# VarietyChooser: the flexible cropping management tool

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**Abstract**
Smartphones are becoming an essential tool for day to day activities on the farm. The world of apps for smartphones are growing by the second. There is a need for simple agronomic apps to be used by people with a range of technology skills for fast information access and effective use of ones time. The VarietyChooser app, built for iPhone, incorporates information from the *Winter Crop Variety Sowing Guide* by NSW Department of Primary Industries (DPI). VarietyChooser provides mobile interactive support to assist selecting crop varieties. This is done by providing the user with comprehensive information on grain yield and disease resistance and tolerance ratings on varieties of nine crops (wheat, canola, triticale, barley, chickpea, faba bean, field pea, lupin, and oats). The VarietyChooser app is stand alone – once downloaded it can be used on any iDevice without mobile reception or internet service. The app is also quick to use: variety information can be found in an instant and is in the farmer's pocket. It provides instant information, and can then later be utilised when consulting the *Winter Crop Variety Sowing Guide* for more detailed information. Download numbers from the Apple App Store indicate the popularity of VarietyChooser. After VarietyChooser was launched in December 2011, downloads have averaged at 199 a month. Data from a survey conducted by the VarietyChooser team also indicates a positive response to the app. This paper will discuss the benefits of apps, an example farmer enquiry (i.e. which variety of wheat should I plant this year), analysis of feedback and survey data from NSW DPI agronomists who used the VarietyChooser app in 2011/12.

**Key Words**
Cropping, mobile, technology, crop, variety, iPhone,

## Introduction

The VarietyChooser application (app) for iPhone or iPad, is a simple and easy-to-use mobile based tool (Figure 1) which allows fast access to comprehensive winter crop information based on the annual publication of the New South Wales Department of Primary Industries (NSW DPI) *Winter Crop Variety Sowing Guide* (Matthews and McCaffery 2012). This includes information such as yield data and disease resistance and tolerance ratings on varieties of nine crops (wheat, canola, triticale, barley, chickpea, faba bean, field pea, lupin and oats). Once the app is downloaded, no mobile reception or wireless internet is required to use the app, making it handy to take out into the paddock and out of mobile range.

The development of this app first began as a pilot project in mid 2011 by the NSW DPI Broadacre Cropping Unit, and is one of the first such apps developed by a government organisation. The team has conducted research to understand how people use the app and where users feel the app can be further developed. This paper outlines how the VarietyChooser app works, the methods used to investigate the app's value as an agronomic tool, and suggestions from participants on how the app may develop in the future.

## Methods

*How does a user operate the VarietyChooser app?*
To access the CropMate™ VarietyChooser application, the user can download VarietyChooser by finding the App Store website through a search engine or directly using the URL (http://itunes.apple.com/au/app/cropmate-varietychooser/id476014848?ls=1&mt=8) (Warden and McIntosh 2011). A typical scenario of using VarietyChooser involved selecting a winter cereal (for example wheat) on the home page of the app (Figure 1a). A trait selection page of the selected crop was generated (Figure 1b). The user then selected the regional information and varietal traits relevant to their situation. At the bottom of the screen are two tabs – 'Varieties' and 'Yield Trials'. As each trait is selected, the number of varieties and trials decreases (Figure 1b). When using the app it is best to monitor this number and look at the results when it gets below 10. The 'Varieties' button displayed the list of varieties which satisfy the required traits (Figure 1c). The 'Yield Trials' button displayed yield comparisons between varieties. The example in Figure 1 is for

a farmer from Moree delivering Australian hard wheat to Silo Group North, having selected for Stripe Rust (WA yr 17-27) ≥ MR and Crown Rot ≥ MS-S.


**Figure 1: screenshots of the NSW DPI VarietyChooser app (a) home page (b) Trait selection page for wheat (c) Variety selection for scenario**

*How data in the VarietyChooser app was sourced and/or compiled?*
The data within VarietyChooser was based on the annual publication of the NSW DPI *Winter Crop Variety Sowing Guide* (Matthews and McCaffery 2012). Both formats utilise the National Variety Trial (NVT) results and many of the research and industry based projects that have provided information to support this application. The NVT MET (Multi Environment Trial) analysis data was used and takes into account the quality of the trials predicting the published yield (not all sites are equal). The data is drawn from 2005-2011 analysed across years and sites. Wheat classification grades are sourced from Wheat Quality Australia.

*How usage data of VarietyChooser was sourced*
Data on download and usage of the VarietyChooser app was gained in two ways. Firstly, download data were recorded from the Apple App Store, from which the VarietyChooser app is downloaded by users for free. This download information is for all iDevices.

Feedback data on the pilot release was sourced through participants completing an online survey, written by the VarietyChooser team and provided through the Survey Monkey website. This was distributed through the NSW DPI network of Broadacre Cropping District Agronomists (DAs). A more comprehensive stakeholder survey to include farmers, consultants and extension providers will be conducted after the release of the 2012 version in May 2012.

