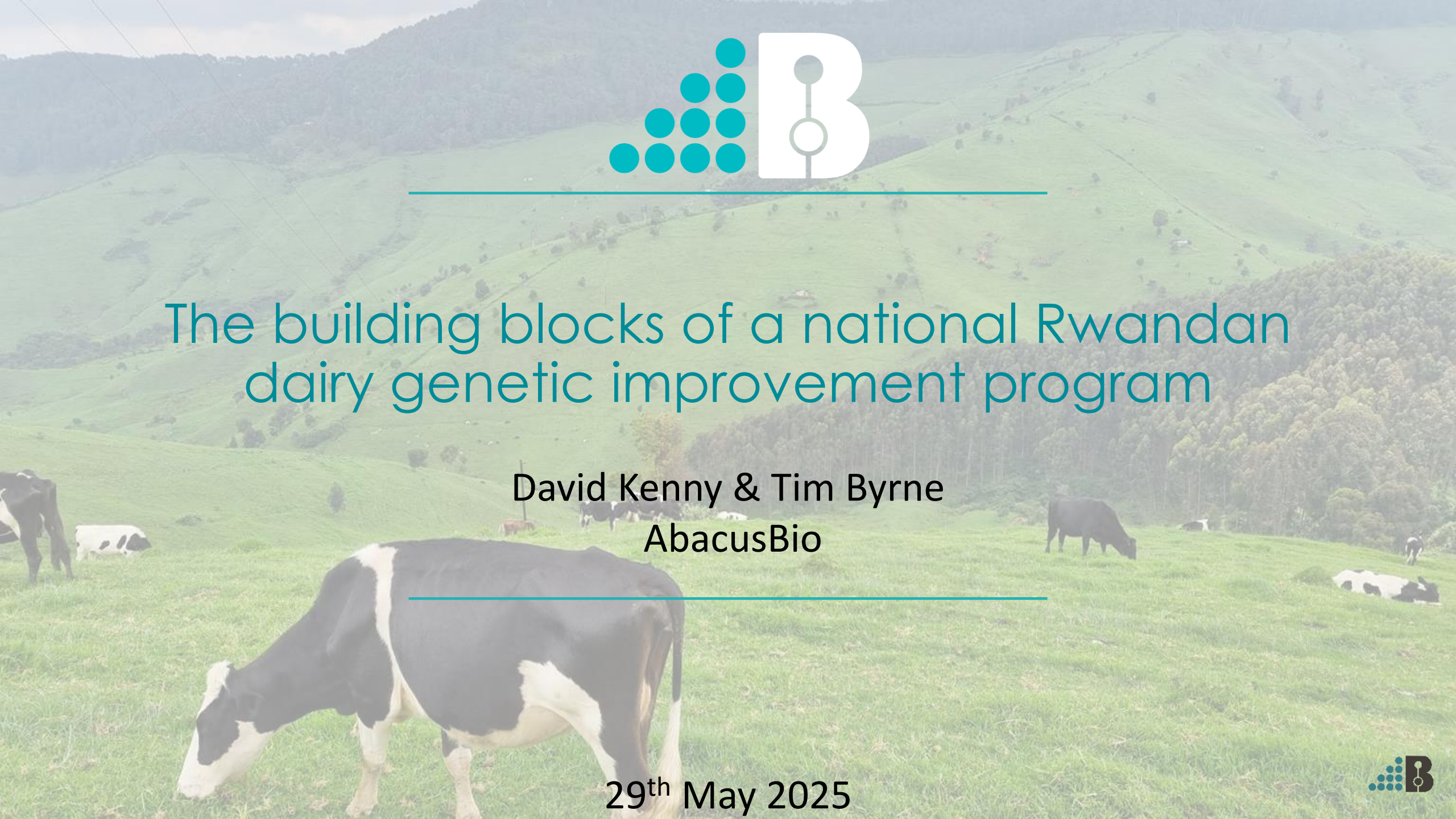


The building blocks of a national Rwandan dairy genetic improvement program

David Kenny & Tim Byrne
AbacusBio

29th May 2025

A long-term direction:



