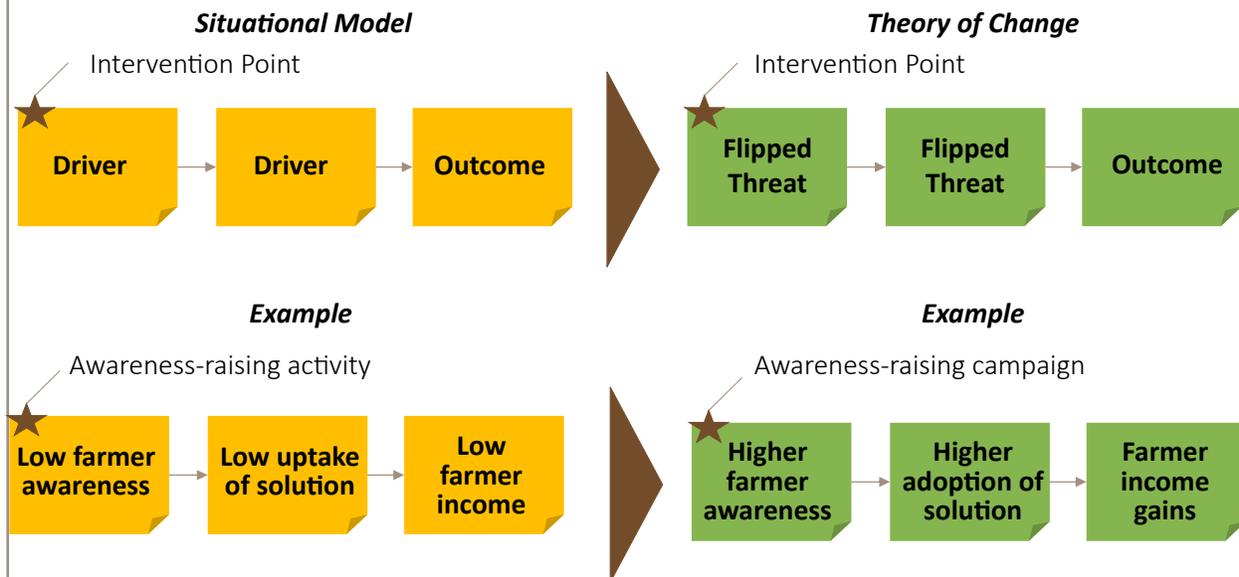
- Indicates Relationship
- ★ Key Driver
- P Prize Payment Indicator
- O Outcomes Indicator

Activity: Build Your Own Situational Model and Theory of Change

Considering a prize concept that you are developing, draft a situational model and Theory of Change using the instructions below.

Situational Model

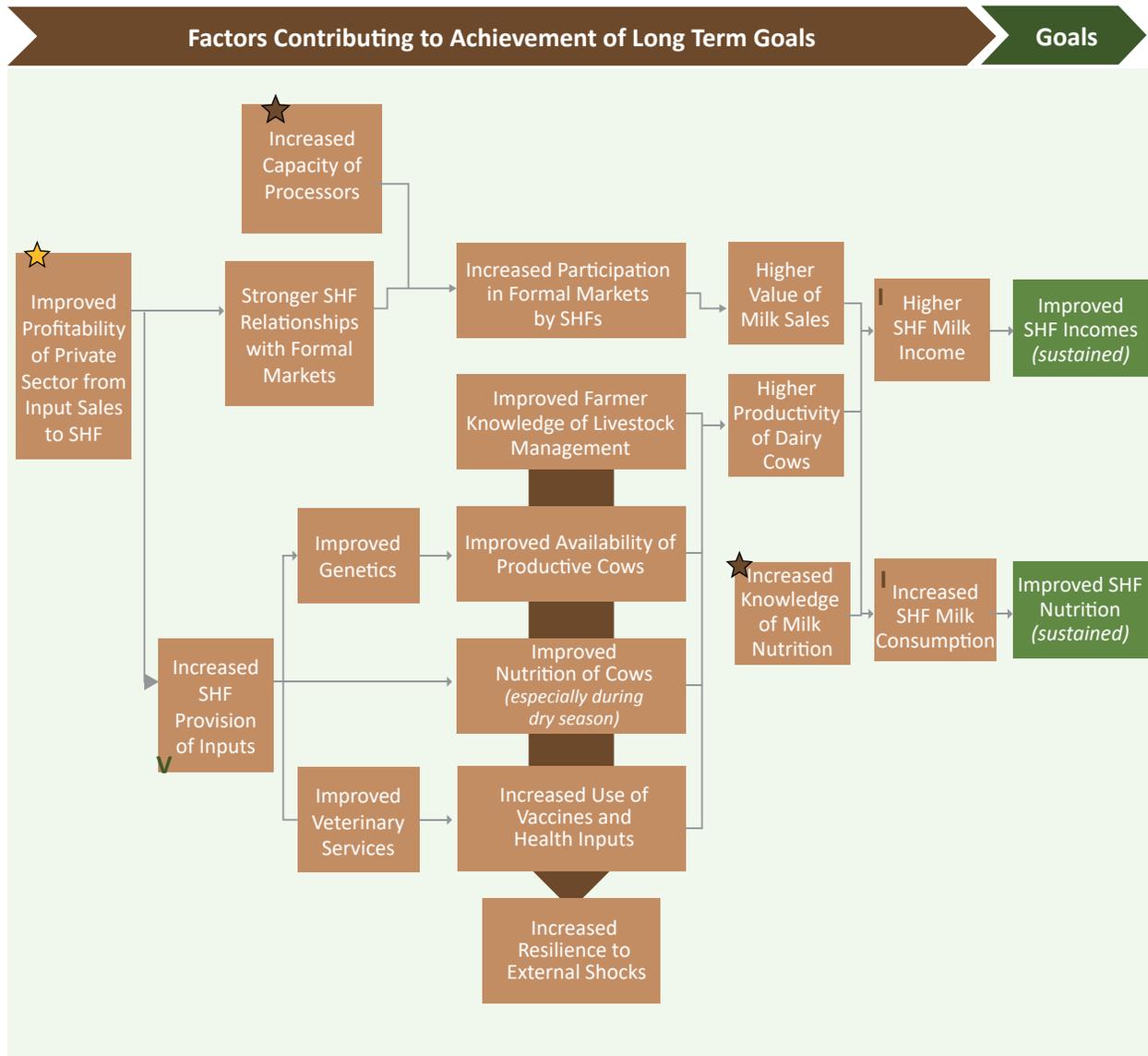
1. Select the main outcomes that you hope the prize will achieve.
2. List the major drivers that threaten the achievement of these outcomes. Use arrows to mark drivers that influence the outcome and the relationships between drivers.
3. Identify key intervention points – factors that you must change to reduce the threat – and strategic approaches for each intervention point. Mark the key intervention points with a star.



Theory of Change

1. Choose one strategic intervention and “flip” the associated threat(s) to create the expected result(s) that will lead to the desired outcome.
2. Build the intermediate part of the chain from right to left by defining the sub-results (what must happen to diminish the threat) and identifying the necessary activities at each node to obtain the result.
3. Repeat steps to complete all results chains, showing links between chains as applicable.

Theory of Change to Increase SHF Dairy Income and Consumption



Step 3 Estimate Project Impact

In the third step in the feasibility analysis phase, designers must estimate the project's individual, population, and intangible impacts based on assumptions about potential participation and market penetration. Potential project impacts must align with program expectations and budget constraints. If potential impacts are low, then designers might consider other designs that could better generate positive outcomes for beneficiaries. To reasonably estimate project impacts, designers must synthesize data collected earlier in the feasibility analysis, such as beneficiary economics, potential competitor capabilities, and product costs and margins. Then designers can estimate a competition's individual and population-level impacts. It may also be useful to collect other contextual information, such as the impacts of similar projects in different geographies and the market penetration or price of a product or solution in geographies with a more mature market, to validate impact estimates.

- **Individual-Level Impacts:** If they align with program goals, individual-level impacts, which estimate the per-unit or per-person benefit of an intervention, can gauge economic, health, nutrition, gender, security, or other measures. For example, a competition that aims to increase farmer incomes might estimate how improved farming inputs benefit average household productivity by estimating the expected household income benefits from adopting these inputs. Data to estimate individual-level impact, such as results from randomized control trials or household surveys that measure the impact of an intervention, can often be found in academic literature. Another useful source of data are potential competitors, who are likely aware of how solutions benefit intended customers — especially if they already market and distribute those solutions.

Individual-Level Impacts in Indonesia

For the Indonesia prize that incentivizes adoption of improved aquaculture inputs such as aerators and automatic feeders, the AgResults team used competitor interviews and academic research to understand the individual-level economics of farmers and the per-unit productivity and potential income benefits of each input. Then, they used data on average farm size to estimate the number of inputs that an average household could buy.



- **Population-Level Impacts:** Designers can estimate population-level impacts by multiplying the individual estimate by the number of solution adopters, depending on the market size and potential market penetration. Designers can use competitor estimates to reasonably project market penetration. Expert input and data from comparable projects can validate these projections. For example, in Indonesia, AgResults estimated potential market penetration based on potential competitors' current capacity, their customer base, farmer characteristics, estimated farmer penetration rates, and how applicable different solutions are across farmed fish species.
- **Intangible Impacts:** Some project impacts, such as policy or market changes caused by a competition, are difficult to estimate but should still be considered when analyzing feasibility. Most AgResults prize competitions aim to create a sustainable private sector market for development challenge solutions. It may be challenging to estimate the benefit of a sustainable market beyond the brief timespan of a competition, but designers should still consider this benefit when determining if they should continue with a prize design.

Designers should consider modeling project impact estimates as early as possible and use assumptions in these estimates to steer how they gather information later in the design process. Early data gaps should not deter designers; for example, it may be difficult to reasonably estimate market penetration until the full suite of competitors is known. A continuous cycle of documenting assumptions and updates is critical here, as more information becomes available.

Impact Estimation: Ginovia Poultry Example

Returning to the Ginovia poultry case study, assume that you know that roughly 35% of smallholder farmers (approximately 1 million households) raise backyard chickens. You also discover that the current market rate cost for a smallholder farmer selling a chicken is \$3, and you estimate that the average farmer sells 100 birds per year. In conversations with private sector actors, you have heard of examples where farmers have doubled the size of their flocks by investing in productivity-improving inputs.

Based on this information, what initial estimates can you make about a prize competition’s total income impact?

Part One: Individual-Level Impact

Prompt	Answer
<i>Determine the scope of the problem per beneficiary (e.g., lost income per person from problem).</i>	Farmers who currently sell an average of 100 birds for \$3 each make an income of \$300 per year.
<i>Estimate the per-unit or per-person economic benefit of the intervention (e.g., how much income would the intervention generate per person).</i>	If the average farmer can double their flock each year and double the number of birds they sell to the market, they can increase their income by \$300- \$600 per year.

Part Two: Population-Level Impact

Prompt	Answer
<i>Determine the size of the intended beneficiary population facing the development challenge.</i>	The total beneficiary population is 1,000,000 farmers.
<i>Estimate the potential market penetration/ coverage of the solution (e.g., percentage of beneficiary population benefitting from solution).</i>	Since the veterinary and day-old chick industries are immature, a conservative estimate of 1% market penetration would impact 10,000 farmers.
<i>Multiply the per-person benefits by the estimated population that will use the solution to determine the solution’s full benefits.</i>	If 10,000 farmers earn an extra \$300 in income per year, total income could increase by \$3,000,000 per year for the duration of the competition.

Wrap-Up: During the feasibility analysis phase of prize design, designers conduct deeper research into a potential competition to assess if the concept is viable enough to proceed to a prize structure. The feasibility analysis should include a thorough understanding of actor motives and interest, a well-articulated Theory of Change, and an initial estimate of potential prize impact.

The feasibility analysis builds on the initial research from concept sourcing and builds out designers' understanding of the prize concept, the likelihood of success, and the value of pursuing the prize. Proceeding from the feasibility analysis to the development of a prize structure hinges on several factors, including confirmed competitor interest, a Theory of Change that aligns with program strategy, and an articulation of potential impact that appears to give a compelling return on investment.



STRUCTURING PRIZES

The third stage of prize design is prize structuring. The prize structure is the set of parameters and rules that determines who competes, how to win the prize, and the overarching timeline. Competition designers start this process by identifying potential competitors. Then they choose payment indicators, structures, and triggers to create an effective and motivating prize.

Based on AgResults' experience, we have pinpointed four steps to effectively structure prizes that will drive long-term market change:



Throughout this process, designers should guard against creating perverse competition incentives that might undermine success.

