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Appendix 7: Illustrative Project Details

Background on Dairy Sector in Tanzania

Dairy Production Challenges in Tanzania

Production among SHFs is limited by a lack of access to quality inputs that increase milk productivity and limited access to formal milk aggregators and markets.

Input Challenges

Indigenous cattle breeds have low productivity potential but dominate the dairy sector. Availability, affordability, and trust of AI technologies is limited among SHFs.

Limited access to, and use of, veterinary services limits the production productivity potential of dairy animals.

Feed availability and quality fluctuates seasonally. Reduced availability during the dry season and the cost of supplemental feeds reduce cattle productivity.

Access to quality extension services and credit for SHFs is low leading to poor animal management practices and a limited ability to invest in increased production.

Marketing Challenges

SHFs lack access to formal markets, relying instead on sales at wet markets or informal sales among neighbors. Transportation difficulties and cost contribute to difficulty in marketing.

Seasonality in production creates low prices during rainy seasons pushing farmers to pursue informal sales arrangements. During the dry season, milk processors and collectors struggle to aggregate milk, creating volatility in their business.

Poor infrastructure and frequent power outages complicate milk collection and increase spoilage.

Lack of quality assurance schemes, traceability, and adulteration of milk discourages milk collectors and processors from providing high prices for SHFs.

Sources:""Tanzania smallholder dairy value chain development: Situation analysis and trends," ILRI, 2014

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Dairy Production Challenges in Tanzania – Production Potential

Indigenous cattle make up 97% of the Tanzanian dairy herd. The productivity potential of the traditional, Zebu cow in Tanzania is relatively low but could be improved through improved animal husbandry.

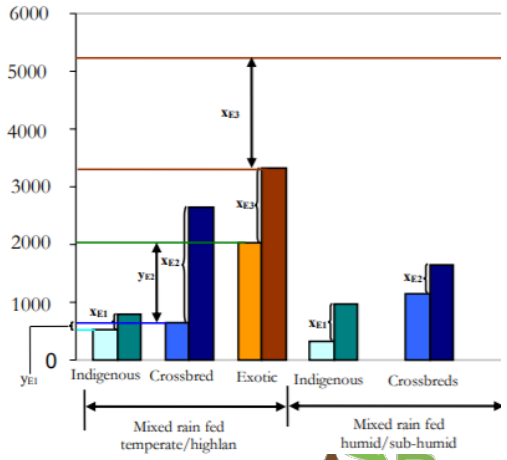
Production Capacity of Indigenous Cattle in East Africa

Production Scenario	Production Environment	Milk Production *(kg)*	Lactation Period *(days)*	Calving Interval *(days)*	Daily Production *(Kgs)*
Minimum	Temperate Highlands	529	193	375	2.74
Minimum	Coastal Humid/Sub-Humid	329	190	510	1.73
Maximum	Temperate Highlands	787	197	473	3.99
Maximum	Coastal Humid/Sub-Humid	984	202	619	4.87

Production Potential for Indigenous and Crossbred Cows

- Traditional cattle in East Africa are producing between 300-1000 liters of milk per lactation period. **The Zebu cattle** is estimated to produce between **300-500 liters of milk per lactation period.**
- In contrast, **crossbreed cattle** in Tanzania are expected to produce between **2000-4000 liters per lactation period** if well cared for.
- In addition to low productivity during lactation periods, indigenous cattle have short lactation periods and long calving intervals, meaning there are long periods where cows are not in milk.
- The use of improved breeds would significantly improve productivity, but access to AI is low, farmers do not have well developed breeding strategies, and knowledge of AI technology is lacking.
- **Improved animal husbandry** can improve indigenous cattle productivity by more than **30%** but this needs to be accompanied by improved inputs.

