

Dataset providers' and users' perceptions of data sharing: insights from AgYields New Zealand National Database

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Highlights

- Data sharing applications have become a functional necessity to advance smart farming, to assist routine farm management strategies and for environmental compliance.
- An analysis of the database status revealed that 61% of the uploaded datasets are from unpublished sources; of this subset, the majority was collected on-farm (37%), followed by technical reports (30%).
- AgYield users experience revealed that data providers from education and technical sectors were comfortable with data sharing when it is framed as contributing to mutual benefit, assisting innovation and communities and supporting the wider agri-sector to thrive.
- Commercial partners and other data providers want data access and the efficiency of integrated systems; however, some remain cautious of losing competitive advantage, privacy, data control and data sovereignty.
- Strategies to foster sharing include the exclusion of metadata perceived as sensitive by companies' interests, particularly cultivar details.

Keywords: data provision, farming, industry, open access, pastoral information

Background

Data at farm scale is commonly collected through national statistical systems, farm registries, subsidies programmes or digital agriculture platforms.

The term data on farms is usually associated with macro-level agricultural activity data (Chamorro-Padial et al. 2025). For example, the European Union and the United States have the most structured data collection systems for farm data which includes economic, production and resource use aspects (European Commission 2026; NASS 2018). The Food and Agriculture Organization (FAO) collect and summarise data from different countries (FAOSTAT 2024). In New Zealand, Statistics NZ is the organization which gathers general agricultural data through mandatory farm surveys (Agriculture Production Survey, APS) combined with administrative data from agencies like Ministry for Primary Industries (Stats NZ 2019). Those databases provide massive, high-quality agricultural

datasets, which are designed for macro-level policy advice but not the micro-level precision required for agriculture modelling, day-to-day farm management or feed budgeting.

The term farm data, on the other hand, refers to the agronomic, yield, livestock, and machinery data generated directly by a farm operation (Jakku et al. 2022). Farm data are dependent on raw data on-farm, which is physically located, generated, or processed within the boundary lines of a property or field (e.g. localized sensors) (Stevens et al. 2007). Farmers and agribusinesses are increasingly requested to share data from their observations and sensors to enable smart farming (Chamorro-Padial et al. 2025) to support technological development, modelling exercises and thus generate strategic insights (Stevens et al. 2007). Data sharing promotes efficiency in developing food security strategies (Hurtovyi 2025) and environmental sustainability (Sarker 2025) particularly when standardized data are accessible (AgYields 2025; Datalinker 2025). International examples of these efforts include Siex in Spain (Gil et al. 2025) and AgroRefed in Australia (Teixeira et al. 2024a). These initiatives focused on improving access to agricultural data, transparency, and digitalization in farming at national scale. Both aim to empower farmers, advisors, and policymakers with reliable and centralised data.

In New Zealand, there are several important databases (Teixeira et al. 2024a). DairyBase (DairyNZ 2026) and Beef + Lamb NZ Economic Survey data (Beef + Lamb New Zealand 2026) are examples of databases for physical and financial data. Specifically, “data on-farms” and “farm data”, which are useful for benchmarking and to assist on farm management generated by farmers, the education and research sectors and agribusiness can be both captured and stored into the AgYields National Database. AgYields is a central, open-access repository for New Zealand pasture and crop yield data (Moot et al. 2021). Since the online launch of the AgYields database in 2021 it has been apparent that some dataset holders (e.g. farmers, research partners and consultants) hesitate to share their detailed datasets. Their concerns relate to data ownership, misuse and transparency issues. Commercially sensitive information being exposed

