

Market Research to Introduce a Bovine Estrus Detection Test

PEN-SIDE TEST MAY HELP AFRICAN DAIRY FARMERS IMPROVE ARTIFICIAL INSEMINATION RESULTS, INCOMES, AND NUTRITION

Jeffrey Wellhausen, Kenneth Hawkins, Tala de los Santos, Helen Storey

Livestock are an important source of income and nutrition for small-holder farmers in Africa and other low-resource settings.¹ For small-holder dairy farmers, artificial insemination (AI) is the only viable method for introducing high-producing, disease-resistant, cross-bred cows to increase milk production.^{2,3} A key challenge for dairy farmers, however, is to properly time AI to maximize the rate of conception and, as a result, their return on investment. Animal behaviors and other observable signs are unreliable indicators of estrus, especially in regard to AI timing.

The P4 Gold test—now in development by Ridgeway Research—will test at the pen-side for reductions in progesterone (P4) levels in milk, which indicate estrus more reliably than observation alone.⁴ If the P4 Gold test accurately indicates the time of estrus and helps to increase conception rates in the field, its use will improve farmers' return on investment in AI through increased milk and calf production.

PATH conducted market research to guide the commercial strategy for the P4 Gold test and subsequent market development activities to achieve product adoption. The study findings inform decision-making related to product pricing, manufacturing, introduction, distribution, marketing, and other issues. This white paper summarizes PATH's market research methods and findings and provides recommendations to facilitate successful deployment of the P4 Gold test in low- and middle-income countries.

GATHERING INFORMATION FROM INTERNATIONAL EXPERTS, FARMERS, AND OTHERS

PATH performed primary market research through two activities: stakeholder interviews and field surveys.

Interviewed stakeholders included internationally recognized subject matter experts, importers of related agrovet products, in-country distributors of agrovet products, and companies that provide AI services for dairy cows. Questionnaires were informed by a literature review and previous project reports and were customized for each stakeholder category. PATH staff conducted 15 structured interviews by phone or email.

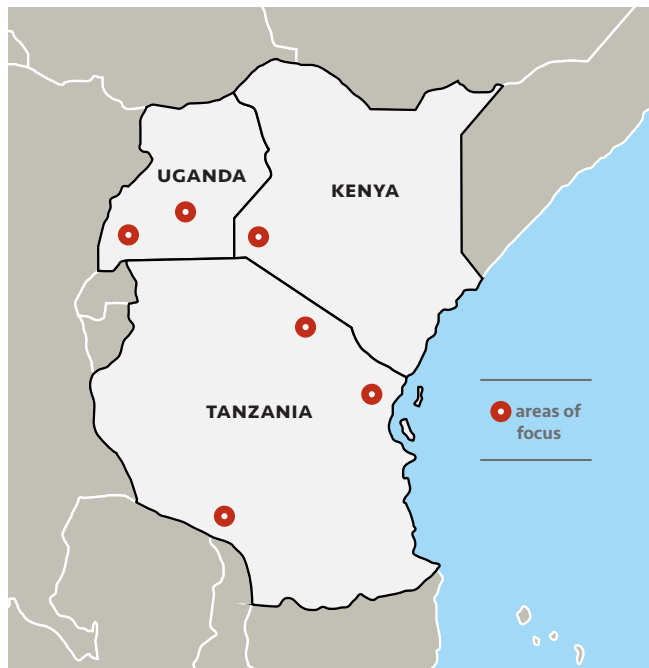
Field surveys consisted of in-person interviews conducted by partner organizations and consultants, who used questionnaires developed by PATH with input from Ridgeway Research and relevant expert stakeholders. Respondents included small-holder dairy farmers (314), AI technicians (42), and owners and managers of agrovet stores (52). Tanzania and Uganda were included based on funder priority, and Kenya was chosen for its high uptake of AI and robust dairy market systems. Figure 1 shows the diverse areas included in field surveys.

KEY FINDINGS OF MARKET RESEARCH

PATH's market research findings spanned nine content areas that are important for planning product introduction and achieving user adoption:

- **Market segmentation.** The research identified seven distinct market segments—such as small-holder farmers and AI service providers—that need to be considered in introducing and marketing the test.
- **Demand forecasting.** Based on several factors—including the estimated number of dairy cows (150 million) owned

FIGURE 1. Regions included in field surveys.



by African small-holder farmers and AI utilization rates—PATH calculated a total market potential for the P4 Gold test of 9 million units per year in Africa. Serving only 10 percent of the potential market in Africa alone would require annual production of nearly 1 million tests.