Terms to Know

- **Competitor:** A private sector actor that has a vested interest in working with smallholder farmers and competes for and receives the prize.
- **Prize:** A monetary award paid to a competitor if/when their verified results show they have achieved the prescribed criteria.
- **Prize Structure:** The set of constraints and rules that determine who competes, the timeline they compete on, and what they need to do to win a prize.
- **Indicator:** An objective and measurable proxy that serves as the basis for prize payment.
- **Trigger:** An event, calendar milestone, or situation that prompts an evaluation of competitor results.



Step 1 Identify and Vet Potential Competitors

After determining at what point in the value chain a prize will intervene, competition designers must identify potential competitors that should display at least one of four 'ideal' traits.

After developing a Theory of Change and identifying at what point in a value chain a prize will intervene, competition designers must identify possible private sector competitors. All AgResults projects are competitor-agnostic, meaning diverse players can participate if they adhere to the competition parameters. However, depending on the prize and the planned outcomes, there may be some 'natural' competitors that are ideally suited to participate. For example, if a competition aims to incentivize the uptake or development of a specific technology, some manufacturers may have already developed or be planning to develop and distribute the new technology.

Generally, potential competitors should display at least one of these ‘ideal’ traits:

- Have **existing relationships with beneficiaries** and understand their needs.

When potential competitors have established relationships with their target populations, they are better suited to encourage new behaviors – a cornerstone of prize competitions. AgResults asks competitors and beneficiaries to undertake new behaviors and take risks, but it takes time to build the trusting relationships that drive such change. By engaging with competitors that already have mutually beneficial business relationships with target populations, AgResults can increase the likelihood that farmers and competitors will adopt new behaviors. After all, competitors that understand the target population are more likely to develop and deliver solutions tailored to that group’s unique needs. Competitors with existing beneficiary relationships are also better suited to scale up than those entering a market or reaching a customer segment for the first time.

Identifying Competitors in Tanzania

The [AgResults Tanzania Dairy Productivity Challenge Project](#) identified multiple competitor types that might work with small farmers to provide productivity increasing dairy inputs.

- Agro-input suppliers: They already provide inputs and want to increase sales of inputs to farmers.
- Dairy processors: They want to source more and higher quality milk. By helping farmers improve productivity, they can source and sell more milk.



- Are **self-sustaining** operations, either self-funded or through established access to finance.

Because prize competitions do not fund competitors in advance of achieving desired program results, competitors must be able to self-finance initial investments in participation. Those investments might include technology or solution development, beneficiary outreach, data collection, etc. If private sector actors cannot self-finance early on, they are unlikely to capture prizes. The level of self-financing needed varies by prize: For long-term R&D prizes, competitors will likely require significant investment capital to fund participation and possible prize capture. For more frequently distributed prizes, competitors can rely on smaller investments or prize reinvestments to participate.

- Want to **enter or expand in the market** but need incentives to overcome current constraints.

Since AgResults aims to support sustainable market relationships, prize amounts and prize structures must be enough to motivate competitors to participate without distorting the market. Designers must understand the current constraints that competitors face and how the incentive would help. Competitors that want to expand their market presence or are currently trying to enter a market will likely need a prize to “nudge” them, although not a large, market-distorting incentive. Alternatively, a prize will not likely incent potential competitors that are not already interested in a market. Prize designers should also avoid creating incentives for activities that competitors would undertake without a prize.

- Could collect or share high-quality data of activities or sales suitable for prize verification.

Prize payment hinges on verifying competitors’ self-reported results, such as sales data, the number of individuals reached, geographic information, or other data points. For competitors to qualify for prizes, they must accurately collect the requested data. Without high-quality data, competitors cannot receive prizes, and the project’s broader progress is jeopardized. With detailed and reliable verification protocols, AgResults is committed to minimizing the likelihood of ‘false positives’ in verification and overpayment.

Designers can gauge how closely competitors align with these four criteria by engaging technical and industry experts as well as competitors. Program designers should also ensure that the relevant policy and enabling environment allows for legitimate and fair competition. This first step of identifying and engaging a motivated set of competitors is critical to prize competition success. It also shapes the types of payment indicators and payment structures for the prize competition.

Fictional Example: Identifying Competitors in Ginovia

In the country of Ginovia, your organization wants to scale up backyard poultry production to increase farmer incomes and their access to animal-based protein. Small poultry producers, who raise the birds on small plots of land, are connected to the market through local abattoirs, processors, agro-dealers, and providers of day-old-chicks. The providers of day-old-chicks purchase back birds from farmers before selling them to market at maturity. Based on this information, what types of competitors might be interested? What are their potential strengths/weaknesses?

Competitor Type	Strengths	Weaknesses
Abattoirs/Processors	<ul style="list-style-type: none"> • Have relationships with farmers • Are motivated to work with producers since more sourcing of chickens should raise income, but transaction costs with farmers currently prevents expansion 	<ul style="list-style-type: none"> • Current data collection systems are weak • Focused on offtake and not necessarily supporting farmer and poultry veterinary needs
Agro-Dealers	<ul style="list-style-type: none"> • Maintain limited relationships with farmers • Possess limited financial capacity to invest in expansion 	<ul style="list-style-type: none"> • Not currently involved in offtake activities • Would likely need to partner with someone to assist with poultry offtaking functions
Day-old Chick Sellers	<ul style="list-style-type: none"> • Maintain very limited farmer relationships • Interested in market expansion • Collect high-quality data on farmers 	<ul style="list-style-type: none"> • Need to develop trust and increased relationships with farmers

This analysis suggests abattoirs/processors and sellers/buyers of day-old chicks are well-positioned to serve as competitors.

Activity Template: Determining Your Own Competitors

Think about a development challenge or an existing program that you could address through a prize competition. What types of private sector actors would you target as competitors to achieve the program's outcomes? What are the potential strengths and weaknesses of each competitor type?



Competitor Type



Strengths



Weaknesses

Activity Template: Determining Your Own Competitors

Think about a development challenge or an existing program that you could address through a prize competition. What types of private sector actors would you target as competitors to achieve the program's outcomes? What are the potential strengths and weaknesses of each competitor type?



Competitor Type



Strengths



Weaknesses

Step 2 Determine the Payment Indicator(s).

After identifying viable competitors, designers must develop the appropriate payment indicators to measure competitor performance and efficiently determine prize payments. A ‘payment indicator’ is an outcome or result that the competition can measure to determine which competitors qualify for a prize based on their progress.

Payment indicators should vary depending on the project’s aims and the actions it incentivizes. For example, prize competitions that focus on product distribution and uptake might focus on product sales or use. Alternatively, if the competition aims to create a new solution or technology, indicators might be linked to product development milestones, quality, and government or international standards. AgResults has used various payment indicators, ranging from the number of inputs/technologies sold, the amount of treated and improved maize aggregated, the development and registration of a new vaccine, or reductions in greenhouse gas emissions.

Evaluation Indicators

Evaluation indicators, or ‘non-payment’ indicators, are program outcomes that illustrate overall impact but may be difficult to link to payment. Progress along these indicators may not be directly tied to competitors’ action, may only be measured over the long-term, or may be difficult to track for payment purposes. Examples include:

- Changes in beneficiary income
- Gendered indicators (i.e. workforce participation, income, knowledge, asset-ownership)
- Environmental outcomes



Figure 10: Types of Payment Indicators

Indicator Type	Illustrative Indicator	AgResults Example
Product development	Product registration; efficacy/safety testing results	Brucellosis : Registration of Brucellosis vaccine
Product uptake	Product sales to a specific beneficiary; market penetration of a technology	Kenya On-Farm Storage : Sales of storage technologies in target regions
Outcome	Increase in production of a beneficial crop; reduced incidence of a negative health outcome	Vietnam Greenhouse Gas Emissions Reduction : Increases in rice yields and reduced GHG emissions

Characteristics of Effective Indicators

Payment indicators help or hinder the overall success of a competition. ‘Bad’ payment indicators may create perverse incentives, encouraging competitors towards undesirable or unrelated outcomes. For example, an indicator that focuses purely on the sale of a product without requiring competitors to reach smallholder farmers might encourage a competitor to sell technologies to large farmers that are not target beneficiaries. Alternatively, ‘good’ indicators are directly linked to program goals and desirable outcomes for target populations.

To develop ‘good’ payment indicators, AgResults recommends that all selected indicators should be:

- **Influenced directly by the competitor’s work** rather than other external activity.

Indicators that are not closely linked to competitor activities may deter participation or even increase the likelihood of a competition rewarding competitors for ‘false positives.’

- o **Good Indicator:** In [Nigeria](#), AgResults wanted to increase the use of an aflatoxin biocontrol technology and linked prize payment to the verified presence of Aflasafe™: Competitors received per-unit prizes for each ton of aggregated maize that tested positive for the biocontrol technology that competitors distributed to farmers and trained them to use.
 - o **Bad Indicator:** AgResults could have used the absence of aflatoxin in each ton of aggregated maize to determine payment in Nigeria. However, aflatoxin levels vary based on soil conditions, weather, and other factors. Even without being treated with Aflasafe™, maize can have no aflatoxin contamination. If the prize had rewarded competitors based on the absence of aflatoxin rather than the presence of the biocontrol agent, AgResults could not guarantee that competitors were distributing and applying the product and training farmers.
- **Directly linked** to the intended **outcomes** with **minimal potential for gaming**.

Although ‘improved outcomes’ or ‘better food security’ are admirable goals, they are too vague to measure and attribute to competitor effort. Instead, AgResults often relies on proxy indicators that have been proven to lead to the desired outcomes. Program designers must select proxy indicators carefully: If they are not linked to desired program outcomes, proxies may perversely incentivize competitors without encouraging progress toward ultimate goals.

- o **Good Indicator:** In [Tanzania](#), AgResults aims to increase dairy productivity. Measuring increases in dairy productivity is challenging because of poor record keeping and variable production across cows and species. Instead, AgResults is rewarding competitors for delivering inputs that are empirically linked to increased dairy productivity. Input delivery, which is verified through sales audits and farmer SMS, is difficult to falsify.
- o **Bad Indicator:** AgResults considered using increased dairy sales to formal channels as a proxy for increased productivity. However, Tanzania has a vibrant informal milk market. If AgResults had used sales as a proxy, milk may have simply shifted from informal to formal channels without any increase in dairy productivity.

- **Achievable** in the intended **project timeframe**.

Indicators should be sensitive enough that competition designers can detect improvements within the project timeframe. In AgResults' experience, indicators that can be measured regularly have typically been the most effective because they enabled more frequent prize payments rather than forcing competitors to invest for multiple years before receiving an award.

- o **Good Indicator:** In [Kenya](#), although the long-term goal was to achieve widespread adoption of on-farm storage technologies among farmers, AgResults knew this uptake might take time. As a result, the competition split storage sales targets into two phases.
- o **Bad Indicator:** In contrast, AgResults could have tied payment indicators to high market penetration. However, measuring penetration rates is challenging, and it was unlikely that competitors could attain high enough product adoption in the project's short time frame.

- **Objective, measurable, and verifiable** by independent parties.

A third party must be able to reliably measure the selected indicator(s). Using a third party to measure and verify results increases the competition's legitimacy and accountability. However, if indicators are difficult to measure, the competition may inadvertently create a perverse incentive to falsify or exaggerate results — no matter who is verifying.

- o **Good Indicator:** The [Kenya](#) competition that focused on improved storage included a rule that storage devices needed to be larger grain borer (LGB)-resistant. AgResults developed an objective standard to determine if a product was LGB-resistant and tested all products against that standard to determine eligibility.
- o **Bad Indicator:** Broad outcomes such as increased income or productivity are difficult to objectively and accurately measure, unless very strong underlying data exists.



Evaluation Indicators

Program designers may be interested in measuring outcomes that may not directly link to competitor action but still demonstrate overall impact. These are called 'evaluation indicators' or non-payment indicators. As designers develop a prize structure, they may need to consider developing payment indicators, which are clearly linked to competitor activities, and evaluation indicators, which are related to overall program outcomes but are difficult to link to competitor actions.

Indicator selection is a nuanced undertaking. To select the most appropriate payment indicators, designers should weigh multiple options against the above considerations. Designers should also assess the indicators to ensure that they neither unfairly exclude or benefit certain actors nor create perverse incentives such as selection bias. Finally, designers should closely consult with subject matter experts and with competitors to determine their willingness to be measured against the chosen indicators.

Activity Template: Determining Your Own Indicators

Think about the development challenge or program you considered in the previous activity. If that program was restructured as a prize competition, what indicators might be appropriate to link to prize payment? Consider the likely competitors and if those indicators are appropriate for those actors.

 Potential Indicators	 Pros	 Cons



**Potential
Indicators**



Pros



Cons

Step 3 Determine the Payment Structure.

