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# 2018 RDE COMMUNIQUÉS

## FEEDBACK TO REGIONAL RDE COMMITTEES

**South African Sugarcane Research Institute**
**Mount Edgecombe**

***UNLOCKING THE POTENTIAL OF SUGARCANE***

**Website: http://www.sugar.org.za**

## PREFACE

Contained within these pages are informative communiqués from SASRI specialists on the issues raised in 2018 by representatives of the regional RDE Committees from the northern irrigated regions of the industry. In instances where essential knowledge is lacking, certain issues have led to proposals for new research projects, which are to be implemented in 2019/2020, subject to funding approval by the Industry leadership. These new projects are highlighted in the document.

The 2018 RDE Committees Workshop was convened in Komatipoort on 8 March 2018 and hence, issues relevant to sugarcane cultivation under irrigated conditions predominate in this document. As agreed by the RDE Committees, the annual workshops will alternate between the irrigated and rain-fed regions, with the next workshop planned for Mount Edgecombe in March 2019.

*Also included in this document are **Communication Action Plans** for each RDE issue. These plans indicate how knowledge exchange is to be facilitated on each issue as a partnership amongst growers, MCP technologists, SASRI Mount Edgecombe-based specialist staff and the regionally-based Extension Specialists.*

## ACKNOWLEDGEMENT

SASRI would like to thank the representatives of the grower and miller communities who give of their time to serve on regional RDE Committees. Without this commitment and generosity, SASRI's delivery of meaningful research outcomes to the industry would be severely compromised.

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# 2018 RDE Communiqués

| Agronomic issues:<br><br>What improvements can be made to current best practices? Growers make money from sugar so not achieving potential yield is costing money.<br><br>(SASRI Reference: Issue 1) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Require a complete BMP recommended package per farm.

**Background**

Uncertainty exist about which BMPs to implement first and which to leave for last. Acknowledged that SUSFARMS® is a guideline but its practical implementation is uncertain.

**Expected Outcome**

Selection and order of BMP implementation is required.

**SASRI COMMUNIQUÉ**

It is within an Extension Specialist's Programme of Work (PoW) to identify production constraints in an area, both at a regional and individual farm level. This information is then used to plan interventions and provide guidance on which BMPs to prioritise to best address these limitations.

With the reinstatement of SASRI Extension to the Komatipoort region, this process will begin to unfold naturally over time. The Extension Specialist will be briefed to share his vision, approach and strategic components of his PoW widely during contact with growers, following approval by the regional RDE Committee.

SASRI has an obligation to ensure that all BMPs are well documented and easily accessible to both Extension Specialists and growers directly. In this regard, a SASRI project is under development to review how BMPs are managed. The project will include the following areas:

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18KE03
*Defining protocols and procedures for effective management and dissemination of SASRI BMPs*

Project Manager
*Poovie Govender*
*(Poovie.Govender@sugar.org.za)*

**Consolidation of BMPs**

This phase will map the entire sugarcane production cycle and then proceed to associate SASRI BMPs with the various farming operations involved in each production phase. The exercise will identify areas where BMPs may not be easily available, or where these need revision or further development. SASRI specialists will be identified to manage each BMP subject area.

**Defining protocols for managing BMPs**

Mechanisms will be devised to ensure regular review and update of SASRI BMPs.

**Improving Accessibility**

A central platform (most likely in the form of a website, including decision flowcharts) will be devised to provide easy access to all SASRI BMPs. The emphasis will be on providing the essence of each BMP (informing farmers '**what**' to do and '**how**' to do it) with links to additional technical information for those who may wish to read further. Additional information is available on the SASRI InfoPack CD that is distributed annually to growers and MCPs (please ask your extension specialist if you have not received a copy).


**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | PC GOVENDER | | |
| Resource /Centre: | KMU | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD01 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 1 |
| Region: | Mpumalanga | Programme Area: | KMU |

| **Communication Plan Outline:** | | | | | |
|---|---|---|---|---|---|
| <u>Publications</u> | | <u>Presentations</u> | | <u>Discussions/Workshops</u> | |
| The Link and/or Ingede | ✓ | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | ✓ | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |
| Include communique in RDE issues booklet. | | | | | |
| Extension Specialist-Grower visits: Marius to re-inforce his approach during each grower contact event. | | | | | |

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| | | | | Knowledge Exchange |
| RDE issues Booklet | RDE Committee | Respond to issue raised | | |
| ES-Grower visits | Growers | Marius Adendorff to re-inforce his approach during each grower contact event. | As determined by Extension | Gauge response during interactions |
| Extension newsletters | Growers | Newsletter articles to provide insight into strategic development of Extension POW highlighting BMPs being prioritised. | As determined by Extension | Feedback from growers |
| The Link | Growers | Explain development of consolidated BMP architecture | | Feedback from growers |
| The Link | Growers | Advertise public BMP platform | When available: as determined by project milestones. | Use page tracker to determine usage |
| | | | | |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Staff time requirements only | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Articles: Soil Scientists, FAS, KMU and EXT – only time to develop articles and newsletters<br>Project proposal: Soil Scientists, KMU - time to collate and create Information Sheets | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| None | | | | |

Alternative sources of income from sugarcane related products (including additional beneficiation of these)

(SASRI Reference: Issue 2)

Click here to return to index

**RDE ISSUE DESCRIPTION**

Alternative uses for cane and cane-by-products that can generate income for the farmer (beneficiation).

**Background**

Currently legislation only allows farmers to get paid for RV and molasses, while mills can utilise and/or generate income from other products and by-products (compost, co-gen, etc). Group also indicated they wish to see more effort to identify new/alternate/better use of sugar-related products. Also want ideas of alternative sugarcane products that will potentially boost the income of growers.

**Expected Outcome**

A list of potential options for further discussion (with possible linking to Canegrowers' Innovation Group). Should items from this list have the potential to be adopted, it may be necessary to revise and adapt varieties (breeding and selection), and agronomics for the new crop use.

**SASRI COMMUNIQUÉ**

**Sugarcane and sugarcane by-products**

Potential additional income or cost saving from sugarcane and sugarcane by-products can by divided into two groups: 1) products produced on the farm from the components of sugarcane; and 2) cost saving through the utilisation of by-products from the mill.

**1. Products produced on the farm from sugarcane**

Growers harvest the stalk and deliver this to the mill, and growers and MCPs are then compensated for the sucrose delivered and the molasses produced by the mill. If the crop was not burnt the leaves could be valuable material to potentially generate additional income or to reduce input costs. The amount of leaves produced is approximately 20% of the weight of stalks delivered to the mill. The ratio between brown and green leaves is about 50/50 and depends on production conditions and management options (such as variety choice and drying off).

The simplest, and yet a very important, option is to retain the leaves in the field where it forms a protection layer to reduce the kinetic energy of water droplets, the chances of soil crust formation and soil erosion. Other important benefits include that it serves as a source of organic matter for the soil and reduces evaporation and thereby saves on irrigation water and electricity costs. It therefore has the potential to boost income (through increased yields in dryland areas) and to reduce input costs (especially in irrigated regions). If both brown and green leaves are available, growers can utilise the brown leaves for energy and retain the green leaves in the field, which should yield on average 70% of the effect of a full mulch blanket.

A portion of the leaves can also be burnt to produce electricity. However, more sophisticated processes such as pyrolysis are also available to produce electricity, gas and oils for later usage and biochar. The latter is the equivalent of charcoal with several potential uses. One is for energy and another is near permanent storage of carbon in the soil. This has significant benefits especially in sandier soils, including increased nutrient and water storage capacity.

Consideration should also be given to the baling of sugarcane residue (mainly brown and green leaves) to be sold as feed for animals. If this is an option, growers should consider retaining a portion of the leaves in the field for reasons mentioned above. Sorting of the leaves into browns and greens is not easy and will require serious consideration if either brown or green leaves is to be sold as cattle feed. Follow the links given in the Sugarcane Leaves reference for more information.

Leaves of sugarcane together with bagasse are potential sources of energy. Use of leaves is termed co-generation and should be viable if supplied to the mill at a cost cheaper than coal with respect to its equivalent energy expressed in MJ/kg (Purchase et al., 2008). See also the article by Joubert et al (2015).

Sugarcane leaves and stalks can be used as a source of cellulose which is used in many household products commonly available in the market. There is opportunity in the exploration and development of this idea through the Biorefinery Industry Development Facility (BIDF) at the Council for Scientific

and Industrial Research (CSIR) campus in Durban (Drs Doug Trotter, DTrotter@csir.co.za and Bruce Sithole, BSithole@csir.co.za).

If the stalk is retained, products such as jaggery and syrup can be produced to add value. See Singh (2013) in the reference list. In this case the risk is on the grower to find a market for the product.

**2. Cost saving through the utilisation of by-products from the mill**

Although large quantities of bagasse are produced, it is retained by the mill mainly for the generation of electricity. The mill also produces large quantities of filtercake (milo, press mud) and fly ash (boiler ash). These products are usually available to those delivering to a mill. Very little to no filtercake is available from sugar mills equipped with diffusers. If available, both filtercake and fly ash could be recycled to cane fields serving as cost effective yield enhancers if used at recommended rates.

As much as 150 ton/ha or more filtercake can be applied either before plant (and incorporated) or between ratoons (as a surface application). The amount of N contained in filtercake is 0.6 -1.5%, P is 0.7 – 1.8% and K is 0.2 – 0.5%. However, local extension should be consulted regarding appropriate filtercake application rates.

Fly ash contains about 0.1% N, 0.8% P and 0.5% K. The pH is about 8 and it contains thus a fair amount of cations such as Ca (2.9%) and Mg (0.6%). It is therefore a good product for soils with a low pH but should be used with caution on irrigated soils where the pH is normally higher than 7.

Vinasse is a by-product of distilleries that use molasses to produce ethanol. Vinasse or condensed molasses solids (CMS, where vinasse has been condensed) is regarded as a potential cheap source of K fertiliser and a potential cost saver. At a water content of 85%, vinasse contains about 1.2% K. However, transport of a product containing 85% water is simply too costly. CMS, on the other hand, contains about 45% water and 5.5% K. Thus, in order to apply 150 kg K/ha, 2 750 kg CMS/ha would be needed.

SASA is constantly searching for opportunities to improve the value of sugarcane and its by-products. Opportunities pursued included co-generation, biofuels and opportunities for bio-products such as bioplastics and a range of biochemicals.

