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UNE's submission to the Future Drought Fund

UNE: of the regions, for the regions. As Australia's first regional university, the University of New England (UNE) was established specifically to support regional communities. That mission has remained undimmed over 65 years; decades in which UNE has developed a world-class reputation for excellence in off-campus education delivery and in agricultural research. UNE is an ideal partner to assist the Commonwealth realise its ambitions through the Future Drought Fund.

It might be argued that more so than any of Australia's 39 universities, UNE has proven "skin in the game" where referencing opportunities for addressing drought resilience. At the time of this submission, the University's home city of Armidale is under severe water restrictions due to unprecedented low rainfall and stream-flows. The possibility that this town may effectively run out of water by late 2020 is growing daily, forcing UNE's management into contingency planning mode around sustaining the University's operations should the situation worsen and a worst case scenario be realised.

At the same time, the eastern Australian drought is badly damaging the current and future livelihoods of farmers and other regional businesses dependent on agricultural prosperity, with flow-on effects to the town and the community's longer term resilience. UNE's regional student intake is already affected by the adverse impact of these financial challenges. Drought damage to agricultural productivity will also put long-term constraints on the ability of levy-funded agricultural R&D bodies to fund research, at a time when the need to find new answers to new challenges is increasingly acute.

Thus, UNE has an unusual degree of firsthand exposure to the immediate and long term effects of drought – and with that, a compelling need to develop solutions as an institution and on behalf of its local and regional partners, and stakeholders.

Moreover, as a regional university and the largest corporate employer in the sub-region, the challenges of agriculture and natural resource management are part of this institution's daily discourse. As this submission was being prepared, dozens of UNE staff are living second lives as volunteer firefighters battling the unprecedented bushfires ravaging the forests and farmland of northern NSW.

The University has expended effort in building expertise to support regional communities, economies and landscapes – areas that the Commonwealth has defined as priorities for Future Drought Fund investment. UNE's research has had a substantial impact on agricultural productivity, and supported improved management of our natural resources, while the University's core business of education continues to add significant human capital to NSW's New England-North West regions.

These contributions were shaped by the varying imperatives of the emerging 21st Century challenge of climate volatility, and by demands for UNE to address questions around regional prosperity and resilience. The University is well prepared to be an enabler and partner in the delivery of the Federal Government's Future Drought Fund agenda.

Addressing Key Strategic Priorities

The *Drought Resilience Funding Plan 2020-2024* lays out three strategic priorities:

- economic resilience for an innovative and profitable agricultural sector;
- environmental resilience for sustainable farming landscapes;
- social resilience for resourceful and adaptable communities.

UNE offers deep capability in each of these areas. The following addresses the Plan's three stated objectives:

Build drought resilience by growing the productivity and profitability of the agricultural sector.

From the outset, UNE has been committed to enhancing Australian agriculture. For example,

- The Agricultural Business Research Institute (ABRI), established at UNE in 1970, has run Australia's beef herd recording program since 1972. ABRI's BREEDPLAN software, developed to power the recording program, is now used worldwide. Because of this pioneering work, UNE became the headquarters for the later development of Sheep Genetics, which has achieved a similar result for the nation's wool and sheep meat industries. *These resources can be used to design responses which will see drought decimated herds quickly re-established and future herds constituted from more drought resistance livestock.*

- The Animal Genetics Breeding Unit (AGBU), which was established at UNE in 1976 to support ABRI with research and development, has become a world leader in livestock genetics in its own right. AGBU's work in genetic selection technologies has added an estimated $1.18 billion in value to the beef and sheep sectors, and the other animal and plant industries it works with. *This unique resource can be used to create the selection technologies for future drought resilient primary industries.*

- UNE has been the headquarters for three important agricultural Cooperative Research Centres (CRCs) – Beef, Sheep and Poultry – each of which was funded for three terms. Each CRC pioneered research that fundamentally changed the production landscape of the livestock commodities they specialised in. Many of the researchers who contributed to the CRCs remain at UNE. *These successes prove that UNE is a proven high value industry partner with a commitment to resilient systems and positive value chain outcomes.*

- Currently, UNE researchers have important roles in two new agriculture-related CRCs. The Food Agility CRC is dedicated to supporting practical digital intervention in food and fibre supply chains; the Future Food Systems CRC is working to optimise the productivity of regional and peri-urban food systems.

