**Forum Report: Rebalancing Regional and Remote Australia (3R Australia)**

*Wednesday 4th December 2024, James Cook University, Queensland, Australia.*

*Produced by the Queensland Academy of Arts and Sciences. February, 2025.*

**Forum: Rebalancing Regional and Remote Australia (3R Australia)**

*Wednesday 4th December 2024*

*JCU, Townsville Building 142 Room 111 (The Science Place)*

**Forum Outline (note that as some speakers were unable to attend due to illness (eg COVID) some ‘last minute’ variations occurred to this program.**

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| --- | --- | --- |
| Time | Title/Topic | Speaker |
| 9:30-9:45 | **Forum Opening** |
|  | Welcome from JCU | Professor Jenny Seddon, DVCR, James Cook University |
| 9:45-12:30 | **Visions for the Future** |
|  | Climate Patterns (and Carbon Sinks). | Emeritus Professor Roger Stone, World Meteorological Organisation |
|  | The history of bold visions for the north | Professor Allan Dale, Chief Scientist, CRC for Developing Northern Australia |
|  | North-west Queensland development as an enabler | Maria James, CEO Mount Isa to Townsville Economic Development Zone (MITEZ) |
| 10:45-11:00 | **Break** |
|  | 3R Australia | Professor Alberto Troccoli, World Energy Meteorology Council |
|  | Indigenous connection to country | Suzanne Thompson, Yambangku Aboriginal Cultural Heritage and Tourism Development Aboriginal Corporation( YACHTDAC) |
|  | Panel-audience Q&A | *Facilitated by Emeritus Professor Roly Sussex, Institute for Teaching and Learning Innovation, University of Queensland*  |
| 12:30-1:15 | **Lunch** |
| 1:15-2:30 | **Benefits and tradeoffs** |
|  | Agricultural industries and climate policy | Nicole Peters/Adam West, Director Climate Policy, Department of Primary Industries (Queensland) |
|  | Biodiversity | Professor Helene Marsh, Emeritus professor of environmental science, James Cook University |
|  |  |  |
|  | Regional communities | Professor David Phelps, Director TNQ Drought Hub |
| 2:30-2:45 | **Break** |
| 2:45-4:00 | **Translating a Vision into Reality** |
|  | Panel and plenary discussions | *Facilitated by Emeritus Professor Roly Sussex* |
|  | Wrap up and close | Emeritus Professor Roger Stone |
| 4:00-5:30 | **Networking event sponsored by the TNQ Drought Hub** |

**Background, inspiration, and overview of the Forum.**

A recent paper, ‘Rebalancing Regional and Remote Australia’ (Troccoli et al., 2024) created an outline of a strategy aimed at ‘transforming Australia’ into a significant global carbon sink. This could be done by sequestering 4 gigatonne (Gt) of CO2 equivalent annually, leveraging about 25% of the nation's landmass. A central pillar of the plan is the creation of sustainable regional and remote communities. Beyond its environmental objectives, the plan presents substantial business opportunities, positioning Australia as a leader in global sustainability efforts.

The Forum (instigated by the Queensland Academy of Arts and Sciences, kindly hosted by the Future Drought Fund, Tropical North Queensland (TNQ) Hub at James Cook University, Townsville ) sought to bring together a balanced framework for discussing and appraising such an initiative. The Forum also aimed to provide opportunities to challenge such a scheme as well as reviewing previous such major schemes. The Forum deliberately aimed to draw together a cross-section of industry, academic, and community leaders who were notable international specialists in their fields.

Thus, presentations at the Forum included

* provisions of a global overview of climate systems and especially climate change, including Australia’s contribution to this issue,
* aspects related to Australia becoming a ‘global carbon sink’,
* a thorough discussion of the Mount Isa to Townsville economic development zone and especially regarding this zone being an ‘enabler’ of future major development programs,
* a detailed history and critique of previous major engineering schemes involving such as river diversions and economic revitalisation ‘for the north,
* a comprehensive provision and opportunity for critique of the key instigator for the Forum in the paper by Troccoli et al ‘Rebalancing Regional and Remote Australia’,
* an inspirational presentation by a well-known and respected First Nations Elder on the need for enhanced understanding of the interconnectedness of systems, drawing on ancient knowledge to manage land and water resources,
* a comprehensive review of water resource management and development programs in north Queensland,
* a major appraisal of biodiversity issues relevant to north Queensland.
* a comprehensive review (by Queensland Government representatives) of agricultural policies, especially those relevant to climate change issues in north Queensland.
* A thorough review discussion and discussion on ways forward and lessons learnt.

**Forum Details.**

**The forum was organised into themes with a key aspect a panel audience Q & A segment, facilitated by Emeritus Professor Roly Sussex (QAAS - UQ).**

**The core themes of the Forum were:**

* **Visions for the Future**
* **Benefits and trade-offs, and**
* **Translating a Vision into Reality (facilitated by Prof Sussex).**

**Introduction and Acknowledgements**

Professor David Phelps, Future Drought Fund -TNQ, JCU, introduced the forum, mentioning the presence of both in-person and online attendees. Professor David Phelps is Director of the Tropical North Queensland Drought Hub at James Cook University (JCU). David is also a Fellow of the Queensland Academy of Arts and Sciences (QAAS),

David Phelps explained the genesis of the forum, inspired by a discussion with Alberto Troccoli and Roger Stone about the development of Northern Australia and the role of renewables in such regional economic development. This discussion was also based on a newly published paper (Troccoli et al, 2024, *Environmental Research Letters*).

Professor Jenny Seddon, Deputy Vice Chancellor of Research at JCU, kindly acknowledged the traditional owners of the land and emphasizes the importance of care for country and regeneration of landscapes. Professor Seddon further discussed the challenges of climate change and the need for collective efforts in mitigation, decarbonization, and green energy solutions.

