

# FLOOD READY AGRICULTURE – BUILDING ON RESILIENCE

**Rik Whitehead, Selina Stillman and Katrina Sinclair**

NSW Department of Primary Industries, Wollongbar Primary Industries Institute

## **Abstract**

The coastal floodplains of the north coast of New South Wales (NSW) are well suited to dairying and sugar cane production. The region produces a substantial proportion of the state's milk production and all of the state's sugar cane production. Flooding is a recurring risk to the business continuity and productivity of these agricultural industries. A recently completed two-year project funded jointly by the State and Commonwealth Natural Disaster Resilience Program and facilitated by NSW Department of Primary Industries has assisted the dairy and sugar cane industries to shift from a flood recovery focus to one of better preparedness and increased flood resilience. The project took a multi-partner approach to identify practical strategies that built on collective experience and the existing resilience within these agricultural industries to reduce the impact of floods on farm businesses, farm families and associated supply chains. The strategies encompass preparedness actions at the farm, local and regional scale. Using a risk management framework, the strategies have been presented in Flood Ready Strategic Plans for each industry. These plans offer a framework to guide and focus future action and investment in flood preparedness and to build on existing industry resilience. The plans reflect the National Emergency Management Committee principles of resilience and build on the collective experience and existing resilience within the dairy and cane farming sectors of the North Coast Region of NSW.

## **Introduction**

Floods are a feature of the north coast of New South Wales (NSW) and can have a significant impact on the agricultural industries and the rural communities that live and work across the coastal floodplains of the region. The frequency of flood events over the last 10 years in the north coast region of NSW are shown in Table 1. These events have tested the capacity and business continuity of floodplain based agricultural industries.

The dairy and sugar cane industries of the north coast of NSW are two major sectors that have faced and had to deal with consecutive coastal flood events and impacts on farm productivity, infrastructure and profitability. These industries have a combined farm gate value of production in the north coast region approaching \$200 million. The industries are vulnerable to flood events and have well organised peak bodies that play an important role in industry development and during flood events.

Year	Flood events 1-5 LGA's impacted	Flood events 6-10 LGA's impacted	Flood events 11-15 LGA's impacted
2014			
2013			••
2012			•
2011		••	
2010		•	
2009	•••	•	•
2008		•	
2007			
2006	•		
2005		•	

**Table 1. The frequency of flood events over the last 10 years in the north coast region of NSW and the relative regional extent of these events based on the number of Local Government Areas (LGA's) declared as Natural Disasters.**

The emergence of disaster resilience with its focus on reducing harm from potential threats, vulnerability and capacity to withstand shocks provided the catalyst for a flood resilience and preparedness project with a focus on the dairy and sugar cane sectors of the north coast of NSW. The aim of the project was to increase the flood resilience of the dairy and sugar cane industries and maintain farm productivity in the face of flood risk. Funding for the project was provided by the joint State and Commonwealth Natural Disaster Resilience Program with NSW Department of Primary Industries (NSW DPI) acting as project facilitator.

## Project approach

Initial workshops with the dairy and sugar cane sectors were held to obtain industry buy-in and to define the scope and milestones of the project. People attending these workshops formed the basis of the steering groups that guided the development of the flood ready strategic plans for dairying and cane farming. The outputs of the workshop created the foundation of project work plans and a schedule of milestones.

The dairy steering group identified early on the importance of utilising the reports and lessons from recent flood events in the region to inform the development of a flood preparedness plan. This material and experience was used to inform the steering group as it represented a rich collation of issues and concerns of what had occurred and suggestions for what could be improved from the perspective of dairy farmers and the broader rural community.

The cane steering group identified engagement with local floodplain management authorities as a critical early aspect of developing a flood preparedness plan for the sector given the complexity of drainage management regulation and the number of agencies with an interest in floodplain land use and management. This engagement was, in part, designed to create positive connections with floodplain authorities and a shared perspective of key issues and

the regulatory and policy environment that influences floodplain infrastructure operation and maintenance.

Both the dairy and cane steering groups had expert and lived knowledge of the impacts of floods and key issues that arise in flood times. These issues were collated and redefined in a risk matrix to create a dialogue around the strategies that would assist to manage these risks. Draft flood ready plans were prepared based on the priority risks that had been identified. The draft dairy plan was taken out to dairy farmers by service providers with links to the industry for information and feedback. The draft cane plan was reviewed by the industry based steering group. NSW DPI facilitated discussion of the draft plans with key agency and service sectors.