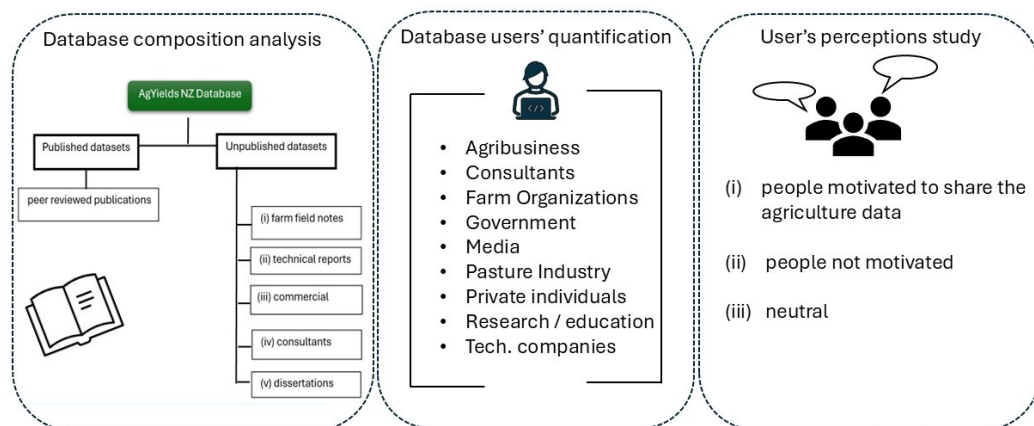


Figure 1 Overview of the three different aspects assessed related to the AgYields database: determination of the composition of the database (December 10, 2025); the quantification and diversity of AgYields users and the qualitative evaluation to gather participants impressions related to data sharing.

and risks when data are stored in third-party cloud environments can also hinder data sharing and public access and usage (Gunasekara 2023).

In this work we assessed the AgYields National Database datasets collection to identify the nature of submitted datasets (e.g. from farms versus from commercial sources) and users. This assessment was then combined with users' perspectives which were gathered through a series of workshops, forums, and discussions held between 2023 and 2025 to inform the development of the AgYields National Database and collate users' experiences and feedback. The main aim was to understand the motivation and concerns users have on data sharing and how these might be addressed to enhance further population and use of AgYields as a public good repository.

Methodology

The methodology evaluated three distinct aspects of the database: database composition, users' classification, and users' perceptions of data sharing (Figure 1).

Database composition analysis

We analysed the entire AgYields database through a complete download of datasets available on December 10, 2025. To assess the different purposes for data collection and understand the composition of the whole database, we classified datapoints (meaning one row of data in the database) from published datasets (peer reviewed publications) and unpublished datasets (e.g. farm notes, commercial trials) (Figure 1). The unpublished sources were subsequently classified as (i) farm field notes (ii) technical reports (iii) commercial (iv) consultants and (v) students' dissertations. This was done through its metadata to determine whether it came from a commercial or educational source (AgYields, 2026).

Database users' quantification

The quantification of users who belonged to each sector allowed us to identify contribution patterns, detect potential biases, and assess whether certain groups were over or underrepresented, and to reveal the diversity of contributors. In this study, "users" were considered authorised end-users who registered to AgYields national database website. The total number of database users and their affiliations were categorised (research education, agribusiness, consultant, pasture industry, farming organizations, technology, government and media agencies) and quantified.

User's perceptions study

A total of 18 events (presential and online) nationwide (North and South Islands) were held between 2023-2025. These consisted of AgYields workshops, and data and experience exchange events (forums, meetings, presentations) with a total number of 102 participants. An unstructured interview method was used to allow dialogue to be guided by the participant's feedback rather than a fixed set of predetermined questions. This provides a qualitative method to gather participants impressions related to data sharing (Swain and King 2022). To determine emotional polarity whether the text is positive, negative, or neutral, a manually code sentiment analysis based on Zucco et al. (2020) was used to convert unstructured qualitative text into structured, quantifiable data. The information was scored and as (i) people motivated to share the collected agriculture data = 1; (ii) people not motivated to share the collected agriculture data = 0. (iii) Neutral = 0.5. Recurring words and sentences from the unstructured interview were organized in an ad-hoc interpretive framework (Thomas, 2006) to identify the underlying drivers of motivation and concern through thematic clustering process (Zucco et al. 2020). These drivers

