



BOOSTING THE EFFICIENCY OF ON FARM STORAGE



On-farm storage capacity has doubled over the past ten years with growers now able to store 41 per cent of their production capacity on average. This expansion is likely to continue as growers strive to maximise the quality, marketability and value of their grain.

The challenge

Australian grain growers have been actively investing in on-farm grain storage due to harvest logistics, greater harvest capacities, demand for feed and seed storage, rationalisation of upcountry grain storage networks, expansion of pulse and speciality crop production and importantly, to derive greater marketing control.

While storage systems can deliver long-term cost benefits, they require significant infrastructure investment and can add complexity across the supply chain. Without appropriate storage management skills, growers can quickly see the economic benefits disappear.

To ensure a return on farm-storage investment, it's imperative that

growers take a strategic approach to infrastructure design and use, implement a best-practice integrated pest management and monitoring program and adhere to hygiene recommendations.

Effective pest management is critical to the economic viability of grain storage as the tolerance for live storage pests in grain sold off-farm is nil.

Without the appropriate preventative measures and, where necessary, correct identification and treatment of pests, growers may see their competitive advantage of on-farm storage slide.

In recognition of this, GRDC extension activities have been focusing on equipping growers with the knowledge and skills to prevent

and manage pest incursions through hygiene, aeration cooling and correct fumigation.

One of the industry's major challenges is eliminating ineffective applications of phosphine which is resulting in poor insect control and developing resistance in key pest species.

Phosphine remains the single-most relied upon fumigant to control stored grain pests in Australian grain-production systems with 80-85 per cent of growers using it at least once every five years and 32 per cent using it annually.

While 97 per cent of growers who attend a grain storage workshop identify the correct way to use phosphine, a broader industry survey by Kondinin Group (2018



National Agricultural Survey) revealed a very different picture, indicating that only 49 per cent of growers using phosphine applied it correctly - in a gas-tight sealable silo that conforms to the Australian Standard (AS2628).

Concerningly, the NAS survey also showed that 14 per cent of growers who have used phosphine during the past five years don't own any gas-tight sealable storage for reliable fumigation. Although this figure should be zero, it is trending downwards from 35 per cent in 2014.

This indicates the critical importance of grain storage extension activities in encouraging the correct use of fumigation, improving grain storage profitability, prolonging the life of existing chemistries and protecting Australia's reputation as a quality grain supplier.

The response

Significant long-term investment in grain storage research, development and extension has positioned Australia as a global leader in the industry.

Extension is an important research information conduit between all sectors of industry and ultimately helps preserve Australia's highly regarded export reputation by encouraging adoption of the latest grain storage management recommendations.

The GRDC is currently investing \$1.2 million annually in the Improving On-

Farm Grain Storage Management Practices through Technical Training project – an extension of the GRDC Stored Grain Project.

In the two years leading up to July 2020, the GRDC Stored Grain Project delivered 221 workshops to more than 5700 growers, advisors and industry personnel across Australia.

Additionally, representatives from the GRDC Stored Grain Project extension team regularly present at GRDC Grains Research Updates.

These activities are supported by a suite of printed and electronic resources including the Stored Grain information hub (www.storedgrain.com.au), a 1800 hotline (1800 WEEVIL), a GRDC GrowNote

manual, app, GRDC instructional videos, GRDC factsheets, booklets and media activities. These resources provide growers with easily-accessible expert advice on the latest grain storage research outcomes and recommendations.

The GRDC extension activities are closely aligned with the team's involvement in research projects through their various industry roles - Philip Burrill as senior development agronomist with the Queensland Department of Agriculture's Postharvest Grain Protection unit, Ben White as a research engineer and manager of Kondinin Group's research program and Chris Warrick as farm business advisor and leader of the GRDC Stored Grain Project.



Ben White, Kondinin Group. Photo: GRDC



The team's industry involvement, networks and experience helps facilitate the rapid and responsive flow of new research information to growers and industry as well as gathering feedback on knowledge gaps which helps to guide future research priorities.

The impact

According to the 2021 GRDC Grower Survey, on-farm grain storage has jumped to its highest level in 17 years with 90 per cent of farms storing grain.

This reflects the growing interest in stored grain economics and management and the GRDC Stored Grain Project workshops are helping provide a platform for positive practice change.

As the nature of grain storage investment is long term, so too is the knowledge and practice change timeframe. Growers require up-to-date, regionally specific information and training to maximise value-adding opportunities and reduce fumigation costs.

By adopting best practice management, growers can also preserve the life of the most cost effective fumigant for on-farm and bulk handler stored grain, equating to a saving of up to \$2.60/t depending on the season and market.

Validation

Jason Rogers operates a farm north of Moree in northern NSW and has attended several GRDC Stored Grain workshops over the years to remain abreast of the latest industry developments and recommendations.

"The workshops and information resources offered by GRDC through the Stored Grain Project are an invaluable way of keeping up to date with the latest information," Jason said.

"It's given us a better understanding of pest behavior and habits which is critical if we are going to continue managing them effectively.

"Grain storage is a significant investment and has implications for the quality and marketability of our grain so it's important that we get it right in terms of temperature, moisture and pest management."

On-farm storage offers the Rogers' flexibility in grain marketing and the majority of their storages are sealable and have aeration.

Another grower who recognises the business benefits of a well-designed and managed grain storage system is Hillston district grower Tim Watson from Sunland Agriculture.

He said advice from industry experts involved with the GRDC's Stored Grain Project had significantly improved the effectiveness of Sunland Agriculture's pest management program.



"Historically we've had issues with weevils in stored grain and were open to advice on improving the effectiveness of our pest control measures," Tim said.

"After hosting a grain storage field day in 2014, we engaged contractors to come and reseal all our silos and we've since installed an additional seven cone-base sealed silos. Sealed silos, along with good hygiene practices and dryicide treatments are critical if we are to successfully manage stored grain pests like weevils.

"Investment in stored grain research and extension is very beneficial to industry; stored grain pests are a serious problem and with tighter receival standards and insecticide resistance issues, the problem will only get worse if it's not managed.

"Grain storage is a key part of our business. It enables us to manage product segregation and have greater control over the marketing of our grain so it's vitally important that we do it well."



References and resources

Stored Grain information hub

<http://storedgrain.com.au>

GRDC GrowNotes Grain Storage

<https://grdc.com.au/grain-storage-grownotes>

GRDC Stored Grain videos

Grain Storage Series:

Part 1/3 | Pressure testing silos

https://www.youtube.com/watch?v=bqH_sHGwlqc

Grain Storage Series:

Part 2/3 | Buying silos

https://www.youtube.com/watch?v=SQ2bp_94KAs

Grain Storage Series:

Part 3/3 | Sealable silos

<https://www.youtube.com/watch?v=H2IAoC2Vqtl>

Grain Storage - Planning for Storage (Webinar)

<https://www.youtube.com/watch?v=h-GbTVIYiZl>

Grain Storage - Efficient monitoring and insect ID (Webinar)

<https://www.youtube.com/watch?v=ClhQsBoY5Wk>

GRDC Grain Storage podcast

<https://grdc.com.au/news-and-media/audio/podcast/grain-storage>

Economics of on-farm grain storage

- A Grains Industry Guide
www.grdc.com.au/GRDC-Guide-OnFarmStorageEconomics

Stored grain pests identification

- The Back Pocket Guide series
<http://grdc.com.au/GRDC-BPG-StoredGrainPests>

Plant Biosecurity Research Initiative

www.pbri.com.au

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