- Competitive analysis.** Because no comparable tests are available to users in Africa, performance and marketing of the P4 Gold test should be benchmarked against currently used methods for detecting estrus, which are observations of behaviors and other physical signs of estrus.
- Pricing strategy.** Survey results showed that US\$2.00 was the highest price most farmers would find acceptable for the test based on their current perception of the product’s value. By contrast, an analysis of expected costs, with input from importers and distributors, suggested that the final price to farmers would likely be in the range of \$2.49 to \$4.77 with existing small-scale production methods (Figure 2).
- Manufacturing.** The current development partner has the capacity to produce only 10,000 to 12,000 units per month with manual processes. Other manufacturers will thus be needed to automate and scale up production to meet anticipated demand. Interviewed stakeholders emphasized that manufacturing needs to be done in the context of a robust quality program.
- Distribution strategy.** Surveyed farmers expected to obtain the P4 Gold test from their AI service provider (73 percent) or an agrovet store (28 percent). However, information from stakeholders indicated that price markups at each step of the commercial distribution chain (see Figure 2) would substantially increase

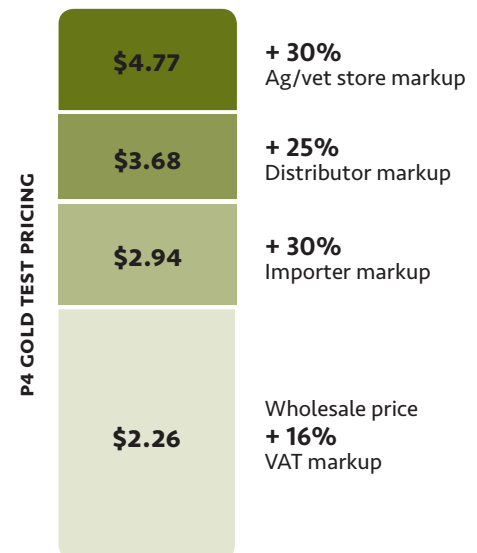
“Our current experience is that small-holder farmers are price sensitive and very slow in adopting technologies that would enhance productivity.”

- Agrovet product distributor

the final price to the farmer, jeopardizing adoption. Findings suggested that low-cost distribution methods will be needed to maintain prices at acceptable levels during the early phases of product introduction.

- Marketing communications.** Surveyed farmers and AI technicians showed strong interest in the P4 Gold test concept and highlighted detection of “silent heats” and prevention of mistimed AI as the two most important benefits to feature in communications. Stakeholders suggested using demonstration programs and training events tailored to local needs to build up the profile of the product and clearly communicate its value to farmers.
- Training and compliance.** Many interviewed stakeholders mentioned the need for user education and training to ensure correct use of the test and to

FIGURE 2. Estimated increases in price to buyer resulting from typical markups by participants in commercial distribution chain.*



*Wholesale price is assumed to be \$1.95. Value added tax (VAT) of 16% is considered typical for African countries. Estimated markups are based on findings of interviews and field surveys. In an alternative distribution scenario in which an artificial insemination technician orders the test directly from Ridgeway Research and marks up the price by 10%, the price to the buyer would be \$2.49.

accelerate product adoption. They noted that this could be accomplished through synergistic AI expansion programs and dairy development initiatives to keep training costs low.

- **Return on investment.** Using reasonable assumptions about the cost and effectiveness of AI and the P4 Gold test under field conditions, PATH calculated that the test would provide a positive return on investment for small-holder dairy farmers in Africa. For example, if the test increased the AI conception rate from 30 to 40 percent, farmers would see a positive return on their investment at prices up to \$3.33 per test (Figure 3).