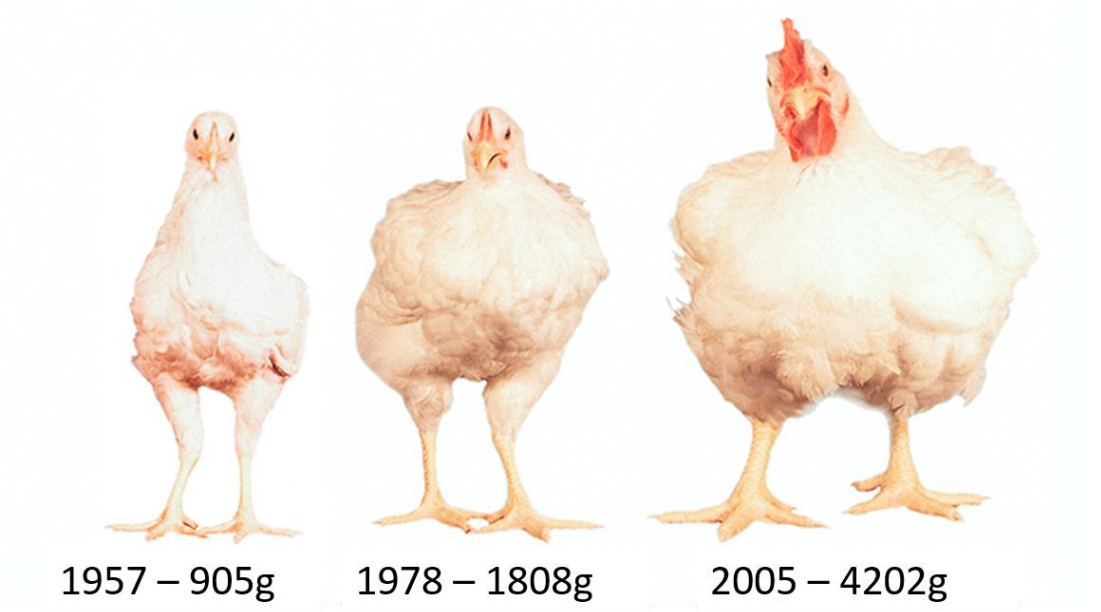
The power of genetic improvement

Leverages population performance and genetic variation

Target multiple economic and environmental (or other) traits at a time

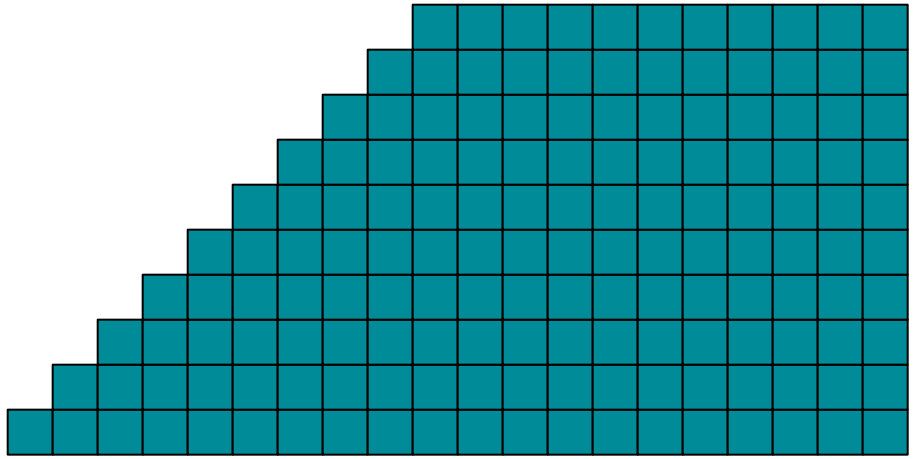
Genomic technology has increased value

Tool to deliver food production, profit, and support progress towards environmental efficiency

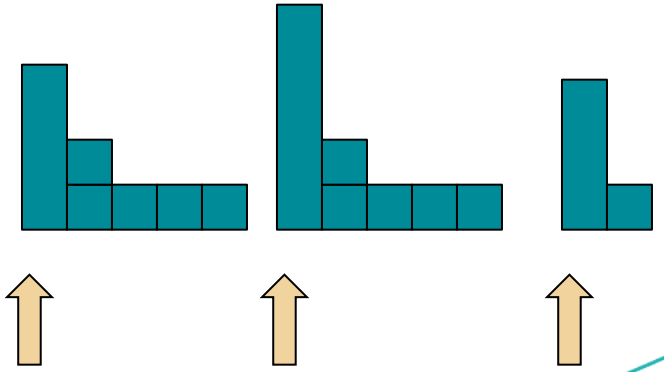


The power of genetic improvement

Genetic Improvement



Fertiliser



What value can be created?