Productivity Gains with Improved Husbandry



"Tanzania smallholder dairy value chain development: Situation Analysis and Trends"
"Livestock Productivity Constraints" https://cgspace.cgiar.org/bitstream/handle/10568/69226/livestock_productivity_constraints_nov2008.pdf?sequence=1&isAllowed=y

Dairy Production Challenges in Tanzania – Animal Health

Production among SHFs is limited by a lack of access to quality inputs that increase animal productivity and limited access to formal milk aggregators and markets.

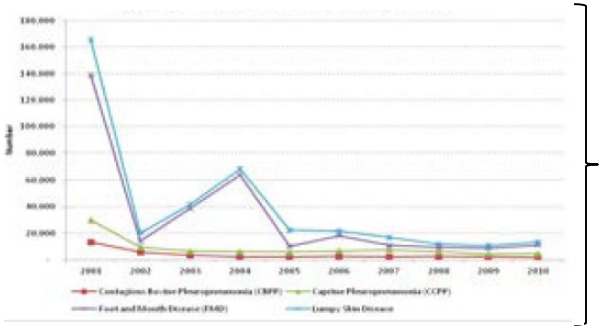
Animal Health Statistics

31% Of households reporting livestock vaccinations

45% Of households reporting de-worming of livestock

1:5901 Ratio of animal health professionals to cattle

Reported Incidence Animal Diseases (2001-2010)



Reductions in reported cases of common livestock diseases may represent true improvement but also reflects a limited farmer incentive to report outbreaks

Animal Health Delivery

- There were 3,580 registered animal health staff in Tanzania (2012).
  - Only 4% of those animal health staff were veterinarians.
  - Private veterinarians primarily work in cities like Arusha, Dar es Salaam, and Mbeya.
- In addition to registered animal health staff, community animal health workers (CAHWs) provide services for SHFs.
  - Research suggests that these CAHWs are relatively knowledgeable and able to make diagnose and treat disease.
- Limited access to veterinary services and inputs reduces the productivity of dairy cattle.

"Tanzania smallholder dairy value chain development: Situation Analysis and Trends"

Dairy Production Challenges in Tanzania – Feed Access and Quality

Smallholder dairy producers graze their cattle on communal lands and on crop fields following harvests. Seasonal availability of food, coupled with limited availability of commercial foods reduces animal nutrition and impacts production.

Traditional Feed Constraints

Seasonal Availability	• During the rainy season, there is an abundance of grazing grasses that dairy cattle can consume. • During dry seasons, however, grazing grasses disappear, contributing to a 40% decrease in milk supply during dry months.
Quality of Feed	• Naturally occurring grazing grasses are generally low in available energy and crude protein, providing less nutritional value than many cattle, particularly crossbreeds. • Most farmers do not utilize available technologies to improve the nutritional value of crop residues. Costs of crop residue technologies can be prohibitive for farmers.
Limited Haymaking	• Most farmers do not make their own hay or silage to insulate cattle against food shortages during dry seasons. • While these processes are effective, storage is scarce and the labor and supplies necessary to create hay and silage can be cost prohibitive.

Commercial Feed Challenges

Commercially available feed to supplement naturally occurring feed provide some recourse for farmers, however…

High Costs

Improved cattle require additional feed to meet nutritional requirements. These feedstuffs can account for as much as 60% of production costs

Low Quality

There is no dairy feed certification scheme in place to ensure the quality and consistency of feed compounds and concentrates.

"Tanzania smallholder dairy value chain development: Situation Analysis and Trends"
"Smallholder dairy cattle feeding technologies and practices in Tanzania," https://www.tandfonline.com/doi/pdf/10.1080/14735903.2018.1440474?needAccess=true

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Dairy Production Challenges in Tanzania – Extension Services

Tanzanian farmers have limited to extension services that are crucial to improving farming practices and herd management.

