



Office Use Only

Project Code	
Project Type	

FINAL REPORT 2024

Final reports must be submitted using the online application form at www.sagit.com.au with this Word document attached **within two months** after the completion of the Project Term.

PROJECT CODE	AGX319
PROJECT TITLE	Promoting secondary and tertiary student engagement in crop production.31/03/2019

PROJECT DURATION <i>These dates must be the same as those stated in the Funding Agreement.</i>	
Project start date	31/03/2019
Project end date	31/03/2022

PRINCIPAL INVESTIGATOR <i>(responsible for the overall project and reporting)</i>		
Title:	First Name:	Surname:
Mr	Richard	Porter
Organisation:	AgXtra	
Mailing address:		
Telephone:		
Mobile:		

ADMINISTRATION CONTACT DETAILS <i>(responsible for all administrative matters relating to project)</i>		
Title:	First Name:	Surname:
Mrs	Annie	Porter
Organisation:	AgXtra	
Mailing address:		
Telephone:		Email:
Mobile:		

PROJECT REPORT: *Please provide a clear description for each of the following:*

Executive Summary (200 words maximum)

A few paragraphs covering what was discovered, written in a manner that is easily understood and relevant to SA growers. A number of key dot points should be included which can be used in SAGIT communications.

- This project should be deemed highly effective if measured by participation number of students, and feedback from teaching staff.
- School participation and engagement level of students in identified schools is very much dependent upon the pro-activity of the Agriculture teacher. The competition continued to be relevant part of the SACE Ag curriculum for students studying agriculture in year 11.
- Schools more isolated from the trial site tended to have less interaction – challenge of distance and relevance, inability to visit the site. To best serve a wider array of schools, need to have additional sites that remain regionally relevant and accessible for each school.
- Good communication is key for successful delivery of this project. Evolving communication channels and methods that are most effective for each cohort and school is an evolving skillset in itself. AgXtra must provide training to its leads on the project each year to ensure continuity of delivery at a high standard.
- There are unexplored opportunities to explore engagement with grain marketers, flour mills, food processors, brewers etc. to demonstrate industry and showcase career opportunities beyond the production aspects of the grains industry.

Project objectives

A concise statement of the aims of the project in outcome terms should be provided.

The proposed project aims to provide an annual opportunity for students involved in agricultural studies at high school and university to engage in a hands-on crop production program in the form of a wheat crop growing competition (herein referred to as the “Crop Competition”). The objectives of the Crop Competition are to:

1. Promote agriculture as a career choice to high school students.
2. Engage tertiary students with agribusiness and consultants for career option awareness.
3. Promote hands on learning to participating students.
4. Address the urban/rural disconnect by moving students out of the classroom and into the field to experience, and participate in, field crop agronomy.
5. Provide university undergraduates with an opportunity to apply theory to, and promote understanding of, replicated research work and agronomy.

Overall Performance

A concise statement indicating the extent to which the project objectives were achieved, a list of personnel who participated in the Research Project including co-operators, and any difficulties encountered and the reasons for these difficulties.

Extent to which objectives were achieved:

- This project should be deemed highly effective if measured by participation number of students, and feedback from teaching staff.
- All KPI’s were delivered in each season of the three funding years, covid-19 permitting.

Key Personnel: Mr Richard Porter, Mr David Mates, Ms Edwina Cockburn, Ms Steph Lunn, Ms Kelly Lunn.

Key issues confronted: Following a successful and interactive 2019 program, the delivery and engagement with students was challenged by the onset of Covid-19.

KEY PERFORMANCE INDICATORS (KPI)

Please indicate whether KPIs were achieved. The KPIs **must** be the same as those stated in the Application for Funding and a brief explanation provided as to how they were achieved or why they were not achieved.