During or following indicator selection, designers should determine the program's payment structure. Payment structures dictate if and how the total prize will be shared by competitors — paid on a per-unit basis, proportionally, as a grand prize, based on specific performance thresholds, or shaped as an advanced market commitment (AMC). When choosing the payment structure, designers should consider the behaviors and results that it encourages or inhibits and how those impact program goals. For example, per-unit prizes might encourage delivery of technologies or solutions and allow smaller competitors to participate. Proportional prizes encourage direct competition for a limited prize pool while AMCs lower the risk to enter the market.

AgResults recommends using one or more of these payment structures:

Proportional



Competitors vie for a pre-determined prize pool based proportionally on to what extent they achieve the prescribed outcomes. The most successful competitors receive a larger percentage of the prize pool compared to less successful competitors. Competitors vie for a pre-determined prize pool based proportionally on to what extent they achieve the prescribed outcomes. The most successful competitors receive a larger percentage of the prize pool compared to less successful competitors.

When to Use



Proportional prize pools may be appropriate when designers want to encourage direct competition between actors. However, if there is a perception that early movers or large competitors have a distinct advantage, a proportional prize structure may discourage others from joining later. This payment structure encourages competitors to scale up without needing to commit additional funds to the prize pool. This structure also ensures the total prize budget is exhausted at the end of the competition.

AgResults Example



In [Kenya](#), AgResults awarded a proportional prize to competitors based on the volume of storage capacity sold.

Per-unit



Competitors receive a prize based on the number of units sold or delivered (e.g., competitors receive \$1 for each product they have sold).

When to Use



Per-unit prizes may be most appropriate when the competition aims to deliver inputs or technologies at scale, and delivery is easily measured. Per-unit prizes may not create direct competition, leading to smaller scale than other structures. However, pairing them with thresholds or grand prizes can drive scale-up.

AgResults Example



In [Nigeria](#), AgResults awarded per-unit prizes to competitors for each metric ton of Aflasafe™-treated maize aggregated.

Threshold



Competitors receive a lump sum or per-unit prize for surpassing a specific indicator threshold. For example, a competitor might receive a per-unit prize of \$10 for every unit sold if they sell more than 1,000 units. The competitor that sells 1,000 units receives a prize of \$100,000 while the competitor that sells less than 1,000 units receives no prize.

When to Use



Threshold prizes may be appropriate when the competition is encouraging scale to promote long-term business model viability or when there are multiple competitors with significant existing market share. This payment structure may allow the competition to test new business models or approaches but only reward those that prove reasonably successful. However, threshold structures may limit competition entry to only larger companies and deter experimentation by competitors.

AgResults Example



The [AgResults Indonesia Aquaculture Challenge Project](#) will award prizes to competitors that reach a specific sales threshold for productivity enhancing aquaculture technologies.

Grand prize



One or more competitors receive the full prize upon reaching a successful outcome. For example, the competitor that sells the most products receives \$1M, the competitor with the second largest volume of sales receives \$500,000, and the third-place competitor receives \$250,000.

When to Use



Like proportional prizes, grand prizes may be appropriate when designers want to encourage competition between actors and encourage significant scale-up. This payment structure can reward a single competitor or multiple actors in a 1st, 2nd, 3rd arrangement. It may be paired with per-unit or threshold approaches to reward the most successful competitors. This payment structure is particularly useful when competition periods are long because it rewards competitors that build momentum over time. However, if there is a perception that certain competitors have an advantage, a grand prize payment structure may discourage others from joining.

AgResults Example



The [AgResults Brucellosis Vaccine Challenge Project](#) will reward a grand prize to the competitor that successfully registers a Brucellosis vaccine aligned to predetermined criteria.

Advanced Market Commitment (AMC)



Competitors receive a purchase guarantee at a specified price/volume when they develop a product or solution (e.g., competitors are guaranteed a purchase agreement of \$1M for 1,000,000 units of a product if they develop it).

When to Use



An AMC structure may be appropriate when competitors perceive that a market is fragmented or inconsistent. The AMC increases the market's volume and consistency, making it more attractive for competitors to develop a product, enter the market, and supply that product. AMCs are effectively a subsidy on the sale of a product or a subsidy to create a market. However, an AMC may temporarily and artificially create a market for a given product that could collapse if the right structures for sustainability are not put in place. An AMC may also create incentives for companies to manufacture and sell more of a product than necessary to maximize their prize.

AgResults Example



The [AgResults Foot and Mouth Disease Vaccine Challenge Project](#) uses a 'cost-share' approach like an AMC. Although it does not guarantee purchase of an FMD vaccine, the prize subsidizes the cost-per-dose of the vaccine for buyers, substantially lowering the cost and increasing the likelihood that private and public buyers will purchase the vaccine.

Combining Payment Structures

Payment structures can be combined within a single project, but there are no firm rules for how and when to combine them. In general, program designers should consider the incentives that each payment structure might create before selecting it. For example, a proportional prize might be paid on a schedule so competitors regularly receive prize funds that can be reinvested while still encouraging competitors to compete with one another.

When to Use



Based on what is known about the competitors and the operating environment, if a combined prize structure is more likely to drive desired program impacts, then designers should consider that approach. Alternatively, designers should avoid a combination approach if analysis reveals that such a structure would complicate the project or even discourage participation.

AgResults Example



The [AgResults Indonesia Aquaculture Challenge Project](#) combines several prize structures: Competitors are eligible for annual per-unit prizes if they exceed a minimum sales threshold for aquaculture inputs like aerators and automatic feeders. This structure aims to encourage competitors to quickly scale and allows competitors to regularly reinvest prizes. At the end of the competition, competitors that meet specific sales thresholds are eligible to split a grand prize purse. This grand prize aims to further incentivize competitors to scale during the project.

The appropriate payment structure will vary based on the competition's intended outcomes, the target competitors, and the payment indicators. Designers should carefully consider each type of payment structure and the outcomes that it may encourage (or discourage) before making a final decision.



Fictional Example: Determining the Payment Structure for the Ginovia Poultry Competition

Returning to Ginovia, we know which competitors might participate (abattoirs/processors and providers of day-old-chicks). Given what we know about those entities, what is the most appropriate payment structure?

Structure	Considerations
Proportional	<ul style="list-style-type: none">• A proportional prize based on total bird purchases might encourage aggressive competition.• Competitors that want to join in later years may be at a disadvantage compared to first movers.
Per-Unit	<ul style="list-style-type: none">• A per-bird prize may encourage competitors to scale and grow farmer capacity.
Threshold	<ul style="list-style-type: none">• A threshold for prize eligibility may encourage only serious competitors to join and limit the administrative costs of dealing with many small competitors.
Grand Prize	<ul style="list-style-type: none">• A grand prize for the highest number of purchases might encourage competitors to scale. It might also discourage smaller competitors from participating.• A grand prize would likely only be used for a multi-year prize period.
AMC	<ul style="list-style-type: none">• An AMC is not likely appropriate. Potential competitors are already purchasing birds, and we would not want to lock competitors into a specific market price.

In this example, proportional or per-unit prizes are the most appropriate. Alternately, a grand prize and threshold prize could be paired with per-unit prize to encourage scale-up and weed out smaller competitors.

Activity Template: Determining Your Payment Structure

Build on the previous activities where you gauged competitors and indicators for an existing development challenge or traditional program. What are the considerations for each payment structure and how will they drive success? What structure would be most appropriate to achieve the outcomes?



Structure



Considerations

Proportional

Per-Unit



Structure



Considerations

Threshold

Grand Prize

AMC

Step 4 Determine the Payment Trigger(s).

After choosing and testing a payment structure, program designers must determine the payment trigger(s). A payment trigger is an event, calendar milestone, or situation that prompts designers to evaluate competitor results and decide if and how to disburse awards. Payment triggers shape the type of competitors that participate, their willingness to innovate, and the speed with which competitors achieve scale.

Did You Know?

Milestone, scheduled, and gateway payment triggers can allow competitors to reinvest intermediate winnings into their businesses.



AgResults has applied four types of payment triggers:

Endline

Endline payments are made at the end of the program and vary in size based on the degree of success. Competitor progress is assessed against payment indicators when the competition wraps up, and prizes are paid accordingly.

Advantages



- Competitors have time to innovate without immediate performance or payment pressures.
- In contrast to short-term prizes, competitors supply all investment capital, so program funds are not spent supporting competitors that do not succeed over the long-term.
- Because there is a long period prior to payment, program implementers can regularly check in with competitors to track progress and adjust competition parameters or support for competitors as needed.

Disadvantages



- Competitors with limited financing may struggle to participate or may elect to not participate at all.
- Competitors may be slower to invest and expand their reach, so the competition could take longer to ramp up.

AgResults Example



- The [Kenya On-Farm Storage Challenge Project](#) provided an endline proportional prize to competitors that reached thresholds for storage sales.

Scheduled

Scheduled payments are made to competitors with qualifying performances at each interval. For example, competitors might be paid annually based on progress during that year.

Advantages



- Competitors can re-invest their prize awards and grow their business quickly.
- Competitors can test their approaches, encouraging adaptation and innovation.
- Competition implementers regularly assess progress, which guards against potential gaming.

Disadvantages



- Competitors may elect to leave the competition early if they do not receive initial awards.
- Pressure for immediate results may discourage competitors from investing in innovations that take time to mature and gain traction.

AgResults Example



- The [Nigeria Aflasafe™ Challenge Project](#) used annual prize payments to encourage competitors to re-invest winnings and reach more farmers each year.



Gateway

Often starting small and increasing at each gate, gateway payments are sequentially ordered and based on achievement gates that competitors must 'unlock' to progress. For example, once a competitor demonstrates that a new product aligns to set standards, they receive a prize and can start selling the product.

Advantages



- Competitors have clear guidance about how to sequence their investments.
- Competitors can track towards specific gateways while beginning to invest and prepare for the next set of gateways.

Disadvantages



- Mature competitors that can quickly pass through initial gates may be favored.
- Failure at an initial gate may cause competitors to drop out when they might otherwise have continued and succeeded.

AgResults Example



- The [Vietnam GHG Emissions Challenge Project](#) began with a small initial phase that asked competitors to test approaches to reduce GHG emissions in rice production. Competitors that demonstrated success at that gate received small prizes and only then could scale their solutions to qualify for larger prizes.

A Closer Look: Gateway Prize Triggers in Vietnam



In Vietnam, AgResults is incentivizing the development and scaling of rice farming techniques and technologies that reduce GHG emissions and increase rice productivity.

The [competition](#) uses a gateway structure with two distinct phases. The initial testing phase required competitors to experiment with approaches to rice cultivation that increase productivity and reduce GHG emissions. Successful competitors received prizes and could proceed to the second phase of the competition. In the second phase, competitors are asked to scale their rice cultivation approach and compete for a grand prize that will go to the most successful competitors.

Milestone

Milestone payments are made as competitors achieve performance targets—not always sequentially—which enables them to address different targets as they prefer. For example, competitors receive prizes when they reach a sales target; they do not have to wait for the end of a performance period for remuneration.

Advantages



- Non-scheduled payments may encourage more rapid progress.
- Competitors may address whichever issues and milestones to which their capabilities are best suited.

Disadvantages



- Larger competitors may have advantages that discourage participation or innovation by smaller actors.
- Competitors may struggle to determine on which milestones to focus.

AgResults Example



- The [Brucellosis Vaccine Challenge Project](#) has provided small milestone prizes to competitors that demonstrate progress toward vaccine development. These prizes keep competitors interested as they vie for a grand prize based on successful vaccine development and registration

Fictional Example: Determining Payment Triggers in Ginovia

Returning to Ginovia once again, we know that likely competitors are small organizations that want to gradually expand, and we are interested in bird purchases but not in a diverse set of payment indicators or sequential achievements. What payment triggers might be the most appropriate?

Structure	Considerations
Endline	<ul style="list-style-type: none">• Potential competitors are small and cash-strapped. Waiting for an endline prizes might limit participation and scale to large competitors that may not exist or exist in limited numbers.
Schedule	<ul style="list-style-type: none">• Regularly scheduled prizes, such as annual or semi-annual prizes, would allow competitors to quickly re-invest prize money.
Gateway	<ul style="list-style-type: none">• Currently, the competition does not require a testing of approaches that is common with 'gateway' prizes.
Milestone	<ul style="list-style-type: none">• A milestone prize for bird purchases could encourage more rapid scaling from competitors.

Based on the situation, schedule or milestone prizes are likely the most appropriate payment triggers.

Activity Template: Determining Payment Triggers

Reflect on your own example from the previous activities. Given the competitors, indicators, and structures that you have chosen for a prize competition that addresses this development challenge, what payment triggers are most appropriate?