**Professor Jenny Seddon's Welcome and JCU's Role**

Professor Jenny Seddon highlighted and made the point of the need for political will, financial investments, and transformational change to tackle climate change. She emphasized the importance of place-based approaches and local knowledge in making informed decisions and ensuring public acceptance of change. Jenny outlined JCU's mission to create a brighter future through education and research that addressed local and global challenges. Professor Seddon further mentioned JCU's research themes, including thriving ecosystems, sustainable regional economies, and supporting indigenous futures. She also discussed JCU's important role in hosting the Terrestrial Ecosystems Research Network and its collaboration with other universities for sustainable development in northern Australia.

**Professor David Phelps' Introduction of Roger Stone's planned presentation.**  Professor Phelps introduced the presentation originally planned for personal delivery by Emeritus Prof Roger Stone (QAAS Councillor). However, Prof Stone was unable to give his presentation himself due to illness and so Prof Phelps provided this on Prof Stone’s behalf.

In this, David Phelps (on behalf of Prof Stone) emphasized the global nature and interconnectivity of global climate systems and the impacts of global emissions (rather than focussing on local emissions) on local rainfall and other climate systems. Prof Phelps explained the differences in climate influences between southern and northern Australia and the importance of understanding these differences for better management and adaptation to climate variability and change. Importantly, the extremely high (natural) rainfall variability in Australia, particularly in regions such as the Desert Uplands, the Burdekin region, and the Southern Gulf of Queensland was highlighted, Further to this, the aspect of the high rainfall variability further increasing in northern Queensland and northern Australia (especially around the Southern Gulf Catchment) was discussed. Prof Phelps also discussed the potential drought risks in Queensland and the need for adaptive schemes to build economies in the face of increasing drought risk.

It was further emphasised that due to the global nature of climate change (and the flow-on impacts to the major year-to-year climate systems that affect Australia, such as El Niño and La Niña) (together with the issue of the huge amount of global emissions that are being produced) that reducing Australia’s emissions to ‘net zero’ may not achieve those anticipated outcomes regarding reducing the impact of the major seasonal to sub-seasonal climate systems that affect Australia (eg droughts and floods, respectively, This is because of the massive amount of carbon emissions being emitted by major northern hemisphere countries that constitute 95% of the world’s outputs (Australia produces about 1% of global carbon emissions). Instead, an approach that would facilitate Australia becoming a *global* *carbon sink* (for example, to achieve ‘*minus 10% global emissions’*) may be considerably more effective than current policies in delivering tangible outcomes.

**Professor Alan Dale – water management issues and governance**

Professor Dale commenced his presentations with acknowledging the traditional owners and then discussing his key topic regarding the governance of Northern Australia and the challenges of big dreams for its development. Alan highlighted the history of ‘big projects’ and policies for Northern Australia and the reasons for their failure. He emphasized the vital importance of starting development from the foundations up and involving traditional owners, pastoralists, and rural communities in the conversation. Alan went on to discuss the current Northern Australian policy framework and its potential to be a stable and effective way to develop the North. Prof Dale further outlined the challenges of attracting investment to Northern Australia and the need for de-risking the investment environment.

Prof Dale argued that many such ‘grand engineering schemes’ (as also possibly proposed by the Troccoli paper) ‘sound great’ - they sound ‘electric’ and promising but which could be called ‘false messiahs’. In his review of grand schemes for northern Australia, he noted that there is not fundamentally enough water available to achieve their aims. Also, there is quite a significant cultural opposition to the transfer of water across major basins for that to happen. Indeed, North Queensland and Central Queensland have a very significant water resource under accredited water resource plans, and we are far from using that effectively and productively. We are actually three to four times less productive with our use of water than places in Victoria and New South Wales. To get the best value out of every dollar of water we have available takes some serious thinking at the basin scale about how to actually pull that off. Also if that that water had actually been taken, there would be a massive impact on environmental flows.

Prof Dale noted that, however, there's a strong point of real conversation between what the Troccoli report is proposing and how we might go forward on some of the key aspects needed as the foundational transition of our economy from a coal-based economy to what a future Queensland could look like. The big catchments are where the large populations centres are (Townsville, Rockhampton, Fitzroy, Bundaberg, Burnett and Mackay) and where the productive agricultural land is.

However, he pointed out, that you have to design this as a highly circularized economy where you integrate all of these things, particularly energy and water. I believe, with good science, with good engagement, with good ingenuity, we can get there, but it's going to take a really solid, integrated catchment effort going forward. With climate change, traditional interests and other key aspects, we're going to have to really resolve this integration of water quality governance mechanisms for older catchment-based approaches. On the water development planning side and what we were fundamentally calling for in the Bradfield review was that we have to shift your water development planning framework that integrates the model, which allows us to reach agreement about that model for development and then progressively actually implement that through good institutional arrangement.

Alam noted that one of the things we're talking about at the moment is to try to take some of these ideas forward through some decarbonation-hub forums such as we had earlier this year and use that opportunity to sort of start planning these things out. Importantly, how do we maximize power generation coming out of an upstream water source and maximize economic development. That means integrating water and energy together.

However, he pointed out that it's going to take some building from the foundations up. How do we do that in an extensive pastoral state such as Queensland where it's been driven more by the pastoral industry, rather than by the large corporate solar companies? How do we do it in aquaculture? And that has real chance to actually really turbocharge oxygenation arrangements. There is a need to start the bioenergy story progressing and move towards more baseline between bio energy, agrovoltaics, wind and others as well. Alam noted that the final part of the requirement is supporting traditional owners, almost exactly as Suzanne Thompson was saying in her presentation example. How we drive that?

**Maria James' Presentation on Economic Development in the Queensland North-West**

Maria James, CEO Mount Isa to Townsville Economic Development Zone (MITEZ).

We were very pleased to have Maria James as a key industry spokesperson present at this forum. Maria opened with an overview discussing the important economic reliance of the North West on mining and resources. Maria sent on to outline the major industries in the North West, including base metals, phosphate, and critical minerals such as vanadium. She also discussed the challenges faced by junior miners and the importance of keeping the workforce in the region. Maria further highlighted the potential value of renewable energy projects and the importance of the Copper String project for the region's development. Importantly, Maria emphasized the need for sustainable development and the opportunities for green economy manufacturing and sustainable agriculture in the region.