Extension Services and Income

	Farmers using extension services	Farmers not using extension services
Net Annual Income Per Animal Income	$17	$12
Net Annual Income Per Herd	$430	$138

200%

Annual increase in income for those farmers using extension services

Access to Extension Services

- While access to quality extension services can significantly increase farmer incomes, extension services are only utilized by about 20% percent of Tanzanian farmers.
- Use of extension services is strongly associated with proximity to urban areas and herd size, meaning that larger, already successful farming operations are most capable of accessing extension services.
- There is no structured system where farmers can access information on animal husbandry, production and market information
- 90% of extension services are obtained directly from the government.
    - Disease control, advice on housing, and feeding information are the primary types of information gathered through government extension agents.

"Realizing Tanzania Vision 2025 Through Livestock, http://www.fao.org/resources/infographics/infographics-details/en/c/320092/

Project Overview

Dairy Productivity – Project Objectives

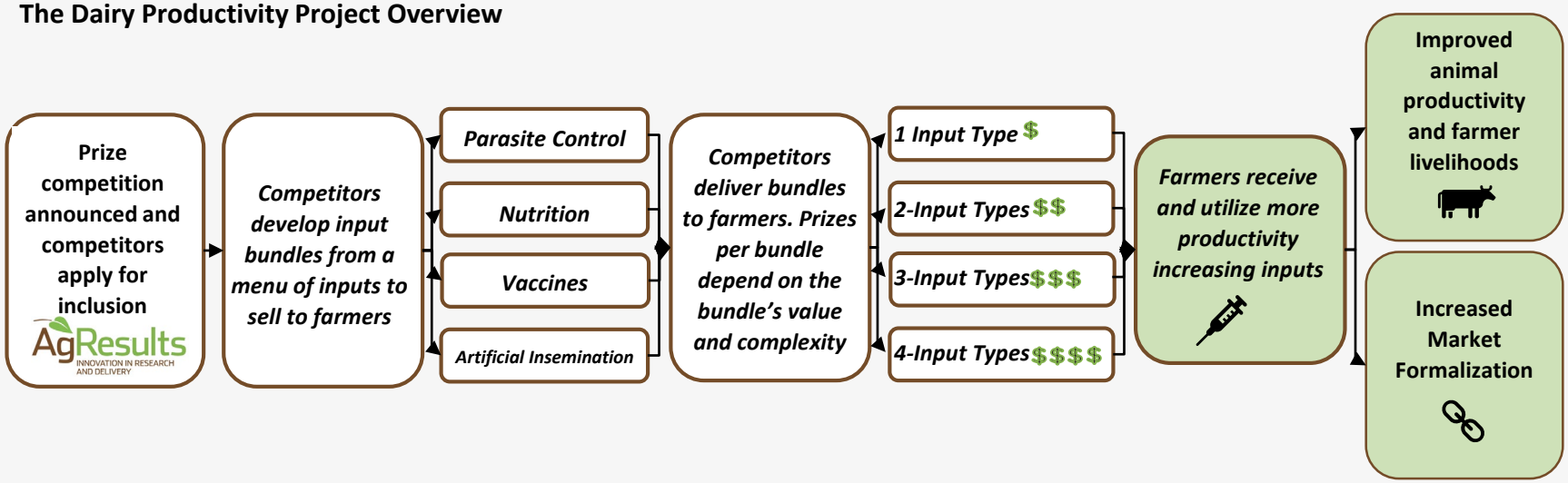
The project aims to achieve 3 key objectives:

1. Increase the delivery and use of inputs and services to SHFs that drive dairy productivity
2. Increase income from dairy production and dairy consumption among participating SHFs
3. Formalize value chain relationships and production in the smallholder dairy sector

To achieve these objectives, we propose the development of the following prize mechanism:

- ✓ A prize for each **bundle of productivity increasing inputs** delivered to SHF dairy producers, with incentives for delivery of more productive input bundles