KPI	Achieved	If not achieved, please state reason.
Over 3 years engage with 5 high schools and sustain 5 University teams	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Present a planning session to each school and the undergraduate student body each autumn	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Achieved in 2019 and 2021, limited interface in 2020 due to the restrictions imposed by Covid-19
Conduct engagement activities each spring including field walks	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Achieved despite the restrictions imposed by Covid-19
Harvest trials and determine winners each year, promote the outcomes through identified channels	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

TECHNICAL INFORMATION (Not to exceed three pages)

Provide sufficient data and short clear statements of outcomes.

2019

High Schools participating were Kapunda, Trinity College, Balaklava, Urrbrae and Rostrevor, encompassing 15 teams that complimented the 6 teams from Adelaide University. A planning session was held for the tertiary participants on April 2019 at the University of Adelaide Waite Campus, where leading industry professionals including Kenton Porker (SARDI), Sean Mason (APAL) and Jason Sabeeney (Syngenta) presented to participants information regarding the competition, allowing students to gain a practical and realistic approach to the theory they have been learning whilst attending university, along with the valuable opportunity to engage and network with industry professionals. A spring field walk was conducted for both the high school and University divisions on Monday the 31st October. 55 competing high school students spent the morning at competition site, which allowed students to gain a hands-on agronomy experience and see first-hand how their crops were performing. Sessions run by industry professionals including herbicide expert Dr. Peter Boutsalis (Plant Science Consulting), local Agronomist Michael Brougham (Elders) and plant nutrient specialist Dr. Sean Mason



(Agronomy Solutions) provided students with information regarding herbicides, general agronomy and Q&A sessions with students in small groups. AgXtra team members Edwina Cockburn and David Mates simultaneously ran a more hands-on session where students took measurements of crop density, number of tillers and head size estimations, which allowed them to complete theoretical yield calculations once back in the classroom. University students attended the competition site in the afternoon, providing an opportunity to review their decisions made during the season. Members of AgXtra including Richard Porter, Edwina and David provided an overview of seasonal conditions and answered questions from students. The competition was harvested on the 16th December using an AgXtra Wintersteiger Delta plot harvester, followed by grain quality testing soon after to calculate protein, test weight and screening percentage of each plot. The trial was set up in randomized block design, with each team having 4 plots replicated throughout the site in random allocation. Using real-time prices as per Viterro standards to estimate the market value of each team's grain, as well as yield calculated from plot weights, we were then able to determine each team's gross margin and thus the winner of the crop competition. Gross margin factors considered herbicide, fungicide and fertiliser inputs, seed costs and application costs when subtracted from overall grain yield/revenue on a per hectare basis. High school team Trinity 2 achieved first place in their division, followed by Kapunda team 3 and Rostrevor team 1. This is a great result considering this was the first year Trinity College has been involved in the competition. High school students were notified of full results at the start of the 2020 school year. University students were also notified in January, with full access to table of results from their cohort, and Uni team 6 coming out on top in what has been the biggest involvement from the university in the competition's history. The winning team from each division receives a respective trophy with names engraved, as well as 2 day passes to the GRDC Adelaide Crop Updates for each member of the winning team for the University division only. We asked all teachers involved for their thoughts on the how the competition ran in 2019, particularly what components they felt were successful and any ideas they had which we could build on for 2020 and beyond.

Sue Pratt, Head Agricultural teacher at Balaklava High School, said of the competition in 2019:

"It is such a valuable exercise! This year was brilliant – it's has always been good but the extra components on the field day were terrific. (the field day) was brilliant. A great way to value-add to the competition and really consolidate their learning. Loved having the practicing experts available to share their expertise and answer questions".

Chad Ramsay, Senior Agriculture Teacher at Trinity College, provided feedback:

“The students all loved the practical components such as the grain counting. There could even be perhaps another practical element involved, something that would be unique and not available at school”, which gives us some good direction going into the second year.

Gen Porter, 2nd year undergraduate studying Agriculture at the University of Adelaide was also able to comment on the competition, saying: “It was a really good experience, definitely something you don’t get as much of an opportunity to do at uni as you’d like and something guys in future years should get involved in.”