Maria noted that a lot of our sustainability and wealth in this overall northern region is inextricably linked to the north west of the region. 70% of imports and exports that come through the port of Townsville are directly linked to the north west minerals province of the region (eg Mt Isa).Only the sugar cane from the Burdekin region is out of that equation. Maria pointed out that there's lots of developments in overseas countries that we need to aspire to. Also, the catch cry of the modern age is critical minerals, meaning vanadium, specifically. Glencore, the huge multinational have just announced that they'll stop their copper exploration, but they're still massively producing zinc in the region. They have a smelter in Mount Isa as well as a refinery in Townsville. She pointed out that there is a huge economic multiplier involving many people that process.

Maria pointed out that SunMetals is another processor of the by-products of sulfuric acid that goes into Insight Pivot fertilizers who convert that into sulphur as part of that fertilizer process. Most of these massive exports travels by train out of the port of Townsville (1000 kilometres). She noted that SunMetals had, for many years, the biggest solar farm in the region. It's now been exceeded. Maria pointed out that 1200 people working in Mount Isa, who are fly in-fly out are losing their jobs, and we want to be able to keep them in the region. She noted that tt's important to focus on these types of issues as, if we lose those skills, we all know the lack of workforce and skills in the area, we'll lose them forever. We also need to keep those small towns going.

Maria noted that the region is obviously trying to work on measures to produce greener commodities. It is known that every part of our supply chain has been scrutinized overseas. If we can show that we can produce sustainably, more greenly, using renewables, it's a plus for us and the Northern region. She noted that we're able to compete in that global economy, and that, fundamentally, is the most important thing, to be able to be competitive, competitive on the world scale. She noted that the long supply chain makes it a little difficult for to remain competitive us in the North West. Maria further noted that it's hard to believe that we are not connected in the north west to the national electricity market. She noted that for towns from the coast to Julia Creek the power comes from the coast (Townsville).

Maria pointed out that by the time the power gets to Julia Creek, brown outs and inconsistent supply occur, and no further industry can develop without energy. Energy costs are the biggest input for industry ion the region. She argued we need to be able to develop energy more sustainably and we need to be able to do it better, and we need to use all the renewables. As an example, the wind blows best at night and the sun shines during the day in this region. She noted we have battery technology that is able to capture that energy. So that is the way forward. Maria noted the need to lobby for the Copper String program and all of the benefits that it will bring, and not just to mining. Other industries that will benefit include cotton. However, large companies will be put off from investing once they find out that there's no electricity substation at Julia creek or Richmond.

Maria pointed to the numerous and noteworthy renewable projects already existing on the North West of the region .However, Maria particularly drew attention to the sustainability of water supply and that ‘’it's all about the water, it always is’ . Maria pointed to the earlier presentation that highlighted the huge year-to-year rainfall variability in the region (especially the Southern Gulf). (Some of the highest amounts of variability in the world). Mining not only needs water as part of the process, but suffers when there is too much water, as the mine can be out of commission for a year or two because of the lack of preparation. She noted that housing is always a major problem for the region as companies cannot attract workers if you don't have housing. If we don't have housing we don't have the workers. Maria noted that the small councils provide childcare, provide recreational facilities. However, If there's a big influx of workers they're able to cope.

Maria emphasised that the issues are really centred around renewable energy, generation and storage. She emphasised that we have the resources and we're able to do it. In terms of the critical minerals processing, we don't want to ship that out. We want those agreements to take place in the North West for mining production. We need the value add process to stay here, so that we have the skills, attract the skills, and keep them in the north. She noted major aspects centre around the Green Economy, manufacturing, green zinc, green copper, the debate around hydrogen and how quickly we can get there, green fuel, and sustainable aviation fuels.

**Professor Alberto Troccoli's Keynote Presentation on Australia's Role in Global Climate Solutions - and especially the potential development of large-scale projects that may have the ability to greatly enhance the economic development of northern Queensland.**

Keynote speaker, Professor Alberto Troccoli (QAAS Fellow) started his presentation by acknowledging the work of Professor Roger Stone and the importance of Australia's unique position in the global climate discussion. As the catalyst for the forum with his recent major publication, Prof Troccoli presented a vision for Australia's and especially Northern Australia’s future, emphasizing the potential for the country to become a global leader in climate change mitigation. Following on from the earlier presentation of Prof Stone/Prof Phelps, Alberto discussed the state of the global climate and the importance of reducing global emissions (rather than Australia’s emissions *per se*) to mitigate the worst impacts of climate change. Alberto again highlighted the potential for Australia to become a *global* carbon sink and the importance of international collaboration in achieving this goal. Alberto emphasized the need for transformational change and the role of renewable energy and green economy solutions in achieving a sustainable future.

Alberto went to considerable lengths to explain the established science behind the human-enhanced greenhouse effect, referencing early research by Eunice Newton in 1850. He emphasized the thin layer of atmosphere we inhabit and discussed the increasing rate of change in CO2 emissions, noting that current rates are 100 times higher than natural processes. Alberto pointed out that temperatures are expected to rise over the next 50-80 years, regardless of the various emissions scenarios, due to current trajectories.

Prof Troccoli mentioned various ways humans modify the climate, including building cities and large infrastructure projects and highlighted the potential for controlled climate modifications to have beneficial effects on emissions and the environment.

Prof Troccoli made a point of discussing successful and controversial very large-scale projects such as the China Desert Green Wall and the Indian Great Man-Made River project

as effective global examples of large-scale sustainability projects. Alberto described the futuristic city of Neom in Saudi Arabia, aimed at technological advancement and sustainability. He further mentioned the Desert Tech project in China, which includes tunnels and wells up to 5000 kilometres long for water management. He discussed the European concept of connecting all of Europe with transmission lines for power generation, now being pushed further by Chinese organizations. He highlighted the Sun Cable project connecting Northwest Australia with Singapore, aiming to provide future renewable energy.