**References and additional recommended reading**


- Joubert R (2015). Alternative uses for sugarcane. Farmers Weekly, 13 February. https://www.farmersweekly.co.za/agri-technology/farming-for-tomorrow/alternative-uses-for-sugarcane/
- Purchase BS, Wynne AT, Meyer E and Van Antwerpen R (2008). Is there profit in cane trash? – Another dimension to the assessment of trashing versus burning. Proc S Afr Sug Technol Ass 81: 86-99.
- Singh J, Solomon S and Kumar D (2013). Manufacturing jaggary, a Product of Sugarcane, As Health Food. Agrotechnology https://www.omicsonline.org/open-access/Manufacturing-Jaggery-a-Product-of-Sugarcane-As-Health-Food-2168-9881.S11-007.php?aid=18218
- Sugarcane Leaves: https://www.google.co.za/search?q=by-products+of+sugarcane+and+their+uses&sa=X&ved=0ahUKEwjJj_6I8IfbAhUEQMAKHag-BYMQ1QIIcigE&biw=1247&bih=630&dpr=1.25

## SASRI COMMUNICATION ACTION PLAN

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | R van Antwerpen | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD02 |
|---|---|

| **RDE Issue Details: Alternative sources of income from sugarcane related products** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 2 |
| Region: | Mpumalanga | Programme Area: | SDO |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | Yes | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | Yes | | | Other (specify below) | |
| Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| The Link | All growers (A/E/Z) | To make aware | 2019 | Q to extension |
| Info sheet | All growers (E) | To make aware | 2019 | Q to extension |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

N/A

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

KMU to decide on its publication in SASRI media.

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

None

Incomplete GIS-based information and decision-making system – require holistic and fully developed management system (SASRI Reference: Issue 3).

Linked to GIS-system is need for better understanding of the relationship between soil and variety selection (combined with issue above in discussions) (SASRI Reference: Issue 4).

Research on the use of NDVI imagery to detect certain pests and diseases in the field is required (SASRI Reference: Issue 21).

Data information systems collaboration (GIS, P&D info shared) (SASRI Reference: Issue 40).

(SASRI Reference: Issues 3, 4, 21 and 40)

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**RDE ISSUE DESCRIPTION**

A lack of a holistic GIS-based site-specific management system (Issue 3).

**Background**

Several GIS-based site management systems are being developed, but it appears none are complete or provide a "holistic" (term emphasised by farmer) management tool or system. More comprehensive information on soils (and management thereof) are required, better links between soils and varieties to improve decision making and guidance of onsite suitability/capability (which seemed to have some link to the lack of farm planning issues raised). It was also suggested that such a system should have capability to accept information about occurrence of P&D so that this could be made available to others for better management and mitigation.

**Expected Outcome**

Holistic GIS-based site management system and decision making tool. It was acknowledged that this was not entirely a SASRI function or capability but that SASRI must advise on aspects where it had expertise, such as varieties and agronomic (etc.) parameters, to be captured. There was some interest for this to be linked to precision agriculture practices.

**Associated Issues**

- Linked to the GIS-system is need for better understanding of the relationship between soil and variety selection (combined with issue above in discussions) (SASRI Reference: Issue 4).
- Data information systems collaboration (GIS, P&D info shared) (SASRI Reference: Issue 40).

**SASRI COMMUNIQUÉ**

SASRI acknowledges the value of the collection of production and other physical data for purposes of analysis to inform on-farm and mill-level management decisions. To this end, many of the mill groups in the industry have already embarked upon programmes to collect production, soils, variety and other data. In most cases, this is integrated into a GIS to enable geo-spatial presentation of data. SASRI has a research and support oriented GIS section, staffed by a GIS specialist and a small staff complement, comprised largely of interns. The primary purpose of the SASRI GIS Unit is to support SASRI research and development. It was never intended that SASRI should directly support any industry wide data collection or GIS. Rather, through the GIS and other subject specialists, the objective was to provide advice to the industry on the most effective and appropriate use and presentation of data. It is

acknowledged that such analysis will clearly better inform critical issues such as pest and disease management, variety choice and the determination of realistic production potential, amongst others, and therefore critical to the progress of the industry.

SASRI, through the Biosecurity function, performs activities on behalf of the industry that involve the collection of pest, disease and variety data. Another area where SASRI collects extensive data, is in soil analyses carried out by FAS. Other data repositories at SASRI include farm and field boundaries and soil parent materials. In some cases these last mentioned data are not complete or up-to-date.

The integration of all available data sets, both from SASRI and local, can provide an immensely powerful management tool which growers could make extensive use of. Regarding the data which SASRI has control over, this could be shared and integrated into systems such as a regional GIS, with the permission of the individual growers. These data could then be available for the grower's own use or, by specialists who, in aggregated form, could perform various area-based comparisons and analyses.

It is in this wider use of data, beyond individual access by the grower or SASRI specialist responsible for the data collection, that there are some concerns. For example pest and disease data often dictate the need for remedial actions, which are particular and individual concern to the grower. Wider access therefore needs to be carefully controlled. Similarly the interpretation of particular sets of data or comparisons e.g. FAS data also needs to be carried out under the supervision and with the approval of those responsible for its original collection and processing, with understanding of the necessary norms and statistics. Analyses and conclusions made by third parties without the necessary input from specialists could lead to misinformation and confusion amongst the grower community.

In the event that data collected by SASRI is provided to regional databases such as a GIS, agreements will need to be reached between the grower, SASRI and the data managers/administrators regarding levels of access and permissions. These will also need to be considered in the light of current legislation relating to the protection of personal data. Legal advice will need to be sought.

**Communication plan**

1. Meetings with relevant decision makers on the integration of P&D & FAS data into the RCL GIS Committee, RCL management, various cane grower associations and SASRI extension. Simultaneous consultations with SASA legal advisors to determine legal implications of data usage. Responsible persons: R Stranack; M Adendorff; K Trumpelmann; P Brenchley. Envisaged time period: July to October 2018
2. Outcome of above to be communicated to Malelane and Komati grower associations and RCL data administrators and development of protocols. Envisaged time period: November to December 2018
3. Implementation of data integration January 2019

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | RA Stranack | | |
| Resource /Centre: | Extension & Biosecurity | Date: | 5/06/2018 |

| **Communication Plan Reference Number:** | 18RD03 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | Issues 3, 4 & 40 |
| Region: | Irrigated North | Programme Area: | N/A |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Exteniosn Specialistss | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | X |
| Other (specify below) | | | | Discussions with stakeholders | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Identifying the appropriate roleplayers and initially holding informal discussions to determine the extent of data integration required and which is possible and legal to implement

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Informal discussion/information gathering | SASRI – GIS, data management, Extension & Biosecurity, local grower groups | Determine the respective needs of various parties, the potential uses and applications of GIS integrated data. Also investigate possible methods of data capture and sharing | July - November 2018 | All stakeholders reached and engaged with. Report compiled detailing all possibilities |
| Informal discussion/infomration gathering | SASA Industry Affairs (legal support) | Determine the legalities and implications of data access & sharing | July – November 2018 | Clarity on legal implications of access to and sharing of personal data |
| Formal meetings | Local grower associations, LPD&VCC & RCL | Share possibilities for data access and sharing as well as potential benefits thereof | January – April 2019 | Permissions agreed and formal protocol written up agreed and implemented |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

N/A

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

N/A

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

N/A

| There seems to be lack of uptake and adoption of newly released varieties – it is not clear why this happens.<br><br>(SASRI Reference: Issue 5) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

There appears to be a lack of the adoption of newly released varieties – it is unclear why.

**Background**

New varieties that are released are intended to enhance production but these are not commonly used. It seems it may be linked to cost of new variety seedcane, which itself is partly linked to poor planning from a supply/demand perspective.

**Expected Outcome**

When new varieties are released the supply and demand needs to be considered so deployment can be better managed and efforts to enhance uptake and use as well as ensuring sufficient supply is produced for popular varieties.

**SASRI COMMUNIQUÉ**

With the re-introduction of SASRI extension services to Komatipoort and the establishment of a seedcane committee, this issue will be partially addressed. The bulking and release of new varieties will be better co-ordinated and aligned with grower requirements. In addition to this regional intervention, SASRI will explore other methods of rapid deployment of new varieties, as described below.

Seedcane availability is a key factor limiting rates of adoption of new varieties throughout the industry. While NovaCane® will assist in providing large quantities of initial planting material, the subsequent propagation stages are still limited by conventional methods that have a propagation ratio of 1 ton:0.1 ha i.e. 1 ton of stalk can plant 0.1 ha. In contrast, the use of single-budded setts (SBS) to produce seedlings (transplants) have a propagation ratio of 1 ton:1.4 ha. This is 14 x the speed of conventional propagation. The use of SBSs in seedling nurseries is limited in the industry. Where applied, higher rates of propagation have been observed. Management via LPD&VCCs is key requirement for successful implementation. It is believed that an intermediate propagation step using SBSs between NovaCane® bulking plots and grower nurseries, will vastly enhance availability of new varieties in the industry. SASRI will explore current methodologies used for SBS production of seedlings and investigate the need for the development of protocols in this regard. If found to be commercially viable, it is envisaged that growers could become seedling co-operators to bulk and sell seedlings of new varieties. This model is currently being applied successfully in Brazil. This may be seen as an alternate income stream for growers. During this "literature" and "feasibility" assessment, other forms of rapid propagation will also be sought. This may lead to the initiation of a SASRI technology development project in the future.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Sanesh Ramburan | | |
| Resource /Centre: | PERC | Date: | 11 May 18 |

| **Communication Plan Reference Number:** | 18RD05 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 5 |

| Region: | Mpumalanga | Programme Area: | N/A |
|---|---|---|---|

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | x |
| Extension Newsletters | x | SASTA | | Grower Study Group | x |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |
| A newsletter outlining the bulking and release process would assist in grower understanding of the current variety deployment procedures. | | | | Extension should communicate this message to growers through usual grower interactions. Information on the seedcane bulking process, and quantities typically available to growers at variety release can be communicated to growers at grower days. | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Newsletter | Growers | Outline bulking and release process for new varieties | September 2018 | Grower feedback |
| Grower day | Growers | Combined with a general grower day on variety selection – the aim would be to inform growers of the deployment process and get feedback on alternate strategies for rapid deployment | September 2018 | Grower feedback |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

No additional budget needed.

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

**General:**

| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* |
|---|
| |

| Continuous water for strategically important infrastructure.<br><br>(SASRI Reference: Issue 6) | Click here to return to index |
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**RDE ISSUE DESCRIPTION**

Water should be available at all times to guard against varietal losses from the mother block and SASRI's research farm.

**Background**

The mother-block and SASRI's research farm (mainly variety evaluation and breeding trials) must be allocated sufficient water at all times – especially during periods of water restrictions. These are important to eliminate varietal losses for future sustainability. Irrigation with poor quality dunder water was also noted. The matter requires Canegrowers intervention with water authorities and mills releasing water.

**Expected Outcome**

No action required from SASRI. A grower (Darryl Pepworth) indicated he would raise the matter with Canegrowers, the mill and irrigation authorities in the region.

