

Leveraging Twitter® to aid tactical fertiliser applications and soil management in the West Australian Grainbelt

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Abstract. Transferring the knowledge required to make tactical in-season fertiliser decisions is a persistent challenge given time lags associated with e-mail and newsletter updates and traditional communication strategies. Segregated communication channels across funding bodies, state departments and collaborating organisations often compound the problem by limiting the exposure of online reference material hosted on different websites. The ease associated with collaborative communication through Twitter® handles increases the breadth of information that can be readily leveraged by extension officers and the range of stakeholders it can disseminate to by re-tweets. Detailed analysis of a 'tweet series' conducted from June – September 2015 highlights the significance of the multiplier effect embedded within the Twitter® platform (evidenced by the number of link clicks, re-tweets and other analytics) and its relevance to one of the main metrics currently used to evaluate extension activities in the WA Grainbelt – 'the number of growers and advisors reached'.

Keywords: twitter, tweets, re-tweets, impressions, engagements

Introduction

Communication plays a vital role in the ability of agriculture departments and organisations to serve producers and other external stakeholders. However, the approaches to communication with producers have shifted dramatically over the past two decades (Hunt et al. 2012). At one time, agricultural extension officers were central in this process, but their role has declined precipitously worldwide. Extension programs have been shifting from the public to the private sector and the funding for extension officers has fallen significantly (Rivera 2000). Meanwhile, research evidence indicates that governments who increase their investment in communication technologies contribute long term to an 'increase of output in Australia's broadacre agriculture' (Salim 2012).

Social media has rapidly developed as a core component of communication technology. Social media is defined as platforms where 'individuals and communities share, co-create, discuss, and modify user-generated content' (Kietzmann 2011). Studies have found that organisations who introduce social media to their communication tools have a positive impact on the relationship that customers have with the product, brand and company, as well as other customers (Laroche, Habibi & Richard 2013). Other research has found a positive correlation between the level of interactivity by an organisation and the quality of relationship with its stakeholders (Saffer, Sommerfeldt & Taylor 2012).

Twitter is typically a central component of an organisation's social media strategy. Twitter is a microblog where users send out 140 character messages and follow other users to receive their tweets (Kwak et al. 2010). Twitter is increasingly recognized as an effective communication tool in organisations given it's a role as a unique conduit for information delivery and an interactive medium to facilitate digital engagement between client and service provider. Most tweets are public, so they provide organisations with valuable information to discover emerging issues and trends among key stakeholders who also tweet regularly (Zailskaite-Jakste & Kuvykaite 2012). They help organisations to more quickly learn stakeholder views that can be incorporated into the organisation's strategies and practices. Australia's Murray-Darling Basin Agency used social media and found it effective at generating conversations and relationships with the community (Johns 2014).

The purpose of this paper is to quantitatively assess the role of Twitter in communicating technical messages to producers and other agricultural stakeholders. Secondly, this paper investigates the role of Twitter in increasing web traffic to web pages containing technical content on crop nutrition that can guide nutrient management decisions. Third, this paper demonstrates the importance of using analytics to deliver more targeted and effective extension messages through Twitter.

Social media as an emerging strategy

Social media has become a most profound social phenomenon over the past decade. It is currently estimated that 68% of Australian internet users have a social media profile (Sensis 2015). In comparison, only 33% of Australian businesses have a social media presence.

Originally designed for personal use, most social media platforms have found their way into organisational practice. Twitter is an important social media platform for organisations to communicate with their key stakeholders (Baird & Parasnis 2011). Although Twitter use has declined somewhat over the past year, it is currently the fifth most popular social media channel within Australia (Sensis 2015) and continues to grow as an organisational tool. Twitter is chosen by organisations because it is powerful, cost effective, and serves multiple functions.

By far the main benefit of Twitter is the efficient transfer of information. Tweets are brief, so they require minimal time to create a message and very little bandwidth to transmit that message. Tweets are also compatible with many portable devices such as smartphones and iPad, allowing for easy usage in a variety of situations. Twitter's ease of usage has been noted as an important function during emergency situations. For example, tweets sent by government officials during the devastating floods in Boulder, Colorado, received high engagement levels because they efficiently transmitted vital information on safe water use (Sutton 2015).

