

Growing the agricultural extension workforce in the Great Barrier Reef catchment: Lessons from the Agricultural Extension Work Placement Program

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Abstract. Effective regional capacity building through encouraging and supporting early career extension officers is essential to achieving Reef water quality outcomes. The AEWPP has built capacity for extension delivery organisations across the Reef catchment and Queensland. This program has demonstrated that this type of model can help address the identified shortage of experienced extension personnel with the appropriate background and experience to support landholders. Not only does the program provide benefits to the individual trainee but it also benefits the mentors and host organisations as well as investors, and of course the Reef.

Keywords: Agricultural extension, internship, Great Barrier Reef, natural resource management

Introduction

The Queensland Government, working with the Queensland Farmers' Federation (QFF), set up the innovative Agricultural Extension Work Placement Program (AEWPP). This has been delivered in the Great Barrier Reef (Reef) catchment and has secured employment for university graduates and early career extension officers as capable extension and land management officers.

To date, the AEWPP has enabled 31 trainees, mentored by industry experts across 19 host organisations, to develop work-ready skills and networks and become part of the fabric of local communities from the Burnett Mary to Cape York. A tailored training program for each trainee provides core skills, enabling them to engage confidently with landholders, learn technical farming information and apply digital technology to support farming improvements. They gain tangible, hands-on experience, a good understanding of the agricultural and land management sector and sustainable farm management practices. Most of these future leaders have gained employment with either their host or other organisations, and some are now mentoring new recruits.

Background

The Great Barrier Reef Water Science Taskforce (the Taskforce) was established in May 2015 to provide advice to the Queensland Government on how to achieve ambitious water quality targets and priorities for investing \$90 million over five years. Agriculture is understood to be the largest contributor to pollutant loads to the Reef and agricultural management practice change is understood as one of the key mechanisms to achieve pollutant load reduction from farms (Waterhouse et al. 2017). Consequently, the Taskforce concluded that agricultural extension, particularly when aligned with other mechanisms such as incentives, is fundamental for improved long term land management. They identified the need for building capacity for extension delivery across the Reef catchments in recognition of the fact that as investment in Reef catchments has accelerated, there has been an identified shortage of experienced extension personnel with the background and experience available to support some of the activities being planned and undertaken with landholders.

The overarching Taskforce Final Report 'Clean Water for a healthy reef' (Queensland Government 2016) recommendation 3 was to invest in more effective, targeted and coordinated extension to support large scale land management practice change. Specifically (under recommendation 3.1) this was to restore the long-term government commitment to both resource and rebuild capacity in extension services across the Reef. The response to this recommendation was informed by a detailed review of practice change, education and extension across Reef catchments (Coutts et al. 2017).

The Office of the Great Barrier Reef and World Heritage (OGBRWH) in the Department of Environment, Science and Innovation (DESI) was tasked with scoping and developing a project to deliver a program to engage new professionals. OGBRWH identified the Rural Jobs and Skills Alliance, based in the QFF, as the most appropriate body to progress the project as the vehicle for recruitment and skills development across all agricultural industries in Queensland.

The pilot project

The project that emerged was a pilot trainee program for graduates and early career extension officers to be based in regional organisations across the grazing, sugar cane, horticulture, banana

and natural resource sectors across the Reef regions. The project was designed to support host organisations in transferring knowledge of experienced extension staff to trainees. In addition, this would also help early career extension officers to improve their employability and work readiness to undertake jobs that were becoming increasingly available with new Reef water quality projects being implemented.

The one-year pilot project funded under the Queensland Government's Reef Water Quality Program (QRWQP), which ran from 2017 to 2018, included three components: an extension training component, a work placement component, and an evaluation component. The pilot project was successful in achieving its objectives, with the work placement component being highly successful in placing six trainees (largely from an environmental science background) in six organisations that provided training and mentoring to the trainees. Five of the six went on to accept ongoing employment in their host organisations. The pilot evaluation found that overall, host organisations considered the work placement component good value for money and time spent at the end of the project.