Structure



Considerations

Endline

Schedule



Structure



Considerations

Gateway

Milestone

AgResults Prize Structuring in Practice

What does prize structuring look like in practice? Figure 11 presents prize structures of some AgResults competitions around the world.

Figure 11: AgResults Challenge Projects and their Prize Structures

Structure	Objective	Competitor	Payment Indicator(s)	Payment Structure	Payment Trigger(s)
Kenya On-Farm Storage	Incentivize companies to develop, market, and sell on-farm grain storage devices	On-farm storage solution manufacturers and distributors	Quality test of storage solution; storage sales volume	Proportional prizes based on storage capacity sold to first incentivize competition entry and then scale-up	Milestone and endline
Nigeria Aflasafe™	Incentivize aggregators to increase smallholder farmer adoption of Aflasafe™	Maize aggregators and grain traders	Quantity of aflatoxin-reduced maize sold	Per-unit prize based on the quantity of Aflasafe™-treated maize aggregated	Scheduled (Annual)
Tanzania Dairy Productivity	Increase dairy productivity by incentivizing input suppliers to deliver high-quality input bundles to farmers	Milk processors and agricultural input providers	Volume of eligible inputs sold	Per-unit prize based on the volume of productivity increasing inputs sold to farmers	Scheduled (Annual)
Vietnam GHG Emissions Reduction	Develop, test, and scale up innovative technologies to reduce GHG emissions and increase rice yields	Technology package producers and sellers	Farmer yield, reduced GHGs, smallholder uptake, repeated use	Proportional prize(s) based on yield improvements, GHG emission reduction, and scaleup	Gateway (Qualify for yield/GHG prize, only then compete for scaleup prize)
Brucellosis Vaccine	Incentivize animal health companies to create, test, and register an effective Brucella melitensis vaccine	Animal health/ pharmaceutical companies and academics	Efficacy studies, Product registration	Smaller grand prize leading to final \$20M grand prize	Milestone/ endline (Milestone prizes incentivize participation toward endline)

Mitigating Perverse Incentives during Prize Structuring

When selecting indicators, structures, and triggers, program designers must consider how certain decisions can create perverse incentives. Perverse incentives motivate actors to work toward undesirable results that clash with program designers' intentions. Selecting inappropriate indicators, structures, and triggers might create scenarios that encourage unsustainable or exploitative behavior, invite gaming, or create long-term market distortions.

Figure 12 shows perverse incentives that a competition might create, as well as mitigating strategies:

Figure 12: Perverse Prize Structuring Incentives and How to Mitigate Them

Potential Perverse Incentives

Selection Bias: Exclusion of populations based on factors such as gender and geography.

Quality Assurance: Use of low-quality products or services to achieve prize goals.

False Reporting: Exaggeration of data to reach prize payment thresholds.

Competitor monopoly: Leading competitors crowding out competition.

Gaming: Achieving proxy indicators without achieving intended outcomes.

Mitigating Perverse Incentives

Adding indicators or bonuses for reaching difficult populations.

Including quality rules (quality tests, spot checks) into competition.

Creating rigorous data verification methods and random spot checks.

Including threshold triggers or other structures that motivate smaller competitors to participate.

Ensuring a combination of indicators robust enough to prevent competitor shortcuts.

Wrap-Up: Strategically identifying competitors and developing payment indicators, structures, and triggers enable designers to craft a prize structure with high potential to drive sustainable market systems change that benefit program beneficiaries.

When designed and implemented effectively, prize competitions can mitigate competitor risks and encourage private sector actors to develop new business models or reach previously untapped markets.

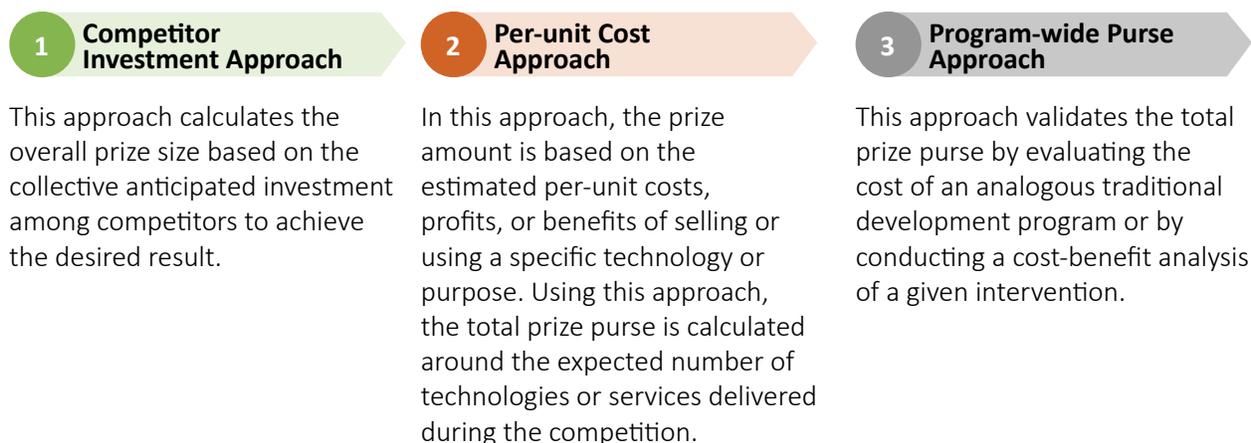
Program designers should structure their prize iteratively, matching competitors with payment indicators, structures, and triggers that are most likely to motivate them. As designers adjust these elements, they may need to revisit initial assumptions to ensure the original approach continues to incentivize the private sector to engage with target beneficiaries to drive desired outcomes. Finally, reviewers should evaluate the selected indicators, triggers, and payments holistically to ensure that the pieces fit together. Throughout, designers should test their assumptions to guard against creating perverse incentives, which may push competitors towards non-desirable outcomes.

RIGHT-SIZING PRIZES

Performed after prize structuring, right-sizing prizes is the process through which program designers determine the size of the prize purse for a competition. An accurate prize size will ensure that the competition properly incentivizes private sector actors to participate without overpaying them. When right-sizing a prize, designers can take a competitor investment, per-unit cost, or program-wide purse approach.

Prize sizing considers the financial motivations of potential competitors, but it is also influenced by other factors, such as by the prize structure — which shapes the competitor pool and competitor incentives to participate — and non-financial benefits of participating¹. Appropriate prize sizing is crucial for a prize competition’s success. If a prize is too big, programs risk overpaying for the desired impact, which may yield short-term gains without encouraging competitors to develop profitable and sustainable market relationships with beneficiaries. On the other hand, a prize that is too small may not adequately incentivize competitors to invest in activities needed to scale up.

When prize sizing, designers should carefully assess the overall maturity of the market to understand how far the envisioned solutions are from the market and how much effort is needed to deliver solutions at scale. Depending on the market’s maturity, the prize may need to be bigger or smaller to avoid overpaying and distorting the market or underpaying and failing to incentivize competitor action. Based on the design environment and available information, AgResults suggests one of three prize-sizing approaches:



To date, AgResults has primarily used the first two approaches in its prize competitions. Program designers should remember that the appropriate prize sizing method depends not only on the project objectives and prize structure but also on available information. For example, a prize structure that pays competitors based on units sold would likely use the per-unit sizing method; alternatively, a “grand prize” structure might use the competitor investment method by basing the total prize on an estimate of the total investments by all potential competitors. Throughout the prize sizing process, designers should continue to ‘pressure test’ the prize size with competitors and experts to ensure that the prize motivates interest without overpaying for results.

¹The prize structure is the set of constraints and rules that determine who competes, the timeline they compete on, and what they need to do to win a prize. Prize structures can vary considerably in a prize competition. Prizes might be paid annually, at the end of a competition, based on the achievement of milestones, etc. For more details, see the previous section on structuring prizes.

Competitor Investment Approach

When accessible, estimates of competitor investments enable designers to calculate a prize purse that lowers the barriers to market entry and incentivizes actors to invest.

With the competitor investment approach, program designers estimate the types and sizes of investments that competitors might make to achieve the program's desired outcomes, and then calculate the prize purse based on the level of effort needed to win the prize and motivate the right behaviors. To estimate these investments, designers should conduct desk research, interview possible competitors, and talk with relevant value chain or technology experts.

If competitors are already investing in a technology or solution, designers should consider the size of those investments. In contrast, if the private sector is not investing in the preferred solution or technology, designers should consider the cost of investments in analogous technologies in the target or similar geographies — assuming appropriate data is available. Assessing these current investments allows designers to set prize sizes that are proportionate to competitor R&D, marketing, technical service, and distribution channel investments.

Designers should set individual competitor prizes so that the total prize purse is less than the aggregate competitor investment — that is, less than the total combined investment by all competitors. Individual competitors' expected prizes, which are shaped by the total prize purse and their expected ability to capture that purse, should be large enough so that (1) participating in the competition is profitable and (2) winning could potentially offset some or all of their investment costs. However, designers should not fall into the trap of creating a prize that is too large. This mistake can encourage competitors to make investments that are bound to fail or can create distortionary market outcomes that allow competitors to capture a prize much larger than the cost of investment. In general, prizes should substantially offset investment costs for competitors and lower their barrier to prize competition participation. Figure 13 illustrates this in more detail.

Figure 13: Competitor Investment Approach to Right-Sizing Prizes

Investment Cost = Research and Development Cost and/or **Distribution Cost**

Research and Development Cost: Competitor cost to research, design, and test new product.

Distribution Cost: Competitor cost to enter new market, establish distribution channels, and gain government approvals.

Prize Per Competitor = Individual Competitor Investment x Expected Chance of Winning Prize

Expected Chance of Winning Prize: This is a ratio based on the number of potential prize winners divided by the total number of expected competitors. Some competitors might believe they have a higher chance of winning than others.

A Major Prize for a Major Solution



Our [Brucellosis competition](#) has encouraged animal health companies to develop a safer and more effective vaccine against *Brucella melitensis* for developing geographies. Few actors can solve such a complex problem, so AgResults deliberately targeted organizations with the resources and capabilities to achieve such a goal. As such, the prize needed to be large enough to entice participation and to offset other opportunity costs in the market with other products that may be more profitable and less risky. To understand the potential cost of vaccine development, AgResults researched the development costs of analogous vaccines and engaged industry experts who could estimate development costs for potential competitors. The prize was then structured to help offset R&D investment costs for a winning competitor.

Ultimately, the Brucellosis prize was large enough to motivate participation from mid-size companies and universities that are interested not only in winning the prize but also in improving their reputation and gaining early access to a future Brucellosis vaccine market.

For example, imagine a competition with ten participating actors, each of whom expect to invest \$100,000 to develop a solution and to receive \$20,000 in revenue in the first year of solution delivery. The total competitor investment in the prize would be \$1M (10 competitors x \$100,000 investment per competitor), so the prize purse should be less than \$1M to avoid overpayment. Since a competitor would otherwise make back \$20,000 of their initial investment in Year 1, a total prize of \$850,000 (\$85,000 per competitor if each competitor has a 10% chance to win the grand prize) could encourage competitors to profit and participate. Assuming a 10% chance of winning, a competitor could reasonably expect to make \$85,000 in prizes and \$20,000 in revenue — which is larger than the initial \$100,000 competition investment. If competitors can expect to earn a return that is larger than their investment, then they are more likely to invest and participate in the competition.

Uneven Distribution of Prizes



Designers should be aware that prize allocations may not be distributed evenly. Competitors that are successful will more than recoup their investment while less successful competitors may not.



Per-Unit Cost Approach

To incentivize delivery of an existing solution that is not widely used, designers can use a per-unit cost approach to craft a prize that increases marginal profits, so competitors are willing to scale.

Using a per-unit cost approach, program designers can estimate the prize amount based on the estimated per-unit costs, profits, or benefits of selling or using a specific technology. This approach is most appropriate for a competition that aims to scale the adoption of a current or improved technology. In these contexts, designers can calculate the per-unit profit margins that competitors could receive through technology distribution or the downstream per-unit premium that adopting a solution could create. For example, if a competitor currently does not invest in distributing a solution because of high distribution costs, a prize that doubles the competitor's profit margin could compel them to ramp up distribution. Alternatively, if a new farming input allows smallholder farmers to grow higher-quality crops that would eventually fetch a premium on the market, designers can size the prize to serve as a temporary 'premium.' In this instance, the designer is matching the prize amount to the 'value' that the technology will create in the long-term and making it available immediately.