**SASRI COMMUNIQUÉ**

The Malelane and Komati grower leadership, together with the relevant local authorities, have agreed that irrigation water allocation to the SASRI Komati Research station is to be prioritised into the future. The decision was taken by the Komati River Irrigation Board to limit the negative effects of low irrigation water availability on the selection of new varieties for the region.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | MW Adendorff | | |
| Resource /Centre: | Extension | Date: | 2018-05-04 |

| **Communication Plan Reference Number:** | 18RD06 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2019 | Issue Number: | 6 |
| Region: | Komatipoort Mpumalanga | Program Area: | BFRU |

| **Communication Plan Outline:** | | |
|---|---|---|
| *Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).* | | |
| Publications | Presentations | Discussions/Workshops |

| | | | | | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | X | Grower Day | |
| Extension Newsletters | X | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | X | | | | |
| Letters to the RD&E committee members and relevant SASRI personnel and departments. | | | | | |

*Please specify any <u>non-traditional</u> Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Stay in contact with the Komati River Irrigation Board and together with the Komatipoort Farm Manager communicate irrigation needs when required.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Communicate the decisions taken by the Komati River Irrigation board to the relevant stake holders | RD&E Committee members, relevant SASRI personnel and grower community | Secure water supply to the Komatipoort Research Farm and seedcane mother block at all times | After the final decision has been taken by the Komati River Irrigation Board | Get water supply to the Research farm to be placed as an agenda item of the Irrigation Board meetings. |
| Develop a communication protocol with the Irrigation Board to ensure full irrigation supply. | Research Farm Management structures, researchers and Irrigation Board | Set clear protocal for communication of needs when they occure. | After the final decision has been taken by the Komati River Irrigation Board | Get water supply to the Research farm to be placed as an agenda item of the Irrigation Board meetings. |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

Limted time required for MW Adendorff, W Roberts and S Ramgareeb

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

Limted time required for MW Adendorff, W Roberts and S Ramgareeb

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

The SASRI research farm needs to keep records of water use and scheduling to be able to demonstrate effective use of water.

Concern raised over the cost-to-benefit of the full nutrition management and recommendations in a period of drought. Better recommendations are required for "out of the norm" conditions such as during drought. Some confidence is required that the FAS recommendations are in fact accurate (no over or under recommended fertiliser rates) and will give better yields.

(SASRI Reference: Issue 7)

Click here to return to index

**RDE ISSUE DESCRIPTION**

Farmers were seeking a better cost-to-benefit understanding of crop nutrition guidelines and FAS recommendations, with particular emphasis around how these might be better applied when conditions were less than ideal (such as during drought).

**Background**

The recent drought highlighted that the FAS recommendations did not necessarily accommodate situations where full yield may not be achieved. This may lead to application of expensive fertiliser without full benefit. This was also needed in the context of surface residue management, cover crops, etc. This raised queries around how accurate and appropriate are the FAS recommendations over all conditions and situations and how can this be better managed to optimise cost-to-benefit?

**Expected Outcome**

Best fertiliser recommendations over a wider range of conditions (soil, climate, mulching) that ensure maximum yield (RV) against the fertiliser recommendation and associated input costs.

**SASRI COMMUNIQUÉ**

**Summary**

FAS nutrient recommendations are derived from specific soil properties measured on submitted samples with adjustments made for key nutrients based on management factors supplied (plant vs ratoon, target yields, green manure, mulch blankets, irrigation). As such, the recommendations can be considered highly site and management specific. However, the given recommendations do not account for possible decreases in target yields or changes in specific management practices that may be different from those supplied at sample submission. It is also not possible to provide recommendations for the multitude of situations that may occur during a growing season that can affect nutrient requirements. However, several Information Sheets and other relevant articles are available to guide such decisions. A project to update these information sources and improve accessibility is to be implemented in the SASRI Programme of Work for 2019/2020.

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18KE01
*Update and revision of crop nutrition and soil management info sheets with development of interfaces to enhance accessibility*

Project Manager
*Dr Louis Titshall*
*(Louis.Titshall@sugar.org.za)*

**Introduction**

At present, when samples are submitted to FAS, specific information is requested as part of the submission form that is used to adjust fertiliser recommendations based on grower management. This includes if a crop is plant or ratoon, what the expected target yield for the crop is, if the previous crop

was trashed or burnt and, for plant crops, whether a green manure crop was grown beforehand. These parameters, along with the specific analysis results from a particular soil sample, are used to establish nutrient requirements for the crop, and adjustments to the recommended rates are applied depending on particular management inputs. In this regard the FAS fertility recommendation represents a soil (field) specific nutrient requirement as it is based on sample properties assessed from the analysis. From a management perspective, the additional information supplied (yield target, green manuring, mulching) allows for further refinement to the given recommendations. As such, the FAS recommendation represents the best possible option for a given soil type and management scenario. How some of these factors are used in formulating the recommendations are described in detail under **Issue 19** (in this communiqué booklet) and the reader is referred to this for further clarity.

Despite this, it is recognised that situational circumstances can lead to changes in the anticipated target yields and management inputs. At present, the FAS recommendations do not cater for these scenarios. Due to the multitude of possible scenarios it is nearly impossible to formulate recommendations to cover each potential situation, while it is also not possible to predict any of these when a sample is submitted. However, in an effort to address such issues, various existing guidelines have been established in an effort to give direction to making adjustments to recommendations when situations change. The following highlights these.

**Nitrogen**

In many instances it is recommended that nitrogen (N) be applied as split applications. Because of this, it is possible to adjust the rates for the second or third applications depending on the performance of the crop during the season. Thus, a grower may wish to either increase or decrease N application where either higher or lower target yields are anticipated. The following guidelines are given:

- *Increasing N application*

  - Excessively high rainfall soon after N application may lead to higher runoff and/or leaching losses. A leaf analysis is advised to evaluate if uptake is inadequate. If a deficiency is confirmed, apply an additional 20 to 40 kg N/ha.
  - Alternatively, a particularly favourable rainfall pattern may indicate the possibility of a higher yield than that originally included on the soil sample submission form. In this situation, additional N should be applied (typically 20 to 40 kg N/ha).

- *Decreasing N application*

  Several factors can lower the yield of a crop or reduce the growth rate during a season. Where specific limiting factors can be identified, it is advisable to lower the N recommendation by 20 to 30 kg N/ha. The following are possible scenarios for consideration.

  - Drought or un-seasonally low rainfall can lower growth rates and target yields.
  - Pests or diseases that are limiting crop growth
  - Early harvest of young cane

**Phosphorus**

Phosphorus (P) application rates are based on soil-specific test values with application rates intended to raise soil-P to adequate levels for crop uptake (see **Issue 19**, this communiqué booklet). Generally there is limited opportunity to adjust P after establishment due to difficulties in ensuring the applied P is accessible to the roots. However, as P is considered immobile in the soil, it is expected that much of the

applied P will remain in the soil. Thus, even where crop performance is reduced due to extraneous factors, it is expected that the applied P will reflect in higher soil test values for the next growing season, when lower application rates are likely to be prescribed.

**Potassium**

Like P, potassium (K) application is usually undertaken at the start of the growing season. This is in part due to the high demand from the growing crop, as well as the generally limited mobility of K in many soil types (exceptions include sandy soils and soils with highly weathered clay minerals of low reactivity). As K fertiliser recommendations are based on soil parameters as well as being adjusted for target yield, it is possible to lower K application rates at a rate proportional to the expected decline in yield. As for P, it is expected that, where yield targets were not achieved, residual K in the soil will reflect in soil testing for the next crop/ratoon cycle, where lower applications are then likely.

**Future developments and plans**

SASRI Information Sheets are a valuable tool to aid growers and extension specialists to make decisions regarding crop and soil management. Several issues raised through this RD&E workshop are addressed in topic specific Information Sheets. However, it appears these are not commonly used to guide decisions, partly due to difficulty in finding and/or accessing them, and that several Information Sheets are dated and some concern over their current relevance exists. As such, a Knowledge Exchange project is to be implemented in 2019 (18KE01: Update and revision of crop nutrition and soil management info sheets). The project aims to: (a) develop interfaces to enhance accessibility: (b) update existing Information Sheets relating to crop nutrition and soil management: and (c) create additional sheets, as required, to improve usefulness to growers. Consideration will be given to developing tools to aid access to these Information Sheets using simple search criteria (e.g. online access tool or "app"). This latter aspect will form an objective of a further project to be implemented in 2019 (18KE03: Defining protocols and procedures for effective management and dissemination of SASRI BMPs).

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18KE03
*Defining protocols and procedures for effective management and dissemination of SASRI BMPs*

Project Manager
*Poovie Govender*
*(Poovie.Govender@sugar.org.za)*

**Useful articles and resources**

- Information Sheets 7.1 to 7.18 (available in the SASRI InfoPack 2018).
- van Antwerpen et al. 2013. Understanding and managing soils in the South African sugar industry. SASRI (See Chapters 7, 8 and 9).
- Miles N. 2016. Crop nutrition in the current drought - for rainfed areas/Gewas voeding vir die huidige droogte -toestande in droëland areas (The Link January 2016 Volume 25, Issue 2) (while not specifically relevant to irrigated areas, when severe water restrictions are enforced (as in the recent drought season), the same guidelines will apply)

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | L Titshall & N Miles | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD07 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 7 |
| Region: | Mpumalanga | Programme Area: | CPM |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | yes | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | yes | SASTA | | Grower Study Group | |
| Information Sheet update | yes | Other (specify below) | | Short Course | |
| Information Sheet new | yes | | | Other (specify below) | |
| Other (specify below) | Yes | | | | |
| KE project 2019: Revision of crop nutrition and soil management Information Sheets with development of improved accesibility interface for growers and extension specialists. | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| The Link/Ingede | Growers and extension (English/Afrikaans/Zulu) | Reinforce validity and value of FAS recomendations with follow-on articles to show options and considerations under various conditions. | Every issue of Link with articles targeted based on topical concerns. Propose a permanent Link section on crop nutritional management | Feedback from growers and extension |
| FAS and extension newsletters | Growers and extension (English/Afrikaans/Zulu) | Reinforce validity and value of FAS recomendations with follow-on articles to show options and considerations under various conditions. | As required by FAS and Extension | Feedback from growers and extension |
| Updated and revised Information Sheets (Propose as | Extension and growers | Update, review, update and expand crop nutrition and soil management | Propose as KE project for 2019 | Improved adoption of SASRI soil-based recomendations and use of FAS services, feedback |

| | | | | |
|---|---|---|---|---|
| KE project for 2019) | | Information Sheets with improved accessibility to growers and extension specialists | | from growers and extension |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Staff time requirements only | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Articles: Soil Scientists, FAS, KMU and EXT – only time to develop articles and newsletters<br>Project proposal: Soil Scientists, KMU | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| None | | | | |

Electricity use on-farm is a concern and generally also regionally. This needs to be optimised at farm level and regionally to reduce cost to growers.

(SASRI Reference: Issue 8)

Click here to return to index

**RDE ISSUE DESCRIPTION**

Cost of electricity is a concern to growers and a strategy to reduce costs is required.

**Background**

Electricity costs can be high for irrigation pumping and other on-farms uses. However it must be used when water is available, which may be during peak periods (which seems to incur greater cost). Regional system overloading also seems to be an issue and seasonal fluctuations in requirement can make it difficult to plan and optimise usage.