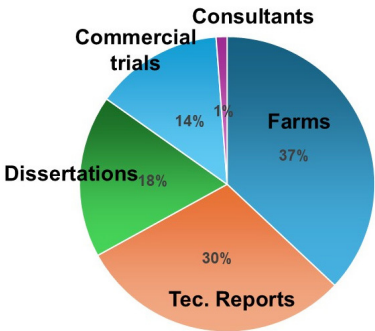


Figure 2 Percentage of datapoints from unpublished data sources included in the AgYields National Database (December 10, 2025). Unpublished datasets represent 61% of the total datapoints.

were ranked according to their relative importance, and their frequencies were quantified. The frequency of positive and negative drivers was converted into a percentage (%).

Results

A total of 52359 datapoints were available for this analysis. Thirty nine percent (39%) were from published sources (all from peer reviewed journals) and 61% from unpublished sources.

Among the unpublished datasets, 37% were from on farm yield measurements, followed by technical reports data (30%) and dissertations (18%). Datasets from commercial trials (agribusiness) and consultants were 14% and 1%, respectively (Figure 2).

Database users' groups

Of the AgYields database registered users (508 in total), 42% were private individuals, while research education and agribusiness users represent 18% and 15%, respectively. Consultants, farm organizations, pasture industry, and technology companies represent 5% each (total of 20%). Users from government and media organizations represent 4% and 1% respectively (Figure 3)

Database users' perceptions

The score analysis of the event participants showed

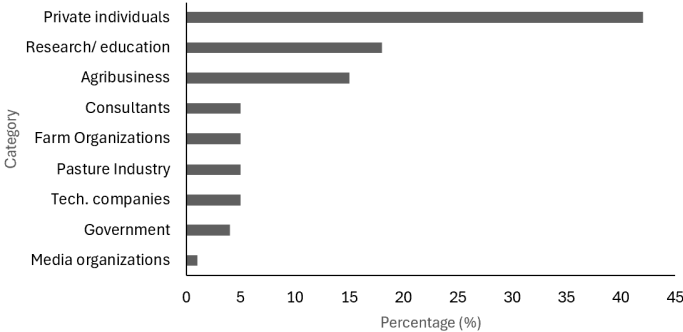


Figure 3 Percentage of database users grouped by category (December 2025).

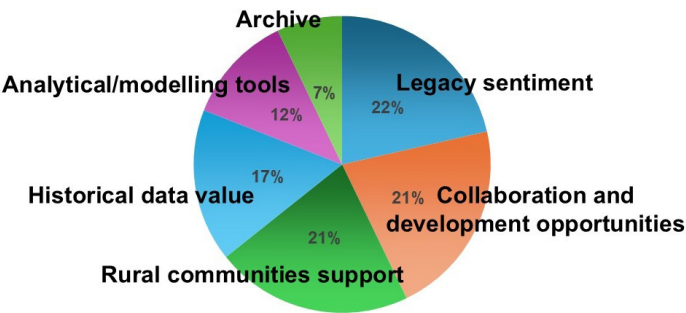


Figure 4 The key drivers for agriculture data sharing presented as a percentage (%) belonging to the 'motivated to share data' group.

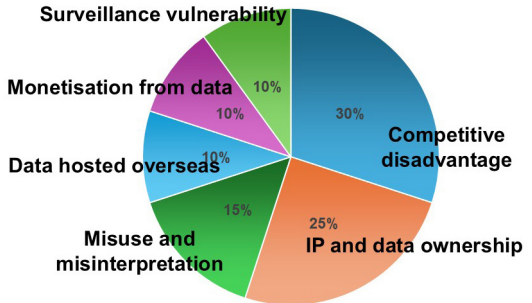


Figure 5 The key drivers for not sharing agriculture data sharing presented as a percentage (%) belonging to the 'not motivated to share data' group.

that, 56% were motivated to share their data and 33% had apprehensions about data sharing. Only 11% of the participants had an impartial position.