Relying on Established Market Trends



In **Nigeria**, high levels of aflatoxin contamination in maize were affecting consumer health. Although a biocontrol product called Aflasafe™ had been proven effective to reduce aflatoxin contamination, few people knew this solution existed, so there was virtually no market for aflatoxin-reduced maize. To structure an effective prize, AgResults assessed the expected long-term premium in the market for aflatoxin-reduced maize, relying on the historical value of "premium" maize in Nigeria. Based on these calculations, the [competition](#) offered a premium payment of \$18.75/MT of treated maize.

Within the per-unit cost approach, designers can narrow in on competitor margins or per-unit premiums upon which to base the prize purse calculations:

Per-Unit Competitor Margin: Prize designers can use current margins of the technology or solution delivery as a basis to develop a per-unit prize. The competitor margin approach is most useful when there are low profit margins — competitors would only make significant margins at large scale — but there are investment barriers that prevent scaling. Anchoring prizes to competitor profit margins encourages them to overcome these barriers by increasing distribution and eventually scaling up sustainably.

When using the competitor margin approach, designers estimate current competitor profit margins and develop per-unit prizes that significantly increase those margins. That increased per-unit profit margin enables competitors to invest in wider distribution and delivery of the targeted solution. Importantly, the per-unit prize should not exceed the per-unit cost of the solution. The per-unit prize should also not exceed a solution's expected long-term profitability because that could distort a market and make it unsustainable. If prizes are distributed at regular intervals, competitors can use the prize funding to reinvest in their business and increase marketing efforts and consumer education, as well as strengthen distribution networks.

The competitor margin approach may also enable competitors to create economies of scale in distribution that permanently reduce solution and technology prices. In some cases — where awareness or cost may make it unlikely for potential beneficiaries to adopt a solution independently — competitors might use the prize to lower costs for beneficiaries. Figure 14 summarizes the per-unit competitor margin approach and how it shapes the total prize purse.

Figure 14: Per-Unit Competitor Margin Approach to Right-Sizing Prizes

Per-Unit Premium = Revenue – Variable Cost per unit

Revenue: Usually revenue from sales to consumers.

Variable Cost: Includes costs that decrease and increase depending on the number of units sold. Variable costs include manufacturing cost, transportation and distribution cost, and marketing cost.

Total Prize Purse = Per-Unit Prize x Expected Units Sold

Per-Unit Margin: Calculate the per-unit prize either by doubling the per-unit margin or by estimating the per-unit premium that the technology may fetch in a mature market (e.g., an improved irrigation technology might cost \$30 more than current technologies).

Expected Units Sold: Estimate the expected units sold by multiplying the beneficiary population by the expected or desired market penetration percentage (e.g., we may expect 3% of farmers to use improved irrigation technologies).

To determine competitor margins, designers should use desk research as well as expert and field interviews. AgResults begins with desk research and then validates the accuracy of these findings through interviews with possible competitors and farmers in the field.

For example, in Tanzania, AgResults provided per-unit prize incentives for input suppliers to sell dairy inputs that increase productivity. To size the prize appropriately, AgResults talked with likely competitors and experts and determined that a prize-per-input that doubled the existing profit margin would motivate competitors to more aggressively market, sell, and educate farmers about key productivity-increasing dairy inputs. Beyond the competition, the productivity benefits from adopting these inputs are expected to encourage farmers to continue using those inputs.

Per-Unit Premium: In contrast to the competitor margin approach, the ‘per-unit premium’ approach aims to set the per-unit prize of a delivered solution equal to the expected premium of the technology or service in a more mature marketplace. In nascent or immature marketplaces, there is low market awareness of the solution’s benefits, so it’s unlikely that the solution already fetches a premium. In these contexts, the prize then enables competitors to invest in efforts to distribute the solution or technology and, in doing so, educate beneficiaries about the benefits. Such efforts encourage consumers to eventually adopt and pay a premium price for a solution. In other words, the per-unit premium provides prizes to incent competitors to invest in a solution with less risk until the market matures and naturally recognizes the solution’s value. Figure 15 summarizes the per-unit premium approach and how it shapes the total prize purse.

Figure 15: Per-Unit Premium Approach to Right-Sizing Prizes

Per-Unit Premium = Revenue – Variable Cost per unit

Revenue: Usually revenue from sales to consumers.

Variable Cost: Includes costs that decrease and increase depending on the number of units sold. Variable costs include manufacturing cost, transportation and distribution cost, and marketing cost.

Total Prize Purse = Per-Unit Prize x Expected Units Sold

Per-Unit Premium: Calculate the per-unit prize either by estimating the per-unit premium that the technology might help create for the competitor or end user (i.e., what makes the product they are selling more valuable).

Expected Units Sold: Estimate the expected units sold by multiplying the beneficiary population by the expected or desired market penetration percentage (e.g., we may expect 3% of farmers to use improved irrigation technologies).

For example, in Nigeria, AgResults sought to introduce a biocontrol agent, Aflasafe™, to address aflatoxin contamination in maize. At the time, farmers were not using biocontrol technologies to reduce aflatoxins, and the market did not differentiate between contaminated and aflatoxin-reduced maize. Using historical market data, AgResults calculated a likely price differential between aflatoxin-reduced and potentially contaminated maize and set the prize value to match this amount. In this way, the competition could encourage competitors to work with farmers to produce aflatoxin-reduced maize and spark market interest in a higher quality product. The prize size, set at \$18.75/MT of aflatoxin-reduced maize, successfully incentivized competitors to work with farmers and improve market differentiation between Aflasafe™-treated (aflatoxin-reduced) maize and non-treated maize. Farmers are expected to continue applying aflatoxin control strategies to capture premium maize prices.

Whether they use the per-unit premium or the per-unit cost approach, once designers decide the per-unit prize amount, they can multiply that amount by the total expected number of units sold to develop the total prize purse. To estimate the total expected number of units sold, AgResults usually estimates how many competitors might participate, their current reach with target beneficiaries, and how they might grow with an incentive in place. Furthermore, it's critical to anticipate how many new actors may join as the competition continues. Designers should recognize that competitors will ramp up slowly: They must first test the solution to see a proof of concept, which sets them up to capture prizes and reinvest then into their business. For example, when designing a prize to distribute a harvest technology, designers may identify a beneficiary pool of 1 million people and 10 potential competitors, each currently with the capacity to deliver 1,000 units of the technology per year. If designers expect competitors to triple capacity by the end of the competition, the competitors may be able to deliver 10,000 units (1% market penetration) in Year 1 and scale to 20,000 units (3% market penetration) by Year 5. Considering a realistic growth rate is key to developing the prize amounts.

Determining the Total Prize Purse



Designers should use the per-unit prize amount to calculate the total size of the competition's prize purse. The per-unit prize amount can be multiplied that amount by the total expected number of units over the project lifetime to arrive at the total prize purse. For the [Nigeria Aflasafe™ Challenge Project](#), the original competition design allocated \$7M for prizes. That prize amount was based on multiplying a per-unit a per-unit prize of \$18.75 against expected sales of ~370,000MT of maize.

Nigeria Prize Size Calculation

$$\begin{array}{r} \sim 370,000 \text{ MT of maize} \\ \times \quad \$18.75 \text{ per MT of maize} \\ \hline \sim \$7,000,000 \text{ prize purse} \end{array}$$

AgResults has relied on industry research to decide likely competitor margins or premiums for a product or solution in other markets. Conversations with intended beneficiaries, competitors, and market experts as well as desk research can reveal if the proposed per-unit prize sufficiently increases competitor margins or is enough of a premium to motivate competitor participation. Whether using a competitor margin or a per-unit premium approach, the prize plus expected revenue per unit should exceed the marginal cost for competitors so that they receive net profit per unit.

Sometimes per-unit prizes can distort a market, causing a competitor's business model to become unsustainable and collapse when the competition ends, and the incentive disappears. Designers should take steps to mitigate this risk and reduce market shocks as the competition concludes. AgResults has occasionally tapered the per-unit prize in later years to prepare competitors and consumers for the project closure and to incentivize competitors to distribute their products more efficiently as market awareness is achieved. In Nigeria, the per-unit prize for Aflasafe™-treated maize was halved in the competition's final year to gradually prepare competitors for a future without a monetary incentive and to test the impact of a prize reduction. By then, most competitors had already built business models whose profitability was not entirely dependent on capturing the year-end AgResults prize. Because these practices were already in place, competitors continued to expand their farmer outreach and provide Aflasafe™ even as the per-unit prize value decreased.

Program-Wide Purse Approach

If a target budget or an analogous “push” program exists, designers can use a program-wide approach to determine the appropriate prize size.

Using a program-wide purse approach, designers can develop a program budget using costs for analogous projects or a cost-benefit analysis of the desired outcome and expected benefits. This way, designers will not over-allocate funds to a prize but can still provide adequate incentives.

Analogous Project Costs

The analogous project cost approach uses the cost of similar traditional ‘push’ projects to determine the budget for a prize competition. The analogous push projects should have similar goals, objectives, and/ or expected activities as the planned prize. Designers can calculate the prize budget using these projects' costs as a precedent, adjusting to match factors specific to the competition's context, such as per capita income. This ensures that the prize does not overpay for results that traditional programs with similar goals have achieved.

AgResults has not yet used this prize-sizing method: It's often difficult to identify comparable push programs with similar goals operating in similar environments. AgResults' prize competitions aim to catalyze outside investment and create sustainable markets, so the prizes must be large enough to generate a market that functions for target beneficiaries well beyond the lifetime of the project. These additional costs of market creation may differ significantly from a 'push' project without similar market development goals — making pricing comparisons difficult. If designers find comparable push programs with similar goals, similar operating environments, and similar stances on long-term market creation and associated investment, then the analogous program approach might be appropriate.

Cost-Benefit Estimation

Alternatively, designers can size or validate the prize using a cost-benefit estimation that weighs the quantified economic benefit of achieving outcome goals against the expected cost of achieving those goals. A cost-benefit analysis should establish the upper and lower bound prize size of an outcome: The lower bound size equals the cost of the outcome (the cost to achieve an outcome), while the upper bound size equals the benefit of the outcome. For example, if a competition wants to introduce a new product, the lower bound prize should equal the cost of a push program that would work with a single implementing partner to introduce the product. Those costs might include R&D, marketing, and government registration. The upper bound value of the prize should equal the value of expected income, productivity, health, or other benefits created by the product. Using this cost-benefit method, the total prize purse should neither fall below the cost of producing the outcome nor exceed the expected benefit of an outcome

Calculating Economic Benefits for Farmers



In [Kenya](#), AgResults wanted storage providers to develop, market, and sell on-farm storage devices to smallholder farmers to reduce post-harvest losses. To size the prize, AgResults first conducted a cost-benefit analysis that showed the expected farmer benefit was \$14 million. AgResults next calculated the incentive payment rate as a percentage of total economic gains by farmers who used improved storage products. This process brought us to settle on \$7.75 million as the total incentive payments, which was 55 percent of that total economic gain.

When using this method, designers should reasonably quantify a program's expected benefits, but for a competition with multiple goals, it may be difficult to quantify all outcomes — particularly if some are non-economic. Non-economic benefits, such as improving women's market involvement, changing cultural perceptions, strengthening household nutrition, improving access to information, or formalizing markets, are broader and harder to factor into a cost-benefit calculation. If a prize mainly expects to create non-economic benefits, the cost-benefit method may underestimate the total benefits of expected outcomes.

Figure 16: The Program-Wide Purse Approach to Right-Sizing Prizes

Approach 1: Prize Budget ~ Analogous Project Budget, Adjusted Based on Context

Analogous Project Budget, Adjusted Based on Context: Contextual factors that could adjust project budget include labor costs, taxes, government regulatory fees, and supply chain maturity. A prize competition should cost less in total than a “push” competition with the same goals.

Approach 2: Cost of Outcome < Prize Budget < Benefits of the Outcome

Cost of Outcome: The cost that would have to be incurred to realize an outcome, which could include research and development costs, labor costs, licensing costs, and supply chain development costs.

Benefits of Outcome: The estimated total benefit of the outcome, including estimated income, productivity, health, or other benefits.

Figure 16 distinguishes between two program-wide purse approaches that use analogous project costs or a cost-benefit estimation. After designers determine the overall size of the prize using a program-wide approach, they need to determine individual competitor incentives. Largely derived from the prize structure, individual competitor incentives should motivate competitors and enable program scale. The program-wide budget approach may be most appropriate when combined with the other two approaches to keep the prize purse and budget reasonable.