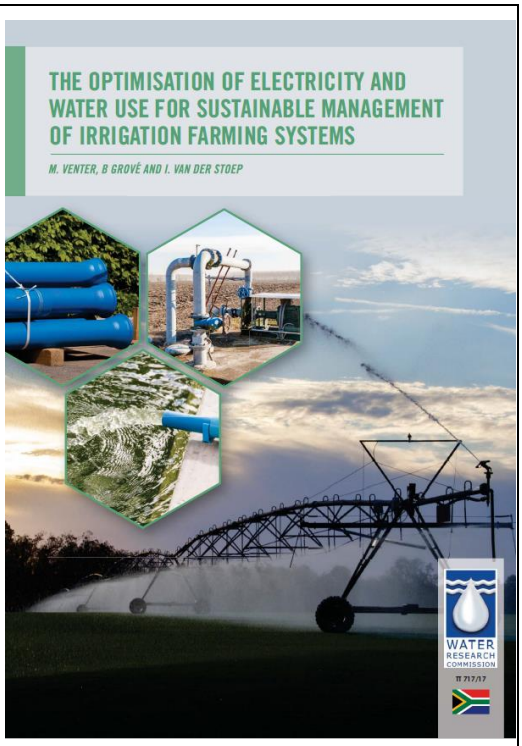
**Expected Outcome**

Management and best practice plan for on-farm and regional electricity use and distribution for growers. Understanding on-farm usage and developing an appropriate management system is key.

**SASRI COMMUNIQUÉ**

The Water Research Commission (WRC) recently completed a very comprehensive research project on exactly this topic. The WRC project report details are as follows:

*Venter M, Grove' B and van der Stoep I. 2017. The optimisation of electricity and water use for sustainable management of irrigation systems. Report No. TT 717/17. Water Research Commission, Pretoria, RSA.*




All WRC reports can be obtained from the WRC. Hardcopies of the report can be posted (free of charge to individuals within SA) upon request from the WRC. The requests can be submitted via post (Water Research Commission, Private Bag X03, Gezina 0031, South Africa) or email (orders@wrc.org.za). Alternatively, the report can be downloaded from www.wrc.org.za (one would have to create a login with a user name and password to freely access all WRC literature). Electronic copies can also be obtained from SASRI (ashiel.jumman@sugar.org.za). Copies of this report have already been shared with SASRI extension specialists and a few irrigation designers in the industry.

The report, to a large extent, is directed to irrigation designers/engineers. The report provides:

- an update of irrigation design rules and norms (with electricity optimisation in mind); and
- a life cycle costing approach (i.e. an integration of technical design and economic analysis to consider both the life cycle operating cost (including electricity costs) and the capital costs of design options) in order to carefully select hardware components (e.g. mainline pipe diameters) or technologies (e.g. high efficiency pumps, variable speed drives, soft start systems, automation/telemetry for off peak pumping).

Growers should ensure/insist that their irrigation designers / engineers are aware of and well versed in the content of the WRC report.

The report indicates that electricity use in irrigation is a function of: (a) technology (and the power required ($P_t$), associated with the decisions made in the planning/design phase); (b) management (relating to pumping hours ($PH$) and time of use); and (c) the electricity tariff option ($k_e$). The figure below was extracted from the WRC report and captures the summary of the variables influencing electricity use in irrigation.

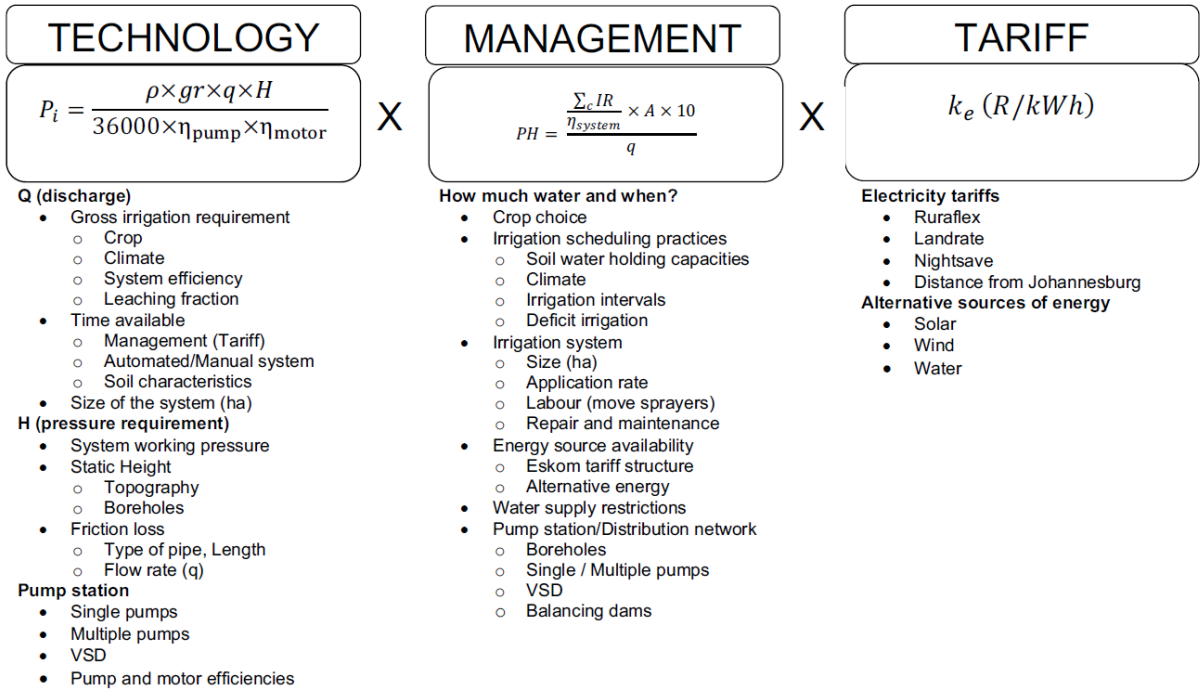



**Figure 3. 4: Schematic showing variables influencing variable electricity costs**

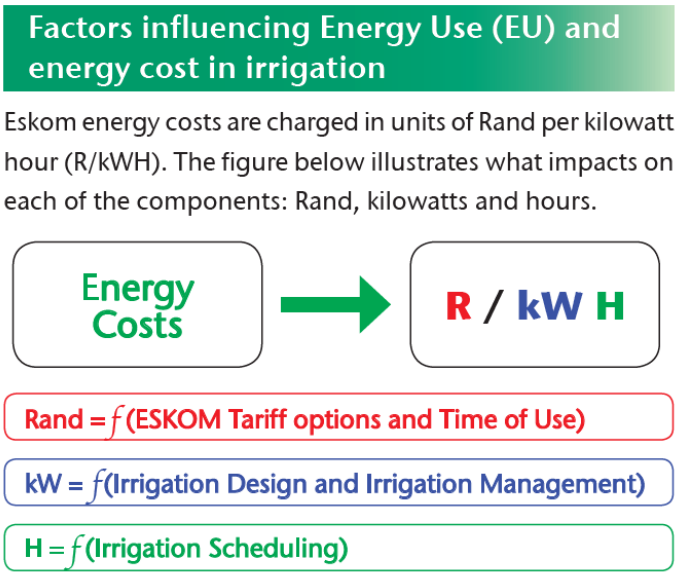
Chapter 6 (p 121) of the report is titled "*Guidelines for farmer advisory services for improved electricity costs management*" and provides a less technical presentation of the variables influencing electricity in an irrigation system, as laid out in the above figure. Application of the proposed methodology in a number of case studies (across sprinkler, pivot and drip irrigations systems for different irrigation capacities, size of area and electricity tariff options) is also presented in Chapter 5 of the report.

In addition, SASRI proposes a very similar framework in Information Sheet 5.10 "*Energy inputs and electricity savings*", published in November 2016 (before the release of the WRC report). The figure below is an excerpt from the information sheet illustrating the similarity in approaches recommended in the WRC report and the SASRI information sheet.

As indicated in the diagram on the left, any attempt to optimise the use of electricity by on-farm irrigation systems should include a holistic assessment of the irrigation design, irrigation management and electricity tariff components.

The main conclusions from the WRC report are briefly summarised below:

- The Ruraflex tariff option yielded a lower electricity cost, even when not pumping in off-peak periods, compared to the Landrate option. The total annual fixed cost was also consistently lower for Ruraflex option than for Landrate. These findings are consistent with an MSc study conducted at SASRI (Jumman, 2009).



- Smaller delivery capacities were found to be more profitable for all system sizes and electricity tariff structures, but also results in larger number of irrigation hours making management inputs more intensive. Larger capacity systems with higher flow rates, increased the KW demand which had a greater impact on energy costs than the associated decrease in irrigation hours.
- Design norms are likely to lead to selection of larger pipe diameters and higher capital costs, but outweighed by lower electricity costs over the life span of the pipeline. Economic principles must necessarily accompany hydraulic design principles (such as designing for allowable friction or allowable velocity envelopes) in the future. The use of SABI accredited and/or suitably qualified designers is highly recommended.
- The financial feasibility of Variable Speed Drives (VSDs) must be assessed individually for each site. Systems where the duty points vary because of elevations differences between delivery points will benefit the most. These include centre pivots operating against slopes greater than 2% and static irrigation systems where block inlets are located at different elevations.

The following can be added from SASRI Information sheet 5.10.

- Irrigation scheduling to make effective use of rainfall is a key management practice to reduce unnecessary pumping.
- Irrigation systems must be maintained properly to operate as per design. Leaking pipes, worn out rubber seals and nozzles, pump impeller wear, clogging of foot valves, etc., will all contribute to increased energy use and poor irrigation performance. Regular monitoring, maintenance and evaluation of systems are essential.

**Further reading**


- Boote DN (2014). *The Development and Assessment of a Direct Energy Calculator for use in Sugarcane Production*. Unpublished MSc. Eng Dissertation, School of BEEH, University of KwaZulu-Natal, Pietermaritzburg, RSA.
- Boote DN and Jumman A (2013). Variable Speed Drives - The Answer to High Electricity Bills? *The Link* 22 (2): 12-13.
- Boote DN and Jumman A (2014). *The unusual setting of an irrigated research farm: reduced energy consumption with variable speed drives (VSDs).* SAIAE symposium and Biennial CPD event. MSC Opera (Cape Town – Port Elizabeth – Durban). RSA.
- Jumman A **(**2009). *A framework to improve irrigation design and operating strategies in the South African sugarcane industry*. Unpublished MSc. Eng Dissertation. School of Bioresources Engineering and Environmental Hydrology, University of KwaZulu-Natal, Pietermaritzburg, South Africa.
- Jumman A (2017). A simple spreadsheet-based irrigation electricity cost calculator (short non refereed paper). *Proc S Afr Sug Technol Ass (2017) 90*: 186 – 189
- Jumman A and Lecler NL (2010). Deficit Irrigation: A potential strategy to counteract the escalating electricity tariffs and water shortages. *Proc S Afr Sug Technol Ass (2010) 83: 160 - 170.*
- Jumman A and Lecler NL (2010). Electricity tariff increases: The impact on irrigators? *Proc S Afr Sug Technol Ass (2010) 83: 152 - 155.*
- Jumman A and Lecler NL (2010). It doesn't always pay to save electricity. *The Link 19(3):7*
- Olivier F and Jumman A (2010). Irrigation scheduling tools: Preparing for steep electricity costs. *The Link 19(1): 6-7.*


**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Ashiel Jumman | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD08 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 8 |
| Region: | Mpumalanga | Programme Area: | SDO |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged)*.