- NSW DPI maintains a permanent suite of offices at UNE. The University maintains other notable partnerships, including a long-running alliance with the Australian Centre for International Agricultural Research (ACIAR), which has adopted UNE as a preferred provider for research delivery. *These linkages ensure that UNE is closely connected to the drivers for policy formulation and implementation.*

- The University's ability to work as a strategic partner is further demonstrated in its new Applied Agricultural Remote Sensing Centre, which is built on complex collaborations within Australia and is now developing important international collaborations. *This along with other initiatives ensures that UNE can access international good practice models and ensure their integration into Australian models for future drought resilience.*

- UNE's own research farms, which adjoin the academic campus, provide R&D practitioners with nearly 2,900 hectares of productive landscapes to work with. This indispensable asset also hosts the UNE SMART Farms, which provide a research platform to assess new technology investment in developments for precision agriculture, productivity improvements and natural resource management protocols.

- The University's SMART Region Incubator (UNE SRI) supports AgTech start-ups through their vulnerable early phases, and regularly brings agribusiness and technology experts into the region to address the community on the 'business of agribusiness'.

These and other examples confirm that UNE has strong capability in a range of critical agriculture-related research and teaching including meat science, soils, ruminant methane, weeds, pest and invasive species. Drought resilient agricultural practices and natural resource management will be key to the water security of Australia's regions and the development of resilient communities.

Improve the natural resource management of agricultural landscapes.

UNE has long recognised the importance of **natural resource management** (NRM) to agriculture. Indeed, the founder of the University's renowned Rural Science programme, Professor Bill McClymont, originally coined the term "sustainable agriculture". McClymont developed a tradition of teaching NRM principles as part of UNE agricultural programmes, whilst UNE's NRM degrees deal with farming as part of, not separate from, the environment.

This embodied understanding of NRM issues is also apparent in UNE's research output. UNE researchers are actively seeking solutions to water management, invasive plant and animal species and more effective NRM governance. Their work ranges from on-the-ground applied science to consideration of natural resource governance and policy.

Water was a focus of UNE research long before 21st century climate shifts brought the vulnerability of this resource into critical focus. The Commonwealth Environmental Water Office (CEWO) is currently providing $6 million in funding to a team of UNE researchers so that they can assess the effectiveness of the 2750 gigalitres of "environmental water" annually released in the Murray-Darling river system.

Meanwhile, the University's freshwater ecologists are providing monitoring and management advice to local governments along the eastern seaboard around how to best manage the health of rivers under pressure from population growth and declining stream flows. These resources are further underpinned by a strong social science capability with interests in *reimagining* water as a component of developing ongoing and future drought resilience.

Invasive species – animals and plants – are one of the biggest challenges for Australia's landholders. Weeds alone cost agriculture an estimated $3.5-$4.5 billion a year in control measures and lost production. Foxes are a $227 million annual burden on farmers, and wild dogs are estimated to cost the sector about $50-$60 million a year. Drought damage will add further effect to these already aggressive challenges and hinder recovery of not managed now.

UNE researchers are at the forefront of the battle against invasive species, which included a significant role in the former Invasive Species CRC. Their work falls into three broad categories – people, ecology and technology – but with a multidisciplinary approach that ensures the knowledge developed in one field informs the others.

Effective invasive species control starts with people. UNE's law and psychology researchers have made important contributions to our understanding of invasive species policy and governance. UNE's Australian Centre for Agriculture and Law is working more broadly on NRM governance, which includes alliances with researchers in South America, USA, Iceland and throughout Asia.

Some of Australia's best wildlife ecologists have worked on developing a better understanding of feral animal behaviour, which early in 2019 resulted in a $30 million grant to address feral cats – killers of two billion native animals each year.

Meanwhile, technology is becoming a potent weapon in the fight against ferals – as demonstrated by the ground-breaking Wild Dog Alert, the result of a UNE-NSW DPI alliance that has brought together several innovative technologies into a single powerful tool. This multidisciplinary approach to incorporating data and hardware into our monitoring and management of natural systems is delivering other potentially game-changing management options.

UNE's research covers many other facets of NRM, from the use of drones to revegetate farms to soil microbiology on cotton farms. Collectively, UNE's research has the capability to give Australian agriculture its best chance of sustaining its natural resource base in times of increasingly climate volatility.