Right-Sizing Prizes: Ginovia Poultry Example

In the fictional country of Ginovia, your organization wants to scale up backyard poultry production to increase farmer incomes and their access to animal-based protein. Small poultry producers raise the birds on small plots of land, and they are connected to the market through local abattoirs, processors, agro-dealers, and providers of day-old-chicks. The providers of day-old-chicks purchase back birds from farmers before selling them to market at maturity. Roughly 35% of smallholder farmers — an estimated 1 million households — raise backyard chickens, and your organization wants to increase the number of birds that farmers sell to the commercial market to increase household incomes. You know the market price for chicken purchases and the general cost of raising a bird to maturity. You also know that Ginovia has a unique, mountainous geography and the previously dominant cooperative farmer structure has recently collapsed. Based on this, what right-sizing approach might be most appropriate?

Approach: Competitor Investment

Considerations:

- Designers need to consider how much competitors, such as processors and day-old chick dealers, would invest to participate. Likely investments include:
 - o Farmer outreach and marketing
 - o Investments in farmer training
 - o Investments in veterinary care, farmer inputs, etc.
- For example, if we expect that a competitor might invest \$5,000 to reach 50 farmers, then their per farmer investment is \$100. Additionally, if we expect to reach 10,000 farmers, then we know that total competitor investment would likely be roughly \$1M. The total prize purse should therefore be set below \$1M to avoid a prize that exceeds total competitor spending and might encourage unsustainable competitor investment.
- Estimating the investment size might be difficult because it depends heavily on how many farmers competitors intend to reach and their envisioned scale.
- Competitor investments might also differ significantly depending on their approach and their current business. For example, while abattoirs might source from more farmers but not provide additional assistance, day-old chick providers might elect to work with smaller numbers of farmers and develop their capacity.

Approach: Per-Unit Cost

Considerations: Per-Unit Competitor Margin

- A per-unit prize for each bird purchased could be easily calculated easily. Market prices on chicken purchases and sales to restaurants should be readily available, and, from there, designers can determine average profit margins. For example, it may cost a competitor \$3 to buy a bird, and they may sell it for \$4. With additional costs such as transport that amount to \$0.20 per bird, we know the profit margin is 20% (\$0.80). Based on this profit margin, designers can determine the value of margin increases for competitors. Then designers can estimate the per-unit prize value based on what they think the margin increase for competitors should be.
- A per-unit prize for purchase of birds that increases competitor margins might better motivate competitors to buy local chickens from small farmers because it reduces the transaction costs of dealing with multiple farmers without distorting the market.
- That additional margin might also induce competitors to provide additional inputs and education to farmers to improve their poultry operations.
- Determining the overall prize purse through this approach should be based on the expected number of birds that competitors would purchase and the per-unit prize. For example, if designers expect competitors to buy 2 million birds during the project and know they want a per-unit prize value that is 2x their current profit on sales, then the total prize purse would be set at \$3.2M (2M birds * \$1.60 per bird purchase).
 - *The per-unit premium approach is not appropriate, although if the birds produced were potentially higher-quality than existing local breeds, this approach might make sense to induce the market to pay for the added value of the improved bird.*

Approach: Program Wide

Considerations: Analogous Program

- Multiple programs have tried to increase SHF chicken production, but because those programs' contexts vary from that of Ginovia, designers would need to carefully select comparable examples.
- Additionally, analogous program examples would be more appropriate if they aimed to achieve market sustainability and develop long-term farmer-private sector relationships. If the analogous program does not have those goals, a prize purse based on that program will underestimate the cost of creating a sustainable market.
- Let's say a program with similar goals was conducted in Ethiopia, primarily funding small providers of day-old-chicks to increase vaccination rates and improve feeding for young chickens. As a result, farmers purchased more disease-resistant and healthier chickens and could increase their flocks and the number of birds they sold to the marketplace. In Ethiopia, the program spent roughly \$3M to reach 15,000 farmers. Those farmers sold approximately four million chickens during the project and the providers of day-old-chicks have had continued success after the program ended. Given the overlaps in goals and other factors, designers might use the Ethiopia program as a baseline to estimate the appropriate prize size in Ginovia if they thoroughly investigate the former to ensure that enabling environments and goals are similar. Additionally, designers should consider if underlying demand conditions, regulatory environment, and possible market actors are similar in both contexts.

Considerations: Cost-Benefit Estimation

- Designers could calculate the expected economic benefits of increased flock sizes and sales. Analogous programs or studies of backyard poultry might have developed reasonable estimates of the expected benefit to farmers of more mature poultry operations. If so, estimating the upper bound of the prize purse should be feasible.
- However, estimating the lower bound (the expected cost of creating those benefits) might be more difficult. Different competitors could use different methods to increase farmer poultry production, translating to different costs. Although designers could theoretically create these estimates, they may be less reliable than the upper bound projections.

Given that designers can easily access market data on the cost of chickens, designers should be able to develop profit margin estimates for the sale of a bird as a baseline for a per-unit prize. Given that this program will likely use bird purchases (or bird purchases above a given threshold), which is a unit-based indicator, using a per-unit approach makes the most sense. Designers can adjust the per-unit prize to ensure that competitors receive a bonus for each bird that motivates them to better work with farmers. The total prize purse can be estimated using the expected number of birds purchased and the per-unit prize for each bird.

Activity: Right-Size Your Own Prize

Given the topics that have been discussed here, think about an existing program or development challenge. How would you size a prize that addresses this challenge? What information would you need to help you determine the prize size?

 Approach	 Considerations	 Necessary Knowledge
Competitor Investment		

 Approach	 Considerations	 Necessary Knowledge
Per-Unit Cost		
Program-Wide Costs		

Pressure Testing Prize Sizes

Throughout the prize sizing process, designers should check in with competitors and experts to “pressure test” the prize and ensure that it motivates competitors without overpaying for results.

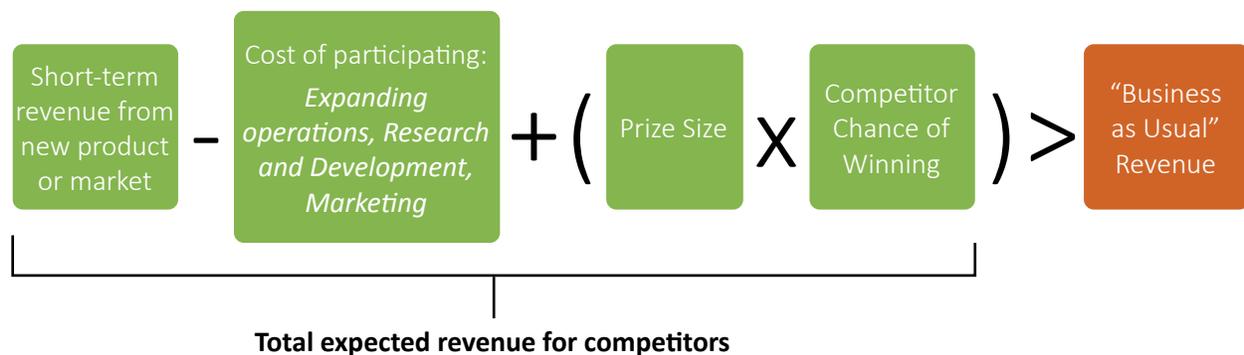
Designers should revisit the overall prize purse size and the potential payments to individual competitors throughout the prize design process. In general, by weighing the cost of competitor participation and their likelihood of winning a prize, designers should create prizes that exceed competitors’ current ‘business as usual’ revenue. That way, competitors are adequately incentivized to change their business models and participate in the competition. As designers determine the prize size, they should consider the revenue potential of solutions, the long-term value of a sustainable market, and the fact that risk-averse competitors may underestimate their chances of winning. Figure 17 below illustrates how to assess the total expected revenue for competitors.

Checking for Competitor Bias when Right-Sizing Prizes

During interviews, competitors may angle for higher prize values by underestimating how willing they are to participate and overestimating their risk aversion—thereby maximizing their potential economic gain. To limit the chances of distorting incentives, designers must validate these competitor responses using research and expert interviews.



Figure 17: Assessing the Total Expected Revenue for Competitors



Considering Project Scale: Designers should know that larger-scale prize competitions will typically have larger prize purses.

A project’s aims and the actions it intends to motivate will significantly impact the scale of the necessary prize purse. For example, when developing prize sizes for competitions that aim to drive large leaps forward in research or product development, designers should know that few competitors are likely to compete and that large advances may require significant investment. As a result, larger prizes may be needed. In contrast, competitions that aim to maximize outreach and market penetration will likely use slightly smaller prizes. Designers need to accurately predict competitor growth and market penetration rates to determine program scale and the necessary size of the prize purse. For example, a competition to drive the distribution of a harvest technology may identify a beneficiary size of 1 million people and 10 potential competitors, each currently with the capacity to deliver 1,000 units of the technology per year. Assuming the competitors triple the capacity by the end of the competition, they could deliver 10,000 units (1% market penetration) in Year 1 and scale to 20,000 units (3% market penetration) by Year 5.

As designers consider the expected size of the project, they should recognize that the lack of upfront funding often creates non-linear project growth. In AgResults' experience, competitors start by investing small amounts to test their approaches. If those initial approaches succeed, competitors become more confident in their ability to win prizes and typically ramp up their participation and investment significantly. By successfully anticipating project scale and growth, designers can most efficiently determine the overall prize purse needed to drive participation and achieve program goals.

Pressure Testing and Considering Scale: Ginovia Poultry Example

Consider the Ginovia Poultry Example. Based on the information provided earlier in this section, what are key considerations when you pressure test your prize size?

Prizes generally offset part of the investment costs that competitors must make. Consider the cost of outreach and education to farmers, the cost of additional staff and facilities to intake and process chickens (or sell chickens to market), and the cost of inputs that competitors might provide to farmers to increase productivity and survival rates. Those factors will determine the per-unit prize for chickens that competitors purchase in the Ginovia Poultry competition.

To determine scale, designers should consider the above investment costs that likely competitors might have to make and the size of the population (below) that competitors might reach.

- **The number of poultry farmers in Ginovia (or targeted regions)**
 - For example, if 1M households raise poultry in Ginovia and 75% of those are considered smallholder farmers, designers should expect that the absolute maximum number of farmers that competitors could reach is 750,000.
- **The number of farmers that the project may eventually impact (either reached in a single year or working with competitors year-over-year).**
 - Similar projects in other geographies only reached 2-5% of farmers in four years. Realistically, the Ginovia prize might reach 15,000-37,500 households.
- **The current flock sizes for farmers.**
 - In Ginovia, the current average flock size for small farmers is approximately 10-15 hens.
- **The flock size that might be reasonable achieved under competition conditions.**
 - Per research on local chickens and local chicken production, flock sizes of 25-50 are manageable without significant facilities upgrades. Growing cycles for local chickens last roughly six months, so farmers could conceivably sell between 25-50 chickens twice a year.

These considerations will help designers estimate how many birds that competitors may purchase. Then, using a per-unit cost approach, designers can determine the overall prize purse.

Based on AgResults' experience, designers should also assume that competitors will gradually ramp up their participation. Growth rates will not be linear but will start slow and accelerate as the project progresses

Activity: Pressure Testing Your Own Project

Given what you know, think about an existing program or development challenge. What information would you need to determine the program's potential scale?

- Market/population size information
- Population characteristics
- Estimated rate of technology/solution adoption
- Size of the potential competitor base
- Available budget and impact by similar programs (if relevant)
- Regulatory environment and government support

What other key data and information might you need to inform possible scale projections?

Wrap-Up: Based on the competition's objectives and the target competitors, designers should use one of three approaches to size and validate a prize that effectively drives participation and innovation without overpaying for results.

When designed and implemented effectively, prize competitions incentivize private sector actors to innovate or scale by mitigating risks and demonstrating the potential of moving into an untapped market. By using one of the three approaches outlined here, program designers can build a prize that is large enough to excite competitors but small enough that it does not inappropriately distort the market and create unsustainable competitor engagement with beneficiaries. This balance should also be reflected in calculating revenues: Considering the costs of participation, the short-term revenue from a new product plus the chances of winning a prize should outweigh a competitor's 'business as usual' revenue. With rigorous field research and expert verification, Pay-for-Results prize competition designers can structure a prize that is "right-sized" for the type of target competitor and the complexity of the target problem.

PRIZE VERIFICATION AND PROJECT MANAGEMENT

The final phase of prize design comprises prize verification and management. Verification enables the competition to monitor competitor progress against the defined program payment indicators. The project management approach articulates the implementation team’s responsibilities, including program marketing efforts, competitor engagement, government engagement and policy monitoring, and dispute resolution.

In the last phase of prize design, designers define the competition’s verification and project management approaches. Verification defines how the competition will evaluate competitors’ reported results and determines prize disbursement. Because verification is linked to payment, the mechanisms used to assess competitor performance must be independent, objective, and reliable. Transparency and objectivity are crucial to build and maintain competitor confidence and bolster the competition’s credibility. Verification must also be robust enough to prevent gaming or cheating, so designers should be prepared to tweak indicators or adjust contest rules and reporting procedures to deter fraudulent activity as needed.