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | X | Other (specify below) | X | Short Course | |
| Information Sheet new | | I will endeavour to workshop the WRC report with SASRI's irrigation working group which includes extension specialists from the irrigation region. Following this, discussions can take place for the planning of grower days, which may have to include SABI representatives (or the members of the WRC project team). | | Other (specify below) | X |
| Other (specify below) | X | | | SABI are the custodians of the irrigation norms and standards. I will encourage SABI to formulate an advanced irrigation design course for designers to get up to speed.<br><br>Knowledge transfer workshops are already planned in the WRC project to refine/launch the updated ARC 'Irrigation Design' and 'Irrigation User's' Manuals. | |
| ARC irrigation design and Users Manual is currently being updated in a WRC project and is expected to deliver the new research content in a user friendly manner for the respective targeted audiences. | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

SABI will have to be approached and encouraged to develop a specific course for irrigation designers and a separate course for farmers. SASRI can facilitate hosting of the courses in strategic regions and encourage attendance and participation by as many farmers and irrigation designers as possible. This arrangement with SABI has been used successfully for training in irrigation management in the past.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Irrigation working group workshop/presentation | Irrigation Extension Specialist and members of SASRI irrigation working group | To workshop the content of the new WRC report on optimisation of electricity use in irrigation | SASRI staff colloquium meeting in July or the 2nd working group meeting in Nov 2018. | Planning and development of strategies for sharing this knowledge with farmer populations in the respective regions. |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

| |
|---|
| Irrigation working group budget is already secured.<br>Extension Specialists will be asked to budget and plan a KE event/initiative on a needs/priority basis, according to their specific regions. |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* |
| |
| **General:** |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* |
| The contents of the WRC report is freely available for use by all South Afrcan citizens. However, no SASRI individuals were directly involved in the WRC research. For this reason, some time will be required to study and master the content of the report in order to prepare training/presentation material for knowledge exchange. Collaborating with the WRC project researchers (Isobel van der Stoep) offers a quicker and potentially more technically sound (and credible) path for knowledge exchange directly to farmers. This, however, is not a necessity.<br><br>The updating of irrigation design norms, however, is centrally managed by SABI (who are also responsible for accrediting irrigation designers as appropriately qualified). For this reason, it is best to partner with SABI to facilitate knowledge exchange and upskilling of the irrigation designers who serve the sugarcane industry. SASRI, however, can use farmers to apply pressure on designers to ensure that the irrigation designers become familiar and comfortable with applying the new design norms and irrigation design principles proposed in the WRC report. |

| | |
|---|---|
| Strategies to manage problem weeds are required. Better control and management guidance is sought.<br><br>(SASRI Reference: Issue 9) | Click here to return to index |

**RDE ISSUE DESCRIPTION**

Need for improved management systems and tools for control of particular problem weeds, not limited to, but including sedges, cynodon and panicum.

**Background**

Persistent aggressive weeds result in major loss of productive areas and is difficult to be effectively controlled after planting. Controlling weeds chemically in ratoon crops is problematic as the crop might be damaged. Many weed species can become major problems and spread as they are more difficult to control at this time.

**Expected Outcome**

Enhanced or better guidance and tools for the control of severe problem weeds. Some quantification (economics) of losses associated with weed infestations would be welcome.

**SASRI COMMUNIQUÉ**

The irrigated northern regions of the industry has persistent aggressive weeds, including kweek (*Cynodon*), rooi uintjies (*Cyperus rotundus*), barbi grass (*Panicum maximum*), itchgrass (*Rottboellia*) and Demoina bossie (*Parthenium*).

**Chemical control trials**

SASRI has conducted a number of chemical control trials in Mpumalanga and KZN (Pongola) that compared new herbicide treatments with existing remedies for most of these species. The number of trials were as follows: (a) two for kweek (Komatipoort and Malelane); (b) one for rooi uintjies (Komatipoort); (c) two for itchgrass (Komatipoort); (d) four for Demoina bossie (one in Komatipoort, two in Pongola and one in Makhatini Flats); and (e) three for barbi grass (one in Malelane and two in Pongola). The best new treatments are currently being further refined in pot trials in co-operation with relevant agro-chemical companies. In addition, the role of integrated weed management for kweek, using a combination of chemical control plus a green manure cover crop, either velvet beans or sunn hemp, was tested on a sandy loam soil at the SASRI research farm in Pongola, and also on a sand and clay soil on the KZN North Coast.

**Integrated Weed Management**

SASRI has also started a new project that collates effective Integrated Weed Management (IWM) strategies to combat these aggressive species. Currently, the following information resources are available:

- *Kweek*

  A recently published 36-page IWM manual for creeping grasses is now available from local extension specialists. The manual describes 16 available tactics for kweek management, with summary tables showing which control tactics can be used to manage various scenarios, based on the density of the kweek infestation (% of the surface area covered by the weed)) and situation in which it occurs. Also included is an example of a farm-scale IWM plan for kweek using a digitised farm map. The manual is also available from SASRI in IsiZulu. In addition, an article in The Link (May 2018) describes some of the recent findings from green manure trials conducted on the three soil types.

- *Rooi uintjies*

  Current remedies available for control have been collated in a Link article (May 2017). Also available is a handout for knapsack calibration, measuring granular Servian® in a disposable syringe. This tool allows growers to apply this product accurately, and will reduce the competition for water in early cane growth. This handout is available from the Extension Specialist, Marius Adendorff.

- *Demoina bossie*

  Integrated Weed Management options have been published in The Link (September 2017).

- *Barbi grass and itchgrass*

  Control strategies for these weeds are in the planning stage and will comprise of chemical and non-chemical control methods.

**SASRI Herbicide Guide update**

An electronic version of the SASRI Herbicide Guide is being developed, which will comprise two parts:

a) a herbicide selector, which will assist growers to select appropriate registered treatments based on weed type, stage of growth, soil clay percentage and whether it is a ratoon/plant crop.;
b) a calculator, which will assist growers with accurate application via different spray tank capacities.

The quantification of losses associated with weed infestations will be evaluated through the development of an analysis tool which will evaluate the costs associated with different treatment options.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | P. Campbell | | |
| Resource /Centre: | PERC | Date: | 20 May 2018 |

| **Communication Plan Reference Number:** | 18RD09 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 9 |
| Region: | Irrigated North | Programme Area: | Crop Protection |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged)*.

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | X | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | X |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | X | | | | |

1. Booklet: Integrated weed management (IWM) manual for tufted grasses
2. Electronic Herbicide Selector

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Partner with local agro-chemical consultants and early adopter growers

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Link and Ingede | All growers. Need to translate into Afrikaans and Zulu | Illustrate and describe some of the common problem tufted grasses in the irrigated northern regions of the industry, including the correct identification, for example,. between *Panicum maxumum* and *P. schinzii.* List the available registered pre- and post-emergence products | January Link and Ingede publication | Growers buying the correct products, requesting workshop day in Mpumalanga for Herbicide Selector |

| | | | | |
|---|---|---|---|---|
| | | Explain how IWM can be used to prevent the spread of problem weeds | | |
| Booklet: IWM for Creeping grasses | All growers. Available in English and Zulu (printed on request) | Distribute the IWM book for creeping grasses (with Marius Adendorff) | Sept/Oct 2018 IN on request | Growers testing water quality, cleaning sprayers, correct calibration, prioritising fields |
| Electronic Herbicide Selector | English | Demonstrate how the Herbicide Selector can assist chemical control of different weed categories and for three problem weeds in IN, *Panicum maximum, Rottboellia* and *rooi uintjies (sedge)* | October Midlands South IN on request | Use of the tool to check new products |
| Electronic Herbicide Guide | English | Investigate the development of a calculator for comparing herbicide treatments, economics for different fields according to yield potential | October Midlands South IN on request | Use of the tool to check treatment calculations |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Subsistence for grower workshop days. Subsistence for Zulu training days | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Technical team x1 to assist Sifiso Hlela. Printing costs. | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| | | | | |

General concern over being unable to detect the presence of pests and diseases early (typically before major damage or clear visual symptoms are presented). This was raised with specific reference to RSD within a mechanised system that could increase the rate of spread if not detected soon enough. However, the consensus view indicated that the concern applied to several other sugarcane diseases and pathogens. Need an early detection method.

(SASRI Reference: Issue 10)

Click here to return to index

**RDE ISSUE DESCRIPTION**

Concern that there is a lack of tools for early pest/pathogen/disease detection.

**Background**

The inability to identify P&D on a site prior to intensive site management could result in an increase in the spread of the disease (such as RSD). Having tools, preferably that can be used in-field with immediate result, would give a major advantage to implementing control measures and reducing the spread of the disease. Systems such as the electronic nose and images from drones were mentioned.

**Expected Outcome**

Tools and/or test kits for the rapid detection and diagnosis of diseases are required. The system should preferably be used by growers and in-field.

**SASRI COMMUNIQUÉ**

Two alternative methods for RSD near-to-field diagnosis are being investigated. A Loop-Mediated Isothermal Amplification (LAMP) assay was developed (Project 11TD08; Ghai et al., 2014) but requires additional modification before it can be used outside the laboratory environment. A lateral flow device (LFD) is also being developed (Project 16TD03) for potential in-field use. The main advantage of these methods is that the need for transporting sap samples to Mount Edgecombe will largely fall away and the turnaround time will be reduced. The LAMP assay is more sensitive than the current methods which may allow a slight reduction in the age of cane to be sampled but sample sizes will remain the same for the foreseeable future. The current 20 stalk sample per 5 ha recommendation is likely to detect infection levels >10% stools infected which is when yield loss usually becomes apparent. By increasing the sample size, lower levels of infection will be possible. Leaf sampling would allow for more extensive sampling of fields but when used as a template for the LAMP assay instead of xylem sap, results were unreliable (Ghai et al, 2017). Research will continue in this area. Refer to RD&E issue no. 21 in this communiqué booklet for comments on satellite and drone imagery technologies for detecting pests and diseases.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | RA Stranack | | |
| Resource /Centre: | Extension & Biosecurity | Date: | 5/06/2018 |

| **Communication Plan Reference Number:** | 17RD10 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | Issues 3, 4, 10 & 40 |
| Region: | Irrigated North | Programme Area: | N/A |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | X |
| Other (specify below) | | | | Discussions with stakeholders | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Identifying the appropriate roleplayers and initially hold informal discussions to determine the extent of data integration required and which is possible and legal to implement

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Informal discussion/information gathering | SASRI – GIS, data management, Extension & Biosecurity, local grower groups | Determine the respective needs of various parties, the potential uses and applications of GIS integrated data. Also investiogate possible methods of data capture and sharing | July - November 2018 | All stakeholders reached and engaged with. Report compiled detailing all possibilities |
| Informal discussion/infomration gathering | SASA Industry Affairs (legal support) | Determine the legalities and implications of data access & sharing | July – November 2018 | Clarity on legal implications of access to and sharing of personal data |
| Formal meetings | Local grower associations, LPD&VCC & RCL | Share possibilities for data access and sharing as well as potential benefits thereof | January – April 2019 | Permissions agreed and formal protocol written up agreed and implemented |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| N/A | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| N/A | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| N/A | | | | |

| Stool damage by mechanised harvesting systems is of great concern.<br><br>(SASRI Reference: Issue 11) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Stool damage and reduced ratoonability associated with mechanical harvesting needs to be addressed in irrigated areas.