2020

The 2020 AgXtra Crop Competition once again included two entry divisions, including a high school division and an undergraduate University division.

Five high schools were involved in the Crop Competition for the 2020 growing season including Trinity College, Balaklava High School, Kadina Memorial School, Murray Bridge High School and Kapunda High School. 12 teams entered the competition with a total of 87 students participating in this division. In the earlier months of 2020, COVID-19 resulted in the temporary closure of some schools and a move to online classes for students, creating uncertainty if the crop competition was able to go ahead. Fortunately, we were able to continue with the competition, with strong support from participating schools.

The 2020 competition continued to target Year 11 students studying agriculture as a subject, where feedback provided by teachers in 2019 indicated that it was easy to follow up results and provide a summary of the competition to students in early January. Most students continued to study agriculture as part of their Year 12 studies. We believe that targeting Year 11 students has also created an increase in awareness for broadacre cropping and agricultural research, providing students with further insights into the agricultural industry and greater encouragement to consider agriculture as a Year 12 subject, or even a career option. In 2020 we also had one team that comprised of Year 12 students, who were very interested in being involved, with some students not able to participate in the competition as Year 11 students as they had not selected agriculture as a subject.

4 teams from the University of Adelaide entered under the undergraduate University division of the crop competition, comprising of Second Year Bachelor of Agricultural Science students. Restrictions resulting from Covid-19 regulations meant we were unable to present to students prior to the season, however we were able to provide an online presentation. A total number of 17 students participated, which given the circumstances was a great outcome. Second year students were once again the main year level group invited to participate in the competition.

As a result of COVID-19, we were unable to present on campus at schools, however we provided students with online tools and presentations to assist students with their decision making, along with covering trial site design and the opportunities that exist in agriculture. Regular updates were provided to each team with how their crops were developing, including photographs and growth stage identification. Similarly, we were unable to attend the Adelaide University campus, with students undertaking all classes online. We were able to provide online presentations to students regarding the presentation and covered opportunities that existed in the industry. University teams were also provided with regular updates throughout the season to assist with their decision making.

We were unable to conduct an on site field walk in September as a result of COVID-19 restrictions, however we were able to have each school out individually to walk through their plots in a COVID-19 safe manner, and undertake some practical activities including growth stage identification and yield estimations for their crops, with AgXtra conducting these activities. Whilst disappointing we were unable to host a large field day as planned, involving all schools attending, feedback received from teachers that it was still an extremely valuable opportunity to be able to come and see their crops given, with a total of 37 students attending. Kadina Memorial, Balaklava and Trinity College were able

to visit the site. University students were also provided the opportunity to come and see their crops and had the opportunity to ask AgXtra staff any questions. The competition was harvested on the 23rd of December 2020 using an AgXtra Wintersteiger Delta plot harvester, collecting grain samples, and determining crop yield for each plot. Plot yields were average across the four plots for each team to calculate an average.



Gross margin factors considered expenses including seed, post emergent weed control, fungal disease control, fertiliser and application costs which were subtracted from the overall revenue from grain sales (based on a per hectare figure). Grain quality testing was undertaken for each plot and then averaged for each team entry, which included grain protein, test weight and screening percentages as per Viterro receival standards, allowing a harvest grade to be derived. Grain prices were set as at the harvest date and the highest cash price for each grade.

High school team Kapunda 1 achieved first place in the school division, followed by Kapunda 2 and Trinity College 2. High school students were notified of full results at the start of the 2020 school term. This was a great result, with Kapunda being involved in the competition for several years now and have finally been able to have not only one team place in the top 3, but two! University team 2 won the University division, followed by University team 4, 3 and 1 respectively. Teams were notified in January and were provided access of the results from all teams. Both divisions saw good crop yields achieved, with very close gross margin results.