Alberto noted the rapid increase in global renewable energy, with 30% of electricity generated by renewables, primarily solar PV and wind power. He emphasized China's significant role in pushing renewable energy investments, despite major recent coal plant construction. Alberto noted the challenges of water availability in Australia, with an average annual rainfall of 450-500 millimetres, but subject to very large degrees of year-to-year variability in that ‘average’ rainfall. Alberto highlighted the potential for desalination plants to provide water where it is needed, noting the decreasing costs of desalination over recent years.

Prof Troccoli further outlined the key objectives for sustainable communities, including water provision, energy generation, and innovative agriculture techniques. He mentioned the importance of building resilient communities that harmonize with their environment and withstand climate extremes as well as discussing the potential for agrivoltaics to optimize land use by combining agriculture with solar panels. He emphasized the need for a comprehensive approach to planning, including economic considerations and population growth projections.

**Indigenous Knowledge and Land Management – Elder Suzanne Thompson.**

We were very pleased to have Elder Suzanne Thompson from Barcaldine as one of our keynote speakers. Suzanne is a First Nations’ Elder and a manager of a major grazing enterprise located (YACHTDAC) in the Desert Uplands region of inland central Queensland. Suzanne is a Fellow of QAAS.

Suzanne Thompson warmly acknowledged the traditional lands and ancestors, emphasizing the importance of indigenous knowledge in land management. She described the cultural significance of water and the sacredness of springs, highlighting the need for sustainable water management practices. Importantly, Suzanne discussed the importance of understanding the interconnectedness of systems, drawing on ancient knowledge to manage land and water resources.

Significantly, Suzanne highlighted the potential for indigenous-led carbon markets and nature-based solutions to contribute to carbon sequestration and environmental regeneration. Suzanne made the point that participation is the immersive experience: We don't just stand back and observe, but I actually get you to immerse into it. She introduced the ‘truth telling dance’. Susanne really touched a nerve in acknowledging all of our ancestors and the whispers that we carry forward. This summary can only partly cover the breadth of Suzanne’s address.

Suzanne asked the question about Aboriginal people being part of this continuum of major projects and this continual race of people that have continually practiced a culture, that's what we have to start to realize. Aboriginal law is very close to the interrelatedness of things purported by quantum physics for our song, lines interweave sky and earth worlds along the ancient, ancestral pathways of timeless, timelessness and ever present create ever present, creating a web of life and those lessons of our life.

She made the clear point that she is hearing some of the things that I listen to when in the drought forums, or whether it's in the agricultural sector, or whether it's in the bush foods industry, or whether it's in free trade, or whether it's in renewables, or whether it's in carbon sinks or you name it. We seek indigenous knowledge. She said that we're getting driven too much by industrialization, by colonialism, by big, grand ideas and not thinking then of those long lived structures and systems. She noted that we have a law story, and that law story then defined and understood the landscape and how we needed to rule and work with that landscape. This is truly our lane. So a snapshot of indigenous land management practices and comprehensive nature based solutions for carbon sequestration, abatement and regenerative Environmental Action should include the following, and I can speak proudly of this, because being a practitioner on country and realizing, am I joining in? Sure.

Suzanne noted that one of the things that she has learnt about pasture management for our country is she cannot afford to allow the buffel grass to get to gray, because that's when it emits all that old grass and all that old matter as much as we go, the biomass is really important. It does get to a point where it does emit. Hence why the traditional burns? Hence why we burnt country, and had an understanding of why we burnt country, why we did those practices that we did.

When it comes to land management practice, we actually have a generational plan in place. We're not looking for a quick fix for tomorrow, but we're looking for something and planning, because we have to realize that for us as aboriginal people, we've been taken out of the equation for 230 years of Land Management. So when we're actually starting to introduce our cool burns, we have to appreciate the fact that these paddocks and these places, haven't been burned for 20 or 30 years in the right way, so their fuel loads going to be very hot. In order for us to slow that down, we picked up sticks, but we made sure that we kept habitat spaces 12 months it took us to prepare this area before we burned. We took all the dead branches off the side, because the early explorers actually documented what Australia looked like. That pristine parkland, great farming, great, great country. But why? Because I guarantee if we look out there now, it doesn't look like that at all. It's because of this practice of patience, of looking after those places that are sacred, our garden, because we need these gardens, because they provide everything for us, water, shelter, food, the most important things. So for me, then, when I think about empowering indigenous people.

Suzanne drew attention to the carbon markets and the map that talks about and shows the current, existing indigenous led carbon markets in Australia. Aboriginal people manage over 51% of the late Australia's land mass when we think about, what does carbon sink mean? She noted the savannah fire forum and learning about Savannah fire methods, right way, wrong way fires. If it's the wrong way fire, then it's going to get rid of all that biomass that you need there. And of course, then we're going to respond accordingly and say, fire is wrong, right, fire is right. And that's what we've got to get right. She pointed out that when it comes to then engaging with Aboriginal and Torres Strait people, it's understanding how you bring us together as a societal group, as a regional group, because our values all would align to one life force. So our country is the beginning of the watershed.

In terms of a carbon sink for northern Australia Suzanne noted we have to stop land clearing, and that's reintroducing right way fire on those cultural practices, because that's what is missing out of these conversations - the true indigenous land managers of this ancient land understand it. We're showing that you can have the two. And we want to start to start to put renewables on our property, but we also then start to move into other areas where we think about them - the paddocks, reducing our paddocks. What does this look like? We need to know, the work that we do. She really points out the need for key animals that benefit that from that wouldn't have that so they're out of that system and space. She noted it's a holistic viewpoint that is need which then brings us into understanding the biodiversity and then, of course, the CO2 benefits.

She noted that we're really proud of finding sustainable ways of letting management and sustainable ways of thinking about place based solutions, so we're not allowing industrialization to take us too far.

**Reconciling Policy Frameworks and Local Initiatives (Nicole Peters and Dr Adam West, Queensland Department of Primary Industries).**

Adam West (as presenter, due to Nicole Peters’ illness) in a theme notably prominent in the forum, emphasized the need for a comprehensive approach to development, integrating traditional knowledge and local initiatives with national policy frameworks. He discussed the importance of third-party facilitation in bringing together diverse stakeholders to develop sustainable development models. Adam highlighted the potential for high-value agriculture and off-stream storage to support local communities and traditional owners and emphasized the need for a shared vision and shared options for development, considering the interests of all stakeholders.

