REPORT FORMAT

REPORT TYPE: Annual Progress Report: ☐

Final Report: ☒

Part 1 - Project Details

Project Title: (< 15 words)	Machinery Development and Extension Support for the Australian Cotton Industry
Project Number:	USQ8C

Part 2 - Contact Details

Admin Contact:	Mrs	Ruth		Hilton	
Organisation	University of Southern Queensland				
Postal Address:	USQ Research and Higher Degrees West St				
	Toowoomba		Qld		4350
	07 46312866	07 46312955		hiltonr@usq.edu.au	
	Ph:	Fax:		email	
Principal Researcher:	Mr	Murray		Schoenfisch	
Organisation	University of Southern Queensland				
Postal Address:	Z2 Building West St				
	Toowoomba		Qld		4350
	07 46311718	07 46311870		schoenfi@usq.edu.au	
	Phone	Fax		email	
Project Supervisor:	Mr	Matthew		Durack	
Organisation	National Centre for Engineering in Agriculture				
Postal Address:	Z2 Building, West St				
	Toowoomba		Qld		4350
	07 46311873	07 46311870		durackm@usq.edu.au	
	Phone	Fax		Email	

Part 3 - Final Report

Introduction and Project Outline
USQ 8C was a three-year project funded for one year in which effort was to be focussed on machinery development and engineering extension support. As a result, some aims could not be undertaken or others completed. The following aims were the target of the first year's research and provided a full year of opportunities.

Project Objectives and Extent of Completion
The project aims were:
1. To continue to provide engineering support to farmers and industry personnel in areas covering Ultra Narrow Row cotton, planter development, stubble management, and all subjects currently covered in USQ7C.
Result Achieved.

2. To continue the development and revision on Machine-pak including a chapter on controlled traffic.
Result - Not completed due to CRDC directive. Information was gathered but will only be compiled when a directive is given to review and re-release Machine-pak.

3. To assist in the development of planting equipment for Ultra Narrow Row cotton.
Result Achieved.

4. To provide support for extension officers in the areas of pupae management, tillage procedures and general machinery requirements.
Result Achieved.

5. To review work on bed architecture, planting techniques and equipment, propose tests to be undertaken and perform field trials. This will involve farmers in each area and the extension of the results to the larger farming community.
Result – Not completed due to shortening of the project.

6. To continue the monitoring of commercial guidance and yield monitoring systems.
Result Achieved.

7. To complete the development of the cotton picker guidance system.
Result Achieved.

8. To link into any existing or new CRC projects which require engineering input and support.
Result - Not completed due to shortening of the project.

9. Review existing planting equipment and implement any changes necessary to improve performance in less ideal conditions including heavy ground cover, alternative bed architectures and dry conditions (moisture seeking technology).
Result – Not completed due to shortening of the project.

10. To examine the feasibility of non-contact pupae sensing technology for the analysis of tillage requirements. DPI and NCEA staff will assist in this area of development.
Result – Not completed due to shortening of the project.

Discuss the results, and include an analysis of research outcomes compared with objectives.

All objectives except for those noted have been achieved as detailed below.
1) The UNR production concept has begun to be widely adopted by industry. Assistance was provided to NSW Department of Agriculture and farmers as required to ensure that all planting options were considered. Some options were tried and other machines used monitored for performance and evaluation. As a result of this cooperation, an Australian manufacturer has begun production of a twin-disc opener planter specifically for UNR row spacings to be used for this year's plant.
During the year and currently still progressing is work on a new novel harvesting concept for UNR to replace the current stripper concepts. If it proceeds, several farmers are considering the assembly and testing of a prototype for the coming harvest.
2) More information has been collected for the next edition of Machine-pak. Of the existing edition, all copies printed have been distributed. In all, 2000 copies have been distributed to the cotton community. Information for new chapters is being collected, including UNR and harvesting equipment. Seeing the project will not be continuing, no further work will be done to compile the information collected until a review of Machine-pak is commissioned.
3) Requests for help by CRC personnel and farmers have been met as they have arisen during the last year. This has resulted in visits to help with technology, machinery and pupae control issues across the whole industry. Projects have ranged from advice on all forms of guidance, to precision agriculture, tillage equipment design and construction, harvester development and farming system management.
4) The management of heliothis resistance through the effective destruction of over wintering pupae has progressed well. Best estimates were that 80% of the total area last year had some control implemented. This year it was hoped that 95% would be cultivated increasing to as close to 100% as possible over the next few years. This was close to reality given a relatively dry winter after a wet harvest. This process was assisted by farmer visits, the mailing of guidelines to every grower, publications in as many magazines as possible and directed help to extension personnel as requested.
5) Not Completed.
6) The commercialisation of past developments has continued this year with the commercial release of the furrow based guidance system now sold through Agri-Dry Rimik, and the final pre-commercial release of the and the cotton yield monitor and picker guidance system. New additions in the form of non-light based sensors and moisture sensors are still under development. Companies are continuing to market the devices that have been developed, and help is continuously offered as required by their manufacturing and marketing arms. It is hoped that this will continue and improve as marketing specialists are brought into the equation.
7) The cotton picker guidance system is undergoing final testing and was released for limited commercial sales this year. Six units were installed on farmer's machines to test units and gather efficiency improvement data. As a result, a nett increase of between 2-5% of raw cotton was seen in replicated trials. Detailed information is yet to be supplied by the grower testing the units.
8) Not Completed.
9) Not Completed.
10) Not Completed.

Which objectives were not achieved and why not? (Please detail any problems you have had during the year)
Having been given a directive to concentrate on the over wintering heliothis pupae management by the CRDC, little time was able to be directed to other objectives. Despite this, 60% of the objectives were completed.

Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry.
As much as possible, growers have been kept abreast of development via the publications mentioned above. Interaction with CRDC board members has ensured focus has been maintained. Contact with researchers and industry personnel at meetings and conference has also ensured industry personnel are aware of work being undertaken during the course of the current project.
Technology developments will impact on the industry this year as yield monitors and guidance systems start to penetrate the market. These developments will aid farmers, developers, researches and the major machinery manufacturers.
Information spread continued, and will expand to cover extra chapters in Machine-pak and new pupae control guidelines in the future if funded.
Farmer visits across the wider industry also continued to assist individual growers to make decisions on all mechanical, technical and tillage issues.
If the new project application had been funded in the last round, research results would continue to be extended throughout the industry from different directions, including grower meetings and visits, published material, Machine-pak, conference attendance, phoned support and direct mail outs.

Recommendations
It would have been beneficial to the industry for the project to be funded over the full three years, but this was not to be. No major trials or farm work could be undertaken as a result of the shortened project. Despite this, much was achieved and several smaller trials of new ideas completed.

Publications

Title:	Pupae Control Guidelines 2000
Author:	Murray Schoenfisch
Printed:	USQ