

**Part 1 - Summary Project Details**

**Final Report**

Report Due Date:	<b>29-Sept-00</b>	CRDC Project Number	<b>CSP91C</b>
Project Title: ( < 15 words)	Maintenance of Cotton Industry Weather Station Network		

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**Aim:**

- To provide ongoing technical support and maintenance for weather station network and data generated by them ensuring provision of high quality weather data to research and all other facets of the cotton industry.

**Staff:** Dr M.P. Bange, Ms. D. Johnson, Mr G. Rapp

**Background and Industry Significance**

The availability of accurate and extensive weather data is essential for strategic research, the operation of decision support systems (eg. CottonLOGIC, HydroLOGIC) and numerous operational aspects of cotton agronomy and pest management. Of particular importance is the need for complete data sets of weather for research into irrigation, optimal sowing dates and many other aspects of cotton production/management. Historical and on-line weather information is used increasingly by growers, consultants and other commercial organisations in making management decisions.

An integrated network of weather stations was installed at 15 locations throughout the cotton growing areas through CRDC Grants CSP48C and have been improved and maintained through CSP58C. Despite numerous difficulties the network is now operating at an acceptable level of reliability. Weather data is now downloaded automatically on a daily basis and is available to many researchers, consultants and growers through the ACRI Internet Site. This proposal seeks funds for the ongoing maintenance of the network and the data it produces to ensure maximal benefit from the network for all cotton industry users.

**Research proposal summary:**

Performance of the existing weather station network and future needs of the industry were recently reviewed (Nov 20, 1996) by CRDC, CSIRO, NSW Agriculture, QDPI, APSRU and the Australian Met. Bureau. The review concluded that despite less than desirable performance from the existing weather stations, performance was now acceptable for the short term. At the meeting the Met. Bureau indicated that future upgrades of their weather station network (with far superior technology) would provide good coverage to the cotton growing regions and may provide an alternative source of weather information. Indications were given that in the medium term (3-5 years) data could become available to ACRI through this route. In the meantime it will be necessary to maintain and service the existing stations, to continuously monitor operation and the quality of data and quickly respond to problems. The network also requires annual

calibration. This mode of operation will provide basic weather information for research purposes, use by the industry. We do not propose to routinely download wind speed and direction data since we believe the existing sensors are unreliable and would require a significant upgrade, and since the software and power requirements for daily downloading and storage of such data puts undue strain on the communication capabilities of the stations. This proposal seeks funds for maintaining and servicing this industry facility by a Technical Officer employed by CSIRO. Dr. M. Bange will be responsible for oversight of the weather data itself and the data files. A separate Cotton CRC funded project (CSIRO 423) will enhance access to the data through improvements to the ACRI Internet site to ensure the data is widely available to much of the cotton industry.

## **Summary of Outcomes:**

### ***Technical Assistance for Maintenance of Weather Stations***

During the course of the project both Deanne Johnson and Graeme Rapp spent in excess of 30 % of their time working with the stations and responding to requests for weather data from growers and researchers alike. Dr Bange has also assisted her with maintenance and requests for data. Generally most requests were satisfied within two days of receipt when possible.

### ***General Maintenance and Calibration of Weather Stations***

Generally over the course of the project the reliability of the weather stations has been satisfactory. Usually no more than two of the stations (total 14) were off-line at any one time. Most failures were generally associated with equipment that has aged and had required servicing or replacing, or problems caused with phone lines. Each year a thorough testing and calibration regime of all sensors attached to the weather stations were conducted in addition to general maintenance.

### ***Data Dissemination***

Towards the end of the project many requests have been met by the provision of data from the Cotton CRC web site. Data is downloaded, automatically checked and is stored in a definitive database. The data is then posted on the Internet, which allows easier and more reliable access to users. During this project this part of the Cotton CRC's web site received more visits than any other.

### ***Collaboration with SILO Project***

During the project Dr Bange started collaborating with members of the 'SILO project' in Queensland. The SILO project involves the production of a web site that provides access to the data collected by the Bureau of Meteorology. In 1998

data that is collected by real time recording weather stations was posted on the web each day. This now provides access to daily data in most areas of the cotton production. One of the outcomes of the collaboration was the provision of a day degree calculator which was accessed from the Cotton CRC's web site.

## **Future**

Presently the industry supports the maintenance of 14 stations spread throughout the cotton growing regions. These stations require regular maintenance and annual calibration. The information collected from these stations is made available via the Cotton CRC's web site. After numerous problems installing the network they were operating at an acceptable level. However, the stations are now over 6 years in age and are beginning to show signs of wear. Components are failing more frequently and the stations show visible signs of degradation from the weather. Maintaining these stations and handling the data for quality and continuity has required much more effort than estimated. Presently only one third of a technician's time is devoted to supporting and maintaining the stations. In addition to the time spent the technician, valuable time of Dr Michael Bange's and David Larsen's are also consumed.

