Dairy Farmer Insights into Natural Disasters

Decision making

As part of business-as-usual activities, dairy farmers are making regular tactical and strategic decisions about their farm business. In the context of natural disasters, additional decisions are often necessary and involve using considered, intuitive and/or adaptive approaches depending on the kind of disaster, personal preference and farm context.

Background

This case study is based on information collected through face to face interviews with 20 NSW dairy farmers. Interviews were conducted at the end of 2023 with farmers who were impacted by recent natural disasters, with farmers being asked to describe how they made decisions and what actions they took to respond and recover from natural disasters (floods, prolonged wet events, bushfires and droughts).

Farmers were located in major dairying communities along the coastline as well as inland. Most farm businesses represented were medium sized (between 150 to 300 cows) while approximately a quarter were large in scale (more than 300 cows). A small proportion ran businesses with 150 cows or less.

It is important to reflect on how decision making occurs in natural disasters because often decisions need to be made

quickly and with imperfect knowledge in risky situations. This case study will highlight the processes, practices and priority actions taken by farmers immediately before, during and after an event to provide insights into what makes for good decision making and risk management in natural disasters.

Approaches to decision making

When dealing with natural disasters and adverse climatic events, the approach to decision making varied depending on the stage of the event (i.e. immediate response or recovery). The three main approaches utilised were:

- **intuitive** – based on past experiences and 'gut' feelings
- **adaptive** – based on a need to try something different in the moment in response to novel or changing conditions
- **considered** – based on gathering and assessing information, having discussions with others and weighing up options

It could be assumed that intuitive decisions are mostly made during the response stage of a natural disaster because this stage often requires quick and immediate actions, while considered decisions are often in the recovery stage where there is more time to consider options. However, interviews found that all three approaches were evident in both the immediate response and recovery stages – although the preference or emphasis on one approach over another (or a combination of approaches) varied between farmers. This variation reflects a range of influencing factors when making decisions, such as perceived risks, urgency, personality, the type of issues being addressed, and the resources and information available to support decision making.

The circumstances in which different approaches to decision making were called upon can be seen when looking at farmer recollections of natural disaster experiences.

Intuitive

An 'intuitive' type of decision relied on past experiences, gut reactions, tacit knowledge (sometimes based on generational knowledge of the family farm), and improvising. Intuitive types of decisions were used when:

- quick decisions needed to be made (gut or tacit knowledge)
- a natural disaster situation was assumed to be familiar (had experience with a similar event, therefore there was previously gained knowledge to draw on)
- when there was no opportunity to consult others (improvisation)
- when planned action was no longer deemed appropriate because the natural disaster event did not unfold as expected (improvisation).

> *Knowing when to get the cows off the flat ground to the hill – I don't know whether there is a right [decision point]…you've got to go with your gut feel. As far as when it's flooded, there's nothing you can do. It's under water, so you're just concentrating on feeding cows and getting them milked and getting through it. Once the water starts to go, then you literally…just try and make it up as you go along. (Dairy Farmer, Far North Coast, 2023)*

Adaptive

Dairy farmers also drew on an 'adaptive' type of decision. This approach included:

- experimenting with different practices through trial and error
- making adjustments to planned decisions
- making decisions in response to changing conditions that were business and circumstance specific

I just think it was a matter of…trying things…We tried a lot of things that didn't work. Sometimes I'd have an idea, or one of the workers would have an idea. You'd say, 'Let's give it a go.' And it just didn't work. 'Let's feed the cows this silage along the fence line on this paddock,' and it just didn't work… that doesn't mean it [was] necessarily a bad idea, it just didn't work. The conditions didn't suit that and things that you might have done in the past which would work, didn't work. So… we tried a lot of things that didn't work to try and find things that did work, I guess. (Dairy Farmer, South Coast and Highlands, 2023)

The adaptive approach involved a level of 'openness'. Farmers reported experimenting to find the 'better' response or developed an attitude of flexibility to address unique or emerging situations that required novel decisions and actions. It was also about allowing enough time to pass for more options to emerge.

Considered

Dairy farmers made 'considered' decisions in their response and recovery from natural disasters by referring to planned responses (taking calculated risks) as well as enacting plans. Reflecting on lessons learnt from natural disaster experiences can be used for future disaster planning, which is also a form of considered decision making.