**Background**

An area of about 5 000 ha is already mechanically harvested in the region and it is expected to increase rapidly. The reduced number of ratoons obtainable with this system is a great concern. This was considered very important by group but some acknowledgement about previous reporting and recent

research in other areas needs to be extended to the Lowveld region – interest in undertaking some "irrigated" regional work, perhaps on a growers' farm.

**Expected Outcome**

Extend recent research to include harvesting systems used in the region. Need guidelines to minimise the effect of mechanical harvesting on ratoonability.

**SASRI COMMUNIQUÉ**

Research investigating estimated yield losses caused by infield traffic has been conducted recently by SASRI. In this study a wide range of systems used in the industry were investigated. The systems surveyed are as follows:

High yielding cut and windrow systems (Uncontrolled traffic):

- Cut and windrow system with 3 wheel grab loaders loading into adjacent low capacity box trailers from field to zone (1 adjacent windrow loaded per tractor trailer swath).
- Cut and windrow system with 3 wheel grab loaders loading into adjacent low capacity spiller trailers from field to zone (2 windrows loaded per tractor trailer swath).
- Cut and windrow system with 3 wheel grab loaders loading into adjacent high capacity spiller trailers from field direct to mill (3 windrows loaded per tractor trailer swath).
- Cut and stack using single and double stack self-loading trailers.

High yielding cut and windrow systems (Controlled traffic):

- Cut and windrow system with high capacity slewing loaders loading adjacent medium capacity field to zone tip trailers (1 large windrow per swath). Field layout with rows in a tramline configuration of 0.4 x 1.25 m spacing with all wheels travelling on the IR.
- Cut and windrow system with high capacity slewing loaders loading into adjacent high capacity spiller trailers (1 large windrow 8 rows (4 tramlines) per swath).
- Mechanical chopper harvester operating on controlled traffic principles harvesting 2 rows (tramline configuration of 0.4 x 1.45 m spacing) per harvester pass with billets loaded into adjacent low capacity tip trailers for field to zone operations.

As indicated, the systems investigated cover a wide range of typical systems. Specific loader and haul-out configurations found within the Mpumalanga region should be investigated in conjunction with typical field layouts, the typical extent of the field trafficked and characteristics of the equipment used infield.

The impact of stool damage on ratoonability is likely to be an issue for any push-piler that is not matched to suit row spacings. Such adjustments should be made to the push-piler prior to field entry to minimise stool damage by ensuring that the push piling tines are constrained to the inter-rows only. In addition to position, floating tine designs are advantageous by not penetrating the soil and thus minimising the risk of uprooting cane or causing stool damage.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Peter Tweddle | | |
| Resource /Centre: | PERC | Date: | June 2018 |

| **Communication Plan Reference Number:** | 18RD11 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 11 |
| Region: | Northern Irrigated | Programme Area: | SDO |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for ESs | | Grower Day | x |
| Extension Newsletters | | SASTA | x | Grower Study Group | x |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Grower Day | Growers | Presentation | March 2018 | Grower feedback, interest, follow up requests for information or farm visits |
| Grower Study Group | Growers | Presentation | 2017 | Grower feedback, interest, follow up requests for information or farm visits |
| SASTA | Growers | Poster presentation | August 2018 | Poster feedback |
| Grower Day | Growers | Field visits | TBC – later in 2018 | Field surveys, estimate of field yield losses, follow up dissemination of information |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

Trip to Komatipoort in 2018. Field surveys. Analysis of data.

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

High accuracy GPS units for loaders and extraction units. GIS support to process and analyse? Alternatively – can view and estimate approximate field traffic extent and impact of equipment using photographs, measurements and cane mass removed per load.

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

N/A

| | |
|---|---|
| Some general concerns around the need for improved farm planning and general site management was raised (Farm Planning Services). This related to best use of land, best systems and other BMPs for a site. ) – seems this was driven by the loss of a farm planning officer in the region in recent times. Clear interest in having this service, though unclear how it should be implemented. One farmer indicated he would consult Canegrowers in the region.<br><br>(SASRI Reference: Issue 12) | Click here to return to index |

**RDE ISSUE DESCRIPTION**

Some general concerns around the need for improved farm planning and general site management was raised (Farm Planning Services). This related to best use of land, best systems and other BMPs for a site – seems this was driven by the loss of a farm planning officer in the region in recent times. Clear interest in having this service, though unclear how it should be implemented. One farmer indicated he would consult Canegrowers in the region.

**SASRI COMMUNIQUÉ**

In the past, SASRI offered a farm planning service through the then SASEX Farm Planning Department. In the 1990s, the industry made the decision to withdraw this service as a core commitment and it was subsequently disbanded.

As the need for planning services continued, efforts were made to sustain some form of support to growers through extension. However, as farm planning is a specialist subject, this proved difficult and whilst there has been limited delivery in some regions of the industry, there is – as has been identified – a clear need for such support.

A further effort was made to deliver Land Use Plans, through interns employed temporarily at SASRI and managed under the GIS section. This group has also managed to generate plans but the rate of delivery has proved slow, due mainly to the highly technical nature of the task, requiring considerable and intensive training. Coupled with this, the tenure of interns is limited and the current situation is far from ideal.

One notable success however has been the SUSFARMS® Midlands Collaboration which, through external end-user funding, has been able to employ a full-time farm planning technician. However, as the incumbent is only able to perform work for the Collaboration, this leaves the majority of the industry unserved. Similar collaborative sustainability initiatives are a possibility but would depend on the strength of local miller, grower and customer relationships geared to promote sustainability of sugarcane farms.

As indicated by growers present at the RD&E workshop, a possible avenue to explore would be to approach the respective grower associations with the aim of obtaining funding for the re-introduction of a farm planning service.

**Communication Plan**

- Follow up with Lowveld growers to determine progress of engagements with Canegrowers and other grower associations. Time period: follow up by end July with Darryl Pepworth and Alwyn van Graan (Chairman of Malalane Canegrowers' Association)
- Direction pursued to be informed by the outcome of these consultations.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | RA Stranack | | |
| Resource /Centre: | Extension & Biosecurity | Date: | 05/06/2018 |

| **Communication Plan Reference Number:** | 18RD12 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 12 |
| Region: | Mpumalanga | Programme Area: | Extension |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | X |
| Other (specify below) | | | | Engagements with local grower associations in Mpumalanga regarding motivation for farm planning service in the region | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Engagements with local grower associations in Mpumalanga regarding motivation for farm planning service in the region

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Follow up meetings and discussions | Local cane grower associations | To determine progress at industry level towards motivating for a farm planning service in the region (and other regions in the industry) | Initial follow up by end July 2018 | Motivation has progressed to industry level (SRASA) for consideration |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

N/A

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

Consultations with the Director and Knowledge Manager in the event the matter progresses

**General:**

| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* |
|---|
| N/A |

| General comment about snake-oils and wonder products. Concern was that farmers were being frequently approached to run trials and/or endorse and/or use unknown products. Some guidance on testing sought.<br><br>(SASRI Reference: Issue 13) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Need guidance on which is beneficial.

**Background**

Acknowledgement that prior guidance has been provided for “on-farm” testing. It was highlighted that farmers can contact local extension or SASRI scientists if in doubt about a product or seeking advice and that there were formal channels (ERA and SAR) for “ad hoc” investigations.

**Expected Outcome**

Did not seem further action was required except to keep informing and distributing guides previously developed.

**SASRI COMMUNIQUÉ**

- The existing on-farm product testing guidelines document is to be sent to extension specialists, which is to include details on appropriate experimental design for growers to conduct their own "on-farm" trials in conjunction with their extension specialist.
- An article on snake-oils and wonder products will be published in the September 2018 edition of The Link.

SASRI is aware of the large range of agricultural products continually coming onto the market, which representatives of the companies concerned either request SASRI to test on sugarcane and provide a ‘rubber stamp’ of approval (which SASRI cannot do), or they directly approach growers with the intention of convincing them of the product’s worth. Many of these products have not been scientifically tested in pot or field trials, and their mode of action has not been established, despite the claims made by the vendors in their advertising and brochures. Often, suppliers are wary of rigorous testing of the products they are marketing. This may result from the product failing to deliver on the results advertised by the product manufacturers. Furthermore, it is illegal to use any product not registered for use in sugarcane or to use a registered product but not according to the label (i.e. “off-label”). Growers are therefore strongly cautioned against purchasing and applying new “wonder” products without being able to objectively assess their true effects on soil health, cane growth, yield etc., as well as the legal implications of misuse of products.

However, should growers decide that a product is of particular interest to them and they wish to pursue their own testing of the product on their farm, then they are advised to perform an observation trial with the guidance of their extension specialist. Guidelines for the initial assessment of a product and subsequent establishment and conduct of on-farm trials have now been provided in a separate

document for use by extension specialists and growers. However, growers must be made fully aware that such trials cannot be used for product registration purposes and are no substitute for the rigorous, scientifically designed testing of new products conducted by SASRI specialists as Specialist Advisory Requests (SARs).

Growers and extension specialists are alerted to several previously published articles, listed below, which explain the SAR process above and can serve as a guide on whether or not to pursue on-farm trials.

- Baker, C. Message from the Director. The Link, May 2016, pg. 3.
- Management of Specialist Advisory Requests (SARs) submitted by commercial companies. *The South African Sugar Journal*, September 2009, pp. 137-138.
- Miles, N. and van Antwerpen, R. Miracle plant growth products: Too good to be true? The Link, September 2009, pp. 6-7.
- Redshaw, K. Specialist Advisory Requests. The Link, September 2011, pg. 11.
- Redshaw, K. SASRI's role in assessing new products. The Link, May 2016, pg. 17.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Malcolm Keeping | | |
| Resource /Centre: | CBRC | Date: | 22-05-2018 |

| **Communication Plan Reference Number:** | 18RD13 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 13 |
| Region: | Komatipoort | Programme Area: | CPM |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | √ | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | √ | | | | |
| Tailormade guidelines document for distribution to Extension. | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

None – Extension have specifically asked for written guidelines.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| The Link article | Extension/growers (English and Afrikaans) | Awareness among growers of issues surrounding wonder products and how to obtain advice on on-farm testing of these. | September 2018 | Appropriate responses among growers and Extension Specialists (ESs) to companies requesting use and testing of their new products. |
| Guidelines document | Extension (for use with growers - English) | Understanding among ESs (and ultimately growers) of how to approach and conduct on-farm observation trials. | June 2018 onwards. | Ability of ESs and growers to successfully conduct on-farm trials of new products, allowing a decision on worthiness of further testing. |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| None | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| None | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| Feedback from SAR Panel members and Extension Specialists will be required to fine-tune the Guidelines document now and in the future. | | | | |

| Long term effects of mechanised cropping systems<br><br>(SASRI Reference: Issue 15) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

**Background**

With many growers moving to mechanised cropping systems in the Lowveld, its long-term impact on issues such as soil compaction, ratoonability and disease development need to be investigated. Information on optimal field layouts under different harvesting regimes is also required.