The Dairy Productivity Project Overview



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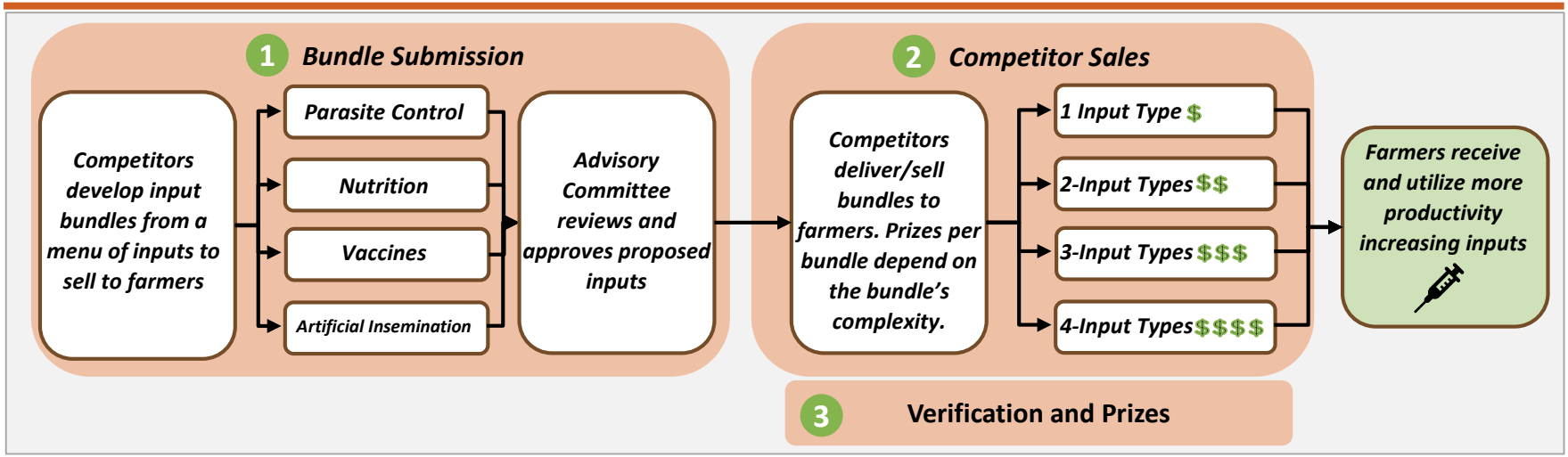
Annual Competition Overview

On an annual basis, AgResults will provide prizes for the provision of productivity increasing dairy inputs to smallholder dairy farmers.

Annual Competition Stages



Annual Stage	Activities
1 **Bundle Submission** *(3 Months)*	• Each competition year, competitors will submit a list of inputs that they will provide to farmers. • The Advisory Committee will determine if: 1. Those inputs come from approved input categories (Parasite Control, Vaccines, Nutrition, AI). 2. The proposed products and amounts are acceptable and prize eligible (i.e. qualify as one of the bundles). 3. The proposed extension services are sufficient for competition entry. 4. Proposed bundles and extensions services are gender sensitive (at minimum will not disadvantage women).
2 **Competitor Sales** *(9 Months)*	• Competitors will bundle approved inputs and sell to farmers. • Competitors may offer more than one combination of inputs to account for varying farmer needs. • The prize value for each input bundle provided depends on the number of input types and the inputs included. More complex bundles will be valued more highly.
3 **Verification and Prizes** *(Ongoing)*	• On a rolling basis, the verifier will track competitor input sales. • Based on the verified amount and combination of inputs sold, competitors will receive an annual prize.

The prize period is shortened to a 9-month period to allow competitors to adjust their input packages and to allow the project to review/approve new bundles and plan for verification each year.