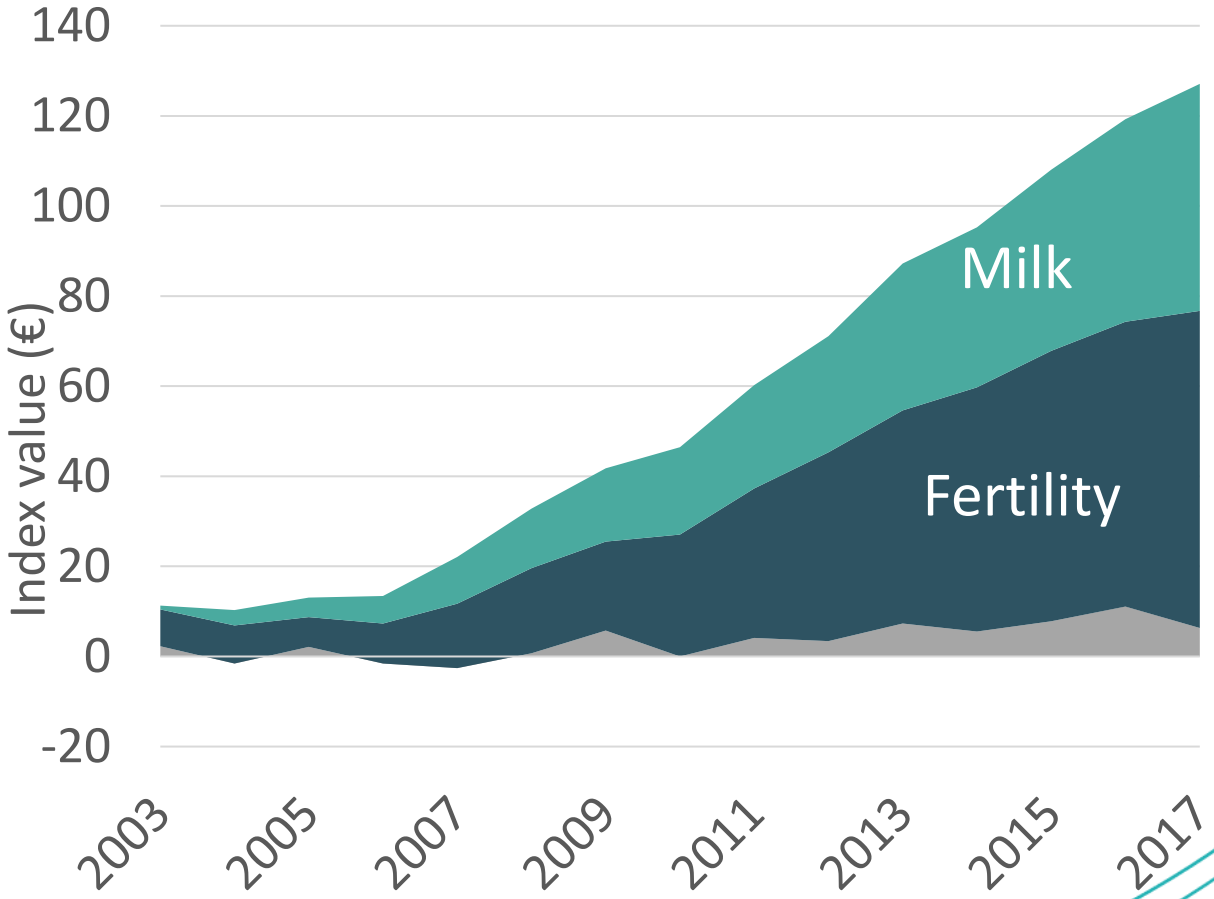
Accumulate – historic

Dairy production benefits worth **€1.47b**

Value driven by fertility, then milk

Other traits (calving, health) modest

€80 per dairy cow per year

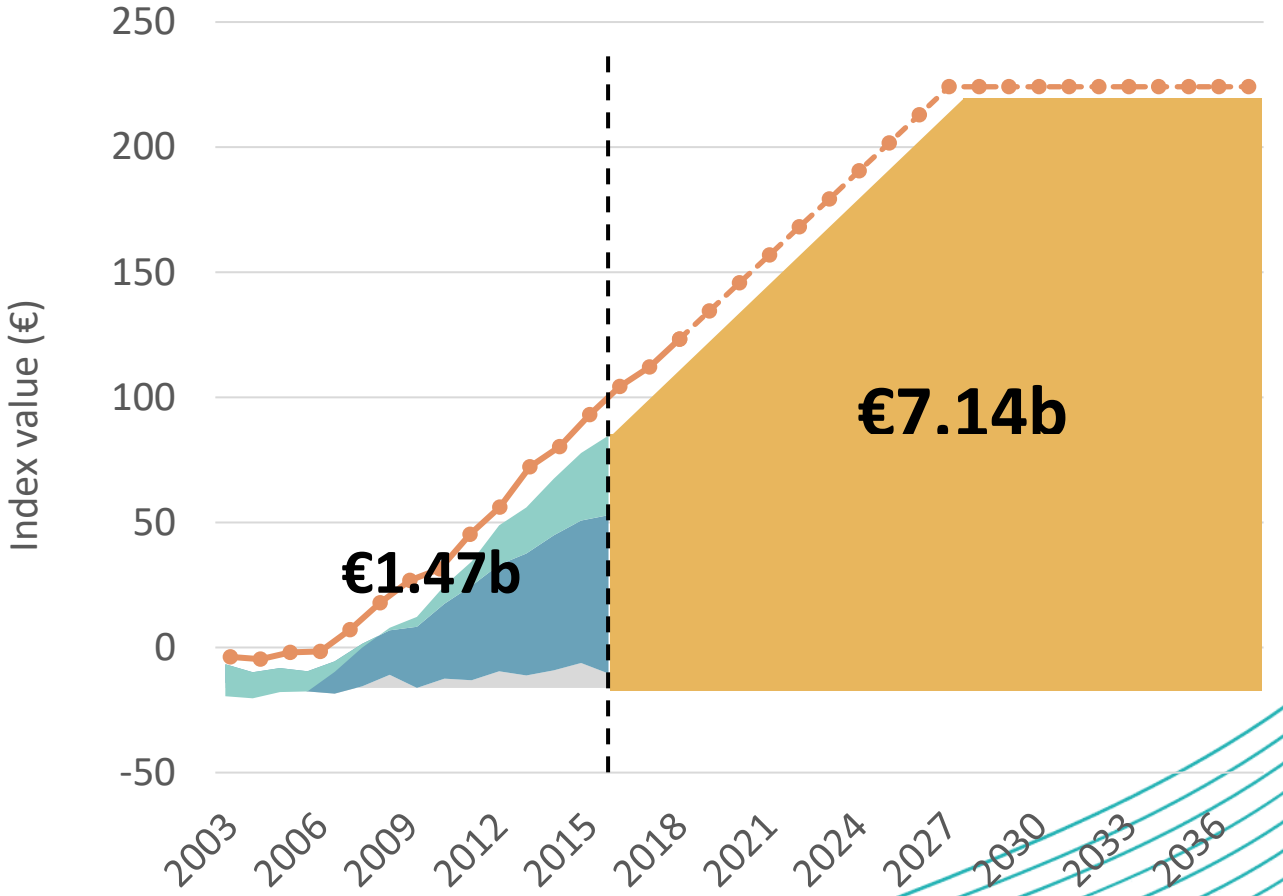


Accumulate – future

Sustain 10 more years of genetic improvement at current rate

Permanent for 10 years

Total value = €8.61b

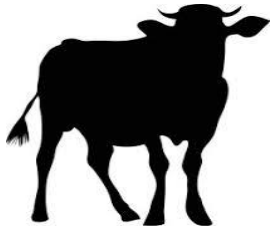


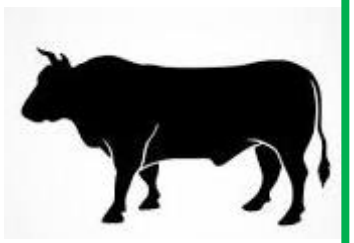
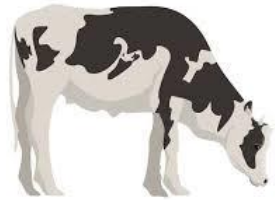
Steps to a Rwandan dairy genetic improvement



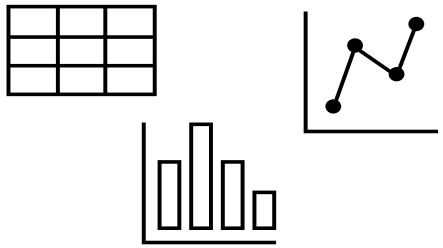
A Rwandan dairy genetic improvement program?