In the immediate response stage, a considered approach involved:

- anticipating the effects of a natural disaster event on key assets
- considering the implications of present decisions on production to ensure the future was not compromised
- drawing on the input of others to reach decision points
- gathering external information(e.g. weather and emergency services) and internal information (e.g. visual assessment of the local landscape and animals) to make informed decisions and guide next steps

During recovery, a considered approach involved:

- seeking the input of advisers and other service providers in deciding on priority actions and addressing technical issues
- relying on farming teams and close proximity peers to action pre-prepared plans and monitor recovery progress
- aligning actions with the strategic plan for the dairy business to guide recovery decisions.

Service providers and trusted advisors can assist farmers in prioritising decisions during times of crisis

We need to get the production back on the cows as quick as we can. Buying in good quality hay is going to help with that, getting pastures established as quickly as we can. We had [a consultant] coming out, like Dairy Australia had that one-on-one consultant to come out and have…a breeding plan. He was really good in… helping make some of those decisions… and we use an agronomist as well…he was really good after the floods as well… I'd ring him up all the time, just asking, "Got this paddock, what can I do with it? Should I fertilize?" stuff like that. (Dairy Farmer, Mid North Coast, 2023)

Priority actions taken duringimmediate response and short-term recovery efforts

The following tables illustrate priority actions taken by the farmers interviewed, with actions presented based on the stage of a natural disaster (i.e. actions to prepare for an immediate response (Table 1), and actions during immediate response and short-term recovery (Table 2)).

Table 1. Priority actions taken during response preparations immediately prior to natural disaster event.

Response preparations	
Floods	• Checking the latest weather reports and observing water levels • Ensuring the safety and health of animals (e.g. cutting fences to allow animal movements if needed, moving animals to higher ground or designated 'safety' zones) • Securing the location and storage of conserved feed (e.g. moving feed away from potential flood prone areas, reviewing feed budget, securing feed storage infrastructure, drain silos in preparation for expected floods) • Protecting infrastructure and equipment (e.g. cutting fences to allow flood water to flow reducing fence damage, moving equipment such as pumps and generators away from flood prone areas, pulling up irrigators)
Bushfires	• Bringing the cattle closer to home base, wetting down buildings and conserved feed, cleaning the baler of all loose hay, slashing or ripping ground near key assets, moving irrigator to a 'safer' place, setting up a tractor-driven pump to get water into the irrigation system to have water reserved for protecting key assets • Setting up water sources (e.g. securing bore water system for stock water, human domestic water for flood events, securing clean water for flood events, filling watercarts and containers mounted to tractors for putting out spot fires) • Evacuating family, staff or neighbours based on threat levels, setting up temporary housing with solar power for family/staff to overcome any power outages
Droughts	• Destocking (drying off, selling or culling) to reduce feeding pressure going into a dry period (could also be applied in wet periods)
Prolonged wet	• Farmers did not indicate specific preparations for this type of event as it was not something expected at the time (floods were expected, but the following months of consecutive high rainfall was not foreseen)

Prioritising actions during both the immediate response and short-term recovery stages tended to follow relatively similar patterns regardless of event type. Instead, a key difference between an immediate response or recovery practice was a shift from emergency/crisis thinking in the immediate response phase (operational), to longer term thinking in the recovery phase (tactical or strategic).

Table 2. Priority actions taken during immediate response and short-term recovery.

Immediate response (during the event and within hours after the event)	
First priority	**Preserving human life** (floods, prolonged wet conditions, bushfires and drought) • Ensuring the safety and health of family, staff and neighbours (e.g. communicating hazards on property, pausing/stopping any high-risk activities, seeking protected areas for people to shelter)
Second priority	**Preserving animal life** (floods, prolonged wet conditions, bushfires and drought) • Ensuring the safety and health of animals (e.g. relocating animals away from danger, continuing to milk opportunistically, attending to animal injuries and disease management, reallocating paddocks for grazing and/or housing, sourcing/providing feed and additives and securing the storage of conserved feed)
Third priority	**Protecting physical assets/natural resources** • Protecting and repairing damaged essential equipment - milking machines (floods and bushfires) • Installing new power sources – setting up a generator for a milking plant/refrigeration to mitigate against power cuts (floods and bushfires) • Temporarily fixing damaged dairy infrastructure such as laneways and fences (floods and bushfires) • Putting out spot fires on the property (bushfires) • Clearing fallen trees/debris along key access road and fence lines (floods and bushfires) • Securing water sources for animals and irrigating pastures/fodder crops (bushfires) • Diverting water away from paddocks (floods)

Table 2. (cont'd) Priority actions taken during immediate response and short-term recovery.