- Motivated to share the agriculture data
From the group willing to share the data, 62% were associated with research and education activities. The remaining 38% represented agribusiness consultants and farmers. Key reasons to share data included a sentiment of legacy (i.e., contribution to future generations), supporting decision making within rural communities and supporting research (Figure 4). Those in the science realm, most mentioned the

drivers for data sharing were the ability, now and in future, to extract value from historic trials (17%), to develop new analytic and modelling tools (12%) and archiving legacy data safely (7%).

- Not motivated to share the agriculture data
Concerns about data sharing were most expressed by participants associated with agribusiness operations (67%; Figure 5). The main concerns related to risks to competitive advantage (30%), intellectual property or data ownership (25%), and the potential misuse or misinterpretation of data (15%).

Discussion

The status of the AgYields National Database indicates that most of the datasets come from farm-level observations and technical reports (Figure 2). The availability of these data reflects the willingness of collaborators to share the data that would otherwise may have been lost to the industry, as many of these datasets are unlikely to be formally published in peer reviewed journals.

Databases which provide observed data from many farms allow the analysis of productivity patterns across regions and districts. Researchers, farmers and consultants can identify how species and cultivars perform under different climatic and edaphic conditions. The recommendations are based on real field performance rather than exclusively under small plots trials.

The value of agricultural databases such as AgYields (crop and pasture yields) is that they can provide a repository for farm-level metrics and technical reports that are a byproduct of routine, large-scale regulatory and operational monitoring that can be combined with field experiments carried out on farm. Farm data, such as fertilizer applications, land use, disease occurrence (Agribase 2025) and production, are collected regularly across different geographic areas to meet government reporting standards (Stats NZ 2022) and environmental compliance (Antle and Valdivia 2021). The value of these data lies in their relevance to on-farm applications across a broader geographic range than is possible from data collected from the declining number of dedicated research facilities in New Zealand. Thus, there is a trade-off between data integrity and relevance between published and unpublished datasets that users must be aware of (Rellensmann and Thomas 2026).

The commercial data entered so far in AgYields represents less than 15% (Figure 2) of the data points. Commercial trials (which focus mainly on specific product performance) are typically proprietary, expensive to conduct, and restricted to specific control variables that may not reflect real-world variability. Because private companies often treat trial results as intellectual property to maintain a competitive

advantage, and often retain their own in-house database, this high-resolution performance data rarely enters the public domain (Wolfert et al. 2017). Consequently, public agricultural databases rely on the broader, more accessible data generated by the research institutions, universities and public-sector technical assessments to provide a comprehensive view of regional productivity (Carbonell 2016). While on-farm data is commonly readily shared, commercial trial data is often unavailable until companies have capitalized on their initial research and development investment (Wiseman et al. 2019). To overcome this collective reluctance the AgYields database can retain commercially sensitive information, for example, by allowing data to be entered at the species rather than cultivar level.

Benefits of data sharing

The key motivation behind data sharing among database users in this study was the desire to preserve the value of historic observations for future generations and the opportunities for collaboration and benchmarking (Figure 4). This is also aligned with one of the major goals of AgYields to prevent “legacy knowledge loss” (Moot et al. 2021). AgYields serves specifically to house decades of historic pasture and crop growth data that were previously scattered across physical folders and old spreadsheets (Beef + Lamb New Zealand 2022).

This ethos of data sharing between academic researchers and private sector organizations is increasingly recognized as a crucial driver of innovation, reproducibility, and societal impact (Kay, 2025). Such collaborative data exchanges enable the integration of diverse datasets, fostering novel insights and accelerating scientific discovery that neither sector could achieve independently (Carvalho et al. 2025).