Adam pointed out that Queensland DPI has three regions and the northern region he is responsible for is huge - over 660,000 square kilometres, about 38 to 40% of the state's area. This region is very diverse, with a whole range of values and competing interests across the Torres, Cape, Gulf, table lands, wet and dry tropics. This region also has a very, very small population linked to a major couple of centres. The region has ‘the lion's share’ of indigenous communities. He noted that some of those interests there were agricultural production, largely built around beef with two major supply chains in the north. Sugar cane is still heavily biased towards raw crystalline sugar production for export. Horticulture focus is particularly on banana production. He noted the region grows about 97% of the nation's bananas, but with some major challenges. There is also mixed cropping, commercial fishing and aquaculture. Adam noted that outside of our traditional production footprints, it is the region's competitive advantages that are really driving new opportunities for agricultural growth and diversification, particularly production systems, the quality of what we produce that is ‘clean and green’, and the region’s proximity to Southeast Asia and Asia Pacific markets. Additionally, we have a favourable biosecurity status, which sets us apart, and the scope for growth and diversification that we have.

He made the point that a huge issue is the level of climate variability. For agriculture and agriculture supply chains and communities, this is not only about the extremes. Major impacts occur from droughts, from Category Four and Category Five Tropical Cyclones, and also the longer-term ‘crank change’ in temperature and how that actually impacts not only the farming systems, but our supply chains and then the communities that around them.

Adam noted that if we start putting in large scale solar farms, they are taking land out of production, even though higher elevated panels are being placed over the orchards, etc, and similar. He note that, traditionally, it's a competitive land use market access that we are dealing with. The markets domestically are saturated. For international markets, it's quite difficult with import, export protocols, costs, logistics, and major disruptors like diseases or COVID. Additionally, we have an aging demographic in the agricultural sector. We have some incredibly savvy producers, but when you start ‘bringing in’ climate change, modifying their production system, introducing new revenue streams, such as environmental or ecosystem markets, decarbonization, major adjustment issues arise.

Adam noted, however, that there is a level of acumen and understanding that's required in the agricultural sector and that a lot of our core clientele are really needing to come on a journey and fully understand and be able to embrace adjustment that within their operations.

Adam drew attention to some major regional projects, especially indigenous First Nation practices. He especially drew attention to the town of Mossman which has major adjustment issues associated with the country’s oldest sugar mill but which has gone into liquidation. A whole community is built around sugar production is now coming to grips with a mill that's no longer operating. He noted that with Northwest of north Queensland a key issue is the function of Glencore and their decision around the phased cessation of copper and potentially smelting, impacting a community of 20,000 at Mount Isa, However, agriculture has been seen as one of the economic diversification pillars. He noted there’s a huge draw for us in terms of agriculture development and diversification. There has been a pulse grain and cotton industry development.

Adam pointed out that there are a number of ‘established players’ in Queensland and North Queensland, that are protecting that agriculture market voraciously, which is sort of providing some resistance to achieving what we need to achieve. He noted that while agriculture is the fourth highest in terms of emissions major carbon sinks exist in our in our forestry and land areas, in terms of long term emission trends, Adam noted that Queensland's agricultural sector is really well positioned to mitigate risks, build on its competitive advantage and transition to a low carbon economy.

Adam noted that there's also a high level and an enduring scepticism around climate variability and change together with the whole carbon markets, ecosystem services, and all these types of things within the agricultural sector. A major concern it that Northern Australia and northern Queensland could be the mechanism that appeases Queensland and the nation's social conscience, and we just don't want to see the region ‘locked up’. We want our families to grow up and prosper here and so it's about getting that balance spot on.

**Prof Alan Dale CRC for Northern Australia and JCU. ‘A History of ‘bold visions’ (Grand Schemes) for ‘the north’.**

Prof Dale noted that if we don't have the stable policy basis for building durable infrastructure assets we don't know where the infrastructure should be or what types of infrastructures we should invest in, we have a declining natural asset. So, we go backwards socially, culturally and environmentally. He noted that there are a bundle of reasons why getting this right is so important, especially our water planning system. Therefore, a lot of the research Alan does is actually around governance systems and how they work, and how they don't work. He pointed out that there are eight ‘names of governments’ that actually influence the way water is managed. He emphasised that if they’re not working well together, there's a huge problem. However, all of them are individually important.

He noted that the bit we're not doing well is bringing all of that into an integrated sort of mechanism. So, the most important aspect is water planning and a water plan. The plan has National Water Initiative agreements that underpin it and so it is quite a robust and mature process. A key issue is how the renewable energy zone aspects fit into that and which has most implications where there's regional flood and drought resilience issues. Also the importance of regional planning and regional NRM planning need to be emphasised. Added to this is where integrated catchment management tends to play out and very importantly, the issue of regional water development planning.

However, Alan pointed out that there needs to be a much stronger foundational traditional owner-based engagement and discussion and dialog about water rights, cultural values, and all these associated aspects that didn't really happen in the past. Also, climate issues needs to be better considered. Issues of water supply to water security need to be considered more. Importantly he noted that when you have a policy vacuum the issue becomes how do you actually use that water really effectively to get the best social, economic and vital outcomes.

Alan noted that when we have a policy vacuum, the ‘crazy ideas’ (‘Grand Schemes’) start to emerge. Alan noted the Bradfield Scheme and proposal that originally was conceived in the 1930s However, Alan emphasised that the Bradfield Scheme has a lot of brilliance and is bold and ambitious. However, he noted that despite all the vision it has not progressed. Briefly, the Bradfield Scheme was to take 3000 gigalitres of water out of the Upper Burdekin River which would have also included taking quite a bit of water out from the Tully River system. This water would have been stored at ‘Hells Gate’ Then that water would be taken over the main dividing range again, dropping into the top of the Thompson River and to the top of the Flinders and then letting it flow, taking very, very significant amounts of agriculture opportunity down there. However, on deep analysis, it was found there simply was not the 3000 gigalitres available for such water transfer and the scheme has not progressed.