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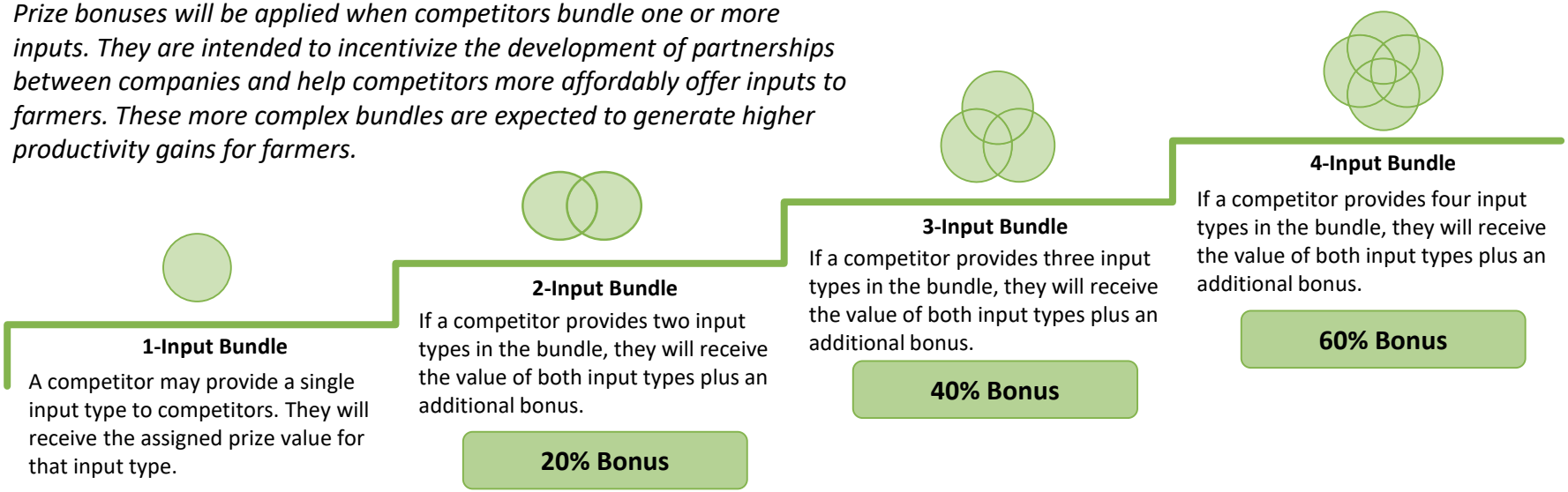
Competition Prize Structure

The prize a competitor receives is a function of the input types, how those inputs are bundled, and the number of total bundles a competitor sells.

Increasing Prize Amounts for Complex Bundles

Prize bonuses will be applied when competitors bundle one or more inputs. They are intended to incentivize the development of partnerships between companies and help competitors more affordably offer inputs to farmers. These more complex bundles are expected to generate higher productivity gains for farmers.



1-Input Bundle

A competitor may provide a single input type to competitors. They will receive the assigned prize value for that input type.

2-Input Bundle

If a competitor provides two input types in the bundle, they will receive the value of both input types plus an additional bonus.

20% Bonus

3-Input Bundle

If a competitor provides three input types in the bundle, they will receive the value of both input types plus an additional bonus.

40% Bonus

4-Input Bundle

If a competitor provides four input types in the bundle, they will receive the value of both input types plus an additional bonus.

60% Bonus

# of Input Types	Input Prize	Bonus	Prize per Competitor
1	Input Prize	--	= Input Prize * # of Bundles
2	Input #1 Prize + Input #2 Prize	20%	= Sum of Input Prizes * Bonus * # of Bundles
3	Input Prize #1+Input #2 Prize + Input #3 Prize	40%	= Sum of Input Prizes * Bonus * # of Bundles
4	Input Prize #1+Input #2 Prize + Input #3 Prize + Input #4 Prize	60%	= Sum of Input Prizes * Bonus * # of Bundles

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Allowable Input Types

The project will include four input types for which competitors may receive prize credit. Competitor prizes will only be awarded for providing allowable input types.