A summary of feedback is provided below following the 2020 crop competition from high school teachers:

- The competition continued to be relevant part of the SACE Ag curriculum for students.
- Providing an understanding of trial research was important components and assisted students with other projects associated with their year 11 agricultural studies.
- Whilst a large inter-school spring field walk was unable to be conducted, it was still an extremely valuable opportunity for students to come out with their team members and gain a hands-on practical understanding of their decisions, allowing them to put the theory they are learning in the classroom into practice.
- Providing activities such as estimating crop yields and recording data at the site allowed students to think of ways to analyse and interpret the results in the classroom.

Feedback received those involved in the competition in 2020 have indicated a positive experience, with all high schools interested in continuing to be involved for 2021. There are also plans for more schools to be involved. Whilst COVID-19 presented a number of challenges throughout the year, we were able to adapt to these changes and continue the competition. Particularly in 2020, the importance of providing students with a hands-on learning opportunity and getting students out of the classroom, such as by attending a field day we believe promoted agriculture as a career choice and addressed the urban/rural disconnect to some capacity, where we hope that in future years we are able to continue addressing these fundamental outcomes.



2021

The 2021 AgXtra Crop Competition once again included two entry divisions, including a High School division and an Undergraduate University division.

Seven High Schools were involved in the Crop Competition for the 2021 growing season including Trinity College, Balaklava High School, Kadina Memorial School, Xavier College, Rostrevor College, Urrbrae High School and Kapunda High School. 18 teams entered the competition with a total of 85 students participating in the high school division.

Once again, COVID-19 caused some difficulties in the High Schools participating as interactively as they have in the

past, however we had an increase in the number of schools participation and a keen willingness to engage through online communications and updates where paddock visits were unable to go ahead.

The 2021 competition continued to target Year 11 students studying agriculture as a subject. This was after past feedback from teachers indicated that the results and summary of the competition could be given to those students early in the following year, as most students continued to study agriculture as part of their Year 12 studies.

We believe that targeting Year 11 students has also created an increase in awareness for broadacre cropping and agricultural research, providing students with further insights into the agricultural industry and greater encouragement to consider agriculture as a Year 12 subject, or even a career option.

4 teams from the University of Adelaide entered under the 2021 University Undergraduate division of the crop competition, comprising of Second Year Bachelor of Agricultural Science students. A total number of 18 students participated in the competition after the return of face-to-face learning allow a visit and presentation from AgXtra staff to create interest. Most students were in their second year of study, allowing them to receive results and summaries in their third year whilst still at university. We hope they will encourage upcoming second year students to participate in 2022.

Once again COVID-19 has impeded our ability to provide rewards for the winning team for the GRDC Grains Research and Development Update, with the Adelaide event being moved to an online forum. However, opportunities similar to the Grains Research Update are being explored as an alternative reward for members of the winning University team.

KPI: Conduct a field inspection and planning session on site with key agronomists and service companies, promoting interaction with university students:

Early 2021 had some normality to it with schools returning to face-to-face learning. This allowed AgXtra staff to present to classes at each of the schools with an introduction to the Crop Competition, some background information around agronomy decisions, useful agronomic tools to explore, trial design and lay-out and an overview of the many career opportunities studying agriculture potentially has to offer.

Likewise, a presentation was made to the university students with an introduction to the competition, some further guidance on their pesticide and fertiliser decisions, useful agronomic tools to explore, trial

design and lay-out and work experience/career options available post-study. A new section of the 2021 presentations to the schools and university students was how to remotely access the on-site weather station for real-time weather, soil and crop response data. This added an additional layer of exposure to AgTech and enhanced learnings around crop input considerations such as plant stress levels, chlorophyll index plus real time and historical weather data.

Throughout the season regular updates were provided to each of the teams with how their crops were progressing, including photographs and growth stage identification. Assessments such as crop plant counts at establishment and NDVI were made in the field with results communicated back to students every few weeks along with reports on general site status and any issues.