**Biodiversity and Environmental Concerns** (Prof Helene Marsh, JCU and QAAS Fellow and Councillor).

Prof Marsh started by noting giving her talk in relation to the 3R concept ‘was a bit like asking someone to traverse a tightrope in a cycle while juggling, because there are so many issues to get right !.‘ Prof Marsh comprehensively discussed the global crises of climate change and biodiversity loss. She drew special attention to the impact of the 2019-2020 fires on Australia's threatened species and ecological communities. In particular she highlighted Australia's unique position as a mega-diverse country with low human population density as well as the particular importance of protecting biodiversity and the role of Indigenous Protected Areas.

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Prof Marsh also drew attention to her remarkable background which includes advising the Australian Government ‘wearing various hats’, chairing the threatened species Scientific Committee for the federal government, participating on the Australian delegation for the World Heritage Committee, and as of last month, the first time Prof Marsh has not been on an advisory committee for the Great Barrier Reef (since the 1970s). She emphasised she has mostly advised the Commonwealth Government, not the State Government.

In particular, Prof Marsh noted, that from a biodiversity perspective, that we have two interlinked global crises: we have the ‘climate change crisis’, and we have the ‘biodiversity crisis’, linked to the global loss of biodiversity. She drew particular attention to the 2019/ 2020 fires in Australia. Prof Marsh further drew attention to the number of threatened species and ecological communities added to the national list from the inception of the EPBC Act through to the end of last year. She noted that last year, we actually added more than twice as many entities to that list. The reason for that was unquestionably the drastic impacts on biodiversity of the of the mega fires in 2019 and early 2020. She suggested more extreme events linked with weather and climate, all over the world to continue to have drastic impacts on our biodiversity.

Prof Marsh noted that Australia is in a very special position here in that we are the only rich, ‘’mega diverse’ countries in the world with a low human population density. Prof Marsh considers this gives us a special responsibility but that it's not necessarily recognized in a statutory way, though. There are an estimated 70 mega diverse countries. These are countries with really high biodiversity. However, there are only three rich ones, Australia, United States and Malaysia. It's classified as a country with a very high human development index. This puts us in a very unusual global position. Prof Marsh noted that in regard to the 3R initiative from a biodiversity perspective, our country has made a commitment under the Montreal global biodiversity framework, to increase protected areas in this country by 30% by 2030 and that is certainly going to reduce the options, but the options are constrained by some other things as well. She noted that in the Northern Territory, indigenous people own 80% of the coast, including the intertidal area, so indigenous peoples rights are really, really important to consider here, as speaker Suzanne Thompson pointed out. So if we look at the criteria for selecting pilot 3R, there has to be availability of partially fertile land, reasonable distance to the coast, and communities with a vested interest in growth. We need to recognise the really important reasons for engaging local communities that others have stressed.

Prof Marsh stressed that in a human population density sense, our record of conserving biodiversity is terrible. All the threatened species indices are declining drastically, and they are still declining. The number one threat is habitat loss, fragmentation and degradation, especially land clearing and uncontrolled land clearing. The overlapping challenge of biodiversity threats is equally difficult. This is followed by wrong-way fires, not the right-way fires of indigenous people.

Prof Marsh noted that the plants threatened plants are actually more numerous than threatened animals, even though it's threatened animals that get all the attention. This means that proposed projects likely to have what's called a significant impact on any matter of national environmental significance. It's mainly the threat of species and ecological communities that actually trigger the Act require government approvals.

Helene notes that present approvals are based on individual projects. This means that you can have three projects doing the same thing next to each other, and they're actually approved independently, which means cumulative impacts are not properly considered at all. On average an individual project impacts about 15 species into ecological communities that have to be considered as part of the improvement process.

She noted a big ‘3R’ project (as outlined by Prof Troccoli) would impact on many more species than that. She drew attention to the Julia Creek Dumbart (a marsupial) (which occurs around Julia Creek) and that's its known distribution. The species are known to occur in the darker red soils which has to be taken into consideration with projects that come under Commonwealth approvals within range. It's rationale for being listed as vulnerable is it has a relatively restricted what's called area of occupancy. It can be inferred that it has continuing decline, and to make it really challenging for development approvals, is a boom or bust species with large fluctuations in numbers. The conservation actions are, firstly, you have to just undertake surveys to better define its distribution and population size, and is really hard to monitor and detect. Then there's the big issue of what's causing its major decline and its feral cats. Then there has to be a maintenance of the extension and density of the grass cover the mutual grasslands in habitat areas by preventing habitat degradation.

She noted that there's an expert committee working out methodologies for measuring nature repair, which is a challenging process. The so called ‘water trigger act’, under a matter of national environmental significance, was strengthened to include the consideration of significant impacts on water resources from fracking actually impacts on water resources.

Helen pointed out that ‘you can't just go out and plant trees’ and think that that's ecosystem restoration. There are national restoration standards now but they don't have statutory force. However, they are informing conservation planning documents that do have statutory force. She pointed to ecological restoration that need to be based on an appropriate indigenous reference system (not meaning indigenous people here). This means a possible undamaged system that should be full recovery, even if it takes a long time frame. Full recovery for some of these systems will take more than a century, and experts say there has not been a single hectare of proper restoration fulfilled restoration (what's called six star restoration) in this country, in a terrestrial environments. It's very hard.

She noted that social aspects are critical to successful ecological restoration, ie, you have to have the community, the rights holders, the stakeholders, on board. The Samuel review recommended that this project by project, species by species approach was ridiculous, and there needs to be landscape scope, landscape approaches to environmental planning. The idea behind that is essentially a zoning system, which has of course, been used in the marine environment, such as Great Barrier Reef, for 40 years, but is much less established in the terrestrial environment.