A second function of Twitter is as a tool for promoting content found on websites and other channels (Johns 2014). Tweets are brief, so users are easily motivated to read the entire tweet. In contrast, websites require more motivation to engage in given lengthier content. In addition, tweets are pushed to the audience, meaning that receivers are made aware of the message as soon as it is sent. In contrast, website content is known to readers only when they make the effort to search for it. Tweets thereby provide an efficient notification system for a wide breadth of users, not just those searching for particular content.

Twitter has been identified as a useful tool for building relationships between stakeholders and organisations. One reason this occurs is that tweets require a more informal style of conversation. Another reason is that tweets can be published frequently, which allows for a stronger connectivity between the publisher of the tweet and the reader of the tweet. Twitter also facilitates two-way conversation between any two parties which may have previously been disconnected by more formal communication barriers. However, research suggests that organisations are currently using social media more for one-way information distribution than user engagement (Shin 2015).

Methods

Tweets pertaining to crop nutrition and/or soil management were published through the Department of Agriculture and Food, Western Australia's main twitter handle (@DAF_WA) during the 2015 winter-cropping season between the middle of June to the end of September. Tweets were published approximately 2-3 times a week and at infrequent intervals. Twitter analytics were gathered and recorded in a rolling activity log containing all metrics during this time frame (see Figure 1).

For each tweet, data was gathered on the following:

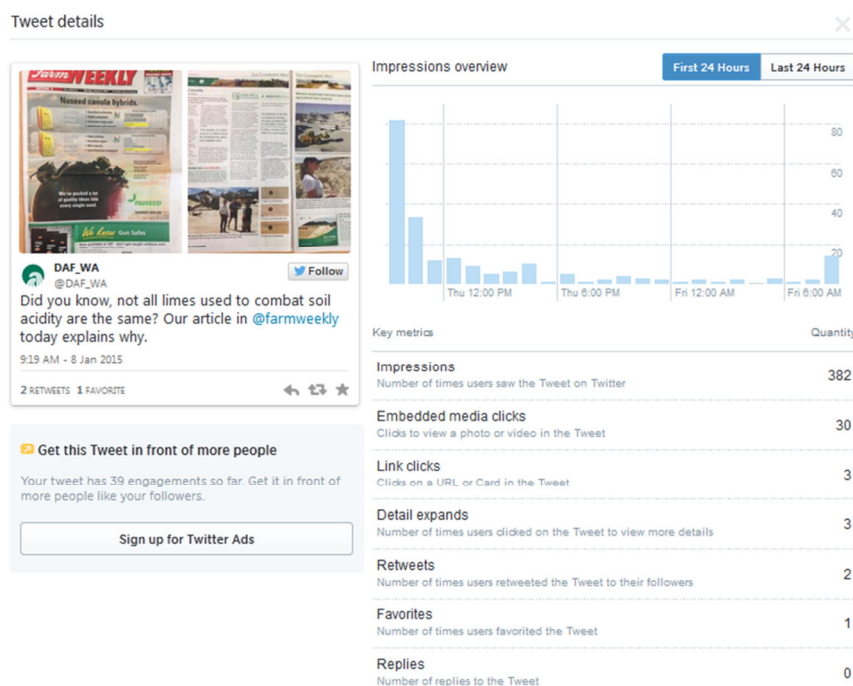
- publication date
- content
- impressions
- total engagements
- embedded media clicks
- link clicks
- detail expands
- retweets
- favorites
- replies.

Tweets were published with four different structures:

- tweets with embedded media but no hyperlink
- tweets with a hyperlink but no embedded media
- tweets with both embedded media and a hyperlink
- tweets with no embedded media or hyperlink.

Most tweets included for analysis were authored and published under the @DAF_WA Twitter® handle; however some were published by the eXtension Aus Crop Nutrition platform (@AuCropNutrition) or the Grains Research and Development Corporation (@theGRDC) and subsequently re-tweeted through the @DAF_WA handle. The tools used to analyse, improve and monitor communication through social media channels are well developed and easily accessible. Within social media, we call this collated data 'social metrics' (Hootsuite 2015). Social metrics within Twitter are broadly based on impressions - the total number of views of a particular tweet, and 'engagement' or 'amplification' metrics, which are described further below.

Figure 1. Example of analytics gathered on a @DAF_WA tweet promoting a rural publication on soil acidity management in the West Australian Grainbelt



Engagements highlight the success of the message delivered through Twitter by providing data on:

- replies: a response sent to your Twitter handle
- favourites: a like of the tweet
- link clicks: user clicks on a hyperlink to an external website to view more detailed information
- detail expands: user clicks to see the conversation thread
- embedded media clicks: user clicks to see better detail of the image or video attached
- engagement rate: percentage of the number of engagements compared to the number of impressions (views).