Verification vs. Impact Evaluation

While verification measures competitor progress against the prescribed criteria, an impact evaluation measures program results and should be conducted independently.



In addition to accurate verification, responsible management is key for a streamlined and organized prize competition. Although AgResults’ Project Managers play a valuable role throughout implementation, they are particularly critical in the start-up phase of a prize, driving outreach to competitors and beneficiaries, engaging with government officials and local NGOs, finalizing contest rules, and securing legal authority for a prize to operate in the target geography. As designers develop their prize, they should articulate likely project management tasks and consider including a management plan outlining roles, responsibilities, and timelines as part of the final prize design.

Considerations for Verification in Prize Competitions

Verification approaches vary across prize competitions based on individual program goals, data to collect, indicators to measure, and potential trade-offs between costs and accuracy. Yet one element remains the same: A prize competition must always be based on a tangible and measurable indicator on which one can pay a prize³. AgResults calls the cost to verify results the “verification burden.” Generally, greater accuracy in verification comes at a greater expense. When verification costs are a concern, designers need to develop a verification system that instills confidence in its accuracy at the lowest possible cost. AgResults prizes aim to maximize the size of the prize pool relative to management and verification costs. Figure 18 below provides some examples of verification in ongoing and completed AgResults Challenge Projects.

Despite these myriad factors, verification systems should be simple enough for competitors to understand the process, their responsibilities, and how payments are triggered. A successful competition hinges on competitor trust, especially around the process that determines payments.

³AgResults defines a payment indicator as an objective and measurable proxy that serves as the basis for prize payment. For more information, see the section on Structuring Prizes.

Figure 18: Examples of Verification in AgResults Prize Competitions



Food and Mouth Disease

Product registration, quality checks, sales audits

FMD vaccine is registered for use with appropriate registration body and its adherence to eligibility requirements are reviewed by a judging panel. After registration, sales of the product are audited. Continuous quality spot checks of the vaccine are conducted to guard against product counterfeiting or degradation.



Tanzania Dairy

Sales audits

Verifier confirms sales of inputs using a combination of traditional sales audits and farmer responses to text-message based survey system. Quality of inputs is pre-determined by only allowing registered and pre-approved inputs proposed by competitors.



Vietnam GHG Emissions

Data collection, modeling

Verifier confirms technology implementation using mobile data and remote sensing imagery, and verifies competitor-provided production practice data with random spot checks and modeling



Nigeria Aflasafe™

Laboratory testing

To ensure that farmers had used Aflasafe™, Verifier tested aggregated maize to confirm maize was Aflasafe™ positive

Creating a Prize Verification Plan

Before the competition launches, designers must develop a verification plan that supports the prize payment timeline and measures key payment indicators. The plan should outline responsibilities, what data sources and activities will be used, and timing of activities. AgResults' experience has revealed several practices to ensure that verification is independent and thorough, yet feasible in a real-life setting. Once designers determine from where they will gather verification data, they can decide which verification method is most appropriate.

Verification Best Practices

When considering verification structures, AgResults recommends the following principles:

- **Verifiers should be independent from the project manager:** Although project managers may coordinate and communicate verification results, an independent, third-party entity should perform verification activities and measurements. That way, a neutral party is conducting verification, minimizing potential accusations of foul play or bias by competitors or the project manager. AgResults has usually engaged a separate organization as the verifier, sometimes in coordination with the government or research organizations.

- **A thorough verification plan may include multiple methods:** Because it's easier to game a single data source of measurement, AgResults has typically used a 'checks and balances' approach to verification, using multiple data sources to confirm the accuracy of reported results. For example, if a verification plan calls for competitors to report their own data, they could easily report fraudulent results. To deter such activity, AgResults prizes have typically incorporated at least two different sources for greater accuracy of verification. For example, the Tanzania Dairy Productivity Challenge Project, which rewards competitors for providing high-quality dairy inputs, uses a verification plan involving an audit of competitor sales records to determine sales quantities and an SMS based system that asks farmers to confirm purchases. Discrepancies between reported sales and farmer reported purchases are flagged for further investigation. If designers build in these kinds of redundancies in verification, they can prevent competitors from winning illegitimate prizes.
- **Verification should be robust but also financially and logistically feasible in the project context:** It may be tempting to create a mechanism that verifies competitor results as precisely as possible to avoid overpaying or overestimating impact, but it's important to consider financial and logistical costs. For example, a prize competition that incentivizes input sales to farmers could attempt to verify that every claimed competitor sale went to the beneficiary population. While admirable, this may not be feasible: Tracking sales to the beneficiary level in a developing country is often challenging and expensive. Instead, designers should build verification plans accurate enough to prevent cheating but as low-cost as possible. Generally, successful AgResults competitions have used verification systems that are robust enough to instill confidence in the measured results' activity. These competitions have also included enough verification redundancies —or cross-checking verification tools — so that competitors know that any gaming could be caught at any time. To prevent gaming, AgResults has frequently relied on randomized spot checks of competitor activities. For example, in Tanzania, the verifier will use "mystery shoppers" who will try to purchase prize-eligible inputs from competitors to make sure they are selling appropriate goods and recording those sales properly. AgResults' rules also state that cheating will be punished harshly, often through expulsion from the competition. As designers develop verification plans, they must explore options that carefully balance precision to prevent gaming and ensure accurate prize payment, all while minimizing verification costs.
- **Verification should try to align with existing stakeholder activities or opportunities:** As much as possible, verification activities should make use of existing activities or fit within competitor business models to reduce costs. For example, in competitions involving sales, competitors likely already keep receipts and record sales data. If they leverage other verification techniques to protect against fraud, verifiers can use this competitor data. In AgResults' experience, setting data collection requirements for verification has helped some competitors build better business and data management systems that they can use after the competition closes. Alternatively, verifiers might take advantage of existing government data collection or regulatory mechanisms, such as vaccine registration and household surveys. Designers and program managers can reduce verification costs and burdens by coordinating verification and other competition activities with government entities.

AgResults experience has shown that while donors and project managers may want robust and detailed verification methods, these come at a cost to the program and to competitors. We should always try to develop verification plans that accurately measure competitor success and inform prize payments without straining program resources or competitor time.

Sources of Data for Verification

To craft a verification plan, designers should consider the proposed payment indicators and the data that could be collected from competitors. This data can come from many sources, as Figure 19 shows:

Figure 19: Sources of Data for Verification

Data Sources	Uses	Strengths	Weaknesses
Survey data	<ul style="list-style-type: none"> • Measure population-wide outcomes • Confirm that beneficiaries are using solutions 	<ul style="list-style-type: none"> • Can show population-level changes 	<ul style="list-style-type: none"> • Can be costly to administer • Can be difficult to attribute broader outcomes to competitors
Transaction data	<ul style="list-style-type: none"> • Gather competitor or beneficiary sales information 	<ul style="list-style-type: none"> • Can be easy to audit 	<ul style="list-style-type: none"> • Cannot be used to confirm population-wide changes
Official records	<ul style="list-style-type: none"> • Confirm government regulation of competitors • Gather population-level information from census data 	<ul style="list-style-type: none"> • Easy/inexpensive to collect 	<ul style="list-style-type: none"> • Rare that available official records are the same as payment indicators
Health records	<ul style="list-style-type: none"> • Confirm health-related outcomes 	<ul style="list-style-type: none"> • Reliable at the patient- or provider-level 	<ul style="list-style-type: none"> • Can contain private patient information
GPS/Remote sensing	<ul style="list-style-type: none"> • Measure geo-spatial outcomes (e.g., farmland usage) 	<ul style="list-style-type: none"> • Requires lower field presence 	<ul style="list-style-type: none"> • Imprecise as a sole source of verification
Competitor monitoring data	<ul style="list-style-type: none"> • Collect competitor sales information 	<ul style="list-style-type: none"> • Easy/inexpensive to collect 	<ul style="list-style-type: none"> • Competitors could manipulate data

Verification Approaches

With appropriate data gathered from relevant sources, the verifier can evaluate if competitors have legitimately reached payment indicators and triggers. Possible verification approaches include:

- **Traditional audit:** Auditing transaction data can verify that competitors have truly engaged in transactions incentivized by the competition. Most useful for sales-based prizes, audits of transaction data confirm that competitor sales are occurring and validate sales patterns showing sales going to intended beneficiaries. For example, the AgResults Tanzania competition will audit competitor transaction data and farmer survey data to confirm input sales. Irregular or suspicious sales patterns that are uncovered by audit can be investigated to prevent overreporting or other types of gaming.

- **Self-reporting and spot checks:** Competitor self-reporting can leverage existing competitor information, and, when combined with randomized spot checks, create a robust verification approach. It may sometimes be costly or unnecessary to audit individual competitor sales receipts. Instead, a competition can require competitors to aggregate and regularly report their own results. To prevent competitors from falsifying data, verifiers can complement self-reporting with randomized spot checks on competitors and beneficiaries. As mentioned above, spot checks should be frequent and unpredictable enough so that competitors cannot circumvent these measures. To implement spot checks, the verifier should have a strong field presence and the ability to reach and speak with last-mile beneficiaries.

Combining Self-Reporting and Spot Checks in Kenya

In [Kenya](#), AgResults incentivized the sale of on-farm storage technologies to smallholder farmers. The competition combined self-reported sales data, audits, and spot checks to verify sales. To qualify for prizes based on total storage capacity sold to farmers, competitors submitted data on the storage capacity of technologies they sold to smallholders and shared transaction data for audit. The verifier complemented this competitor data with spot checks to ensure smallholder farmers were using the technologies.



- **Survey:** Verifiers can use surveys to understand broad changes in a population: Quantitative results can confirm population-wide change, and qualitative data can provide supplementary details. Surveys verify outcome-based prizes and payment indicators. For example, a prize where competitors are paid based on their ability to increase beneficiary incomes could use pre- and post-competition income-based surveys of beneficiary populations to verify performance. Using only survey data as a payment indicator may be risky because it may be difficult to attribute survey results directly to competitor activities. Also, population-wide surveys can be costly to implement, so verifiers should consider using targeted surveys or data collected by government or donor surveys. Moving forward, SMS-based survey technology may reduce costs: In Tanzania, AgResults will use SMS surveys to complement a traditional sales audit and further validate reported sales of dairy productivity inputs.
- **Quality Tests/Registration:** When competitions must confirm a solution's quality, the verifier can use quality tests, product specification requirements, or product registrations to complement other verification mechanisms. For many solutions, quality assurance approaches may capitalize on existing government regulation mechanisms. For example, AgResults' Brucellosis and Foot and Mouth Disease vaccine competitions use existing international vaccine registration processes to verify quality and trigger prizes. Other quality tests may use industry standards or require adjudication by a technical panel of experts, as the text box illustrates.

Developing Objective Quality Tests

Part of AgResults' [Kenya on-farm storage competition](#) took place in the Eastern Region, where farmers were combatting a new damaging pest called the Larger Grain Borer. Competitors that sold on-farm storage technologies in the Eastern Region were required to have their products reviewed by a technical committee to ensure they effectively prevented crop damage from this pest.

For AgResults' [Nigeria prize competition](#) that tackled aflatoxin contamination in maize, competitors distributed Aflasafe™ to farmers and aggregated the treated maize. The International Institute for Tropical Agriculture (IITA) then administered tests to validate the level of Aflasafe™ detected in the maize. Competitors received prizes based on the volume of maize that passed these verification tests.



Designing Verification to Avoid Perverse Incentives

To create a comprehensive yet pragmatic verification plan, designers must carefully consider the available data, payment indicators, and incentives for fraud or gaming by competitors. An incomplete or inadequate verification plan may create perverse incentives for competitors and encourage them to engage in undesirable behavior, undermining the entire program. Figure 20 presents common perverse incentives and verification mitigation techniques that AgResults projects have used.

Figure 20: Perverse Verification Incentives and How to Mitigate Them

Potential Perverse Incentives	Mitigating Perverse Incentives
Reporting: Competitors reporting false results and receiving awards.	Complement competitor data verification with audits or spot checks.
Conflict of Interest: Verifiers failing to maintain independence from competitors.	Carefully vet and continually track the activity of verifiers.
Gaming: Competitors skewing delivery to verification standards rather than desired outcomes.	Include multiple complementary verification methods incorporating multiple data types.

Verification: Ginovia Poultry Example

Consider the Ginovia Poultry Example visited throughout this toolkit. The designers have decided to develop a prize competition based on the private sector purchase of poultry from backyard farmers, incentivizing private sector poultry productivity and use of productivity-increasing inputs. Likely competitors include abattoirs, processors, and buyers/sellers of day-old chicks. The competition will use an annual proportional per-unit prize based on the number of birds that competitors purchase from smallholder farmers.