An evaluation survey was conducted as part of the pilot evaluation (Empatheia 2018), with the host organisations, mentors, and trainees. Respondents to the survey were largely in agreement that the combination of activities and access to specialised targeted capacity building products, was successful in embedding trainees into practicing extension organisations, together with a Reef extension network. When asked about the extent to which their capabilities had been strengthened, all trainee participants agreed or strongly agreed to a positive change and improved confidence.

This is particularly impressive considering that most of the trainees had no prior experience in the agricultural sector or in extension. As one trainee observed at the end of the placement:

Not having a background in grazing or having completed any agriculture-focused subjects at university proved a significant challenge for the initial six months of this program, consequently hindering my ability to be able to engage with the grazing community and provide extension independently of senior staff. Since that time, however, with continued training and in-house support from colleagues (i.e., on grazing systems, grazing land management, erosion remediation methods, etc.) I have been able to work more independently with regards these topics.

Building on the pilot

Since 2018, QFF has continued to work with industry, AEWPP graduates and the Queensland Government to deliver the AEWPP. Subsequent iterations of the program (2018-2020 & 2021-2022) have built on the initial success of the pilot due to a strong focus on evaluation and continuous improvement. This has ensured continued value for its participants, host organisations and funders. The success of the pilot program attracted Australian Government investment through the Great Barrier Reef Foundation (GBRF) Reef Trust Partnership to support an additional eight trainees in the 2018 -2020 program. A further four participants were funded directly through host organisations so that they could be included in the training program.

Key changes were made to the model based on recommendations from the review of the pilot (Empatheia 2018). The pilot had accommodated training and capacity building for existing staff in host organisations. With the advent of a separate Department of Agriculture and Fisheries (DAF) led project identifying and meeting the training needs of existing extension staff across the Reef regions, the subsequent phases focused solely on the trainee work placement program.

The recruitment process for trainees was also modified to enable the host organisations to be involved in the recruitment and development of specific training programs based on their needs and relevant regional characteristics. The trainee selection process was also enhanced to achieve a best-match result between trainee qualifications, interests, and work placement characteristics. Greater focus was put on ensuring the best mentor/mentee fit, and an additional Australasia Pacific Extension Network (APEN) mentor was made available for each trainee, depending on their needs. The training program was also refined based on feedback from trainees.

The key elements of the program model that have become embedded since the pilot are as follows.

Steering Committee

The Steering Committee comprises QFF, DESI and DAF staff, as well as an external consultant, an independent extension advisor, and a past AEWPP graduate.

Selecting host organisations

The Steering Committee agrees on the selection criteria and ultimately selects the host organisations. QFF run an open tender process calling for expressions of interest from potential

host organisations. QFF uses its extensive networks to advertise the Expression of Interest process to ensure that all potential host organisations that meet the program requirements can apply. Hosts must demonstrate that they have the capacity to host a trainee, have suitable mentors and agree to a cost sharing arrangement, ensuring a reasonable wage and all on-costs are covered.

Trainee selection

Potential participants (trainees) in the program are identified and selected through an open and transparent process based on a set of specific criteria agreed upon by host organisations and the Steering Committee. A position description is done for each trainee in partnership with each host organisation. QFF then recruits nationally to match the host's requirements. The prospective trainee chooses which business and region they wish to work in. This national recruitment process is one of the drawcards for small to medium size organisations to participate in the program (RMCG 2022).

Work program

Trainees are assigned to projects where they can work directly with landholders to implement best practice land management in the agricultural or natural resource management (NRM) sector. The trainees are given responsibilities within those projects that provide a range of learning and skills development opportunities.

Training

A training framework has been put in place to support skills development and to provide a range of opportunities. Alongside the work plan, there is a training plan that ensures the mix of informal and formal training can be achieved. For the trainee this includes:

- Resources developed by University of Melbourne to support Micro-credentialling and ensure that trainees have extension theory aligned to practice developed on the job/in the field. This has proven the most challenging component for adoption and review over the life of the program. The challenge being to align training with work priorities, trainees' preference to focus on on-the-job training and specific skills development and host organisations preferences.
- Specific skills and training courses and programs which are refreshed over time.