Rwanda and international dairy bulls



Performance data



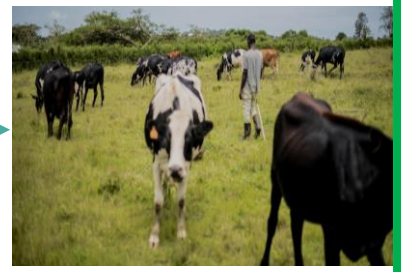
DNA/pedigree info





Elite sire genetics for Rwandan dairy system





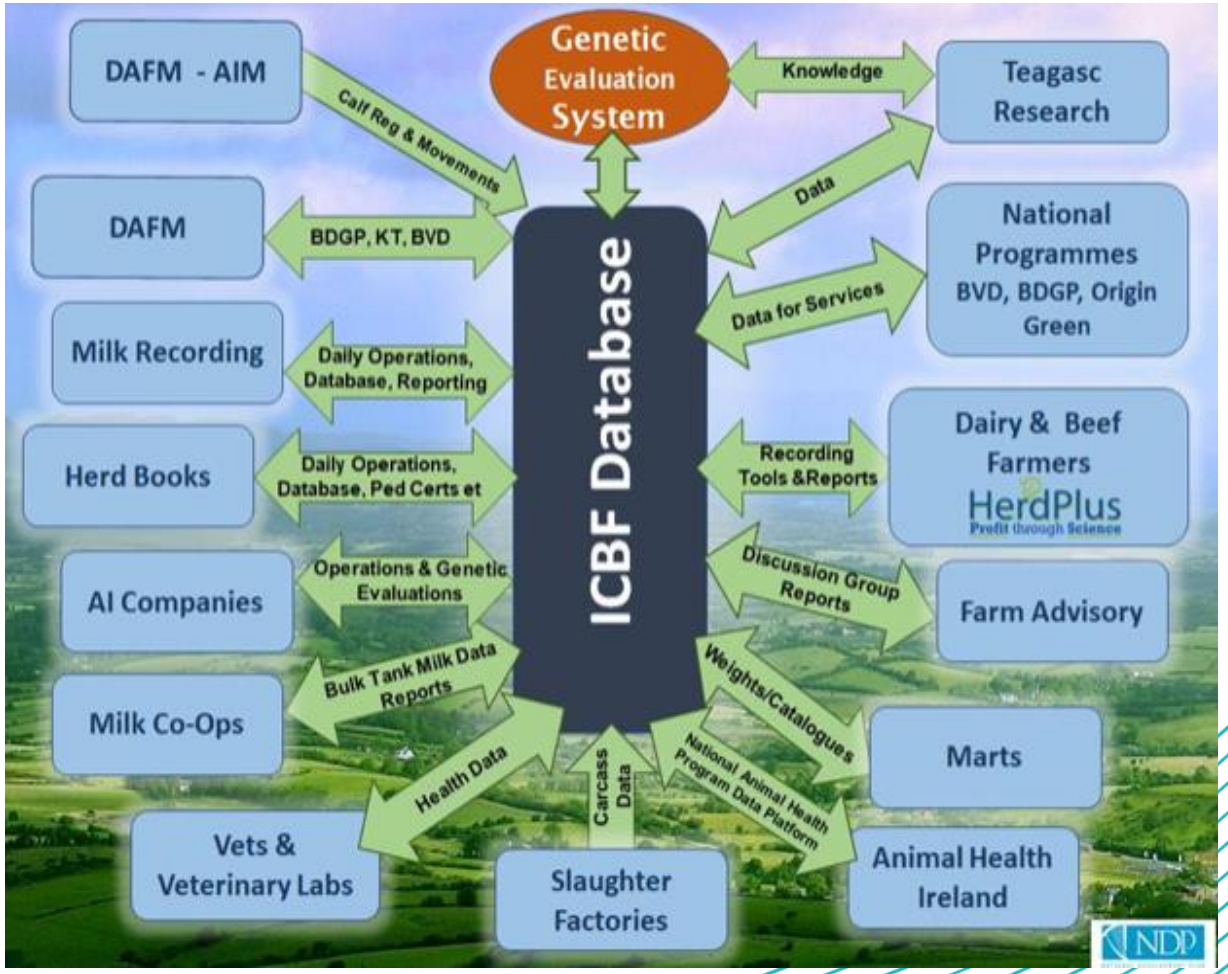

Centralised industry body and database

Developed breeding programs operate under central industry body

- Develops, maintains and advances breeding program
- Requires nurturing skilled personnel