## Results

The results generated from the scenario described in the method section can be shown in the form of a comparative graph. The results were generated from the scenario described in the Method section. The VarietyChooser app generated five varieties that fitted the requirements put in by the user and were compared in a local trial in the north west of NSW (Figure 2a). The results were a percentage of a comparative variety which in this scenario was Janz. If the user wants to investigate a variety in greater detail a summary of the traits can be generated by selecting the Varieties tab (Figure 2b).

(a) (b)


**Figure 2: screenshots of the NSW DPI VarietyChooser app (a) Results of the traits selected described in the method (b) description of traits for Sunguard, the highest yield variety in the scenario chosen in the method**

*Download data*

By monitoring download data through the Apple App Store (Table 1 and Figure 3), the VarietyChooser app has been downloaded a total of 1192 times since it was uploaded to the App Store in November 2011. Over that time there were obvious spikes of usage which correlated with promotion activities of the VarietyChooser team, such as the official launch of the app (December 2011), and presenting the app at various events such as GRDC Advisory Updates (February and March 2012).

**Table 1 (left): download data of the VarietyChooser app. Source: Apple App Store.**

| Month | Number of downloads |
|---|---|
| Nov-11 | 126 |
| Dec-11 | 475 |
| Jan-12 | 136 |
| Feb-12 | 161 |
| Mar-12 | 180 |
| Apr-12 | 114 |
| Total | 1192 |
| Average | 199 |

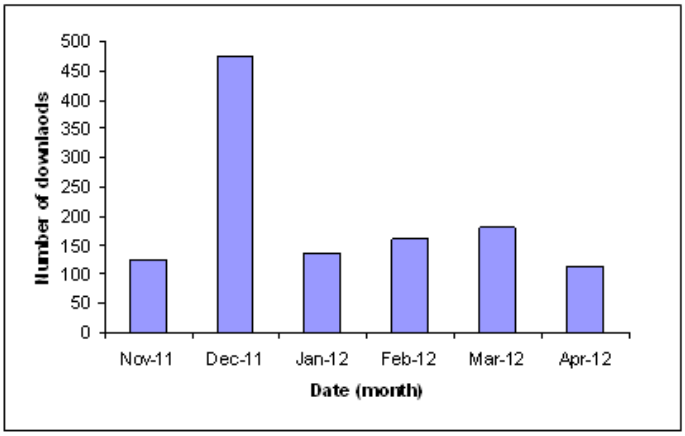


**Figure 3 (right): downloads per month of the VarietyChooser app. Source: Apple App Store.**

These data shows positive results in terms of download numbers, especially due to the fact that the app was a pilot project.

The limitation of this dataset is that there is no companion information on who is downloading the app, such as their gender, where they live and work, or what sort of device they use. This has led the VarietyChooser team to investigate other methods of assessing how the app is used.

*Survey data*
The dataset of results used for this survey were of 10 responses, all from DA's predominantly in central and southern New South Wales. The gender of respondents was nearly equal, average age of all participants was between 30 and 49 years and 50 % of the participants used VarietyChooser regularly.

6 of the survey participants found the VarietyChooser app 'easy to use', 3 found it usable and no respondents said it was to difficult to use or navigate. Approximately half of those participants use it regularly during decision making of a cropping programme. One comment stated the VarietyChooser app was "quick and convenient", demonstrating the potential of the app to be the first source of information provided in a timely manner, before using the *Winter Crop Variety Sowing Guide* (Matthews and McCaffery 2012) for more detailed information.

As well as the ability to find variety information fast, comments provided from the survey indicated that the VarietyChooser app could provide information with finer detail, such as "sow depth response", "sowing time information" and "VSAP trials incorporated into data". This led into the question asking for suggestions for further development, which provided comments such as:

- Providing flyers of information on varieties able to be printed off.
- Separating trial information of varieties under irrigation versus dryland treatments.
- Including time of sowing windows and location maps.
- Providing a contact person for a particular crop, for example nominating a DPI DA with strengths in wheat research as the contact for the Wheat section.

Overall, survey results provided a positive response to the VarietyChooser app, with 100% positive feedback of respondents who answered the question on whether the app should be invested in annually to keep it up to date. Comments supporting this included "it is no use if it is not up to date", "it needs to reflect the current variety guide so if changes are made there then it needs to be updated" and "to be done properly, this is a definite Yes. Once every 3 or 5 years would be useless".

**Conclusion**
Variety Chooser is a user friendly, smart phone application that provides a way of selecting winter cereal varieties using traits, generating yield results using long term statistically valid research based on NVT data , research projects and variety specific information. The response by survey participants has cemented the fact that the VarietyChooser app is easy to use and simple to find cropping and variety information fast. With the continued move toward mobile technology, the VarietyChooser app is at the forefront in this area, especially for the broadacre cropping industry.

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The VarietyChooser app can be found on the Apple App Store at http://itunes.apple.com/au/app/cropmate-varietychooser/id476014848?ls=1&mt=8.

**References**
Matthews P and McCaffery D (2012) Winter Crop Variety Sowing Guide 2012. NSW DPI Orange.

Warden E and McIntosh G. (2011) Poster: CropMate™ and VarietyChooser: new technology providing flexible management tools. 2011 Australasia Pacific Extension Network National Forum.