Undoubtably one of the reasons for installing the weather network was because it was difficult in the past to obtain data through the Bureau of Meteorology. With the advent of the Internet it has allowed the Bureau and other associated parties through the SILO project to deliver climate and weather information more quickly and effectively. The SILO projects objectives are to:

- Provide a rich source of national meteorological and agricultural data that is readily accessible to decision makers, researchers and educationalists, particularly in the agricultural area.
- Develop a coordinated information service that will facilitate further adoption of climatic risk management.
- Provide a framework to encourage future additions to the agrometeorological data bank.
- To establish collaborations required ensuring the system remains operational beyond the term of this research funding.

Briefly some of the resources already available through the SILO project include:

- Patched historical climate files up to yesterday.
- Weather forecasts.
- Seasonal Climate Outlook.
- Weather data forecasts suitable for modelling purposes.
- Daily estimates of solar radiation.

The SILO project presents the industry with a unique opportunity to harness the information collected by the Bureau to assist research and crop management directly.

A new proposal 'Enhancing Access to climate and weather data' has been supported by the CRDC and encompasses three components, which are:

*1. Provision of weather information through the existing cotton industry weather station network.*

Now that real time weather information collected at standard Bureau of Meteorology stations can be accessed via the SILO website, it is proposed that the cotton industry's automatic stations located near these real time stations could be removed. The benefits in using the Bureau's station are that data is collected from high quality sources and data can be checked and managed by the Bureau. Stations that are located nearby these real time recording stations are:

Emerald  
Dalby  
St George  
Boggabilla  
Warren  
Bourke  
Midkin

The remaining six stations would remain in place as there are no real time stations located nearby. Parts from the stations removed would be used in the interim to maintain the remaining stations. It is requested that the same amount of technical resources be made available to maintain these remaining stations.

Importantly part of the ongoing maintenance regime will include the station located at ACRI. More effort will be placed on ensuring that this station is as accurate as feasibly possible.

*2. Provision of patched point data sets to the Australian Cotton Research Institute for research purposes.*

Access to accurate and continuous historical climate records are crucial to research activities (especially modelling OZCOT, HEAPS, APSIM etc.) at ACRI. Already the SILO project is in the process of developing a service to ACRI to provide patched point data sets for all the existing and potential cotton growing regions. This database will be updated daily via the Internet. This information is presently being used for modelling activities and investigation of seasonal performance in context of the whole climatic record.

*3. Collaboration with partners of the SILO project to develop weather and climate tools specific to the cotton industry.*

The cotton industry has a strong reputation for using decision support tools to assist with crop management. Underlying these tools is a need for accurate and continuous weather data. Examples include the need of cumulative degree-days for monitoring crop development, for different management decisions, and degree-days for NutriLOGIC contained in CottonLOGIC. The SILO project has already developed a prototype degree-day calculator that is presently available free to the industry for evaluation during the 1999-2000 growing season.

## **Plain English Summary**

**Project Title:** Maintenance of Cotton Industry Weather Station Network

**Principal Researchers:** Dr M.P. Bange, Ms. D. Johnson, Mr G. Rapp

**Project Aim:** To provide ongoing technical support and maintenance for weather station network and data generated by them ensuring provision of high quality weather data to research and all other facets of the cotton industry.

### **Summary:**

The availability of accurate and continuous weather and climate data is essential for strategic research, operation of decision support systems (eg. CottonLOGIC, OZCOT crop simulation model) and numerous operational aspects of cotton agronomy and management. In addition historical climate data is being used by researchers to assess the potential of cotton growth in new regions and to analyse the performance of crops in current seasons in the context of the whole climatic record. Increasingly consultants and growers are using this information for making informed management decisions.

This project supported the maintenance of 14 stations spread throughout the cotton growing regions. These stations required regular maintenance and annual calibration. The information collected from these stations was made available via the Cotton CRC's web site. After numerous problems installing the network they were operating at an acceptable level. However, the stations are now over 6 years and components are failing more frequently and the stations show visible signs of degradation from the weather.

It is proposed to improve access to weather and climate through a new CRDC project 'Enhancing Access to climate and weather data' and will encompass three main components, which are:

- 1. Providing weather information through the existing cotton industry weather station network.*
- 2. Provision of patched point data sets to the Australian Cotton Research Institute for research purposes.*
- 3. Collaborating with partners of the SILO project to develop weather and climate tools specific to the cotton industry.*

