

Capturing More Value from Cotton Data

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The potential to gain value from the data being recorded by modern machinery, new sensors, unmanned aerial systems (UAS) and satellite images is still emerging. This document describes opportunities for gins and growers to gain benefits from data ranging from improved module handling to increasing farm profitability.

Radio Frequency Identification (RFID) for Enhanced Traceability and Logistics of Cotton Modules

John Deere introduced its new round module building cotton harvester over 10 years ago and currently round modules comprise the majority of the cotton processed by gins in many regions of the U.S. With such a high level of adoption, the time has come to take advantage of a key feature of those round modules – each one contains four RFID tags and an added external tag that uniquely identifies that module. In 2018, the American Society of Agricultural and Biological Engineers adopted an electronic module numbering standard that extends the use of RFID tags beyond only John Deere modules. Cotton Incorporated has funded a demonstration project with the USDA-ARS gin lab in Lubbock, TX to allow the option to use only the RFID tag to track the cotton from the harvester through the ginning process without adding other tags or spray paint. Additionally, ownership information is only entered once. This project has involved the generation of many software tools that have been developed in an open source environment, so they are freely available to gins as well as commercial software companies supporting the ginning industry. One of those tools is an Android app in the Google Play store that can be used to scan the



Figure 1. An android app can be paired with a hand-held scanner to read the RFID tags on the cotton modules.

code on round modules using the device's camera by pairing it with a Bluetooth RFID scanner (Fig. 1). eCotton software from EWR has also added new features to support the use of RFID tags in 2019. Links to several online resources generated as part of this project have been collected on Cotton Incorporated's web page at: <https://www.cottoninc.com/cotton-production/ag-resources/harvest-systems/rfid-tracking/>.

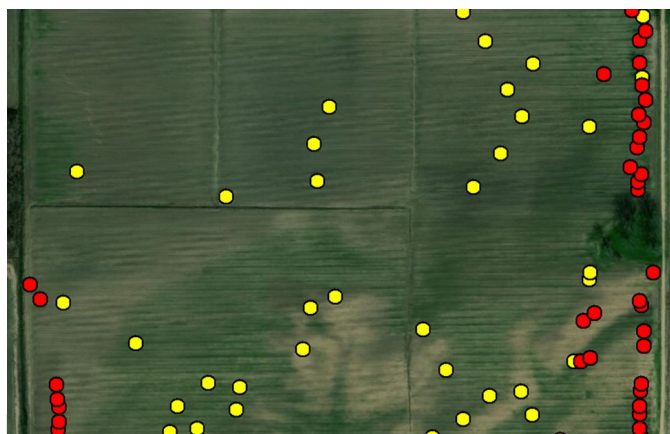


Figure 2. Data from HID file created by harvester—yellow dots where module was wrapped and red where dropped.

Virtual Variety Trials and Quality Mapping

An additional feature the new cotton harvesters from John Deere has is data on every cotton module created by the machine including module weight, area harvested, moisture content and the location where the module was wrapped and location where it was unloaded from the harvester (Fig. 2). In 2019, we are looking for cotton producers with these capabilities who would be willing to share this data with us to test the ability to have a “virtual variety trial” where the module weight and area will be used to calculate a seed cotton yield. Regional university variety trials will be used to estimate a lint turn out value so cotton yields can be estimated, or a producer can report lint turn out values from the gin if available. If successful, this project would greatly increase the data points we have on how popular cotton

varieties perform over multiple soil types, production systems and environmental conditions.

Work is being conducted to link the quality data on the bale from the gin back to the round module it came from. As more gins begin using RFID tags to track modules from the field to the module feeder, producers will have the ability to generate a fiber quality map of their field. We are testing the hypothesis that some of the quality parameters such as mic and length could be calibrated to yield variability in the field. If yield can be correlated to one or more quality measure, high resolution quality maps would be possible.

Agricultural Data Standards for Improved Data Flow

As data becomes more valuable to farmers, it is important to make that data easy to capture and manage. AgGateway is a non-profit committed to enabling digital agriculture and they have facilitated the development of the Agricultural Data Application Programming Toolkit (ADAPT). ADAPT makes it easier for software and hardware from different companies to share data (think of it as a Rosetta Stone for agricultural data). Cotton Incorporated recently sponsored the development of an ADAPT “plug-in” for cotton classing data so will be easier for ag software providers to support cotton specific data.

Cotton Incorporated is also in discussions with the National Cotton Ginners Association to see if U.S. cotton ginners may benefit from data standards. Most

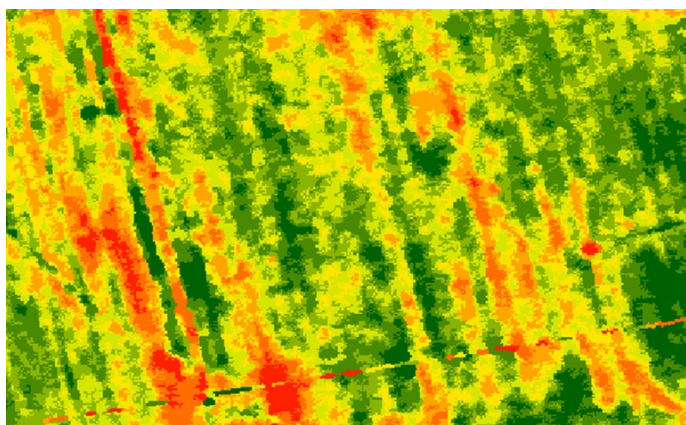


Figure 3. Data from multiple sources could identify parts of a field that maybe more profitable as wildlife habitat.

agricultural equipment manufacturers have adopted Standard ISO 11783 (ISOBUS) to transfer data between tractors and implements. For example, a tractor from one company can plug into the ISOBUS port of a sprayer from another company and the display on the tractor will automatically configure itself to support that sprayer. Such a system could make it easier for cotton ginning equipment to “talk” to each other. There also may be opportunities for gins to anonymously and automatically share data on energy use and ginning rates so they can bench mark their performance against regional averages.

Sustainability Programs and Agricultural Data

Automated data collection has the potential to reduce the burden for producers to participate in sustainability programs as brands, retailers and in some cases, consumers, demand more transparency in the cotton supply chain. A specific example of how a sustainability program can use data to bring value to cotton producers is found in a new partnership between Quail Forever, the American Society of Agronomy, National Fish & Wildlife Foundation (NFWF) Conservation Partners Program and Cotton Incorporated. Precision data such as yield and soil maps are used along with discussions with the producer to identify portions of their fields that are consistently losing money (Fig. 3). Then opportunities to change those areas to become profitable are considered by reviewing the suitability of USDA conservation programs.

The U.S. cotton industry has recently launched the U.S. Cotton Trust Protocol (USCTP). That protocol relies on farm level data collection to benchmark farmers’ progress towards the industry goals and will provide the global textile supply chain additional assurances that U.S. cotton is produced in a responsible manner. In 2020, Cotton Incorporated will be working with USCTP to see if some of the data needed can be retrieved directly from a grower’s existing electronic records so they don’t have to enter data twice and in some cases, not at all when the data is collected by their tractor.

Please email ebarnes@cottoninc.com if you would like to become involved in any of these efforts.

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