Responsibility extends to maintaining a central, future-proof database

- To effectively store high-quality data collected within industry

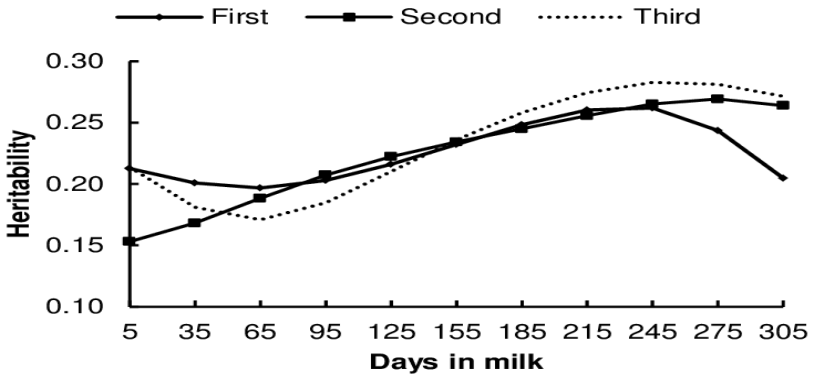


Where can genetic improvements be made?

Factors underpin potential to make improvements for a trait through breeding:

- Trait contribute to profitability or other desirable outcomes?
- Extent that trait is under genetic control?
- Potential to collect performance data on trait?







Data collection

Sufficient, accurate performance and pedigree data key to genetic improvement

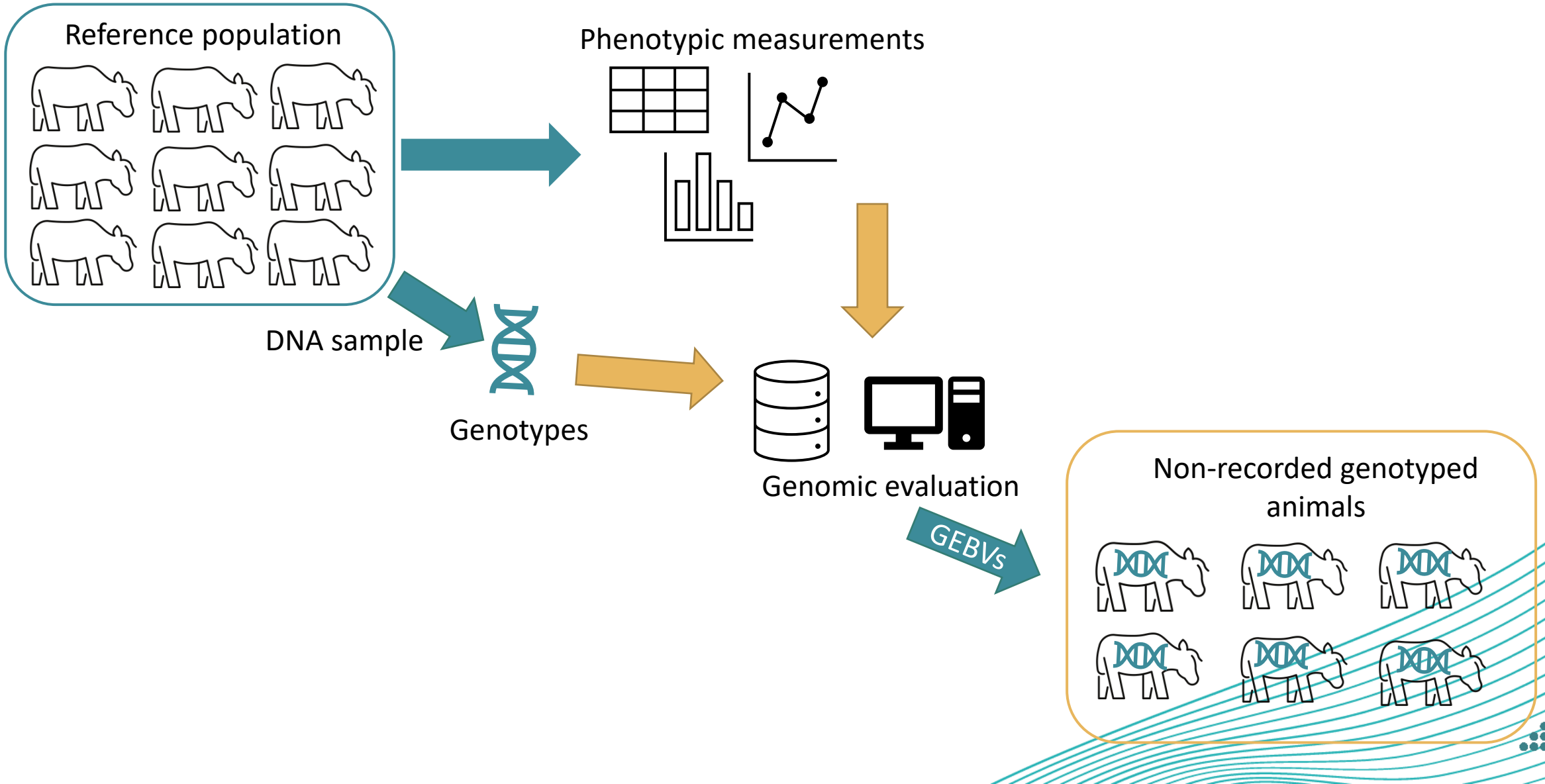
- Initial collection enables analyses of potential to genetically improve traits
- Longer-term routine collection underlines accurate genetic evaluations

