Precision Agriculture

Tasmanian RD&E project

National Vegetable Extension Network
TASMANIA

The Precision Agriculture (PA) Project was an on-farm research, demonstration and extension project funded by the Tasmanian Department of Primary Industries, Parks, Water and Environment under the *Cultivating Prosperity: A 2050 Vision for Agriculture* grant program. It was undertaken by the Tasmanian Agricultural Productivity Group (TAPG), with the Tasmanian Institute of Agriculture (TIA) and Serve-Ag.

Project goal

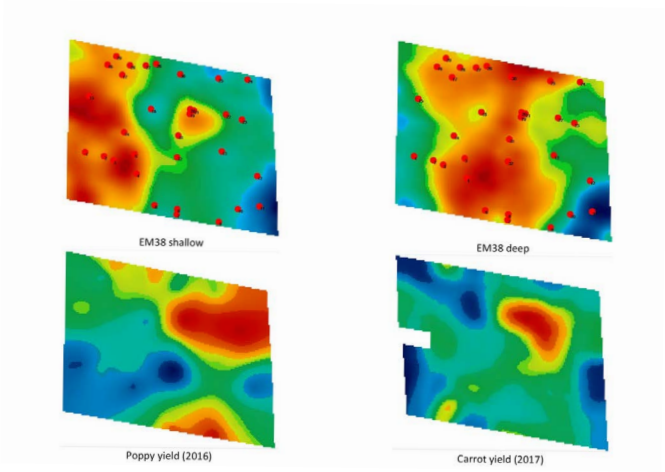
The goal of the project was to boost farm productivity in Tasmania using precision agriculture technologies in order to:

- improve the efficiency of irrigation and fertiliser management
- increase the accuracy of yield prediction
- provide accurate and useful information to assist farm managers' decisions, increasing knowledge and confidence and ultimately, profitability.

The project was also investigating the limitations to uptake of PA practices and future directions for the PA industry.

Key messages

- **Variability of yield within a single crop is often significant**
- **Precision agriculture tools and the information they provide can facilitate better management by refining input use and drainage plans**
- **Detailed knowledge of paddocks and their performance can be usefully paired with emerging agricultural technology**
- **There is a lot of interest in PA technology in Tasmania**
- **Tasmania needs more skilled people in this field**



The PA tools used

Yield monitoring: knowing which parts of your paddock are producing well and which are not is crucial to management decisions. The capacity to measure yield using harvesting machinery is critically limited in Tasmania. For this project, hand harvest sampling was used in most crops due to the lack of yield monitoring technology.

Imagery: Aerial imaging using normalised difference vegetation index (NDVI), as this study used, or other kinds of vegetation imaging, can give a detailed picture of the vigour and biomass of your crop as it grows. Areas of poor growth can be mapped and investigated and therefore managed.

Soil mapping: pH and electromagnetic induction (using EM38) levels can be mapped over the entire paddock prior to growing a crop. The data obtained can help create a plan for variable rates of liming, irrigating and sometimes fertilising.

Digital elevation modelling: the topography of the paddock and surrounds is vital for drainage planning, which is important for increasing crop performance, particularly in low slope and variable soil type situations.

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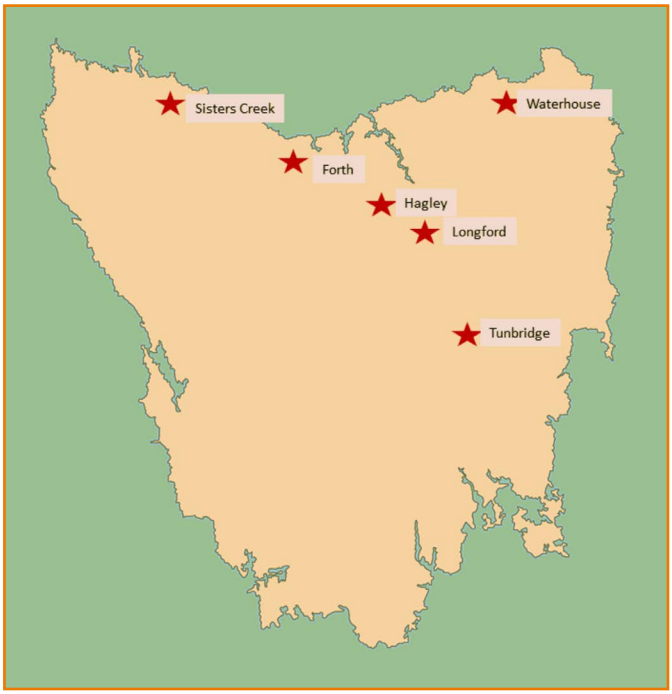

Six sites were chosen from a range of soil types across Tasmania for this project:

- Beswick Holdings, Sisters Creek,
- Forthside, Forth,
- Mill Farm, Hagley,
- Rannoch Park, Longford,
- Marengo, Waterhouse,
- Ballochmyle, Tunbridge.

Four Precision Ag expos were held, three in Deloraine and one in Hagley, as the key extension activity of the project. Each expo was attended by over 200 people and received positive feedback from stallholders. This event will continue to be an annual showcase of PA and its relevance to agriculture in Tasmania.

Results from the PA Project

The yield results from the six sites highlighted the variability across paddocks. The crop yields ranged from a 40% variation from lowest to highest, in an onion crop, to a 1400% variation in a potato crop. Across all, variability averaged a 500% difference between low and high yield. This variability could sometimes be partly explained by measurable factors mapped by the project, particularly waterlogging. Across seasons, it was also found that some areas consistently produced high or low yields, while other areas responded differently depending on the crop and the season - useful data for managing the paddock.

The NDVI images obtained throughout the project highlighted areas of poor growth in crops. This is a rapidly advancing area of technology and is becoming more readily available and accessible to individual growers.

The project showed that PA can assist growers in more deeply understanding their paddocks, more easily locating trouble spots and more efficiently managing variable applications of water, lime and fertilisers. Combined with widespread technology such as GPS and with constantly improving accessibility to other useful tools like imaging and drones, there is much to be gained from increased uptake and demand.

Key factors for progress

Key factors which the industry must address to make further progress in the adoption of precision agriculture are:

- emphasis on the importance of soil-water management, both in terms of drainage and vari-rate irrigation (where applicable) as the fundamental foundations of efficient crop production
- yield mapping capacity across a range of crop harvesters, and increased use of in-crop imagery to identify in-season crop growth variability
- the capacity of growers/advisors to effectively use data to investigate the causes of variability
- increased education and training opportunities for a wide range of audiences to ensure a pipeline of skilled operators in the industry.

Resources

TAPG has developed a Precision Ag ‘one stop shop’ for information, advice, direction and equipment purchasing, that can be found on the front page of their website.

http://tapg.net/precision-agriculture/

This fact sheet has been funded by Hort Innovation, using the vegetable research and development levy and contributions from the Australian Government. Hort Innovation is the grower- owned, not-for-profit research and development corporation for Australian horticulture.