Short-term recovery (up to 4-6 weeks following the event)	
First priority	**Preserving human and animal life** (mega bushfires, consecutive massive floods, prolonged wet conditions and severe droughts) • Still prioritising people and animal safety and welfare post natural disaster - farmers talked about the lasting effects on the mental health of themselves, family and staff and the deterioration of animal health in extreme or persistent weather events
Second priority	**Repairing and restoring physical assets + feedbase management + workforce management** • Assessing overall damage to property (all natural disaster events) • Feedbase management that includes paddock restoration i.e. levelling, resowing, fertilizing – this was often a delayed and lengthy process, feed budgeting, moving and storing conserved feed, purchasing feed, changing feeding and grazing regimes over time depending on available 'improvised' spaces for feeding i.e. using roads, laneways, feedpads and sacrifice paddocks (floods, prolonged wet conditions, bushfires) • Fully repairing and maintaining farm infrastructure and equipment such as perimeter and containment fences, laneways using coarse rock or stony sand for resurfacing and levelling, water pipes and livestock water points, irrigation pumps, generators, repairing earthen channels (floods and bushfires) • Recruiting staff or contractors to assist with recovery (all natural disaster events)
Third priority	**Herd management** • Herd management (e.g. returning to focus on herd reproduction, reinstate breeding routines – one of the last things to attend to) (floods and prolonged wet conditions) • De-stocking or agistment of cattle to take the feeding pressure off recovering pastures and fodder systems (floods, prolonged wet and drought)

A few priority actions mentioned, which tended to be more longer-term recovery activities, but are worth mentioning included:

- Investing in new infrastructure and equipment such as upgrading effluent ponds to minimise run-off during floods, or purchasing mobile water pumps for bushfires (some farmers applied for government grants to full or partly cover these costs)
- Buying land for growing additional feed (floods and prolonged wet conditions)

Triggers to make decisions and take priority actions

While it is acknowledged that decision making is unique to each dairy farming business and natural disaster event, there were various 'trigger points' that farmers used to prompt and guide their decisions, which included:

- event triggers (e.g. monitoring local water levels so when creeks and rivers reached a certain height, this prompted flood preparation actions)
- physical triggers (e.g. bare, sodden or damaged paddocks prompted farmers to instigate contained feeding including supplementary feeding which sometimes meant relocating animals and feeding them temporarily on roads/laneways, staggering restorative paddock activities based on extent of damage, weather conditions and techniques used)
- animal triggers (e.g. a drop in milk production can prompt farmers to adjust feeding rations and prioritise feeding the highest quality feed to the milking herd)
- personal triggers (e.g. self-observations or observations of others suffering from mental and/or physical exhaustion prompted farmers to seek additional casual staff)

Cows leaving the dairy and returning to the paddock to graze, walking along a well-maintained laneway.

Conclusion

Overall, dairy farmers demonstrated that their decision making involves drawing on combinations of intuitive, adaptive and considered approaches for responding to and recovering from natural disasters. While each decision approach can be useful during and after a natural disaster event, relying heavily on intuitive or adaptive approaches can be problematic when past experiences can no longer provide practical solutions to novel conditions and constant on farm experimentation may be difficult to maintain if results are inconclusive and self-directed only.

Dairy farmers indicated that while they learn from their own experiences, there is a lot to learn from the experiences of other dairy farmers and dairy specific service providers in natural disaster response and recovery efforts. Therefore, this project has recommended the design of a series of workshops involving dairy farmers and service providers to co-develop a decision support tool based on actual and potential natural disaster scenarios for informing future natural disaster response and recovery decision making, understanding risks and defining a recovery pathway.

Looking over recently flood-impacted but now recovered paddocks on a dairy farm in the south of NSW.

Acknowledgments

The Storm and Flood Industry Recovery Program - Dairy Sector Recovery and Resilience is funded by the Australian and NSW Government's Storm and Flood Industry Recovery Program. For more information on this work, please contact the NSW DPIRD dairy unit dairy@dpird.nsw.gov.au.

We would like to acknowledge the NSW dairy farmers and service providers who willingly contributed their time, shared their experiences and provided intellectual input during the Storm and Flood Industry Recovery Program. We would also like to thank the University of Melbourne's Rural Innovation Research Group, led by Prof. Ruth Nettle and Research Fellow Nicole Reichelt, for their contribution to planning, data analysis and reporting on the information collected from dairy farmer interviews.