Mulloon Rehydration Initiative

Drought Resilience Innovation in Action

Mulloon Creek at Westview, 2015

Mulloon Creek at Westview, 2020

Introduction

Landscape rehydration (LR) and Sustainable land management (SLM) practices, such as those employed in the Mulloon Rehydration Initiative (MRI), offer a relatively low-cost toolkit that can offer significant potential to mitigate the economic impacts of droughts. This case study, including similar MRI landscape rehydration projects around Australia are an example of how LR techniques can be used to increase drought resilience. This report provides a cost-benefit analysis (CBA) of the MRI and explores how scaling these solutions to a national level could amplify economic, environmental, and social benefits. The report also aligns with the United Nations Convention to Combat Desertification (UNCCD) targets, focusing on gender equality and other co-benefits of LR and SLM.

The MRI has been developed by Mulloon Institute (MI), mullooninstitute.org, when work commenced on the Mulloon Home Farm in 2006. The Institute has evolved into a global leader in landscape rehydration (delivering strategies that restore the natural movement, storage and cycling of water), and the MRI (as well as other word undertaken by MI) continues to capture significant interest from academics, governments and other landholders.

The MRI is located in the Mulloon Creek catchment in southern New South Wales (state of Australia). The catchment area of the project is 23,000 hectares, includes 50+ kilometres of creeks and tributaries, and involves over 20 landholders.

The Australian National Drought Agreement (ANDA) serves as a governance framework, providing high-level guidelines for drought management across various government levels in Australia. While it establishes essential principles for collaboration and resilience, its role is primarily about governance and policy alignment, rather than direct implementation of drought resilience strategies. In contrast, the Future Drought Fund (FDF) represents a more actionable program, delivering specific initiatives aimed at enhancing drought preparedness. The FDF's success, particularly through the establishment of regional Drought and Innovation Hubs, has been crucial in providing localised support and resources, directly contributing to the resilience of farming communities.

Context: Economic Impacts of Drought in Australia

Australia frequently experiences severe droughts, leading to substantial reductions in agricultural productivity and economic stability. According to the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), the 2018-2019 drought alone caused a 21% decrease in national crop production and a 6% reduction in livestock production, resulting in an estimated economic loss of $1.6 billion for the sector. These figures highlight the critical need for resilient land management practices across the country.

Cost-Benefit Analysis of the Mulloon Rehydration Initiative (MRI)

Costs of Sustainable Land Management

1. Initial Investment Costs:

- Infrastructure Development: $1,000,000 (10-year amortisation = $100,000 annually) for 20 km of stream rehabilitation.

  Source: This estimate is derived from the Mulloon Rehydration Initiative's (MRI) budget reports and market rates for the design, regulatory approval, and installation of 'in-stream interventions' such as 'leaky weirs' and other stream management techniques over 20 km of stream rehabilitation. The cost includes materials, labour, and engineering services.

- Vegetation Restoration: $250,000 (10-year amortisation = $25,000 annually) for native riparian vegetation planting, fencing, and maintenance.

  Source: The cost of planting and maintaining native riparian vegetation, including the cost of fencing riparian areas, was estimated using current market rates for native plant species, fencing materials, and labour. The figure also accounts for ongoing maintenance.

- Monitoring and Research: $300,000 annually

  Source: This value covers the annual costs of monitoring and research activities, including the purchase of equipment, data collection, analysis, and reporting. The estimate is based on MRI's detailed monitoring plans and past expenditure reports, noting that a more streamlined monitoring plan could be implemented for future projects.

2. Ongoing Maintenance Costs:

- Maintenance of In-stream Interventions: $50,000 annually

  Source: Annual maintenance costs for the in-stream interventions include inspections, repairs, and preventive maintenance. The value is based on cost estimates from similar projects and the MRI's maintenance schedules.

3. Community Engagement Costs:

- Community Programs: $50,000 annually

  Source: Costs related to community engagement, education, and stakeholder involvement have been revised down to $50,000 annually, based on a more conservative estimate of the budget allocations for outreach activities, workshops, and educational programs conducted by MRI.

Benefits of Sustainable Land Management

1. Economic Benefits:

- Increased Agricultural Productivity: $300,000 annually

  Source: This estimate is based on conservative yield improvements reported by farmers participating in the MRI. Productivity gains are attributed to improved soil moisture and reduced erosion, leading to higher pasture yields and improved grazing conditions for utilisation in grazing production systems. The value is calculated using pre- and post-implementation agricultural yield data and adjusted to reflect a more realistic expectation of outcomes.

- Reduced Water Costs: $100,000 annually

  Source: This value represents more conservative savings from decreased water use, primarily for stock and domestic purposes, due to improved water retention in the landscape. It is derived from water usage reports and cost savings estimates provided by local farmers in the MRI.

2. Environmental Benefits:

- Improved Water Quality: $150,000 annually in reduced water treatment costs

  Source: The estimated value of improved water quality comes from savings in water treatment costs, which result from reduced runoff and soil erosion. The figure is based on water quality improvement studies in the region and data from similar projects.

- Carbon Sequestration: $50,000 annually

  Source: This value is adjusted to account for the costs associated with delivering outcomes from a carbon project, including initial baselining, a 20% retention by the government for risk, and project developer costs. The net value considers the sequestration rates of the planted vegetation and their impact over time.

3. Social and Gender Equality Benefits:

- Educational Programs: $50,000 annually

  Source: The value associated with educational opportunities is based on the costs and benefits of educational programs run by MRI. This includes training workshops, educational materials, and outreach activities that have provided substantial benefits to the community.