For the mentors the training is focused on developing effective-mentoring skills.

The training frameworks are refreshed at the beginning of each cohort, with the 2018 program providing additional focus on digital and GIS skills, 2019 being aligned to the Extension Model of Practice (EMOP) (Williams et al. 2021), and the 2024-2026 training framework updated against the Skills Impact review (2023). This mapped training opportunities for extension officers that support improvement of land management in light of requirements for Reef water quality practice change, industry standards for best management practice as well as the Queensland Reef Protection regulation minimum practice standards.

Networking and events

While the COVID-19 pandemic impacted on the availability of some key events that were available to other cohorts, the AEWPP project manager worked hard to provide access to events in-person and virtually. This ensured ongoing access to professional networks and opportunities e.g. APEN conference, Reef Extension Forum, bus tour and other cross regional networking trips, and graduation events.

Program evaluation

There has been comprehensive monitoring and evaluation of the program since its inception. Each phase of the program has been evaluated by an external consultant to ensure that the delivery model is continuing to meet host, trainee and investor needs.

The success of the administration model

Evaluation by Coutts J&R (2020) rated the project management, adaptive management, and learning by QFF as excellent; with host organisations, mentors, graduates and observing stakeholders all rating the management as excellent. Mentors noted that it was enjoyable to be involved because most of the administration and groundwork was completed by QFF. Reporting was acknowledged as being easy and streamlined. One host noted that the reporting aligned with what was required by industry, so the trainees (and organisations) got the extra benefit of learning how to fill in industry reports through the program.

Value for mentors and host organisations

The AEWPP supports improvements to the mentoring capability of senior extension staff in host organisations, augments the mentors and the host organisations professional networks, and supports host organisations with the knowledge transfer from experienced extension staff to trainees.

Host organisations and mentors reported that their services and professional reputations have improved, and they've valued the upskilling of their industry (RMCG 2022). They reported that the program has been highly effective in improving trainee understanding of how farm management practices in Reef catchment areas impact on water quality and the environmental conservation of the Reef. AEWPP graduates interviewed by RMCG, advised they had little understanding of these issues prior to participating in the AEWPP, and this was confirmed by the mentors.

One host noted the high calibre of the trainees, and that the program itself led to the fast-tracking of their trainee's development when compared to other recruits not participating in the AEWPP. They felt that recruits who weren't part of the AEWPP generally took longer to develop to a standard where they could manage projects and responsibilities of their own. One mentor reported that an effective extension officer normally needed seven years of experience, but the program fast-tracked this by three years.

It was also noted that the program contributed to the improvement of host organisations' client support and extension services. Coutts J&R (2020) identified that the program was successful in attracting and delivering committed, knowledgeable and 'work ready' young extension personnel into the Reef regions that would, in many cases, not have foreseen a career in the Reef Extension System. Additionally, it expanded the discipline base of extension personnel beyond the traditional agricultural science fields, and by attracting graduates with environmental science degrees, added to the diversity and effectiveness of the Reef Extension System. A broader farming community perspective was offered by a stakeholder who suggested that the development of young extension officers 'gives them a bit of confidence that there is going to be support [because] even the government is recognising the importance of supporting farmers' (Coutts J&R 2020, p.35).

All trainees, mentors and hosts interviewed reported that the AEWPP graduates often remain with the organisations providing consistent staffing and relationships with their clients. About a third of the host organisations to date have hosted two or more trainees.

Mentors appreciated the value of networking across different organisations and learning from the slightly different experiences. They also valued the formal mentor training and their own personal development through the program.

Value for trainees

The evaluation of the most recent phase conducted by RMCG (2022) highlighted the specific skills gained by trainees participating in the program as follows:

- Development of people and project management skills such as understanding a diversity of perspectives, communication, mediation and problem-solving.
- Developing a deeper understanding of the interface between farm management and potential impacts on water quality and reef outcomes.
- Agronomic management and primary production skills including GIS mapping, use of drones, and how farms can improve their productivity.

