Applied Biosystems™ Axiom™ Genotyping Solution: High-throughput genetic testing for agriculture

Accelerating Precision Breeding for Sustainable Food Security and Resilient Agriculture.

Applied Biosystems™ Axiom™ Genotyping Solution is an advanced genetic testing technology that helps breeders and researchers quickly and accurately identify the best plants, animals, or fish for breeding. It can process thousands of samples per week, is customizable for different species and traits, and delivers precise, reliable results. The system supports faster development of high-yield, disease-resistant, and climate-adapted varieties, making agriculture and aquaculture more productive and sustainable. Its automated workflow makes it easy to use and cost-effective, benefiting large-scale breeding programs and food security efforts.

Thermo Fisher Scientific
Dr Thulile Nhlapo

Commodities

Aquaculture, Livestock, All Crops

Sustainable Development Goals

Categories

Pre-production, Practices, Biological control

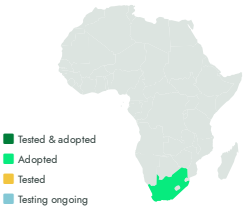
This technology is pre-validated.

9·8 Scaling readiness: idea maturity 9/9; level of use8/9

Inclusion assessment 4

Climate impact 2

Tested/adopted in



Problem

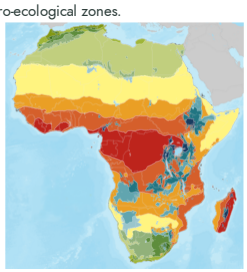
- **Low productivity:** Traditional breeding is slow and imprecise.
- **Disease and pests:** Crops and livestock lack resistance.
- **Limited genetic diversity:** Reduces adaptability and resilience.
- **High costs and inefficiency:** Field trials are time-consuming and expensive.
- **Complex traits:** Hard to track traits controlled by many genes.
- **Food insecurity:** Low yields and poor nutrition in staple crops.
- **Manual errors:** Workflows are slow and prone to mistakes.
- **Inbreeding risks:** Leads to harmful mutations and reduced performance.

Solution

- **Boosts productivity**: Uses genetic markers to accelerate breeding of high-yield crops and livestock.
- **Improves resistance**: Detects genes for disease and pest resistance, reducing outbreaks.
- **Preserves diversity**: Analyzes genetic variation to prevent inbreeding and support adaptation.
- **Cuts costs**: Automates high-throughput genotyping, reducing labor and per-sample costs.
- **Decodes complex traits**: Identifies key genes for traits like drought tolerance and nutrition.
- **Strengthens food security**: Breeds nutrient-rich crops and improves livestock yields.
- **Streamlines workflows**: Offers full automation from DNA extraction to data analysis.
- **Prevents inbreeding**: Ensures pedigree accuracy and healthy genetic diversity.

Where it can be used

This technology can be used in the colored agro-ecological zones.



Target groups

Breeders, Seed companies, Researcher center

Key points to design your program

High-Throughput Genetic Testing for Agriculture (Axiom™ Genotyping Solution) can be integrated into crop improvement, livestock development, aquaculture breeding, and agricultural innovation programs to accelerate breeding, improve productivity, and strengthen resilience to climate and disease challenges. Its adoption contributes to **SDG 2 (Zero Hunger), SDG 9 (Industry, Innovation and Infrastructure), SDG 13 (Climate Action), and SDG 15 (Life on Land).**

To integrate this technology into your project, plan and budget for the following activities and prerequisites:

- Facilitate access to genotyping platforms, laboratory infrastructure, and bioinformatics tools.
- Build partnerships with Thermo Fisher Scientific, research institutions, breeding programs, universities, seed companies, and livestock organizations.

- Train breeders, researchers, and laboratory personnel on genomic selection, marker-assisted breeding, and genetic data analysis.
- Promote women's and youth participation in biotechnology, breeding programs, and agricultural innovation.
- Monitor breeding efficiency, genetic gains, improved varieties or breeds released, adoption rates, and productivity outcomes.

IP

Unknown