Amplification provides data on the extension of the original message beyond the original Twitter account's audience. It takes into consideration:

- retweets: user shares the tweets with their followers
- modified tweets: user makes an adjustment to your tweet before sharing with their followers
- sent to email: tweet is shared by email.

A snapshot of the 'reach' achieved through tweeting

The extent of the multiplier effect is dramatic and can have significant impacts when using Tweets to disseminate technical information, highlight research activities and promote upcoming field days and associated extension events. A preliminary example of the extent of the multiplier effect is provided in table 1. In just over a week, a series of just 6 tweets had been viewed nearly 4000 times in total, with more than 100 viewers clicking through on embedded URL links to view detailed information on the subject matter that was tweeted about.

The engagement numbers in table 1 signify that 241 people were interested enough in the tweeted content to click on that tweet either to view an image in more detail, read the full tweet, reply to that tweet, click on the URL link and/or retweet that tweet to their own followers. Over 100 URL clicks means that over 100 people clicked through to more detailed reference material or event details to read the particularities of the tweeted content and understand the full story.

Table 1. Tweet analytics for a typical series of six tweets on crop nutrition from 15th June to 23rd June

Date tweeted	Tweet type & purpose	Impressions	Engagements	URL clicks
15 th June 2015	Hyperlink & image – event promotion	239	31	18
22 nd June 2015	Hyperlink & no image – decision making	359	12	10
22 June 2015	Hyperlink & no image – highlight research activities	461	15	13
23 June 2015	Hyperlink & no image – decision making	392	19	14
18 th June 2015	Hyperlink & image – highlight research activities	935	30	8
20 th June 2015	Hyperlink & image – decision making	1527	134	39
Total		3913	241	102
Average for sample		652	40	17

The benefits of tweeting layered information

A single tweet can disseminate both a brief research summary outlining the implications for decision making on-farm, as well as provide a clear, easily visible link to more detailed research outcomes. To give an example, we reference a tweet delivering research outcomes on the impact of the timing of Nitrogen fertiliser applications on canola yield in low rainfall areas (see figure 2.) The embedded image provided the one pertinent line of information important for decision making, whereas the hyperlink connected viewers to the full 4 page trial report. The layering of information in this manner has four main benefits. It allows delivery to be tailored to different audience preferences; access to as greater if not more growers and advisors than those typically present at a technical workshop or field day; provides the information on-demand, making it accessible on-farm, and also places a minimal time requirement on both the sender of information (the tweeter) and the viewer. The viewer has a variety of options and can choose to; read and absorb a short, sharp one liner; click on an embedded hyperlink to view more detailed information on the spot; or favourite that tweet to revisit it in detail at a later time.

Fleming, Wilson & Measham (2014) suggest that relationships with growers are at the heart of successful communication and behaviour change, and that growers don't always demand instantly applicable answers with an immediate benefit to their profitability. While we agree, there are clear occurrences where growers require basic, timely information to aid tactical agronomy and farm profitability. Fertiliser nitrogen is one of the largest variable costs for many WA growers and the decisions on when and how much to apply is typically informed by seasonal conditions. In these occurrences growers don't require an established relationship with an expert to move from knowledge to action, but moreover the right information, on-demand, and in an easily accessible format.

A pertinent example of the impact of short, sharp tweets designed to disseminate technical information can be obtained by contrasting two tweet types – a tweet oriented toward aiding this year's decision making process based on a summary of pertinent research outcomes, and another aimed at promoting the relevance of a new research project on nitrogen nutrition (table 2). The former had a much higher engagement percentage and more than 4 times the number of URL clicks to further information. Conversely the second tweet, albeit on the same subject matter (nitrogen nutrition) but with a focus on future activities and upcoming research outcomes, had a significantly lower engagement rate, lower URL clicks and only a third of the number of re-tweets.