Prof Marsh showed that you would look at the whole region in deep consultation with the community and the indigenous rights holders. Then you would identify areas where development can safely occur in terms of matters of natural environmental significance. You'd identify some other areas where a standard approval process will take place, and then you identify no go areas, and I would hope that agricultural lands would be taken into account in this sort of planning approach, because Australia has a limited amount of arable land. She asked whether this approach could be used to expedite approvals for ‘three R’ type projects under either the nature of positive legislation, or if it never makes it through the Senate, which is distressingly likely.

She noted the Queensland Government has an MOU with the Commonwealth for three pilot Regional Planning pro projects, two of which are in in North Queensland. Queensland has actually advanced further than any other state jurisdiction in Australia. She further asked whether it could be possible to include provision for a ‘3R’ or ‘3R’ Pilot Project with appropriate community support, because this sort of planning can only occur with the community consultation.

Helene noted press reports about another ‘3R’ project in Western Australia. It's got 300,000 wind turbines, 60 million solar modules, and a prospect of producing green hydrogen. It's close to a proposed port on the Great Australian Bight. It does include a development envelope which is twice the size of Alberto Troccolli’s‘3R’ suggestions. A big difference, though, is that the new project isn't for 100,000 people but for 8000 and I actually think that's more realistic.

**Agricultural Goals and Challenges – Prof David Phelps JCU, TNQ Drought Hub**

Prof Phelps made a point of highlighting the importance of primary industries in Queensland's economy and their social fabric. He stressed current agricultural productivity and the need for a doubling of agricultural product value. In this, the key platforms for addressing the goal are: research, development, extension, innovation, and new products. Mention was made of a major innovation fund and risk mitigation strategies. Prof Phelps further provided an overview of the Northern region, including its size and diversity with notable discussion on major supply chains in the north: beef, sugar cane, horticulture, commercial fishing, and aquaculture. He put an emphasis on the region's competitive advantages and the need for new opportunities for agricultural growth and diversification. However, Prof Phelps noted the challenges posed by climate variability and the need for resilient farming systems.

**Prof David Phelps, FDF-TNQ JCU discussing agricultural productivity during droughts, the need for economic diversity. and the future of small communities.**

Prof Phelps focused on why we need some bold visions, why we need agencies such as ‘Copperstring’, why we need agriculture, and why we need to diversify our economic base. The Productivity Commission in 2017 conducted a review of adaptive capacity and painted a pretty gloomy picture, as most of Northern Australia is the least adaptive region in the country. He noted there is a little shining light above average in the in the central west area, where they'll actually produce some examples. However, even though it's in a in an above average adaptive zone, this region is still grappling with the impacts of the most recent drought. He argued that one of the points of this is that we need economic diversification. We just cannot have, for example the town of Mossman coupled to a single industry (sugar), and relying upon a single piece of infrastructure. However, agricultural remains a core driver of the economy in north Queensland. The region has $7.3 billion per annum of gross value of product. About 21,000 people are employed in in agriculture and livestock, followed by cropping and then horticulture, both in terms of production and their footprint. Livestock actually covers the most area and produces the most value. He noted that livestock production, by and large, depends on rainfall, unsurprising, really, because it's rainfall that grows grass, and that's grass a catalyst. Also, most of cropping systems are dryland systems (as opposed to irrigated), although even irrigation, certainly across this region, relies on rainfall to fill the dams to irrigate. He noted that ‘if the rainfall tap turns off’, the economy slows down. When you look across Queensland, there are various hot spots of extended drought. David showed regions where drought declarations occurred between 1964 and 2022 and that these areas were unsurprising. Also, he showed that the areas that have the most reliable rainfall have the least drought. If you have good, reliable rainfall, then you can also intensify your agricultural production. However, he noted that ,perversely, ‘the wheels can fall off’ in a really big way when ‘the tap does turn off’. He pointed out that some of the areas that have most reliable rainfall could actually be at most risk of having the least resilience and least able to adapt and pivot quickly when future droughts do hit. David used western Queensland and central western Queensland as an example of what can really happen when that ‘when the tap does turn off’ (in drought). He pointed out that in 2015, the Ag-Force agency conducted a survey at that stage that showed that particular drought was only three years in existence and not covering over half of land. Land holders had less than half of their livestock numbers. So that also essentially means less than half your income, which also spills over into community impacts. A lot of our small, rural and regional towns are dependent on agriculture, so places like in the central west such as Winton, Longreach, and towns out to Birdsville, relied very much on agriculture, but diversified into tourism over the last 20 or 30 years. A lot of towns diversified into tourism. However, he noted that despite having tourism by 2016, 40% of business owners stopped paying themselves an income. Instead they were paying their staff to keep their neighbour’s kids employed in the town and in their out of school jobs to keep the community going. However, one in four people left because there weren't any jobs left. In the two years ago that the drought declaration was lifted, populations have bounced back. He noted that the COVID outbreak was actually a boom period for Outback tourism. This is perceived to be the case as we have wide open spaces with less risk of disease transmission. There, he noted, while places like Cairns were really suffering because of the loss of international tourism, places like Winton and Longreach were actually booming. However, he noted, that the breaking of the drought really helped kick-start populations returning to those inland towns. The important point is that you can end up with a socio economic drought as well. He point out that this happened in a progression where firstly its stops raining, grass stops growing, cattle have to be sold because there's no feed, then there is no money for land holders to spend in town, the town businesses start to suffer, the jobs dry, population declines, and it takes a long time to rebuild.

Prof Phelps drew attention to towns such as Aramaic, which was once the administrative centre of western Queensland. Today, it has probably only a quarter of the population that it had 30 years ago. So we do have this consolidation and shrinking of some towns, with consolidation into larger centres. He noted that economic diversification and new ways of making money to keep jobs in town is absolutely crucial for the survival, the vibrancy, and the future of these small rural communities. Prof Phelps noted that what is really needs is to bring new economic opportunities and proactive communities in rural areas. He points out that what is most important is that it needs genuine engagement with those proactive communities. We need to have both government and private investment and we need to have the support coming in from the top down to support that bottom up.