**Desired end result**

- Quantify the long-term effects of mechanised cropping systems on soil compaction, stool damage, ratoonability and spread of diseases.
- Provide methods to minimise / ameliorate the impact of mechanised cropping systems on soil structure.
- Categorise varieties according to their response to mechanical harvesting.
- Investigate the effect of mechanised cropping systems on disease incidence and provide methods to reduce the risk of disease spread.

- Provide information on optimal field size, row length and field verge size for different cropping systems under a range of conditions e.g. irrigation, yield potential, soil type.
- Quantify the expected loss of jobs under mechanised harvesting systems.

**SASRI COMMUNIQUÉ**

**Long term effects of mechanisation**

The long term effects of mechanisation on soil compaction, stool damage has been researched. The impact of mechanisation on fields is exacerbated during wet field conditions. Expected yield losses have been measured to be as high as 50% over the point of impact. Fortunately, only a small fraction of the field has such traffic. Seasonal soil moisture changes will also tend to reduce this worst case example on an annual basis. Estimated yield losses on an average field basis taking variable moisture conditions into account across the season and the proportion of the field trafficked has been estimated for a range of typical mechanisation systems used in the South African sugarcane industry. These are presented in the paper titled: "*Estimating Crop Production Losses for Various Infield Sugarcane Extraction Systems*" by Tweddle *et al.* (2015) and indicate the estimated range in yield loss of 1-9% between the least and most damaging systems. A chopper harvesting system was subsequently investigated to add to the complement of systems analysed. The chopper harvester operation cut two lines per pass and followed controlled traffic principles and thus deemed to be one of the lowest impact chopper harvesting systems available. Despite these better practices in place, the mechanised chopper harvester system was still estimated to be one of the most damaging due to the magnitude and extent of heavy traffic passing throughout the field. The yield loss in this system was estimated to be approximately 8-9% Tweddle *et al.* (2016).

From a ratoonability perspective, the damage caused to the stool has been established primarily as a function of poor field conditions, crop conditions, harvester selection and setup combined with chopper harvester operation management. The greatest value loss is caused through a mismatch of various sub factors linked to the above categories. For more details a comprehensive overview is provided in the 2016 RD&E communiques (Issue 20) (available from extension and contained in the 2018 SASRI InfoPack CD).


- Tweddle, PB, Lyne, PWL and Bezuidenhout, CN (2015). Estimating Crop Production Losses for Various Infield Sugarcane Extraction Systems. Proceedings of the South African Sugar Technologists Association, 88: 392-395.

- Tweddle, PB (2016). Estimating Traffic Induced Sugarcane Losses for Various Harvesting, Loading and Infield Transport Operations in South Africa. Unpublished PhD thesis. University of Kwa-Zulu Natal.


**Lessening negative impacts**

The least impact is generally when the soils are the driest, however, less structured soils of lower clay percentage tend to be vulnerable under most field conditions. Despite such variability in soils and field conditions, some principles tend to be consistent in minimising compaction and stool damage, namely: (a) avoid trafficking wet soils; (b) practice controlled traffic over the inter-rows and away from the crop rows; and (c) use equipment that has the lowest impact with respect to soil contact pressure. This is achievable through low axle mass and low tyre inflation pressure. In addition the extent of traffic through the field should be minimised and should be constrained to the same position consistently year on year.

Amelioration of compacted soils is covered by SASRI Information sheet 6.2. General soil health improvement practices such as break cropping, leaving mulch layers, increasing organic matter return

will assist in the recovery of structure and some degree mitigate against compaction. Soil management strategies are also provided in SASRI Information sheet 14.1.

**Crop characteristics**

Crop characteristics suited to mechanised harvesting are well-known (e.g. stalk straightness, fibre, population, length of top etc.). Our current irrigated varieties will be "rated" for each of these traits and an index of suitability to mechanised harvesting will be developed. These ratings will be included in the variety Information Sheets. It is important to note that these will be “theoretical” ratings. Actual, observed responses of varieties to mechanical harvesting need to be quantified from commercial observations.

**RSD**

Research in Australia has shown that RSD is spread rapidly by mechanical harvesters. In one trial, up to 70% of the stools in the harvested rows tested positive in the following crop. They were able to prevent the spread of RSD by cleaning all parts of the harvester that came into contact with cut cane using a high pressure washer before spraying with a disinfectant. However, while harvester decontamination is recommended in Australia, it is seldom practised because the operators are reluctant to lose time when moving between fields and farms. Harvester decontamination is also not practised in Brazil but in both Australia and Brazil, fields are replanted more regularly than in SA. With fewer harvests, substantial RSD spread and increase is less likely and the risk of significant yield reductions associated with high RSD incidence is minimised. SASRI, RCL and the contractor in the Lowveld have been involved in discussions on the research and procedures required to reduce the risk of spread. Decontamination procedures are currently being tested in trials in Komatipoort and Bruyns Hill (Project 16TD02).

**Field size and layout**

Optimal field size is a function of individual needs and circumstances that depend on farm boundaries, irrigation systems, slopes, extraction routes and operational considerations such as harvesting systems. Integrating all these divergent goals demands various compromises that have different management priority ratings. The optimum should be based on the density of cane that is extracted from the loading swath which depends on the number of rows joined to form the windrow and the yield of the crop. As the yield is a variable that changes between seasons, the average typical yield would dictate the length of swath that one may wish to load based on the capacity of the extraction vehicle. Such minor extraction roads, while ‘on average’ will achieve a filled extraction vehicle, do not cater for varying yield performances or other issues such as lodged cane where payloads are compromised. An alternative approach is to practice controlled traffic, where longer runs with a fully laden extraction vehicle are less of an issue (from a compaction perspective) as the traffic is constrained to traffic the inter-rows.

Providing optimal solutions are site specific and require that there is a good understanding of current and future needs. These plans are typically built into carefully considered and well-crafted land use plans in conjunction with the grower where synergy between agronomic, hydrological and operational constraints are formulated.

**Labour**

The Brazilian industry in their rapid mechanisation commitment have been able to give approximate values to job loss and job transition requirements. An indication is that for every mechanical harvester introduced, that up to 80 low skilled manual labour jobs are lost and 18 higher skilled jobs such as harvester operators, mechanics, and drivers are typically created (Zuurbier, 2008; Chaddad, 2010).

- Chaddad FR (2010). UNICA: Challenges to Deliver Sustainability in the Brazilian Sugarcane Industry1. International Food and Agribusiness Management Review, 13(4).
- Zuurbier P and van de Vooren J (2008). Sugarcane ethanol. Contributions to Climate Change Mitigation and the Environment The Netherlands: Wageningen Academic Publications. Available at: https://www.wageningenacademic.com/doi/pdf/10.3920/978-90-8686-652-6 [Accessed: 25/04/2018].


**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Peter Tweddle | | |
| Resource /Centre: | PERC | Date: | June 2018 |

| **Communication Plan Reference Number:** | 18RD14 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 15,18,34 (Linked to 11) |
| Region: | NI | Programme Area: | SDO |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | x | Staff Colloquium for Extension Specialists | | Grower Day | x |
| Extension Newsletters | | SASTA | x | Grower Study Group | x |
| Information Sheet update | x | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Link article | Growers and MCPs | To publicise the potential long-term impacts of mechanised harvesting and how these may be lessened | As soon as possible in 2018 | Increased awareness amongst growers and MCPs, resulting in greater than anticipated interest and participation in grower days and study groups |
| Grower Day | Growers | Presentation | March 2018 | Grower feedback, interest, follow up requests for |

| | | | | |
|---|---|---|---|---|
| | | | | information or farm visits |
| Grower Study Group | Growers | Presentation | 2017 | Grower feedback, interest, follow up requests for information or farm visits |
| SASTA | Growers | Poster presentation | August 2018 | Poster feedback |
| Grower Day | Growers | Field visits | TBC – later in 2018 | Field surveys, estimate of field yield losses, follow up dissemination of information |
| Info sheets | Growers | Update mech sheets | 2018 | |
| Info sheets | Growers | Update variety info sheets for mech harvesting 'theoretical 'rating | 2018 | |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Trip to Komatipoort in 2018. Field investigations or surveys. Analysis of data. | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| High accuracy GPS units for loaders and extraction units. GIS support required to process and analyse. Alternatively – can view and estimate approximate field traffic extent and impact of equipment using photographs, in field measurements and cane mass removed per load. | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| N/A | | | | |

| Effective water use for optimal yields<br><br>(SASRI Reference: Issue 16) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

**Background**

Water is a scarce resource but is critical for growing sugarcane in the irrigated north. It is important to determine how much water is required for optimal yields. Information on the frequency of irrigation and the amount of water to apply during each event is required.

**Desired end result**

- Provide information on the effective use of water to optimise yields under different soils and cropping systems.
- Apply existing knowledge to local conditions (literature study).
- Plant demonstration trials using different rates of irrigation under a range of conditions (e.g. soil type, irrigation type).
- Provide information on cost implications of different water regimes.

- Organise study groups for knowledge exchange.
- A 'Back-to-Basics' / 'Farming for Dummies' book (Grant Taylor's suggestion).

**SASRI COMMUNIQUÉ**

Due to the variability of seasonal weather, soil texture and depth, irrigation system capabilities and performance and planting/harvesting dates, the issue is relatively broad and complex. Upon inspection, however, it appears that no new research was required. Based on available knowledge, the following essential points may be of value.

**Provide information on the effective use of water to optimise yields under different soils and cropping systems**.

Adherence to the principles of good irrigation planning and design (especially on marginal systems with shallow soils), meticulous system maintenance and precise operation and management (especially irrigation scheduling) are key elements to using water effectively to optimise cane and sucrose yield.

The information contained below provides a snapshot of past/recent research which addressed (to some extent) the question of using water effectively to optimise yields.

A computer program (DRIP; Drought Irrigation Program) was recently developed to assist sugarcane farmers with irrigation management decisions during times of limited water supply. It enables the user to assess the likely impact of their irrigation decisions on crop growth and farm profitability. The Excel program uses a crop and water balance model to calculate the impact of specified irrigation strategies on crop yield and survival under assumed future water allocation and climate scenarios. Farm level gross margins for three consecutive years are calculated from simulated yields and production costs at field level. Irrigation strategies that can be explored include: (a) growth phase specific soil water depletion thresholds; (b) reduced irrigation amounts and/or longer irrigation cycles; and (c) abandoning low potential fields. A knowledge exchange project is to be implemented in 2019 to develop an effective way of implementing the program on a wider scale (also RDE issue no 32).