Utilise standardised practice on animals with unique ID tags in representative herds

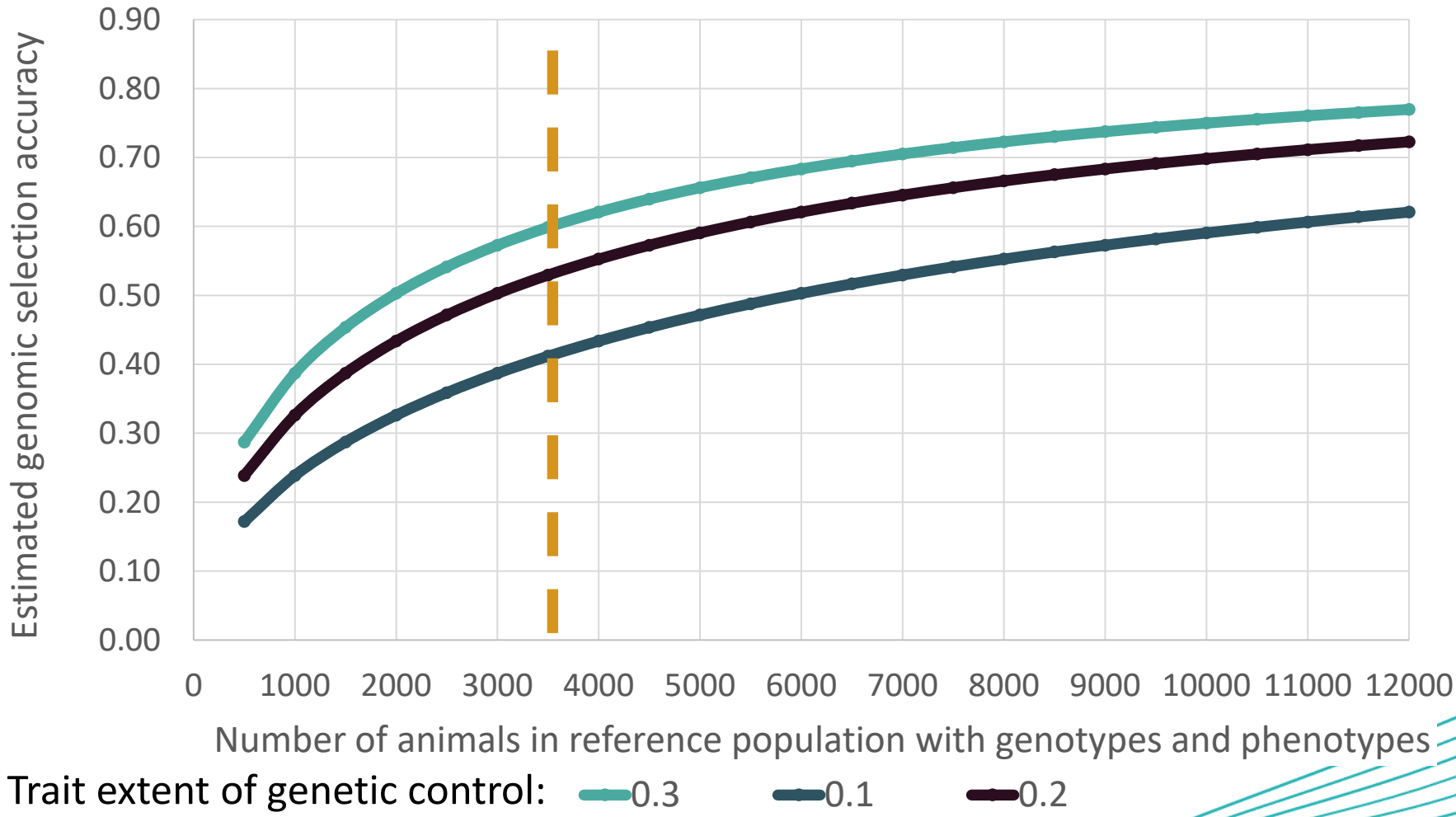
- Accurate data translates to accurate breeding decisions