Industry and agency feedback on the draft plans was presented to the steering groups and used to refine the draft plans and create the final plans which were published in late 2014.

## **Key findings & learnings**

### ***Flood ready strategies***

Strategies and key themes that were identified as important to being a flood ready farmer and industry on the floodplain included:

- management of personal safety during and after a flood,
- hazard and risk identification to reduce impacts on and loss of property,
- incorporation of learnings from flood events into farm operations,
- farmers aware of the key agencies relevant in flood times and aware of their role,
- farmers are part of the industry network and stay connected and informed,
- well-developed farm plans for flood risks, mitigation, preparedness and recovery,
- positive relationships created and maintained between farmer groups and local floodplain authorities
- collective bargaining for cost effective insurance cover and back-up generators,
- informed and timely use of available forecast and flood warning information,
- effective farmer – processor dialogue on likely or current farm access risks,
- industry is an active and key player in regional natural disaster damage assessment and reporting processes.

The flood ready strategic plans for dairying and cane farming along with key material identified and developed during the project have been placed in a central web portal on the NSW DPI website which was specifically established for flood ready farming information and resources for use by industry, service providers and researchers. Industry has established web links to this material to support awareness and use of the plans and other resources.

## ***Making connections***

The dialogue, relationships and network connections made during the preparation of the flood ready strategic plans is considered one of the most valuable components of the project. A significant proportion of project time was focussed on establishing and maintaining the relationships between the key agricultural industry and flood management stakeholders to create a common ownership of the objectives and increase the likelihood of practice change occurring as a result of the project.

A multi-partner approach involving industry and agencies allowed for the sharing of the collective experience and knowledge of the stakeholders. Linking in with established groups and organisations highlighted the current resilience and capacity of the industry sectors to manage and cope with flood events.

Our experience was that active engagement and facilitated round table sessions with key players was necessary to open up the dialogue and expose the existing goodwill and the willingness to co-operate. This was borne out in the specifically arranged meetings by the NSW DPI project team with local government and industry representatives. The dialogue was always positive and stimulated thinking and suggestions around improvements that could be made to assist the industry resilience. One challenge is to develop a self-sustaining process to enable this interaction to continue after the project has formally finished and the outputs handed over to key stakeholders.

## ***Changing attitudes***

We found a shift in thinking by industry stakeholders from one of frustration with government agencies not doing enough to help industry deal with floods to one of industry taking a flood ready leader role. The shift to 'flood ready leader' within industry was in part created by the established leader network that exists within the dairy and sugar cane sectors. It was also in part by the revealing of the existing resilience and preparedness within the industries which provided a positive foundation to build on. Other messages and activities at play particularly during the recovery phase of recent major flood events also contributed to industry taking on a flood ready leader role. This included the impact of recent consecutive floods on farm businesses which in part pushed people towards a threshold in their capacity and farm business to cope and remain profitable. Other factors involved was a growing emphasis on self-preparedness and industry experience that financial assistance (e.g. grants) covered only a small proportion of the total losses. Uncertainty with regard the scope and detail of future government funding for recovery was also a factor.

### ***Skills within steering group***

Although experts and consultants with specialised skills were brought in to assist with some key elements of the project and they were extremely valuable in bringing focus and clarity to the project, it soon became apparent that the steering group members involved had an established level of resilience and a wealth of expertise and skills. As a consequence, this knowledge and experience within the steering groups benefited the project by members compiling risk assessment tables, industry engagement documents and articles for newsletters as well as leading industry engagement and consultation activities. These contributions greatly assisted the project and provided momentum.

Utilising expertise and good-will within the project partners had many positives, though there were some risks and challenges. Utilising the expertise within a multi-stakeholder steering group is an advantage in that it provides ownership of tasks within the group and allows motivated members to be creative and make a valued contribution. However clear boundaries and agreements with people that volunteer from within a steering group is important to clarify what is reasonable to expect within their available time and the quality and scope of work they are prepared to contribute. In addition, when people are offering their services “freely”, it can be a challenge to take back control of a task if key elements and milestones are not being met without the risk of offending people and relationships. There is also the sensitive balance of when an offer of assistance should be taken up and when for expediency and project control a service provider should be contracted to deliver an output.

### ***External communication***

The project team went to considerable lengths to communicate the project aims and progress to key stakeholders at critical milestones. However, in the early stages of the project, some stakeholders reported concerns that they could see little progress and that the project was not delivering on practical and tangible benefits. This appeared to be caused by an unintended lack of communication with a broader stakeholder audience as well as different expectations amongst key stakeholders with regard project deliverables and timeframes.

