Developing an alternative herbicide management strategy to replace PSII herbicides in the Wet Tropics area

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Appendix 2

End of project survey
By May 2018, the online videos released since March 2018 received 171 views for the Plant cane video and 188 views for the ratoon cane video.

Unfortunately only 15 growers completed the online Monkey survey. SRA had not used the online Monkey survey tool with growers before and we showed that the grower community is not interested in this type of communication platform.

To remedy for the small number of respondents, we used the opportunity of the Meringa Water Quality day organised by Belinda Billing, SRA on the 1st May 2018, to run the survey with the participants. 23 local growers were present and participated in the survey.

The field day survey was not only designed for the project requirement but also encompassed questions that were relevant for other adoption and nutrition projects. Only questions relative to this project are discussed in this document.

In both surveys, growers were asked to comment on their herbicide selections for the current 2017/2018 season

**Question 1 - What are the residual herbicides you use in plant cane? (rank 1-5) (Priority Ranking)**

![Plant cane preferred pre-emergent herbicides - by respondent count](image)

Pendimethalin and atrazine were the most selected as first preference for plant cane, used by 34% and 23% of growers respectively, indicating that the traditional mix of pendimethalin/ atrazine is still the most popular, due to its high efficacy and its crop safety factor.
Diuron based herbicides were used as the preferred herbicide by 23% of growers, suggesting that the use of diuron in plant cane is still common, however likely at very low rate.

Imazapic based herbicides were used only by 18% of growers as second choice but were never the first choice, perhaps because of the fear of phytotoxicity. Where they were selected as second choice, they were probably applied in established cane before or at out-of-hand crop stage.

Metribuzin was selected by 15% of growers as a second choice and by 18% of growers as a third choice. Metribuzin was probably applied in established cane before or at out-of-hand, because of its sensitivity to UV light.

Flumioxazin, which was only recently registered, was selected by 9% of growers as first preference. It illustrates growers’ awareness of alternatives to PSII herbicides with better environmental profile. Isoxaflutole was only used by 6% of growers as first choice and by 15% as second choice, likely due to its cane phytotoxicity issue in some soils. Metolachlor and ametryn were only used by a minority of respondents, which is likely due to efficacy and pricing. As these actives are mobile and their toxicities relative to diuron are quite high, their low use pattern is reassuring.

**Question 2 - What are the residual herbicides you use in ratoon cane? (rank 1-5) (Priority Ranking)**

As a first choice in ratoon, 22% of growers use atrazine, 22% use imazapic based products, 19% of growers use isoxaflutole, and 16% never use residuals. Only 14% use diuron based products on ratoon as a first choice. The emerging product flumioxazin is only used by 3% of growers as first choice, likely due to its pricing and lack of knowledge in the product.

Amongst growers that use a second product in ratoon, 27% of growers use isoxaflutole and 31% use imazapic based products.
These results demonstrate that growers have increased their use of pre-emergents like isoxaflutole and imazapic and reduced their reliance on diuron.

The emerging product flumioxazin is not yet widely used in ratoons but its use is expected to rise in the near future.

Surprisingly, atrazine was the most preferred herbicide used in ratoons. Reasons for this may include that it is a well-known herbicide by growers, controls a broad spectrum of broadleaves and grasses, and may be used in combination with paraquat at out-of-hand crop stage. This reliance on atrazine may seem quite alarming, but atrazine only has a low toxicity (0.036) to aquatic species relative to diuron.

For ratoon cane, it is positive that diuron-based herbicide use is low and suggests a high awareness of reef water quality issues. Encouragingly, a number of growers have also recognised that in some situations there is no need for pre-emergents at all.

Overall, results suggest that growers have moved away from diuron-based herbicides and are quite comfortable in using other active ingredients.

The following two questions were only part of the online survey so results need to be taken with caution as there were only 15 participants.

**Question 3 – What is your Guinea / Hamil grass control strategy?**

![Bar chart showing strategies for Guinea/Hamil grass control](image)

93% of growers still use spot spraying to control Guinea grass as no other direct spray strategies was identified. 46% also use fallow crop to reduce the seed bank and 61% rely on pre-emergent herbicides.
**Question 4 – What weeds do you find the most difficult to control?**

![Weeds most difficult to control](image)

These answers highlight that Guinea grass is still a significant issue that requires additional research work.

**Future SRA investments**

In addition to growers, productivity services, QDAF and agribusiness resellers were present at the Water quality day. A total of 44 participants were asked to give their opinions on future SRA investments. In the following graphs, their answers were combined to the ones from the online survey.

**Question 5 - SRA should demonstrate how effective herbicides are in controlling different weeds.**

![SRA should demonstrate how effective herbicides are in controlling different weeds - by respondent count](image)

88% of participants would like to see SRA investing in herbicide efficacy trials/demonstrations (54% of respondent are strongly favourable)
**Question 6 - SRA should invest into developing sensor systems that enable automatic spraying systems.**

63% of respondents would like to see SRA investing in sensor systems for weed management. 21% were neutral suggesting perhaps that these were unfamiliar with this technology and therefore unable to have an opinion.

**Question 7 - SRA should invest into developing aerial mapping technology and systems that allow mapping of weeds, pests or crop conditions. (select 1 answer) (Multiple Choice)**

65% of respondents would like to see SRA investing in aerial mapping. The answers for aerial mapping and detection sensors were very similar, suggesting that growers who are interested in mapping are also potentially interested in detection sensors.
Question 8 - SRA should continue to invest in research/adoption projects focussed on water quality.

75% of respondents would like to see SRA investing further in water quality.

Question 9 - SRA should invest into a mobile app for weed identification (only part of the online survey)

71% of respondents are favourable to investment into a mobile app for weed ID.

Whilst not a statistical survey, the results give an indication as to how people felt where SRA investment should be directed (within the scope of the questions asked).

The following table compares how themes related to the project compete with each other and with other themes discussed throughout the survey. The order for support is as follows, with 1 being the issue with most support.
<table>
<thead>
<tr>
<th>Rank</th>
<th>Issue</th>
<th>Type</th>
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<tbody>
<tr>
<td>1</td>
<td>New technologies and strategies for canegrub control</td>
<td>Research</td>
</tr>
<tr>
<td>2</td>
<td>Demonstrate efficacy of herbicides on different weed species</td>
<td>Development</td>
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<tr>
<td>3</td>
<td>Support for the use of farm technologies – variable rate, GPS, drones</td>
<td>Adoption</td>
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<tr>
<td>4</td>
<td>Continue research and adoption related to water quality</td>
<td>Adoption/Research</td>
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<tr>
<td>5</td>
<td>Develop a mobile app for weed ID</td>
<td>Development</td>
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<tr>
<td>6</td>
<td>Facilitate self-driven grower groups</td>
<td>Adoption</td>
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<tr>
<td>7</td>
<td>Aerial mapping technology to allow mapping of weeds, pests, crop condition</td>
<td>Research</td>
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<tr>
<td>8</td>
<td>Demonstrate Six Easy Steps</td>
<td>Adoption</td>
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<tr>
<td>9</td>
<td>Invest into sensor systems allowing automatic spraying systems</td>
<td>Research</td>
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