

Flood and drought resilience lessons for the mining industry

Harnessing adaptation for industry futures

Recent droughts and floods in Central Queensland have demonstrated the vulnerability of mining operations and surrounding communities to extreme climatic events. The dependence that national and regional economies have on mining-led export earnings combined with the resource sector's impact on environments and communities during extreme weather events makes the minerals sector an important focus for climate adaptation research. This project investigated coal mining operations in Queensland, and examined climate-influenced drought and flooding challenges relevant to the future viability of the industry and local communities. Two key premises of this research were: that adaptation to current climate variability can help inform the resource industry's long-term adaptation to anthropogenic climate change, and that dialogue about industry adaptation can lead to greater industry engagement around its contribution to climate change and enhance mitigation efforts.

Mining industry activities vulnerable to climate variability

- » Production and extraction
- » Dust suppression
- » Road and rail accessibility for resource transportation to ports
- » Maintenance of mined pits, tailings dams
- » Mined land rehabilitation efforts
- » Road and rail accessibility for supply of machinery and other equipment
- » Operation of power stations at full capacity (limited by water scarcity)
- » Stabilized energy prices for both residential and commercial users

Key issues limiting industry resilience to extreme weather events

Researchers engaged with a diverse group of regional stakeholders from mining industry organisations, local governments, state government agencies, other industry groups and regional planning bodies to identify flood resilience lessons for the mining industry. In addition to competition over water access during droughts and direct impacts on production and revenue for the resources industry, the research identified unaddressed key issues and policy lessons relevant to strengthening the mining community's preparation for future extreme weather events.

» Failure to learn lessons from past experiences, and short-sightedness

Floods and droughts are not unusual in Central Queensland, but once the crisis has passed, efforts to systematically evaluate responses to better inform future preparation remain inconsistent. The industry's primary focus on planning is production- and output-driven, with negligent efforts undertaken to plan for long-term climatic impacts. Poor organisational memory, high staff turnover, and a significant reliance on short-term contractors creates a tendency to neglect the lessons learned from extreme weather events, and therefore prevent the establishment of organization-wide memory.

» Community perceptions of the industry

While community members recognise mining companies as a source of assistance in the immediate aftermath of climatic events, community concerns around mine water discharge during floods, and competition over water scarcity during droughts, can have negative reputational

impacts for the mining industry. The resource sector finds it difficult to deal with these perceptions, but there is an industry-wide acknowledgement that they act as one of the biggest motivators to bring about changes in the way it plans for, and manages climatic risks.

» Difficulty switching industry mindsets between extreme 'dry' and 'wet' conditions

As with many other sectors, there is an inherent contradiction in industry mindsets between encouraging water conservation during the dry season, and managing excess water resulting from extreme floods. Lack of sufficient time available prior to the onset of extreme events



January 21, 2008: Emerald, QLD. Aerial view of flooding in the town of Emerald, showing a submerged drag line at a coal mine (photo by James Laws/Newspix.)

further prevents mining operations from rallying internally within their respective organisations to seek additional financial, technical and human resources to build effective risk management plans.

» **Tensions between diverging interests of different industry stakeholder groups**

The wide variety of players active in the region, each with a diverse set of values, priorities and interests, makes sharing of information and knowledge on resilience to extreme climate events particularly challenging. Entrenched or vested interests, competition between organisations within the same economic sector or divergent ideological positions lead to mis-representation of facts and often erode the trust information sharing requires.

Even in a best-case scenario, adaptations for one

stakeholder may negatively impact others. For example, greater 'flexibility' in government regulation of stream water quality to allow de-watering of flooded coal pits into the river system; increased water resource extraction; or water-trading during droughts may lead to conflict situations between mining and agricultural groups.

» **Inadequate regional level planning**

Poor integration of broader regional issues and multi-sectoral perspectives, combined with a lack of political will and top-down governance, prevents meaningful integrated planning. State interests to foster industry growth and revenue prevent due consideration of local community priorities and ecological impacts. There is a strong need to develop regional leadership, regional innovation, and better understanding of regional contexts to inform planning.

Policy lessons for climate adaptation in the resources sector

Coordinated and timely planning

Coordinated and timely planning both by governments and industries is critically important. This includes long-term water resource management strategies and planning for droughts, as well as preparatory planning for floods. Local governments should be included early on in the process due to their local expertise and established credibility with the community.

Methodical learning and collective knowledge management

Ongoing and robust monitoring, evaluation, review and feedback procedures are critical to achieving methodical learning from past experiences. Similarly, collective knowledge management, transfer and training can enable the development of a common pool of regional and catchment-wide expertise in preparing for and managing impacts from climate changes.

Sharing responsibility

Co-sharing responsibility with other actors to develop suitable response mechanisms positively influences the degree of collaboration and the quality of communication. Past experience in dealing with climatic extremes demonstrate a high level of collaborative planning and a sense of collective responsibility across stakeholders to condition goals, make decisions and execute plans

in order to maintain long-term regional and local social, economic and ecological integrity.

Better understanding of local and regional contexts

Unfamiliarity with the local context can play an important role in impeding adaptation, particularly in light of Australia's diverse climatic zones, and socio-ecological landscapes. Within a single organisation, different sites have demonstrated varying degrees of success in managing risks. While both internal and external communication and individual mine site leadership play an important role, other factors, such as the geographical location of the operation, local floodplain hydrology, inter-site climatic variability, socio-ecological regional context within which the mine is located, and unfamiliarity of mining personnel with local climatic conditions can further influence the operation's resilience towards external climatic perturbations.

Engagement, communication and collaboration between stakeholders

Engagement and communication across different stakeholder groups is needed to facilitate timely, multi-directional information exchange and to build cooperative relationships. Collaborations have previously enabled individual stakeholder groups to bring together diverse resources to respond to both water security issues during drought and flood-related disaster and emergency situations.

This document summarises key findings from the NCCARF report *Extractive resource development in a changing climate: learning the lessons from extreme weather events in Queensland, Australia*. The project was funded by NCCARF and led by Vigya Sharma, University of Queensland. To download the full report go to: www.nccarf.edu.au/publications/extractive-resource-development-changing-climate

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