- Gender Equality: Significant, contributing to UNCCD gender targets

  Source: While this benefit is not quantified in monetary terms, it reflects the significant social value of gender equality initiatives within the MRI. These initiatives ensure equal access to resources, decision-making, and benefits for women, contributing to UNCCD gender targets.

4. Co-benefits:

- Food Security, Disaster Risk Reduction, Poverty Reduction, Ecosystem Integrity: Significant non-monetary benefits

  Source: These co-benefits are assessed qualitatively through studies on the broader impacts of SLM practices on food security, disaster risk, poverty alleviation, and ecosystem health. While difficult to quantify, these benefits are critical to the overall success and sustainability of the MRI.

In a recent landholder survey conducted with participants of the MRI, Gerry and Robin Carroll shared valuable insights into their experience with the in-stream interventions implemented on their property.

Gerry and Robin noted that they now feel significantly more confident in handling future droughts, as they no longer expect Mulloon Creek to stop flowing completely, as it did in the severe droughts prior to the intervention works. This confidence is directly attributed to the perceived improvements in water retention and availability, allowing them to maintain higher stocking rates without fear of needing to sell off livestock at reduced prices during future droughts.

While they acknowledge that it may be too soon to fully assess the long-term agricultural productivity gains, Gerry and Robin have already observed improvements in pasture health, with greener pastures persisting longer into the colder months. This has bolstered their optimism about future productivity increases, driven by better hydration conditions.

Net Economic Impact of MRI

- **Total Annual Costs: $525,000**
- **Total Annual Benefits: $650,000**
- **Net Annual Benefit: $125,000**

Scaling Solutions to a National Level

The success of the MRI provides a compelling case for scaling LR and SLM practices across Australia. The following analysis explores how scaling up these solutions could multiply the economic, environmental, and social benefits at a national level.

Potential National Scale-Up: Costs and Benefits

Assumptions for Scaling:

- Australia has approximately 430,000 km of rivers and streams, with many regions facing similar challenges to those addressed by the MRI.
- A national-scale implementation could cover approximately 10% of Australia's river systems, focusing on regions most vulnerable to drought and land degradation.
- It's likely that a more streamlined and scaled back approach would be used for monitoring at such a scale and that three would be other efficiencies gained through utilising methods such as remote sensing. It is estimated that the 2000 units.

1. Initial Investment Costs (National Level):

- .Infrastructure Development: $2.15 billion for 43,000 km of stream rehabilitation (10% of the national river system) – 10-year amortisation = $215 million annually
  - o Calculation: $1,000,000 per 20 km multiplied by 2,150 units (43,000 km / 20 km).
- Vegetation Restoration: $500 million for nationwide native riparian vegetation planting, fencing, and maintenance – 10-year amortisation = $50 million annually.
  - o Calculation: $250,000 per 20 km multiplied by 2,000 units.
- Monitoring and Research: $260 million annually
  - o Calculation: $300,000 multiplied by 200 units + $100,000 multiplied by 2000 units.

2. Ongoing Maintenance Costs (National Level)

- Maintenance of In-stream Interventions: $100 million annually
  - o Calculation: $50,000 multiplied by 2,000 units.

3. Community Engagement Costs (National Level)

- Community Programs: $100 million annually
  - o Calculation: $50,000 multiplied by 2,000 units.

- **Total Annual Costs (National Level): $725 million**

Potential Annual Benefits (National Level)

- Increased Agricultural Productivity: $600 million annually
  - o Calculation: $300,000 multiplied by 2,000 units.
- Reduced Water Costs: $200 million annually
  - o Calculation: $100,000 multiplied by 2,000 units.
- Improved Water Quality: $300 million annually in reduced water treatment costs
  - o Calculation: $150,000 multiplied by 2,000 units.
- Carbon Sequestration: $100 million annually
  - o Calculation: $50,000 multiplied by 2,000 units.
- Educational Programs: $100 million annually
  - o Calculation: $50,000 multiplied by 2,000 units.

- **Total Annual Benefits (National Level): $1.3 billion annually**
- **Net Annual Benefit (National Level): $575 million annually**

Co-benefits and Long-term Impact at a National Scale

Scaling up LR and SLM practices like those in the MRI to a national level would enhance National Drought resilience and have profound long-term impacts:

1. Economic Resilience: The projected annual net benefit of $575 million reflects significant gains in agricultural productivity, water cost reductions, increased crop yields and pasture for livestock, and farm profitability across the country.
2. Environmental Sustainability: Large-scale implementation would improve water quality, increase carbon sequestration, and support biodiversity conservation nationwide.
3. Social Equity and Gender Equality: Expanding these practices would create opportunities for inclusive community engagement, ensuring that women and marginalised groups have equal access to resources and decision-making processes. This aligns with the UNCCD's gender equality targets and promotes social resilience.
4. Food Security and Disaster Risk Reduction: Enhanced agricultural productivity and water management would strengthen food security and reduce vulnerability to climate-related disasters across Australia.
5. Poverty Reduction and Ecosystem Integrity: Increased farm profitability and resilience would contribute to poverty reduction, while supporting ecosystem integrity and sustainability.

Conclusion

The Mulloon Rehydration Initiative demonstrates the significant potential of sustainable land management practices to enhance economic resilience, environmental sustainability, and social equity.

Scaling these solutions to a national level could transform Australia's agricultural landscape, providing substantial economic, environmental, and social benefits.

Adopting such practices on a broader scale could enhance agricultural productivity, conserve biodiversity, improve water quality, foster community resilience, promote gender equality, and reduce poverty, ultimately leading to a more sustainable and economically stable future for Australia's rural landscapes.

The long-term impact would not only strengthen the nation's resilience to drought and land degradation but also contribute to global efforts to combat desertification and promote sustainable development.

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