Similar to 2020, COVID-19 restrictions hindered us holding a full Field Day where all schools could attend together. However, we offered a similar scenario to the previous year where the schools attended individually, allowing a COVID-19 safe option for students to walk through their plots and undertake some practical activities with Agxtra staff. Students also had the opportunity to hear a presentation and ask questions of a senior industry agronomist (Michael Brougham, Elders) who explained the key roles of his job and further understanding of advisory agronomy.

Once again, these smaller group sessions were well received and whilst not all schools were able to attend, Balaklava High School, Rostrevor College and Trinity College were present. Apart from the opportunity to leave the classroom, the smaller group situation allowed the students to be more interactive with the presenters and created a lot of value seeing their own crops. 40 students attended the day with positive feedback from teachers. University students attended the site later in the afternoon with presentations based more-so around the effects of inputs on their crops, pesticide activity and agricultural careers.

KPI: Harvest plots, conduct grain quality testing, calculate gross margins and notify winning entrants:

The trial was set up as a randomized block design, with each team entry replicated four times and randomized in each replicate. The competition was harvested on the 23rd of December 2021 using an AgXtra Wintersteiger Delta plot harvester. The grain samples were collected, and crop yield was determined for each plot. Plot yields were average across the four plots for each team to calculate an average yield for each team.

The factors that were considered when calculating gross margin were expenses (including seed, pest, weed and disease control, and fertiliser) and application costs, which were subtracted from the overall revenue from grain sales (based on a per hectare figure). Grain quality testing was undertaken for each plot and then averaged across the 4 replicates for each team entry. This included grain protein, test weight and screening percentages (as per Viterra receival standards) allowing a harvest grade to be derived. Grain prices were set as at the harvest date and the highest cash price for each grade.

The Urrbrae entries achieved first place in the High School Division, followed by Balaklava 1. High school students were notified of full results in early February 2022 at the start of the school term. University Team 4 won the University division, followed by University team 1, 2 and 3 respectively. Teams were notified in early February and were provided the results from all teams. A visit to both winning teams to present their trophy (schools) and industry event prize (University) are currently being organised.

CONCLUSIONS REACHED &/OR DISCOVERIES MADE (Not to exceed one page)

Please provide concise statement of any conclusions reached &/or discoveries made.

- This project should be deemed highly effective if measured by participation number of students, and feedback from teaching staff.
- School participation and engagement level of students in identified schools is very much dependent upon the pro-activity of the Agriculture teacher.
- Schools more isolated from the trial site tended to have less interaction – challenge of distance and relevance, inability to visit the site. To best serve a wider array of schools, need to have additional sites that remain regionally relevant and accessible for each school.

- Good communication is key for successful delivery of this project. Evolving communication channels and methods that are most effective for each cohort and school is an evolving skillset in itself. AgXtra must provide training to its leads on the project each year to ensure continuity of delivery at a high standard.
- There are unexplored opportunities to explore engagement with grain marketers, flour mills, food processors, brewers etc to demonstrate industry and showcase career opportunities beyond the production aspects of the grains industry.

INTELLECTUAL PROPERTY

Please provide concise statement of any intellectual property generated and potential for commercialisation.

There was no intellectual property generated by this project.

APPLICATION / COMMUNICATION OF RESULTS

A concise statement describing activities undertaken to communicate the results of the project to the grains industry. This should include:

- *Main findings of the project in a dot point form suitable for use in communications to farmers;*
- *A statement of potential industry impact*
- *Publications and extension articles delivered as part of the project; and,*
- *Suggested path to market for the results including barriers to adoption.*

Note that SAGIT may directly extend information from Final reports to growers. If applicable, attach a list of published material.

2019

A broad promotion of the crop competition was achieved, with our AgXtra staff involved in running the competition able to attend several key events throughout the year:

- Growing The Future 2019
- SAGIT Update in Adelaide, July 2019
- Adelaide University Careers Night, August 2019
- Urrbrae High School Careers in Ag, September 2019

Attending these events as well as the reach gained from our increased focus on social media, has promoted increased awareness of the competition not only by those who are actively involved in the competition the wider community.