Allowable Input Types

Parasite Control	Vaccines	Improved Nutrition	Artificial Insemination (AI)
• Acaricides + • Anthelminthics *(Competitors will be required to provide both product types to become prize eligible)*	• Vaccines for commonly occurring cattle diseases *(The list of approved vaccines may be adjusted throughout the prize. See Appendix)*	• Hay and Fodder Sales • Minerals • Urea Molasses Blocks • Community Fodder Plots • Etc.	• Conventional AI • Sexed Semen

Competitor Bundle

A competitor can provide one or multiple input types to become prize eligible. Competitors may vary their bundles to tailor to farmer needs.

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Bundling Input Types

AgResults will allow competitors to offer any of the below 11 bundle combinations to farmers and may offer more than one in any competition year, as long as it has been pre-approved by the Advisory Committee. AgResults expects that competitors are unlikely to offer more than 2-3 bundle types for participating farmers.

1-Input Type Bundles

Input Type	Inputs Provided
Parasite Control	Acaricides, Anthelminthics
Nutrition	Fodder/Hay requirement + Minerals
Vaccines	Min. of 2 Vaccines (estimate includes ECF)

Each of these three input types might be offered as a stand alone bundle. The prize for these stand alone bundles is smaller than if a competitor offered multiple inputs.

2- Input Type Bundles

Input Combination	Inputs Provided
Parasite + Nutrition	Acaricides, Anthelminthics + Nutrition
Parasite + Vaccines	Acaricides, Anthelminthics + 2 Vaccines
Vaccines + Nutrition	2 Vaccines + Nutrition
Nutrition+ AI	Nutrition + AI

Competitors can offer 4 types of bundles that pair 2-input types. AI can be offered here only if it is paired with a nutrition intervention to ensure that farmers can benefit from an improved cow. An additional prize bonus is available to competitors that pair inputs types.

3-Input Type Bundles

Input Combination	Inputs Provided
Parasite + Nutrition + Vaccines	Acaricides, Anthelminthics + Nutrition + 2 Vaccines
Vaccines + Nutrition + AI	2 Vaccines + Nutrition + AI
Parasite + Nutrition + AI	Acaricides, Anthelminthics + Nutrition + AI

Competitors can offer 3 types of bundles that pair 3-input types. An even higher prize bonus is available to competitors that offer 3-input type bundles.

4-Input Type Bundles

Input Combination	Inputs Provided
Parasite + Feed + AI + Vaccine	All Approved Inputs

Competitors that offer bundles that combine all 4 input types will receive the highest prize bonus.

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Illustrative Prizes for Each Input Type and Bundle Combination

The prize a competitor receives per bundle of inputs delivered depends on the inputs included in the bundle. Below are the prize amounts for each combination. The prize amounts decrease for simple bundles to encourage more complex bundles in the later years.

Prize Amounts for Each Input Type

Input Type	Inputs Provided	Award Per Bundle Y1-Y2	Award Per Bundle** Y3	Award Per Bundle** Y4	Estimated Productivity Gain
Parasite Control	Acaricides, Anthelminthics	**$6**	**$4**	**$3**	**13-23%**
Nutrition	Fodder/Hay requirement + Minerals	**$27**	**$20**	**$13**	**62-82%**
Vaccines	Min. of 2 Vaccines (estimate includes ECF)	**$5**	**$3**	**$2**	**23-33%**
AI* **	AI (w/ conception rate of 75%)	**$15**	**$12**	**$7**	**16-26%**

Prize Amount for Each Bundle with 2-Input Types (20% Prize Bonus)

Input Combination	Award Per Bundle Y1-Y2	Award Per Bundle Y3	Award Per Bundle Y4	Estimated Productivity Gain
Parasite + Nutrition	**$39**	**$29**	**$20**	**70-100%**
Parasite + Vaccines	**$13**	**$9**	**$6**	**30-50%**
Vaccines + Nutrition	**$37**	**$28**	**$19**	**80-110%**
Feed + AI	**$50**	**$38**	**$25**	**85-115%**