RECOMMENDATIONS TO GUIDE INTRODUCTION AND ACHIEVE ADOPTION

PATH’s market research findings provide the foundation for the following recommendations for successfully introducing the P4 Gold test and accelerating adoption in Africa:

- **Manufacturing.** Manufacturing capacity should be dramatically increased as soon as feasible to both reduce unit costs and meet anticipated demand. It is recommended that capacity be built by engaging manufacturers with existing large-scale capacity and experience marketing and distributing to users in Africa. High-quality, reliable, large-scale manufacturing is essential for long-term success.
- **Product introduction and distribution.** To concentrate use of resources, product introduction should take a phased approach, initially targeting two or three strategically selected countries, and include pilot studies to demonstrate test performance and value. Also, the product should be introduced in partnership with government programs or nongovernmental organizations already engaged in AI expansion

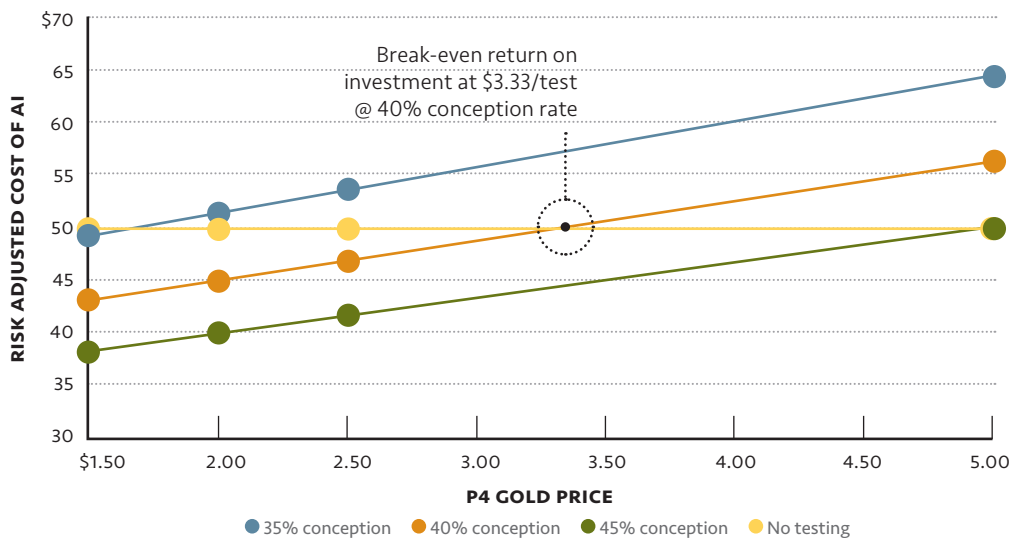
activities. These partners offer advantages such as low-cost distribution channels, an already engaged market, extensive technical expertise, and decades of experience in dairy cattle production systems. If introduction is successful, distribution via commercial channels will become increasingly viable over time.

“The typical rate [for conception with AI based on observation] is 27 to 30 percent. They [small-holder farmers] would be very happy with 40 percent.”

- Interviewed subject matter expert

- **Marketing.** The early phases of product introduction should include local training and demonstration programs for potential users. This will not only promote product use but also prepare farmers to incorporate use of the new tool in their current practice, ensuring proper test use for optimal results. To support training programs and brand development, marketing communications and collateral should be targeted to specific audiences based on their role in the value chain and the test’s benefits for them. Marketing communications should include the results of studies demonstrating test performance and value during local use.
- **Product pricing.** The current gap between the expected product price and price acceptability among potential users needs to be closed. The price to farmers can be reduced by scaling up manufacturing and introducing the product through noncommercial channels (see