Trainees interviewed were from large cities such as Brisbane, Perth and Sydney, and the support provided by the program to assist them in settling into the regions was important. Networking and staying in touch with each other were also highly rated aspects of the program. The careers and homes in the Reef regions that most of the AEWPP graduates have established is best illustrated by highlighting some of individuals' stories.

Zoe Egger, Farmacist

One of the original 6 trainees from the pilot project, Zoe Egger, was mentored by Farmacist, an independent agronomy and precision agriculture service provider that services the Mackay region and other Reef regions. Farmacist specialises in agronomic advice, geospatial data collection and management, development and extension activities supporting farming practice changes.

During her placement, she was exposed to trials, crop types and industry bodies. She had the opportunity to attend capacity building workshops, covering topics from effective extension techniques to precision agriculture. At the end of her placement, she accepted a job with Farmacist in Mackay, where she remains as a valued member of the team and the community. Zoe's

currently works as a Spatial Agronomist, leading the Point of Difference project using precision agriculture and nutrient planning to help growers maximise their farm potential.

Carleigh Drew, NQ Dry Tropics

Carleigh Drew was hosted by NQ Dry Tropics (NQDT), a natural resources management group that operates within the Burdekin Dry Tropics region. Through its Sustainable Agriculture Program, NQDT works to empower graziers and sugarcane farmers in maximising productivity while decreasing negative environmental impacts. Many projects are aimed at safeguarding the Reef from excess nutrient and sediment exports. At the time of her placement, Carleigh had recently graduated from the University of Queensland with a Masters in Environmental Management. She came into the AEWPP with managerial and communications experience in a project leads company but wanted to learn more about the potential of regenerative agriculture. After completing her placement with the AEWPP, Carleigh accepted a job with NQDT and is now a valuable member of the team, developing positive partnerships with landholders and other NRM groups, and participating in delivering real, practical outcomes that benefit both farmers and the environment. She is currently the Project Manager for the Grazing Resilience and Sustainable Solutions project for the Burdekin region.

Molly Blake, Australian Banana Growers Council

Molly Blake was appointed as a trainee with the Australian Banana Growers Council (ABGC). ABGC is the peak industry body for Australia's commercial banana growers, advancing the interests of growers and ensuring a strong industry future through effective leadership and representation. Throughout her studies in Environmental Management at the University of Queensland, Molly developed a passion for contributing to the development of sustainable and resilient communities within the nexus of the global food system. With over 90% of banana farms in Australia located in catchments adjacent to the Great Barrier Reef Marine Park, the banana industry has an important role to play in contributing to improved water quality flowing into the Reef. Through the AEWPP and under the guidance of her host organisation and mentors, Molly developed vital skills in supporting banana growers to contribute to a more sustainable industry for future generations. Since accepting a job with ABGC in their South Johnstone branch, located around 1.5 hrs south of Cairns, Molly has been assisting banana growers throughout the North Queensland region to achieve best management practices, largely associated with improving sediment, nutrient and pest management.

Value to investors - the Reef and regional capability

The AEWPP has successfully delivered against multiple objectives of the QRWQP. The QRWQP aims to accelerate progress towards the Reef 2050 Water Quality Improvement Plan targets by:

- Improving land management through voluntary and regulatory approaches.
- Building regional capacity to deliver better water quality outcomes.
- Delivering, supporting and translating best available science and knowledge.

The strategic themes of the QRWQP recognise the need for investment in enabling projects to build the foundation for successful on ground actions, which more directly contribute to water quality outcomes. Without good science and innovation, data and effective regional capacity, these outcomes could not be achieved.

These objectives deliver on the 2020 Queensland Government (Queensland Government 2020) priorities of:

- protecting the environment
- supporting jobs
- backing small business
- growing our regions
- investing in skills.

The focus on small to medium enterprises in regional communities (external to government) has and continues to be an attractor for Queensland Government investment. RMCG (2022) identified several factors that make it difficult for the sector to attract and retain people, including remote locations, access to housing and services, remuneration, poor image regarding working conditions, unclear career pathways or opportunities, and a persistent culture of not valuing training and skill development in some parts of the sector.