Table 2. Comparison of tweet analytics from tweets with different purposes

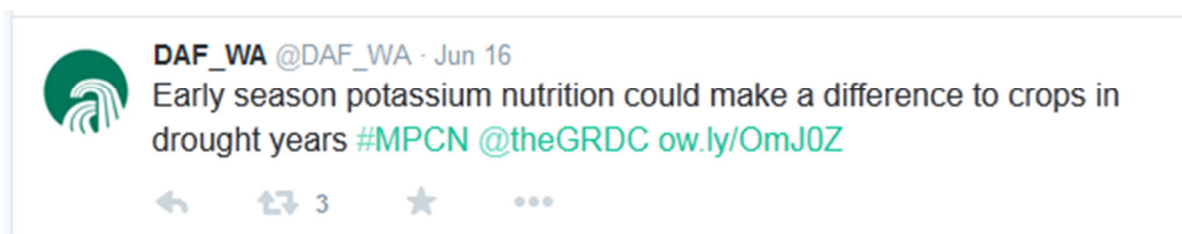
Tweeted content	Purpose	Impressions	Engagements	Engagement percentage (%)	URL clicks	Re-tweets
Timing of N is flexible	Decision making	1553	137	8.8	39	9
Nitrogen timing research could save valuable dollars	Promotion of new field research upcoming activities	939	31	3.3	8	3

Figure 2. Tweet to aid tactical agronomy (left) and promote new research activities (right)

Tweets which provide the information necessary to aid the decision making process typically have much higher engagement rates, along with tweets which clearly elucidate issues with an immediate impact on production. These tweets dictate either an immediate course of action or an acknowledgement that the issue at hand requires consideration and thus typically receive higher rates of engagement, and subsequently higher impressions given the larger numbers of re-tweets.

The potential application of Twitter in collaborations and reputation

Twitter is potentially beneficial as a communication tool for increasing awareness of the user's reputation and role within a specific network or industry. This occurs because tweets may include hyperlinks, Twitter handles, and/or hashtags that link back to the source. In the grains industry, a pertinent example is the potential impact of a well-structured tweet used to reinforce the nature of the collaboration between the funding body, the project deliverer and the end user. Twitter also allows users to select their visual brand image and further reinforce the reputation and recognition of their brand (see Figure 4).

Figure 4. Tweet linking research outcomes with the research initiative funding the work

Following the delivery of a series of potassium nutrition seminars across WA in 2015, a tweet was published with a link to a media release that summarised the research outcomes presented at the seminars. The hashtag MPCN is the abbreviation for the research initiative More Profit from Crop Nutrition, the program which helped coordinate delivery of the seminars.

In this example the project deliverer (DAFWA) has a clear association with the end user through their logo displayed in the twitter handle, but also references the collaborative research

initiative that the project deliverer is a part of via the MPCN (More Profit from Crop Nutrition) hashtag. The tweet is structured in a way that also links back to the Grains Research and Development Initiative (@theGRDC) - the funding body driving the More Profit from Crop Nutrition initiative.

Carefully structured tweets not only disseminate technical information quickly, easily and on-demand to a large audience, but also help build familiarity with a branded body of research. Taking the More Profit from Crop Nutrition (MPCN) initiative as an example, regular association between an assortment of technical updates, event promotions, and online resources with the MPCN hashtag will help growers and industry build the association between the research initiative and the outcomes it delivers for growers and advisors. A regular series of tweets can build this association, in addition with in-person deliveries at field days and workshops, to help enable a better evaluation of the initiative's contribution to industry. It does so by reinforcing the connection between the initiative and its relevance to an individual grower, and also through raising awareness of the initiative and its outcomes to a much broader audience by means of re-tweets through other networks, thus enabling a more engaged and broader cross section of growers who are able to gain familiarity with, and provide feedback on the initiative. Given the distance barrier often prevents regular contact between project deliverers (i.e. Extension Officers) and the suite of growers and advisors across the West Australian Grainbelt, regular updates through Twitter can also help reinforce learnings from a one-off in-person delivery (i.e. a technical workshop) in isolated areas and help perpetuate familiarity with the initiative, its outcomes, and the people and organisations behind it.

Conclusions

Twitter is an excellent platform for engagement in the digital world that can be effectively leveraged for a range of purposes within agricultural extension. It is first a rapid tool in which to communicate to producers and agricultural stakeholders. Through the layering of information, it can disseminate research outcomes to a broader audience, leveraging online resources during key times of the season, improving the brand recognition between a research initiative and the outcomes that are of relevance to end-point users, as well as promoting and supplementing face to face engagement at field days, workshops and webinars.

This paper acts as a case study illustrating that a disciplined approach to structuring and disseminating tweets, as well as collating, analysing and integrating twitter analytics can help form the basis of a communication strategy that enables meaningful engagement in the digital world. Leveraging twitter through these guidelines is also an effective and pragmatic approach to help overcome the challenges to delivering meaningful extension in the West Australian Grainbelt.

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