



Sustainability Index

A breeding tool for a greener future

Key points

- The Sustainability Index enables dairy farmers to fast track breeding for reduced greenhouse gas emissions intensity. It complements a range of on-farm management practices to reduce emissions.
- Choosing highly ranked bulls on the Sustainability Index helps fast-track genetic gain for reduced greenhouse gas emissions.
- The higher an animal’s Sustainability Index, the more efficient it is for emissions intensity.
- To fast-track genetic gain for sustainability, breed replacements from animals that rank highly for Sustainability Index that also rank highly on ABVs for fertility, mastitis resistance and cell count (and udder depth for Jerseys).

Genetics and emissions

The Australian dairy industry has committed to a 30 per cent reduction in the intensity of greenhouse gas emissions on-farm by 2030.

Dairy farmers should use a combination of management practices to reduce greenhouse gas emissions (GHG).

Introduced in August 2022, the Sustainability Index is a breeding tool to help dairy farmers fast track genetic gain for reduced emissions intensity.

[Leading Irish research](#) found that genetics is one of the most cost-effective strategies to reduce greenhouse gas emissions, but it’s not the only tool.

Breeding should be used in conjunction with other management decisions, such as energy use and feeding, to reduce a farm business’s overall carbon output.

Table 1 shows the expected reductions in greenhouse gas emission intensity by 2050 from using the Sustainability Index and the relative trade-offs in BPI to achieve this.

Table 1. Expected reductions in greenhouse gas emission intensity and relative BPI trade-offs from using Sustainability Index

	Holstein	Jersey	Red Breeds
Reduction in emissions intensity	6.3%	7.3%	4.4%
BPI trade-off	27 units (5.5%)	19 units (4.4%)	5 units (1.9%)

Reducing greenhouse gas emissions

There are two approaches to reducing emissions on a dairy farm — reducing the total or gross emissions or reducing emissions intensity.

The Sustainability Index focuses on reducing emissions intensity; that is, decreasing the amount of carbon emitted relative to milk production.

This is calculated by dividing the amount of carbon emitted by the amount of milk produced.

The reduction in emissions intensity is achieved through dilution — higher production per cow means more milk per tonne of carbon.

This index places greater emphasis on traits that contribute to reducing emissions, such as feed saved and survival, while also considering production, health, fertility, type, and workability traits.

Sustainability Index

The Sustainability Index is a standalone index. Breeding indices combine more than one trait at once, to make it easier to select animals. DataGene publishes three indices:

1. **Balanced Performance Index**
Combines traits affect lifetime contribution to the farm business
2. **Health Weighted Index**
Fast tracks genetic gain for fertility, mastitis resistance and feed saved
3. **Sustainability Index**
Fast tracks genetic gain for reduced methane emissions intensity.

The Sustainability Index prioritises an animal's ability to reduce greenhouse gas emissions and increase production, while also considering other vital profitability traits.

The Sustainability Index is a relative ranking of animals expressed as a unit against a base of 0.

The higher the Sustainability Index value, the more efficient the animal is at producing milk per kilogram of greenhouse gas emissions.

The reliability — or confidence — in the Sustainability Index is similar to the reliability for the Balanced Performance Index (BPI).

Using the Sustainability Index

To fast-track genetic gain for sustainability, breed replacements from animals that rank highly for Sustainability Index that also rank highly on ABVs for fertility, mastitis resistance and cell count (and udder depth for Jerseys).

Dairy farmers could choose a short list of animals based on the Sustainability Index and further breakdown that list based on the bulls that are also highly ranked on the Balanced Performance Index (BPI) and have high Australian Breeding Values for fertility, cell count and mastitis resistance.

DataGene's Good Bulls App is an easy way to do this.

Expected impact

Holstein and Red breeders using the Sustainability Index should achieve faster gain for emissions reduction and production, compared to the Balanced Performance Index (BPI).

Dairy's sustainability toolkit

Breeding is just one of many tools dairy farmers use to improve the sustainability of their systems. Here are some examples of sustainable practices used on Australian dairy farms.

- Managing herd life and number of replacements bred
- Sustainability breeding index
- Nutrition and additives
- Pasture management and utilisation
- Fertiliser strategies
- Irrigation and water use strategies (75% of dairy farmers recycle water)
- On-farm energy generation and energy savings including solar panels
- Animal health
- Silage plastic recycling

However, there will be a slightly slower genetic gain for mastitis resistance, cell count and fertility compared to the Balanced Performance Index (BPI).

In Jerseys, the Sustainability Index is likely to result in slower gains for mastitis resistance and cell count and fertility and neutral to slightly declining udder depth compared with the BPI.

If this is a concern for your herd, look for Jersey bulls that are high for both Sustainability Index and Daughter Fertility or Udder Depth ABV.

Acknowledgement

DataGene is an initiative of Dairy Australia and the herd improvement industry. DairyBio provides the research pipeline to develop and maintain Australian Breeding Values.

More info

[DataGene Tech Note 29 Sustainability Index](#)

[Fun video: what is methane? And what part does livestock farming have?](#) University of Wageningen

[Australian Dairy Industry Sustainability Framework](#)

[Teagasc 2019: An Analysis of Abatement Potential of Greenhouse Gas Emissions in Irish Agriculture 2021-2030](#)

Contact us

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