Prize Amount for Each Bundle with 3-Input Types (40% Prize Bonus)

Input Combination	Award per Bundle	Estimated Productivity Gain
Parasite + Nutrition + Vaccines	**$52**	**90-130%**
Vaccines + Nutrition + AI	**$65**	**100-140%**
Parasite + Nutrition + AI	**$67**	**90-130%**

Prize Amount for Each Bundle with 4-Input Types (60% Prize Bonus)

Input Combination	Award per Bundle w/ Bonus	Estimated Productivity Gain
All Inputs	**$83**	**110-160%**

**In Years 3 and 4, the value of bundles with only 1 or 2 inputs will be reduced. The value will be 75% of the original value in Y3 and 50% of the original value in Y4. The value of more complex bundles will remain unchanged

***AI is not offered as a stand alone input but must be paired with feed

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Verification of inputs involves three components

Sales Audits
Compose the backbone of verification. Transactions will be recorded through a cloud-based sales tracking system and will be audited according to normal accounting standards.

SMS Surveys
Sent to farmers periodically based on competitor-provided data on input bundle and extension provision. These robust "surveys" of SHFs will further confirm sales and extension provision.

Risk-Based Spot Checks
Provide an additional level of verification to check that farmers are receiving inputs in the necessary quantities to trigger prize awards, especially in cases that seem awry.

The chosen sales Verifier will propose a verification solution that includes the following tasks:

1. Collect competitor sales data, including sales reports with full data on products and services provided to SHFs
2. Review competitor sales reports for tangible goods for the verification period
3. Analyze the trend of sales from one reporting period to the next to identify abnormal sales activities
4. Require farmer confirmation of received inputs and extension through SMS survey system linked to sales database
5. Conduct 'Mystery Shopper' visits to further verify a subset of input and extension provision
6. Aggregate input/bundle sales data to determine overall prizes
7. For the above tasks, propose a statistically robust solution based on sound auditing standards to verify provision of inputs

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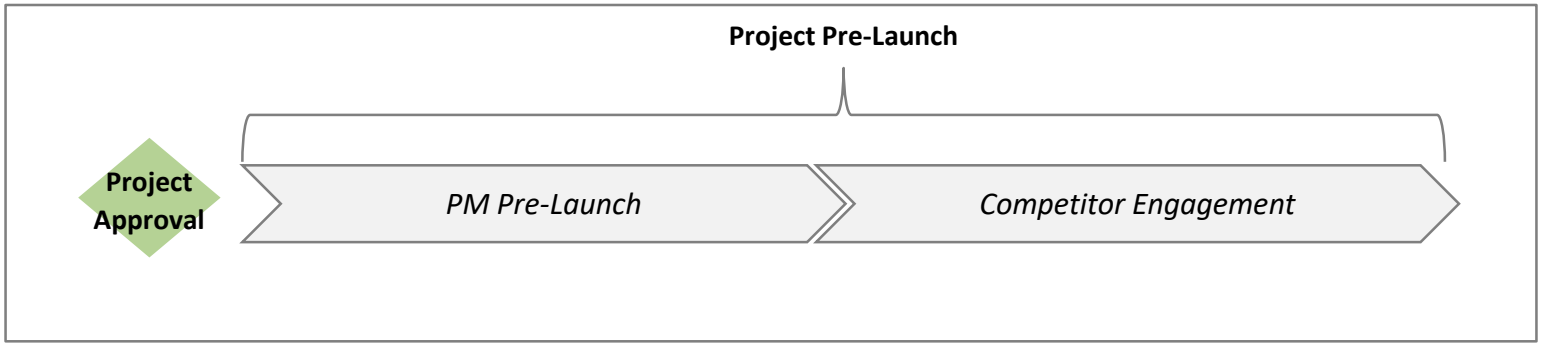
Project Management Activities During Pre-Launch

During the pre-launch period, the Project Manager will convene an Advisory Committee, finalize competition rules, seek formal government approval for project implementation, and engage industry stakeholders to drive interest in the competition.