Powers and Hampton (2019) stated that data sharing is expected to enhance research reproducibility and transparency, which should address growing concerns over irreproducible results in both, fundamental and applied sciences. Another motivation presented by Hart et al. (2021) was to stimulate economic value, by allowing private firms to leverage academic findings to develop new products, services, and technologies which can lead to future funding or resources for further research.

Ranking motivations of individuals can be complex because the main driver depends on whether the data provider is a farmer, a researcher, or a corporation. A similar assessment by Kay (2025) found slightly different perceptions and motivations specifically among dairy farmers in New Zealand. He found that productivity and profit were the primary drivers for data sharing, followed by saving resources and lower the production costs. To date dairy farmers have not been large providers of data into AgYields which may be

because they maintain their own datasets from pasture cover measurements as a routine part feed budgeting for their business (Monteath 1973; Luo and Legard 2020).

Different motivations collectively underscore the strategic importance of structured partnerships and robust frameworks to facilitate secure and ethical data sharing (Kay, 2025). While compliance acquires the most data (Wiseman et al. 2019), reciprocity and contribution (Figure 4) retrieves the best data. When data providers share because they “make” or “save” something, there is a fundamental interest in the accuracy and quality of that data (Teixeira et al. 2023; Wolfert et al. 2017). When agricultural data are shared in structured and accessible databases undoubtedly knowledge grows faster. Farming practices become more precise and efficient, and all people involved such as technicians and students can develop more accurate and precise data collection and analytical skills (AgYields 2025). Overall, the expectation was that fostering an open data culture could improve public trust and policy relevance, as shared datasets can inform evidence-based decision-making across government, industry and society (Stats NZ 2021).

Data sharing concerns

In this study we identified a reluctance of agribusinesses to share data as a significant but understandable barrier (Figure 5). Commercial agribusinesses (e.g. seed companies, chemical manufacturers, and agritech startups) operate under a different set of constraints to educators and researchers (Carbonell 2016). Agribusinesses often considered data as a proprietary asset to maintain a market share. Companies noted that if data and methodology are shared in public repositories (such as AgYields) the ability to recoup their research and development (R&D) costs is lost, leading to a market disadvantage. Unlike farm observations, which are descriptive, commercial trial data are often prescriptive and contain the precise management practice of application rates and timings that companies consider trade secrets (Wolfert et al. 2017). In an agricultural context, data exchange, whether voluntary or involuntarily now permeates modern farming. This can lead to a “data paradox” where individuals and commercial entities trade privacy for the functional benefits of a digitised community (Barth and de Jong 2017).

Our results show that 15% of the participants were not motivated to share data due to concerns about data misuse or having their information misinterpreted (Figure 5). A key issue is that context and metadata are essential for understanding the main data (Teixeira et al. 2024b). Data presented without context or explanation can be misleading, especially when comparing field trials operating in different regions

or production systems (Kay 2025). This is overcome in AgYields by allowing information related to agronomic management, soil type and measurement methods to be entered as part of the description of the datasets. This aims to reduce the tension between data providers (farmers) and those who process, manage and use the data (agribusinesses, services and digital platforms) which can be a major obstacle (Sanderson et al. 2018). A developing issue overseas is that farmers are suspicious of how data might be used for price discrimination or by the industry to reinforce market power (Sprenkamp et al. 2024). At this stage, this was not raised as a concern by farmers in New Zealand, but it may become so in future if data provided are used by policy makers to restrict on farm practices.

Surveillance, data hosted overseas and monetisation from data were also mentioned as impediments to data provision by the group of people unwilling to share the data (Figure 5). According to Fadul-Pacheco et al. (2022) data is increasingly viewed as a commodity, yet there is a lack of clear business models that compensate data providers for their datasets. In New Zealand, the recently introduced NZ Farm Data Code of Practice, an industry-led accreditation, aims to ensure that agritech companies are transparent about data rights and security (NZ Farm Data Code 2024). It provides the rules for how data are formatted and the ethical aspects of data handling. In AgYields users can upload raw data that remains stored securely as a draft dataset. It is only when data are submitted in a standardized, cleaned, and as non-sensitive outputs that they are open to be shared with the wider community. Users can anytime contact the moderation team to edit, revise or remove sensitive data.