Formal communication plans were not developed until later in the project cycle and this combined with what may have been little or selective flow of information from some steering group members to their member organisations meant that project information and updates may not have been provided and circulated. Development and active implementation of a formal communication plan assisted to turn around loss of confidence in the project expressed by some stakeholders. The communication plan supported a more pro-active approach to getting messages and updates out through industry networks and newsletters.

In the second phase of industry engagement with the flood ready plan for dairying, two contractors were appointed with established links within the industry to assist with a more comprehensive engagement with dairy farmers. Although this engagement process was an

unplanned expense it was extremely valuable and helped build awareness of the project and credibility and assisted significantly to promote flood ready farming concepts.

### ***Differences in focus***

A critical difference between the dairy and sugar cane industries was that flood ready farming for dairying tended to raise a broader range of flood preparedness issues compared to sugar cane which focussed on floodplain drainage and infrastructure as the key issue. Although dairy raised local drain maintenance as an issue, it dominated the discussions by the cane farming steering group.

Floodplain drainage governance, regulation and its complexities became a focus of the sugar cane sector due to their experience with floodplain regulation, the limited funding allocated to rural focussed floodplain infrastructure and the risk posed to crops by floodplain infrastructure that did not function efficiently and as designed in times of flood. A contributing factor to the cane industry focus on floodplain drain maintenance and head-works was that other resilience capacity building strategies were within their scope to influence and activities were already underway. In addition, cane farming dominates the lower floodplains and river lands of the Tweed, Richmond and Clarence Valleys whereas dairying in these valleys tends to be located in the mid and upper reaches of these river systems. In flood times, dairy cattle are typically shifted to higher ground and flood mounds where stored feed can be fed out on a temporary basis. As a crop, sugar cane is at risk from prolonged deep inundation and from prolonged shallow inundation in the early stages of the crop.

### ***Steering groups***

We endeavoured to initiate action and a direction based on the wants and needs of the steering group in order to create ownership of the project and reduce the threat of it being seen as a project by government. Part of the strategy used was to engage farmers and industry representatives with leadership roles and who were well known in the industry. This provided credibility to the project and these people made valuable contributions in their own right.

Contracting the services of people already actively engaged and trusted in the dairy industry during our final engagement stage provided ready access to farmer insights that otherwise may not have been readily given if the contractor had no previous relationship with the industry.

A legacy of the project is that there has been an open, constructive and lengthy dialogue across a broad range of stakeholders around what flood ready means for the dairying and cane industries and that the linkages formed may assist the industries to have a greater voice in flood planning and recovery. NSW DPI acted as a broker in establishing some of the linkages and connections that were considered critical for project success. Dialogue was

considered critical to establish relationships based on trust as a foundation for continued engagement across key players and to build on the existing capacity, innovation and strengths within the industries.

### **Strategic Plan structure**

To make the readability and useability of the final plans as user friendly as possible, we divided the plan into five broad sections.

1. Introduction and industry overview
2. Aim and who benefits
3. Strategies and actions for flood resilience,
4. Future direction
5. Further information and resources

The Strategies and Actions section was purposely divided into three levels:

- Farm scale strategies and action options
- Local scale strategies and action options
- Regional scale strategies and action options.

The levels for strategies and action represented the different needs of the key stakeholder groupings and by setting it out this way we hoped to make the plan more user-friendly and practical in particular at the farm level. The farm level strategies covering two pages could be quickly scanned and used to identify key risks and as a check of preparedness. This format also allows for the table of farm level strategies to be extracted and used as a stand-alone document in future extension activities.

### **Examples of flood ready strategies identified in the plans**

An example of a farm level strategy from the Flood Ready Dairying Strategic Plan for the North Coast Region of NSW (Stillman et al 2014):

<b>Risk</b>	<b>Desired Outcome</b>	<b>Strategy</b>	<b>Options</b>
People not receiving or chasing information on local Flood levels and triggers and not anticipating flood behaviour.	Flood information is being accessed and is being used in farm planning, evacuation response and decision making.	<b>Be informed</b> Know the triggers and flood levels for taking action. Keep a farm flood book listing the websites and good sources of weather and information that will be valuable in a flood.	Check out and know where the information is that will provide river level, rainfall, and flood warning information.  Keep up to date with changes to local warning and alert systems, developments in mobile technology and web based information tools (e.g.