The feedback received from teachers, university agricultural science students and even comments made by the participating high school students have indicated an overwhelming positive experience from the competition in 2019. While the hands-on learning opportunities as well as the change to strategize and plan a theoretical cropping system are key components, this is only part of the primary aims of the crop competition. To promote agriculture as a career choice to high school students and address the urban/rural disconnect by moving students out of the classroom and into the field to experience, and participate in, field crop agronomy are the fundamental outcomes Agxtra hope's to achieve by continuing to run the crop competition. It has been indicated from the 2019 season that this is certainly being achieved in some capacity. AgCommunicators were contracted by AgXtra to deliver a communication program for the competition. Two main social media platforms have been utilized to increase awareness and promote the competition as a unique opportunity, with these being thorough Facebook and Twitter.

- Facebook:
 - A total number of 11 posts were published regarding the competition from April to October 2019 and were all photo posts.
- Twitter:

- A total number of 10 posts were published regarding the competition from May to October 2019.

Once again, AgCommunicators were contracted by AgXtra to deliver a communication program for the competition in 2020 via social media channels Facebook and Twitter.

- Facebook:

A total number of 7 posts were published regarding the competition throughout the 2020 year. These were from February to December 2020 and were all photo posts.

- Twitter:

- A total number of 10 posts were published regarding the competition from May to October 2020.

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Outlined below is a summary of the findings from the 2020 crop competition.

- Kapunda 1 were 1st place winners of the high school division for 2020 in the second year of the competition.
- University team 2 consisting of 2nd year Agricultural science students were 1st place winners in the University division for 2020.
- The 2020 crop competition had the largest number of participants ever in the competition, with a total of 87 school students across 5 schools and 17 university students across four teams, taking the total number of participants to 104. This was an increase from last year, with the total number of participants being 99 in 2019.
- As a result of COVID-19 restrictions, we were unable to have a field day in September involving all schools, however, were able to each school attend at separate times.
- Given the circumstances regarding COVID-19 throughout 2020, it was excellent that the competition continued gain interest with two new schools now involved (Kadina Memorial School and Murray Bridge High School). This was due to the success of the competition in 2019 as a result of funding received from SAGIT, making it feasible for new schools to be involved.

Outlined below is a summary of the findings from the 2021 crop competition.

- Urrbrae teams 1 and 2 were the 1st and 2nd place winners of the high school division recording the highest gross margins.
- University team 4 were 1st place winners in the University division for 2021, consisting of 2nd year Agricultural Science students.
- The 2021 crop competition saw an increase in the total number of schools competing compared to the previous year with 7 school entries. The university division had the same number of teams enter at 4, taking the total number of participants to 103, one down on last year.
- As a result of COVID-19 restrictions, we were unable to have a full field day in September that would have involved all schools, however, were able to take each school through the site individually and provide interactive presentations to engage the students. University students were also able to visit and be accompanied through the trial.
- COVID-19 continued to present some challenges throughout 2021, however AgXtra were fortunate to be able to visit schools and the University before the start of season. Communication with staff and students was then maintained throughout the year and updates sent through regularly. Thanks to the funding received from SAGIT, extra time spent putting together communications and visits made to additional schools was made feasible.
- The prospects for the 2022 competition are looking very positive with the current schools expressing interest to continue their participation, as well as additional interest in the last month from Keith High School, Clare High School and Booleroo Centre High School confirming their participation. Communications with additional schools are currently in the process demonstrating additional growth in concept for 2022.

POSSIBLE FUTURE WORK

Provide possible future directions for the research arising from the project including potential for further work and partnerships.

- Continue delivery to existing region, sustain or grow engagement numbers
- Expand geographical coverage of the project, address additional schools
- Incorporate new partners to enhance understanding of the value chain and the holistic grains industry