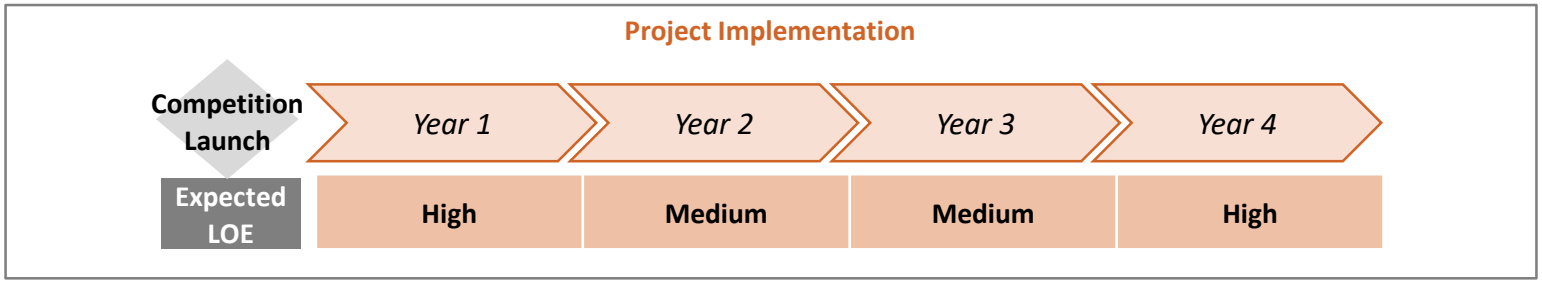


Project Manager Key Activities During Pre Launch

Timeline	Activities
PM Pre-Launch	• Convene an Advisory Committee of relevant Tanzanian Dairy Experts to assist in rules finalization. The Advisory Committee will seek to have equal male and female representation. • Coordinate with Advisory Committee, selected verifier and AgResults to complete definition of contest rules. • Coordinate in-country project approval process with relevant government ministries. • Begin outreach to industry associations to generate awareness and interest in project. • Propose a dispute resolution mechanism when disputes arise or competitor misconduct is suspected.
Competitor Engagement	• Stage informational events informing possible competitors of prize competition and contest rules. During these events, the Project Manager should help facilitate the development of competitor partnerships. • In coordination with the Advisory Committee, develop competitor selection criteria. • Continue to update inputs menu where changes are necessary based on introduction of new products or regulation. • Issue request for applications from competitors to apply to participate in the project.
Secretariat Engagement	• Support the Secretariat in selection of a Verifier. • Provide ongoing updates to the Secretariat via quarterly reports and weekly telephone meetings.

Project Management Activities During Project Implementation

After the pre-launch period, the Project Manager will actively oversee project implementation including solver recruitment, solver assistance, dispute resolution, and issue mitigation.



Project Manager Key Activities During Project Implementation

Timeline	Activities
Year 1	• In coordination with the Advisory Committee, review competitor applications and proposed input bundles, and select competitors for project participation. • Enter into legal agreements, which include competition rules, with all participating competitors. • Provide high level of administrative support and assistance to competitors as they begin working with farmers, including help competitors manage their input delivery partnerships. • Help coordinate between competitors and the verifier to ensure that ongoing verification activities are proceeding. • Coordinate results reporting by competitors and the verifier and share with the Secretariat. • Coordinate with the Secretariat and Advisory Committee in the event of verification disputes. • Report any implementation roadblocks or challenges to the Secretariat and work to mitigate those challenges.
Year 2	• Ongoing activities, including competitor recruitment, input bundle review, dispute resolution, etc. • Monitor changes in the regulatory and political environment.
Year 3	
Year 4	• In addition to implementing the final year of the project, the Project Manager will lead the coordination of project's closeout.