Based on this information, what verification methods could be most effective for a third-party verifier?

Verification Method Description	Data Source	Who Will Collect the Data?	How Often Will They Collect the Data?
Audits: The prize could require competitors to keep receipts of their purchases, allowing the verifier to audit these transaction records.	Competitor transaction records.	The verifier could require competitors to self-report their records periodically.	Requiring monthly reporting would allow the verifier to monitor progress and monitor sales trends to prevent fraud.
Spot checks: An additional random spot-check mechanism could ensure the integrity of competitor transaction records.	Direct interaction with farmers/ competitors.	The verifier could use field-based staff to conduct regular, randomized spot checks.	The verifier could conduct monthly spot checks to align with competitor data reporting.

Activity: Create Your Own Verification Plan

Consider an existing prize concept that you are developing or want to develop. Based on the prize structure and competitors, what verification processes would ensure competitors have achieved the prize's intended outcomes? For each verification method, note the data source, data collector, and frequency of collection.

 Verification Method Description	 Data Source	 Who Will Collect the Data?	 How Often Will They Collect the Data?
---	---	--	---

 <p>Verification Method Description</p>	 <p>Data Source</p>	 <p>Who Will Collect the Data?</p>	 <p>How Often Will They Collect the Data?</p>
---	---	--	---

Project Management for Prize Competitions

Project management is the range of activities implemented during a prize competition. Depending on the implementing organization, the parties responsible for project management may vary: Each AgResults prize competition has a third-party project manager contracted through a competitive procurement process. This project manager usually has a significant field presence and existing relationships with potential competitors and other stakeholders, such as government officials, industry, and donor organizations.

Some aspects of project management fall outside the scope of prize design, but a complete design should still include the anticipated project manager role and activities. This ensures from the outset that the project manager engages competitors, monitors the implementing environment, and drives program activities. Although they vary depending on the prize competition, AgResults' project manager responsibilities typically cover a range of activities, listed below in the order that they typically happen:

Who Manages the Competition?

Although AgResults contracts a third-party project manager through a competitive procurement, other organizations may choose to have the prize designer also manage the project.



Rule Finalization

In many cases, project managers convene a panel of technical experts to provide guidance through prize implementation. Prior to the competition launch, the project manager can collaborate with the technical panel to review the design and to finalize competition rules. By using a technical panel to finalize rules, AgResults maximizes the chances of an accurate understanding of competitor types, program growth projections, awareness of the operating environment, and potential risks.

Dispute Resolution

AgResults' final prize rules include contractual mechanisms for dispute resolution, which define how to handle situations where competitors question the amount of prize paid or not paid to them. Well-defined and publicized dispute resolution mechanisms standardize the process for handling disputes and insulate a competition from reputational risks stemming from unsatisfied competitors.

Competitor Engagement

Prior to and after competition launch, project managers should widely publicize the competition to potential competitors to maximize participation and scale. This awareness-raising should continue through the pre-launch period to attract competitors that have the best chances of winning and impacting target beneficiaries. AgResults' project managers have often used "road shows" to raise general awareness around the development challenge and to attract competitors to participate.

Competitor engagement may also include technical assistance and coordination where appropriate. Potential competitors may sometimes need guidance on how to enter the competition, how to best reach beneficiaries, or how to create partnerships to expand their presence. The project manager can be instrumental in assisting and facilitating successful participation.

Finally, as the prize progresses, project managers should monitor competitor activity and approaches. Active monitoring may reveal the need to adjust the prize design based on competitor activities, changes in market conditions, or other unexpected events. As the text box illustrates, sometimes when intermediate prizes are disbursed throughout the competition, there may be opportunities to adjust prize amounts or structures — either to add incentives or to mitigate overpayment.

Adjusting the Prize and Timeline in Nigeria

The AgResults [Nigeria Aflasafe™ Challenge Project](#) encouraged significant competition and sparked the creation of a premium market around aflatoxin-reduced maize. To further test the impact of the incentive and potential market, the project manager and AgResults agreed to add another year to the competition but cut the per-unit incentive in half. Despite lowering the incentive, competitors continued to buy increasing quantities of Aflasafe™ and aggregate Aflasafe™-treated maize, confirming that the prize had created sustainable market relationships between competitors and farmers to reduce aflatoxin contamination.



Coordination with Other Stakeholders

Beyond the competitors, the project manager should coordinate closely with other stakeholders in the market system to identify project opportunities and mitigate risks. Key stakeholders include the government, other donors, target beneficiaries, and market experts. This keeps project management abreast of changes in the implementation environment and to forecast project impacts.

Continuous Improvement

The project manager can also encourage competitors to improve their performance throughout the competition. For example, sharing project data when possible enables competitors to calibrate and improve their strategies. The project manager should avoid even appearing to favor any competitor. Impartial approaches to continuous improvement could include releasing annual progress reports to competitors and holding a town hall for competitors to ask key questions about competition rules and progress.

Progress Reporting

Given the program manager's proximity to the competition and awareness of day-to-day factors impacting progress, they are best positioned to provide insight in regular progress reports covering activities, successes, and challenges. AgResults' project managers create regular progress reports that are shared with leadership to inform subsequent design alterations and implementation decisions. Sometimes, these reports provide status updates; other times, they allow AgResults to proactively respond to changing environments and develop mitigation strategies to project risks. In some instances, project managers may identify risks to program operation that can result in program closure.

Thanks to project manager insight and reporting, AgResults closed two projects early due to changing market and regulatory circumstances, in Zambia and Uganda. The Zambia Biofortified Maize Challenge Project incentivized millers to buy biofortified, pro-Vitamin A maize from smallholder farmers. There was modest participation, and AgResults awarded a portion of the prize purse. However, it became clear that the combination of an unsupportive enabling environment, miller reluctance to change their business models to incorporate biofortified maize, and difficulty convincing consumers of the benefits of PVA maize was hindering the project goals, and it ultimately closed after three years of implementation. The Uganda Improved Legume Seed Challenge Project incentivized seed companies to produce high-quality legume seeds. However, it was terminated early due to enabling environment challenges, lack of competitor participation, and the inability to verify the quality of seeds sold under the project.

In both cases, the project manager was critical in identifying and cataloguing program threats. Building in progress reporting to project management functions can give funders greater insights into ongoing prize competition developments.

Communications

Project managers should also develop communications strategies to not only publicize the competition launch but also disseminate learning and results. Proactive communication about positive program results can increase participation, encourage greater government or NGO support of the project and of intended development outcomes through direct or regulatory action, and highlight the successes of the private sector. Additionally, managers can communicate lessons learned that development practitioners can use as they consider developing additional programs. Communications should target audiences such as policymakers, development donors and practitioners, and project participants, and be disseminated across multiple channels to maximize reach.

Verification Oversight

The project manager should also be required to manage the project's verifier as well as collect and communicate verification results. AgResults' project managers coordinate with the project verifier to monitor their progress and ensure that competitors are aware of verification requirements. The project manager may also identify any risks of verifier collusion with competitors and give guidance for the verifier to improve its performance.

Critical throughout implementation, strong project managers can help prize competitions adjust and refine designs to improve their quality. AgResults has learned that taking the time to carefully develop project management responsibilities and select qualified candidates maximizes the chance of success. Even if an organization chooses a different project management approach than what is outlined above, designers should still think critically about necessary management tasks throughout implementation and articulate them clearly during design.

External Evaluation

Apart from project management, project donors may also consider developing an evaluation plan. Prize competitions are significantly enhanced when paired with an objective external evaluation, which systematically documents the benefits of investment and identifies strengths and weaknesses of a competition strategy. Evaluations can also highlight the need to potentially course correct partway through if a project does not appear to be on track to achieve the intended goals, and, when possible, compare the outcomes of the investment to outcomes that would have obtained in its absence.

Each AgResults prize competition includes an external evaluator that was not involved in the prize design and can therefore objectively assess implementation and, where appropriate, estimate the competition's impact. To facilitate learning across competitions, each AgResults project evaluation addresses the [same set of research questions](#) with some adaptations to reflect the specific goals of each project. To maintain objectivity, the external evaluations are handled by one of the donor organizations and are not part of the formal AgResults design process.

These evaluations enable donors and prize competition developers to assess the program's impact on beneficiaries, enabling programs to go beyond monitoring payment indicators and look at broader outcomes to create learnings for future prize designs.

Evaluation Resources

Learn about evaluation best practices and its role in maximizing impact using the resources below.

- [OECD: Outline of Principles of Impact Evaluation](#)
- [CDC: Introduction to Program evaluation for Public Health Programs: A Self-Study Guide](#)
- [Free Management Library: Basic Guide to Program Evaluation \(Including Outcome Evaluation\)](#)
- [International Initiative for Impact Evaluation: Resources](#)
- [Poverty Action Lab: Research Resources](#)
- [Better Evaluation: Manager's Guide to Evaluation](#)



Wrap-Up: Effective prize verification and project management requires frequent engagement with competitors and other stakeholders, starting during prize design. By weighing project goals, likely data sources, competitor capabilities, and opportunities for gaming, designers can develop robust and independent verification procedures. Additionally, designers can enhance the likelihood of program success by building well-developed project management responsibilities to improve the program's ability to generate stakeholder interest and participation as well as identify and respond to project risks.

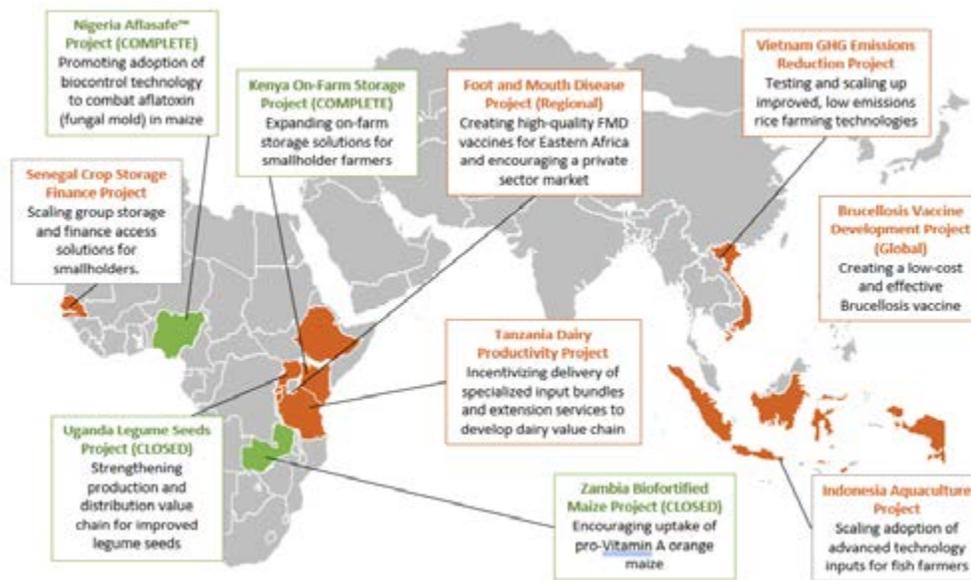
In the last phase of prize design, designers define the competition's verification and project management approaches. Verification plans should include multiple methods to ensure that competitors have followed contest rules. Conventional verification methods, including sales audits and competitor self-reporting, should be matched with additional measures such as spot checks, targeted surveys, or quality tests. Lastly, at the core of a complete design is an articulation of the anticipated project manager role and activities. This prize management guidance should include efforts to increase awareness, manage stakeholders to mitigate risks, and share lessons learned to encourage continuous improvement. Collectively, well-designed prize verification and project management plans round out a strong prize design, enhancing the likelihood of project success during implementation and lasting impact.

About AgResults

AgResults is a \$152 million collaborative program between the governments of Australia, Canada, the United Kingdom, the United States, and the Bill & Melinda Gates Foundation that funds agricultural Pay-for-Results prize competitions. Since 2013, AgResults has designed and implemented these competitions to incentivize the private sector to overcome specific market barriers and solve food security challenges — particularly for people living in poverty. AgResults competitions fall into one of two categories: 1) prizes that incentivize the Research and Development (R&D) of a new solution or product to address a market failure; and 2) prizes that encourage the development of innovative delivery models and encourage smallholder farmers to adopt an existing product or service at scale.

For more information on AgResults' approach, as well as its current portfolio and suite of learning products, please visit <https://agresults.org/>

Our Portfolio



Our Impact



For more information, check out Learning Library on the AgResults website: <http://www.agresults.org/learning>



AgResults is a partnership between:



<http://www.agresults.org>



info@agresults.org