Farm Electronic Data Management Systems

Background

The 4R Nutrient Stewardship program requires accurate farm data to enable growers to have certified acreage to support various sustainability claims over time. While data can be captured manually, the task of keeping records for each field can be difficult.

Ag retailers supplying growers with fertilizers have provided databases to store soil records and fertilizer deliveries. Over time, these database programs have evolved to collect 4R information for growers. As part of this 4R feasibility effort, a combination of ag retailer data recording systems and commercial farm data management systems were reviewed to determine their adequacy to capture data on each of the 4Rs to enable acreage certification.

Our review consisted of assessing the following products to determine their suitability:

- Field View/My John Deere
- Farm Brite
- Crop Tracker*
- Ag Expert Field
- Farm Command
- Agri Suite
- Ag Retailer Programs relevant to the Holland Marsh
  - Holmes/Solio- Ag Connexion Smart Farm*
  - FS Partners/Growmark My Field program*
  - Alliance Agri-Turf/Solio- Ag Connexion Smart Farm*

Our review consisted of a combination of web searches and interviews. Interviews are designated by an asterisk next to the product name.

The above farm management software included the following features:

- Crop Management
- Inventory Management
- Field Mapping and planning
- Weather records
- Farm business management
- Web-based access
- Centralized database

With respect to the 4Rs, only a few software was found to be complete. Most captured practical information on the "what," "how much" and "when" but fell short on "how" the fertilizer was applied. For example, one of the 4R criteria is "the right place" or how was the nutrient delivered to the plant.

One software reviewed was built specifically for the 4R program and capturing acreage for certification. The Ag Expert Field is currently being used by FCC in Western Canada to support their 4R Sustainability Incentive Program. The program has 19 distinctive features providing complete farm management services including agronomic practices. There are predetermined data entry forms allowing growers to enter their data to supplement machine driven information.

Another product, Farm Command also meets 4R requirements. It is a comprehensive digital platform combining data sets, unique digital infrastructure, and machine learning. The tool addresses all areas of crop production, from seed to yields. The program is comprehensive and can be used for the Carbon market as well as the 4Rs program. Farmers Edge located in Winnipeg developed the software.

A third product, Crop Tracker, developed in Kingston, Ontario has the potential to meet requirements of a 4R program for vegetable growers. The company offers fully developed data management systems for other commodities such as Ontario tender fruits and apple growers. The company would be interested in developing a product for Holland Marsh vegetable growers.

A fourth product, Field View/My John Deere is promoted through an ag chemical company as a field data management system. It is an easy-to-use program with various data layers uploaded automatically once field equipment is equipped with sensors. Yield maps as well as satellite imaging is accessible.

A fifth product, the Ag Retailer programs offer complete data management systems for participating growers. The two products reviewed are similar and offer web-based services to growers. Their current weakness is in the "How is the fertilizer placed" and acreage reporting. In the meantime, the Ag Retailer programs provide nutrient management services to their growers documenting their actions as Ag Retailers with respect to a client. Where growers elect to use the web portal provided available through the Solio group to them, additional cropping information can be supplemented. For example, broadcasting and incorporation of fertilizers. If the spreading of the fertilizer is by the Ag Retailer, the incorporation timing is lacking as growers are unlikely to supplement the information. In Western Canada, an attestation form was created where growers certify several farm practices before acreage certification occurs. Through, grower interviews we were able to

assess the use of the web portal. Fertilizer Canada is currently conducting a study on 4R support data management programs and will be releasing its report in May 2025.

Centralized databases exist with all the commercial products and historical data can be traced back for audit purposes. With the 4R Retailer certification, audit does include verification of a sample of grower records at source. Data security is the responsibility of the commercial provider. Through web-based access growers are provided with an individualized security code.

Grower interviews did confirm access to their records through a web-based portal. Only a few growers utilized their access including downloading field records to their cell phone, while others preferred receiving their fertilizer records on paper but they were aware of the portal.

Based on our interviews, only one grower was beginning to use an integrated management system but would also maintain access to the ad service provider for fertilizer records. Fertilizer information required for food safety audits are transferred manually to that system. A smaller grower maintained all farm records manually using spreadsheets.

Conclusion

Data management systems are available, and the degree of information recorded depends on the growers digitized equipment to capture and transfer data as well as supplementing farm practices info. Farm practices info is not regularly entered other than the date a field activity took place. Some growers also had access to two or more systems. For example, with My John Deere software, a database is created to capture field activities.

Elements of 4R practices are covered better than others and it is recommended that grower goals and certification of practices be captured by the CCA and signed by the grower.