---

Keep a log of the records during the event to refer back to.	Apps).  Have a back-up plan if there is a power outage and Internet is not available e.g. battery-operated radio, mobile and phone contacts upriver.
--	--

---

An example of a regional level strategy from the Flood Ready Cane Farming Strategic Plan for the North Coast Region of NSW (Squires et al 2014) is:

---

<b>Risk</b>	<b>Desired Outcome</b>	<b>Strategy</b>	<b>Options</b>
Complexities of off farm infrastructure ownership and obligations impede effective management of drainage systems and transport networks.	Off farm infrastructure is managed according to highest value practice and reduces flooding impacts through ongoing maintenance and innovative upgrades and practices consistent across growing areas.	<b>Advocate and negotiate</b>  Industry, water management authorities and government work together to reduce perceived complexities of legislation and regulations regarding tenure, ownership and management.	Opportunities are sought for open dialogue between all parties with interests across the drainage system.  Opportunities to work together with Floodplain Management Committees to raise awareness around infrastructure, regulations and funding capability are sought.

---

Options for action and achieving the desired outcome were agreed as a preferred approach to managing risk on the basis that addressing risk could be undertaken by any number of activities some of which would be invented by people within industry and others or may arise at a later time. The intent of the plan was to flag risks and options for improvement rather than prescribe actions that may or may not be relevant in the specific situation and do not account for innovations by dairy and cane producers to solve a challenge on their farm or within their industry.

## Conclusions

The flood ready strategic plans for dairying and cane farming for the north coast of NSW represent the legacy of a broad range of conversations around what flood resilience means and what can be done to build resilience through preparedness and connecting existing networks.

The strategic plans represent a pathway for increasing flood resilience and preparedness in the dairy and cane farming sectors based on an acknowledgement of recurring issues raised



after flood events, stakeholder input and risk management thinking applied to key issues. This has provided direction for going forward, for building on the resilience that exists and providing some clear signals as to where future joint investment, collaboration and effort could be directed to achieve the flood ready visions for these sectors.

To assist in maintaining ongoing activity and commitment to the strategies contained within the flood ready plans, initial implementation workshops for the dairying and cane farming plans were facilitated to identify short term priority actions with leaders and partners. Follow up dialogue is planned at two to four monthly intervals with action team members to check and discuss progress and assist to address challenges or pursue new opportunities.

Some of the challenges ahead for flood ready dairying and cane farming include:

- potential change in personnel within government and industry creating some loss of momentum and loss of corporate knowledge and relationships,
- meeting expectations of different stakeholders including the timeframes in which they expect to see things done and what they want to see done,
- making natural disaster planning and preparedness a normal business activity to address some of the risk and uncertainty that weather and climate creates,
- building the capacity and confidence within industry and key service providers to take opportunities to implement priority elements of the plans and continue to support flood ready agriculture industries,
- implementation of flood ready strategies and actions in the absence of a formal governance arrangement post-project for ensuring progress and momentum.

The views expressed herein do not necessarily reflect the views of the NSW Government or the Commonwealth of Australia or the partner organisations.

## **Acknowledgments**

We wish to acknowledge the following people for their valued contribution to the project.

Pat Dwyer (NSW DPI Fisheries) and Jenny McInnes (NSW DPI Agriculture).

Past and present members of the Flood Ready Dairy Steering Group.

Past and present members of the Flood Ready Cane Farming Steering Group.

## References

National Emergency Management Committee (2011) National Strategy for Disaster Resilience: Building on our nation's resilience to disasters. Coalition of Australian Governments, Canberra.

Squires R, Stillman S and Whitehead R (2014) Flood Ready Cane Farming Strategic Plan for the North Coast Region. NSW Department of Primary Industries, Wollongbar NSW.  
<[http://www.dpi.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0007/535444/flood-ready-cane-farming-strategic-plan-nsw-north-coast.pdf](http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/535444/flood-ready-cane-farming-strategic-plan-nsw-north-coast.pdf)>

Stillman S, Stow W and Whitehead R (2014) Flood Ready Dairying Strategic Plan for the North Coast Region. NSW Department of Primary Industries, Wollongbar NSW.  
<[http://www.dpi.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0007/530827/flood-ready-dairying-strategic-plan-north-coast-nsw.pdf](http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/530827/flood-ready-dairying-strategic-plan-north-coast-nsw.pdf)>