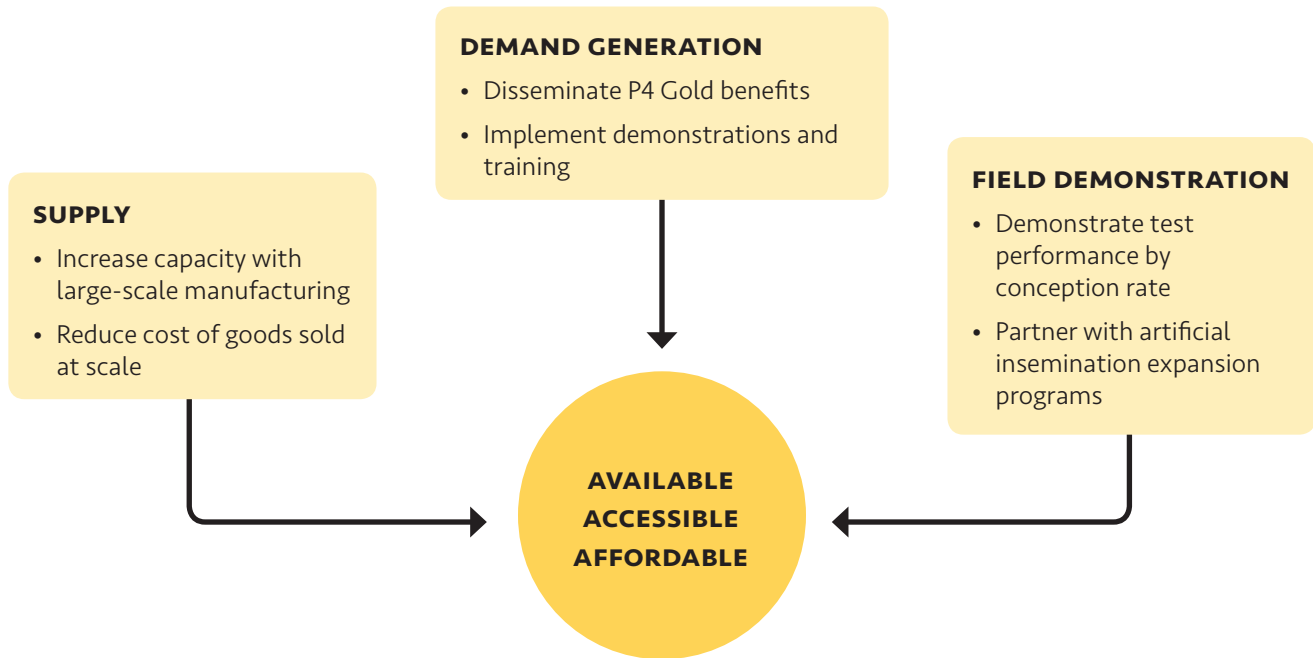
FIGURE 3. Calculated return on investment for small-holder farmers using the P4 Gold test.



ASSUMPTIONS

- Artificial insemination (AI) cost = \$15
- Conception rate using observation (only) = 30%
- 1 AI/cycle
- Average of 1.5 tests used/AI
- Pregnant cows are not inseminated

FIGURE 4. Suggested activities for successful commercial implementation of the P4 Gold test.



comments above). At the same time, demonstrations of the test’s ability to increase AI conception rates among small-holder farmers’ dairy cattle should be conducted and the results shared to increase the product’s perceived value. In the short term, external investments or subsidies may be needed to facilitate introduction and pave the way for sustainable use.

Figure 4 highlights suggested activities to accelerate implementation of the P4 Gold test in Africa by making it available, accessible, and affordable. If product introduction is supported properly and with the right partners, large-scale manufacturing is achieved to reduce the product price, and the test performs sufficiently in demonstration studies, the P4 Gold test should prove to be a commercially sustainable tool for increasing small-holder dairy farmers’ incomes and improving nutrition while providing fair profits for the product developer, manufacturer, and others.

ACKNOWLEDGMENTS

This work was funded by a grant from the Bill & Melinda Gates Foundation. The authors thank the One Acre Fund and International Livestock Research Institute for their partnership in conducting field surveys in Kenya and Tanzania, respectively.

References

- 1 Salami A, Kamara AB, Brixiova Z. *Smallholder Agriculture in East Africa: Trends, Constraints, and Opportunities*. Tunis, Tunisia: African Development Bank Group; 2010.
- 2 Cunningham EP, Syrstad O. *Crossbreeding Bos indicus and Bos taurus for Milk Production in the Tropics*. Rome: United Nations Food and Agricultural Organization; 1987.
- 3 Brotherstone S, Goddard M. Artificial selection and maintenance of genetic variance in the global dairy cow population. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*. 2005;360(1459):1479–1488.
- 4 Shearer JK. *The Milk Progesterone Test and Its Applications in Dairy Cattle Reproduction*. Gainesville, Florida: University of Florida Cooperative Extension Service; 2003.



www.path.org

PATH is the leader in global health innovation. An international nonprofit organization, we save lives and improve health, especially among women and children. We accelerate innovation across five platforms—vaccines, drugs, diagnostics, devices, and system and service innovations—that harness our entrepreneurial insight, scientific and public health expertise, and passion for health equity. By mobilizing partners around the world, we take innovation to scale, working alongside countries primarily in Africa and Asia to tackle their greatest health needs. Together, we deliver measurable results that disrupt the cycle of poor health.

STREET ADDRESS
2201 Westlake Avenue
Suite 200
Seattle, WA 98121 USA

MAILING ADDRESS
PO Box 900922
Seattle, WA 98109 USA