Improving contribution of commercial trial data

Given the concerns raised by the user's not motivated to share their dataset, there are strategies available in AgYields that may encourage commercial data sharing. These include:

- (i) Data aggregation: by pooling data into averages or aggregating trials results users can benefit from collective insights without exposing the raw data.
- (ii) Data anonymization: removal of identifiable records, including testing-cultivar names, and suppression of exact GPS coordinates.
- (iii) Past data sharing: trial records from past decades might not be relevant commercially today but are valuable for research and modelling purposes.
- (iv) Clear rules and policies for users' knowledge: data sharing and usage are legally constrained by the specific terms of use, privacy policies, and digital governance regulations of each participating platform. All registered users of the AgYields database are subject to the Lincoln

Table 1 Summary of the research data management (RDM) rules governing the AgYields National Database following the FAIR principles *.

Feature	Lincoln University Policy
Legal Basis	NZ Privacy Act 2020
Data Ownership	Generally held by the University (as the institution), though IP may be shared with funders.
Sovereignty	Respects Māori Data Sovereignty & CARE* principles.
Open Access	Aims to share data via AgYields using CC BY 4.0, provided privacy is protected.

Note: Lincoln University (2025) research data management policy, governance & policy hub. Available at: <https://research.lincoln.ac.nz/privacy-policy>. *FAIR: findable, accessible, interoperable, reusable (Teixeira et al. 2024a). **CARE: collective benefit, authority, responsibility and ethics (Carroll et al. 2020). ***CC BY 4.0: Creative Commons Attribution 4.0 International.

University Privacy specific framework designed to balance the open-access mission of the project with the privacy and commercial sensitivity of the data contributors using the Creative Commons license for the data it hosts (Table 1). The Creative Commons license is a standardized, legally binding public copyright license that allows creators to grant the public permission to use, share, and build upon their creative or academic work (Moore et al. 2021).

These strategies have been embedded within AgYields to address the trust deficit by ensuring that the agribusiness remains the owner of their raw observations while still collaborating with open access databases. Some accuracy and quality of data and metadata are lost in this process (Teixeira et al. 2024b) but the shift from sharing data to sharing insights or sharing subsets of data are the most likely path forward to increase data richness and the use of AgYields database, or other open access repositories, attracting commercial trial data. Early alignment with frameworks like the AgYields standards (e.g. standard csv output template) and DataLinker (Datalinker 2025) ensures that shared information remains interoperable and high-quality (Teixeira et al. 2024b), preventing the technical “siloization” (Wolfert et al. 2017) that often delays collective resilience and climate adaptation (Moot et al. 2021).

Conclusions

In this study we explored the motivation and/or concerns users have on data sharing. As technology and digital farming continues to expand, the management of agricultural data has become a critical issue. Six main motivational aspects on data sharing were identified preventing publication and access of the agri-data. The preservation of the value of historical observations for future use together with opportunities for collaboration and benchmarking are the primary drivers for data sharing. Achieving an appropriate balance between protecting data providers’ rights and enabling the benefits of data sharing requires a carefully designed

data-management context. The AgYields National database operates under a specific framework designed to balance the open-access mission of the project with the privacy and commercial sensitivity of the data suppliers. To encourage earlier sharing, open-access databases such as AgYields can adopt strategies such as excluding sensitive metadata to protect commercial interests.

ACKNOWLEDGMENTS

Funding for this project and manuscript preparation was provided by T.R. Ellett Agricultural Research Trust (Project: AgYields database for smart and sustainable pasture and crop choices in New Zealand) and from Beef + Lamb New Zealand under project 21195-3 - Advancing AgYields to support forage/crop decision making. The authors wish to thank AgYields database users, event participants and data providers for their contribution to this work.

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