David suggested that it's the ‘bottom up’ approach that actually matters. We can't just come in, for instance, to somewhere like Julia Creek and start ‘waving the flag’ to say will save you in a way that does not meet their own community aspirations, needs and desires. He emphasised that we have to get that consultation bit right. The consultation part is to get right is a whole of community approach. Everyone has to be engaged in discussions. He noted that on top of this we need grand ideas, we need economic development, we need agriculture, we need mining, etc, because we need these communities, and these communities need us

Please note that Dr Christa Pudmenzky was not able to present due to illness.

**Future Directions and Collaborative Efforts - Summary of facilitation and discussion sessions chaired by Emeritus Professor Roly Sussex (University of Queensland and QAAS Councillor)**

Prof Roly Sussex chaired robust discussion sessions, including a session on future directions and collaborations.

In these discussions Prof Alan Dale shared a story of local initiatives in the remote town of Georgetown, highlighting the potential for community-driven solutions to infrastructure challenges. He discussed the importance of horizontal perspectives and the ability to see beyond immediate problems to develop comprehensive solutions. Alan emphasized the need for collaboration and shared responsibility in addressing complex issues like climate change and water management. He particularly highlighted the potential for indigenous knowledge and local expertise to contribute to sustainable development and environmental management.

Prof David Phelps emphasized the importance of local knowledge and initiatives in addressing climate change and water management challenges. He encouraged participants to continue the conversation and take responsibility for pushing forward the discussed ideas and initiatives. David highlighted the potential for collaborative efforts and shared vision to develop sustainable solutions for the future.

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Glenys Schuntner raised the importance of local leadership and the challenges of succession planning. She discussed the role of local government and the need for training and support for community leaders. She stressed the importance of volunteers and the challenges of maintaining community clubs and organizations. She also further emphasised the need for a whole-of-community approach to development and resilience.

Suzanne Thompson's reflected on Indigenous Leadership and Succession Planning and shared her experience of meeting Butch Lenton, reflecting on the challenges faced by Indigenous people, particularly in regional areas. Suzanne discussed the impact of the recent referendum and the state government's actions on the truth and treating process, highlighting the generational shift in leadership and knowledge. Suzanne expressed her frustration with the "poor poppy syndrome" and the lack of opportunities for Indigenous people to contribute meaningfully to their regions. She revealed her decision to run as an independent candidate for the federal seat of Maranoa, aiming to shift the narrative and address the disconnect between regional needs and government actions.

Other audience members and especially Prof Helene Marsh discussed the potential for North Queensland to appeal to Australia's social conscience by capitalizing on its natural values and biodiversity. Helene suggested incentivizing existing economic interests to disinvest or adopt sustainable practices, creating a conservation offset for development. She emphasized the importance of balancing commercial realities with the long-term health of the unique environment, drawing from their 30 years of experience in the region. Helene was asked to elaborate on how regional planning could play out in specific areas like Collinsville and Julia Creek.

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**Perspective on Regional Planning and Indigenous Engagement**

Suzanne made the point that formal regional planning processes should engage with rights holders, Indigenous people, and stakeholders comprehensively. An MOU between federal and state governments around Collinsville and the need for a comprehensive regional plan for renewable energy. It was suggested it all should start with an established planning process rather than a blank slate to maximize engagement opportunities. It was highlighted to note the importance of integrating regional EPBC-oriented planning with state land use planning to avoid future conflicts. The Importance of Respectful Dialogue and Integrated Planning was particularly emphasised together with the need for respectful dialogue to avoid political trading and to achieve collective impact approaches. They stressed the importance of integrating regional EPBC planning with state land use planning to ensure a cohesive vision for the region. Speakers called for a joined-up approach that considers both infrastructure and biodiversity conservation, warning against separating these elements. Speakers introduced the idea used by the Brisbane dialogs, where participants engage in non-debate discussions to foster understanding and collaboration.

**Prof Phelps called presenters to share insights and next steps and** invited presenters to share their thoughts on important issues, real problems, and ways to move the initiative forward. Prof Marsh applauded the forum organizers and highlighted the importance of master planning and addressing cumulative impacts. Speakers suggested a pre-lodgement framework for key stakeholders to engage in integrated planning before project development. Prof Marsh emphasized the need for integrated and early access to development areas to address core issues effectively.

**Suzanne Thompson shared her vision for community-driven governance** where sheimagined a world where citizens decide policies and invite politicians to align with their vision (Prof Sussex and Prof Stone noted this could be similar to the successful Swiss governmental approach). Suzanne suggested that collective creative thinking could lead to innovative solutions and better governance. Suzanne highlighted the potential for place-based approaches and the importance of involving all stakeholders in decision-making. She called for a shift in power dynamics to empower communities in shaping their future.

**Maria and speakers discussed the challenges of competing priorities among regional mayors and the need for coexistence and equity distribution**. They suggested planning and programming projects that benefit all Shires, ensuring fairness and inclusion. They emphasized the importance of follow-up and action after forums to ensure practical outcomes. They called for a collaborative approach to achieve economic progress while maintaining fairness and equity.

Speakers supported bottom-up planning for just transitions but acknowledged the need for political will and top-down engagement. The speakers shared a joke about the lack of votes in the Gulf of Carpentaria and the challenges of cross-jurisdictional planning. They highlighted the importance of balancing community needs with investment to avoid shutting down projects without considering local impacts. The speakers called for a mix of bottom-up and top-down approaches to ensure both social license and investment for successful initiatives.

Speakers acknowledged the importance of community consultation and shares examples from Switzerland and Ireland. Speakers suggested setting milestones and actions to consult various groups and align their visions for Australia's future. Speakers proposed using graphic design facilitators to create imaginative visualizations of community-driven initiatives. Finally, the speakers emphasized the need for practical planning and project-based approaches to achieve community-driven outcomes.

**Reference**:

Troccoli, A., Stone, R. C., Bardi, U., Breyer, C., and Henggeler, C. (2024) ‘Rebalancing Regional and Remote Australia: a vision for a global carbon sink while creating sustainable communities’. *Environmental Research Letters, Volume 19, Number 11.* 111003**DOI** 10.1088/1748-9326/ad78ea

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