The AEWPP delivery model responds directly to these challenges by engaging local businesses and agricultural support industries to deliver workshops, provide specialist advice and training, utilise local training venues, local suppliers and businesses. It locates trainees within regional communities, with encouragement and support to engage in the community.

Under *The Queensland Youth Strategy's - Building Block 4. Educating into employment*, the Queensland Government is committed to ensuring young people have the knowledge and skills to successfully navigate economic and social pathways to employment in a globalised job market (Queensland Government 2017). The AEWPP was recognised by the 2022 Queensland DESI Award for Excellence under the category 'Empower Queensland's youth', recognising its contribution to improved social, economic, and civic participation of young people in regional Queensland.

The future of the program

Stakeholder consultation undertaken as part of the latest AEWPP review (RMCG 2022) universally confirmed there remains an ongoing need for agricultural extension professionals across all agriculture sectors. The issues that the 2017 pilot and subsequent phases of the program aimed to address continue, with:

- A need to provide succession plans for experienced extension officers leaving the industry.
- The investment in Reef water quality programs in the agricultural sector continues to grow. All investors (GBRF, Australian Government and Queensland Government) note the key challenge in activating on-ground contracts is an insufficient workforce available to provide experienced extension and agronomic expertise.
- The need to build overall regional capability at scale to ensure sustained legacy of investment, enhance regional communities, and increase the viability of small to medium enterprises in the agricultural and NRM sector.

The agriculture sector is also experiencing strong competition for skilled staff, with this challenge being further exacerbated by the COVID-19 pandemic. RMCG (2022) identified that there is an opportunity to summarise and communicate the approach taken with the AEWPP and the lessons learned, to funders and other agencies interested in implementing a 'gold standard' trainee internship program. This has particular importance now in the current context of a post-COVID-19 world with the need for government entities and private sector businesses to attract innovative graduates and build the resilience, adaptability, diversity of their programs, industries and organisations.

Further, RMCG (2022) identified opportunities for growth of the program, for example, beyond the Reef catchment geographical area, tailoring program components for other outcomes, diversifying funding sources and engagement in government and industries sectors. QFF is considering its response to the report. While further opportunities to promote and expand this 'gold standard' program for growth in delivery of intern programs for the agricultural sector are being explored, two key programs have been established in 2023 as a foundation for the future.

AEWPP In the Great Barrier Reef catchment (2022-2026)

The redesign the QRWQP for the 2022-2026 period included the AEWPP as an integral part of the QRWQP program design to support long term regional capability. This resulted in the Queensland Government funding a new phase of the AEWPP. The program will continue to place early-career extension officers and graduates for 15-month placements in suitable host organisations, with two trainee cohorts, one in 2024 and one in 2025. There remains strong support from past and other potential host organisations to participate in the program. Co-investment from other funders to expand the program is also being explored.

There will be opportunities to fill gaps in specialisation required to meet requirements of many Reef projects. The training program will include new content under the training framework to support enhanced extension including environmental science, water quality monitoring and data extension to growers, First Nations cultural awareness and support, and digital technologies in line with the EMOP.

Queensland's agricultural technologies sector (2024)

In 2023, QFF also launched a new program to connect entrants in the fields of agriculture and/or information technology with work placements in AgTech and agronomy related agribusinesses throughout Queensland. The Agricultural Digital Support Work Placement Program is funded through the Queensland Government under the \$15 million Vocational, Education and Training (VET) Emerging Industries initiative and forms part of Queensland's \$200 million Future Skills Fund. The VET Emerging Industries initiative will develop flexible industry strategies for the state's agribusiness, energy, manufacturing, and screen and digital sectors.

The Agricultural Digital Support Work Placement Program will place 20 AgTech Officers with host agribusinesses to support the digitisation of the agricultural sector and the uptake of new technologies throughout the regions. This is based on the AEWPP model with 12-month

placements to provide AgTech Officers with mentorship, accredited training, access to specialist knowledge and networking opportunities to commence in January 2024.

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