UNE would argue that Australia's Future Drought Resilience requires the appropriate and sustained investment in R&D to effect invasive species control alongside resource engineering to stimulate drought resistance agri-businesses in drought affected regions.

Maintain and improve the wellbeing and social fabric of rural regional communities.

UNE provides rich learning opportunities for personal and professional development through educational offerings which are grounded in the knowledge gained from world class research, informed by the benefits of deep partnerships with industry and government, and designed to ensure student success. The profile of our alumni provides testimony to the success of the UNE model over many decades.

UNE has developed a recognised flexible, adaptive distance education model supported by a network of study centres distributed across NSW (Armidale, Tamworth, Moree, Gunnedah, Taree, Sydney) and connections across Australia. Over 20,000 students per annum enrol with UNE to purse undergraduate and postgraduate qualifications and professional development. As noted above, students from rural and remote drought affected communities have been affected by the financial hardships attendant on the on-going drought and have withdrawn from or deferred their studies. This at a time when UNE's overall students numbers are growing as student candidates seek to future proof their professional contributions and employability.

The University's strong connections to industry and business, and engagement with community, ensure that UNE's curriculum and teaching practice create strong foundations for student success. The University's graduate employability profiles are amongst the very best in Australia and UNE holds a number of national awards for the quality of support provided to students.

In addition to our proven capabilities in agriculture and primary production, recent initiatives including SiMERR, Tamworth's Coledale and more recently UNE's Centre for Rural Criminology are continuing exemplars towards UNE's understanding of, and commitment to the need to address the wellbeing and social fabric of rural regional communities. The recent development

of the UNE Boilerhouse Discovery Centre (with NSW Government support) will extend UNE's contribution to educational outreach and the managed emergence of educational tourism in New England. With the New England Regional Art Museum (NERAM) and the New England Conservatorium of Music (NECOM), UNE also makes a substantial commitment to rural cultural and the creative industries of New England and further contributes to regional tourism.

UNE is currently investing in a new digital hospital initiative which will extend our current rural health care provision and ensure that acknowledged deficits in the healthcare of rural and remote communities are addressed. Given the reported impact of extended drought conditions on the quality life years of rural citizens and low socioeconomic groups (see Figure 1 below), targeted investment now in resources which improve rural healthcare resources will deliver both long term social and economic return on investment.

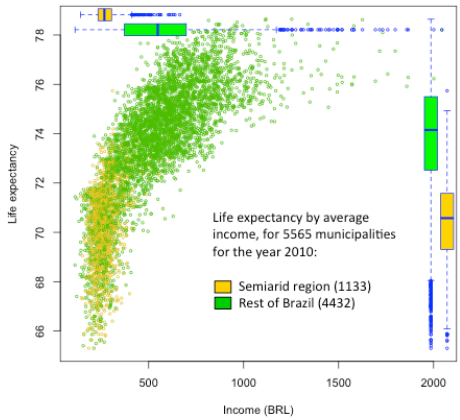

Figure 1: https://doi.org/10.3390/ijerph111010737

UNE has established strong connections with Aboriginal communities and has built enabling provision through its distance education portal as well as through the Oorala Aboriginal Centre to support Indigenous youth leadership. Extended programmes through UNE include work to preserve and develop Aboriginal practices which reflect their legacy in environmental stewardship; future drought resilience will benefit from greater recognition of the contribution of Aboriginal knowledge sources and their leadership roles in new resource management models.

Regional universities have a crucial role to play in educating local workforces and helping drive innovation in rural and regional Australia, enabling regional populations to not only realise their educational and lifestyle aspirations but also to survive and prosper in a fast changing global economy. Through our sponsorship of, and support for the regional innovation ecosystem, UNE has sponsored business incubation and innovation through the Smart Region Incubator (SRI). We are now expanding the SRI provision into Tamworth and Moree from its Armidale base. Thus, UNE continues to be at the forefront of innovative education delivery models particularly suited to rural and regional Australia. UNE would argue that consideration of microfinancing options offered through rural incubators would advance the innovation agenda and support community resilience through economic diversification, a model proven in other countries with similar environmental and demographic challenges.

For further information, please contact:

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