Development of genomic evaluations



Genomics – phenotypes are needed

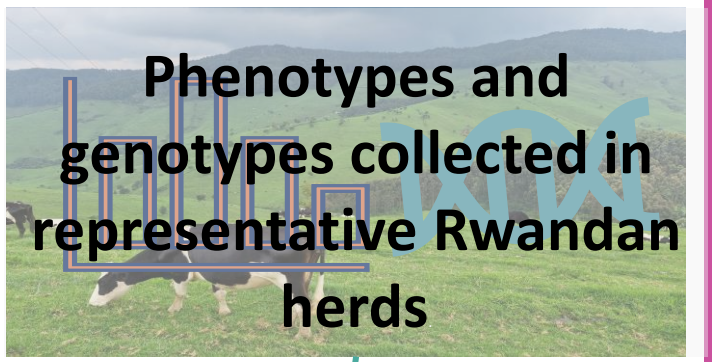


Identifying elite genetics in short- and long-term

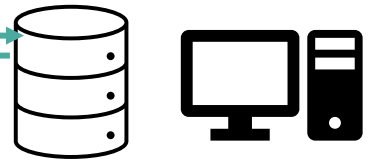
Short-term



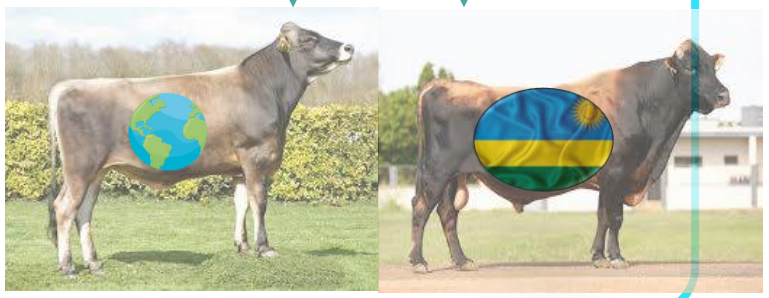
Long-term







Rwandan genomic evaluation





Disseminating elite genetics

Mechanisms required to facilitate distribution of elite genetics into the commercial herd:

1. Selection indexes: Reduces data on bull's genetic merit into a single monetary value
    - Simplifies identification of elite genetics in on-farm breeding decisions
2. Build infrastructure to enable widespread use of artificial insemination
    - Ensures ability to access elite genetics



Embedding genetic improvement program

Buy-in of farmers critical to success

- Pursue and use of elite genetics to bred replacement females and sires
- Routine data collection for evaluation

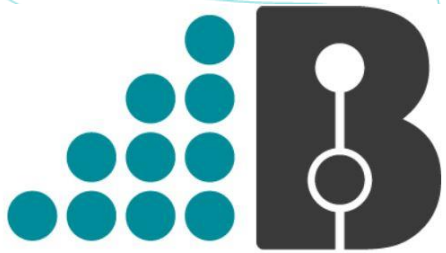
Research farms could promote buy-in by demonstrating value of genetics and best practice



Conclusion

- Genetic improvement validated to provide economic industry-level benefits
- Central data infrastructure, and establishment of accurate data collection and genetic evaluation frameworks are key to success
  - All activities must revolve around a centralised industry body
- Considerations exists in parallel to formal process
  - Context is important – local expertise and buy-in required to tailor

Thank you for listening!



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