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18KE04
*Implementation of DRIP (Drought Irrigation Program)*

Project Manager
*Dr Abraham Singels*
*(Abraham.Singels@sugar.org.za)*

Research conducted in Komatipoort indicated that:

- sugarcane irrigation water requirements were 1 092 ± 252 mm/annum (subject to seasonal rainfall, climate conditions, specific soils, etc.) (Jarmain et al., 2014);
- 1 142 mm of irrigation may enable a cane yield of 123 ton/ha, while 663 to 985 mm may result in yields of 112 to 124 tons/ha, respectively (for a plant crop in a specific rainfall season and a specific soil type) (Rossler et al., 2013);
- savings in irrigation water may be realised with a mulch layer (due to reduced evaporation from the soil, especially before full canopy), with minimal impacts on crop yield, provided irrigation scheduling was adjusted accordingly for the mulch layer (Olivier *et al.*, 2009); and
- crop production functions developed via computer simulation models indicated that near maximum yields in Komatipoort required 1 150 mm of irrigation water on shallow soils (0.6 m sandy clay loam) and only 900 mm of irrigation on 1.2 m deep sandy clay loam (Lecler and Jumman, 2009). This study provided: (a) an indication of the sensitivity of crop water requirements to both soil depth and irrigation system uniformity; and (b) a demonstration of how the crop models at SASRI can be used for analysis of unique or specific contexts and environments

**Apply existing knowledge to local conditions (literature study)**

An extension specialist will be capable of providing the necessary guidance. In unique and tricky circumstances, where external service providers (such as irrigation designers) cannot provide any help, the extension specialists can submit a request for assistance from the SASRI subject specialists (via an Extension Request for Advice - ERA) to conduct mini-assessments and analysis in order to provide recommendations.

**Plant demonstration trials using different rates of irrigation under a range of conditions (e.g. soil type, irrigation type)**

Demonstration trials are different from scientific trials. Demonstration trials serve as a pathway for extension interaction and knowledge exchange. Demonstration trials are resource-intensive and require advance planning. Hence, growers and MCPs are encouraged to consult their extension specialist well in advance about establishing demonstration trials on their farms. The extension specialist is familiar with local conditions and is best placed to define the nature of demonstration trials.

**Provide information on cost implications of different water regimes**

Armitage *et al.* (2008) provides an example of a computer modelling framework which can be used to conduct analysis of various irrigation systems, regimes and contexts. The framework was developed and applied by Jumman (2009) to evaluate potential design and operating solutions to a selection of irrigation issues, including: (a) over-irrigation on shallow soils; (b) the opportunity to shift electricity use out of expensive peak periods; and (c) the opportunity to demonstrate and promote the benefits of deficit irrigation strategies. Other similar costing models and assessment frameworks have been developed and can be used for specific and better defined problems. Local extension specialists may be consulted regarding the use of these economic tools.

**Organise study groups for knowledge exchange**

The local extension specialist will be able to facilitate study groups on a needs basis.

**A 'Back-to-Basics' / 'Farming for Dummies book**

With regard to this point, the following are pertinent.

- SASRI commissioned a study in 2010 to specifically upgrade and strengthen the irrigation module in SUSFARMS®. The module now offers a relatively comprehensive check list of the basic components of irrigation design, operation, maintenance and evaluation (see module 3.11, P 3-50, SUSFARMS® manual). The irrigation module can easily be used in isolation from the remainder of the SUSFARMS® tool.
- Discussions have been initiated at SASA to investigate the possibility of developing a back-to-basics sugarcane agriculture course to complement the current SASRI and STC educational offerings.
- The recently updated SASRI senior certificate irrigation course notes and the irrigation Information Sheets series serve as valuable reference material for sugarcane farmers.
- SASRI has also developed and delivered two-day modular courses on the fundamentals and principles of irrigation and irrigation scheduling. These materials are available from the local extension specialists.
- Furthermore, on a national basis, a very comprehensive "Irrigation User's Manual" (and an "Irrigation Designer's Manual") can be purchased from the ARC's Institute for Agricultural Engineering (ARC-

IAE) in Silverton, Pretoria for a small fee (R 350). The ARC's publication list and order forms can be obtained from http://www.arc.agric.za/arc-iae/.

- Finally, SABI also offer a comprehensive array of NQF accredited irrigation courses for beginner, intermediate and advanced levels (including labour-targeted training). The training brochures can be downloaded from www.sabi.co.za. Please note, SASRI can also help to facilitate customised SABI courses in a local venue on specific topics, provided there are adequate participants to make up a class (usually, 10 -20 people required to justify the cost to SABI). Customised courses with provision of a local venue and catering can be used to negotiate lower course fees.

**Proposed way forward**

The re-establishment of SASRI extension services in Komatipoort provides growers and MCPs operating in the area with an opportunity to explore SASRI tools, training and knowledge focused on achieving good yields in times when irrigation water availability is restricted. The extension specialist will play a central role in facilitating knowledge exchange through demonstration trials, study groups, training interventions and written materials.

**References**


- Armitage, R, Lecler, NL, Jumman, A and Dowe, K. 2008. Implementation of the *Irriecon V2* decision support tool to assess net returns to irrigation systems. *Proc S Afr Sug Technol Ass (2008)45.*
- Lecler, NL and Jumman, A. 2009. Irrigated Sugarcane Production Functions. *Proc S Afr Sug Technol Ass* (2009) 604.
- Olivier FC, Lecler, NL and Singels, A. 2009. *Increasing water use efficiency of irrigated sugarcane by means of specific agronomic practices.* WRC Report No. 1577/1/09. Water Research Commission, Pretoria, RSA.
- Rossler, RL, Singels, A, Olivier, FC and Steyn JM. 2013. Growth and yield of a sugarcane plant crop under water stress imposed through deficit drip irrigation. *Proc S Afr Sug Technol Ass (2013)170.*
- Jarmain, C, Singels, A, bastidas-Obando, E, Paraskevopoulos, A, Olivier, FC, van der Laan, M, Taverna-Turisan, D, Dlamini, M, Zahn, M, Bastiaanssen, W, Annandale, J, Everson C, Savage, M and Walker, S. 2014. *Water use efficiency of selected irrigated crops determined with satellite imagery*. WRC Report No. TT602/14. Water Research Commission, Pretoria, RSA.


**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Ashiel Jumman | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD16 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 16 |
| Region: | Mpumalanga | Programme Area: | CPM |

| **Communication Plan Outline:** | | | | | |
|---|---|---|---|---|---|
| *Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).* | | | | | |
| Publications | | Presentations | | Discussions/Workshops | |
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |

| | | | |
|---|---|---|---|
| Information Sheet new | | | Other (specify below) | |
| Other (specify below) | | | | |
| | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Many of the requests are symptomatic of the previous absence of extension services in Komatipoort. A knowledge exchange strategy should be developed by the recently appointed extension specialist. This would entail spending a period of time, initially, to gauge/identify the training needs, research and knowledge gaps and the specific areas of concern for the local region. A knowledge exchange strategy can then be developed and implemented to systematically and logically initiate/facilitate events, platforms and processes for effective and targeted training, knowledge exchange and, if required, customised analysis/research for the local issues on a priority basis.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| To be identified | | | | |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

It is believed that an extension strategy, implemented over a couple of years, will naturally/automatically begin to address the questions and requests relating to the foundational knowledge in irrigation. Time should be allowed for the extension specialist to establish himself in the area and from that base, he can guide SASRI towards a more strategic/targeted/impactful investment of knowledge exchange effort.

## Evaluation of new varieties in the region

(SASRI Reference: Issue 17)

Click here to return to index

**RDE ISSUE DESCRIPTION**

**Background**

Growers need guidance on variety choice for different soil types and growing conditions, especially when new varieties become available.

**Desired end result**

- Plant more post-release variety trials in large and small-scale grower areas.
- Provide information on optimal yields for each variety under different growing conditions.

**SASRI COMMUNIQUÉ**

Relevant variety trial data from the Pongola area are available and will be communicated to growers at grower events and through Extension in the coming months. Additionally, a new site has been identified for the establishment of a variety trial in Malelane. An existing variety trial on Crookes Bros estate in Komatipoort will be harvested for the fourth time this season, and the results will be distributed to growers through extension. A late season variety trial will also be established on the SASRI Komatipoort farm in 2018. Data from all trials will be collated and analysed to develop site specific variety recommendations that will be communicated to growers in the region in various forums (grower days, short courses, field days, Extension interactions).

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Sanesh Ramburan | | |
| Resource /Centre: | PERC | Date: | 11 May 18 |

| **Communication Plan Reference Number:** | 18RD17 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 17 |
| Region: | Irrigated North | Programme Area: | VI |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | x |
| Extension Newsletters | | SASTA | | Grower Study Group | x |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | A grower day focusing on variety choice for irrigated conditions should be arranged. | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

A collaboration with a leading grower in the region is underway to establish a new variety trial in November 2018.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Grower day | Growers | Update growers on latest variety | October 2018 | Better adoption/request |

| | | | | |
|---|---|---|---|---|
| | | performance under irrigation. Provide recommendations for different conditions. | | for newer varieties by growers in the area |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| No additional budget needed. The event could piggy-back on currently scheduled trips to Komatipoort by Sanesh Ramburan. | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| | | | | |

| Optimal in-field loading systems for the Lowveld<br><br>(SASRI Reference: Issue 18) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

**Background**

Information on optimal in-field loading systems is required for the Lowveld. Stool damage caused by the push-pile system needs investigation.

**Desired end result**

- Expand the research that has been conducted on optimal in-field loading systems in KZN and Pongola to the Lowveld.
- Quantify and provide information on stool damage caused by the push-pile system.
- An assessment of the Hitachi slew loader as well as other loaders commonly used in the area is urgently required

**SASRI COMMUNIQUÉ**

**Infield traffic and yield losses**

Research investigating estimated yield losses caused by infield traffic has been conducted recently by SASRI. In the study, a wide range of systems used in the industry were investigated. Those systems that were surveyed are as follows:

High yielding cut and windrow systems (rainfed operations):

- Cut and windrow system with 3 wheel grab loaders loading into adjacent low capacity box trailers from field to zone (1 adjacent windrow loaded per tractor trailer swath). Yield of 76 $t.ha^{-1}$.
- Cut and windrow system with 3 wheel grab loaders loading into adjacent low capacity spiller trailers from field to zone (2 windrows loaded per tractor trailer swath). Yield of 130 $t.ha^{-1}$.

- Cut and windrow system with 3 wheel grab loaders loading into adjacent high capacity spiller trailers from field direct to mill (3 windrows loaded per tractor trailer swath). Yield of 91 $t.ha^{-1}$.
- Irrigated fields and all infield traffic adhering as best to CT principles where possible:
- Cut and windrow system with high capacity slewing loaders loading adjacent medium capacity field to zone tip trailers (1 large windrow per swath). Field layout with rows in a tramline configuration of 0.4 x 1.25 m spacing with all wheels travelling on the IR. Yield of 55 $t.ha^{-1}$.
- Cut and windrow system with high capacity slewing loaders loading into adjacent high capacity spiller trailers (1 large windrow 8 rows (4 tramlines) per swath). Yield of 123 $t.ha^{-1}$.
- Mechanical chopper harvester operating on CT principles harvesting 2 rows (tramline configuration of 0.4 x 1.45 m spacing) per harvester pass with billets loaded into adjacent low capacity tip trailers for field to zone operations. Yield of 70 $t.ha^{-1}$.
- Cut and stack using single and double stack self-loading trailers. Yield of 89 $t.ha^{-1}$.

As indicated, the systems investigated cover a wide range of typical systems. Specific loader and haul out configurations found within the Mpumalanga region should be investigated in conjunction with typical field layouts, the typical extent of the field trafficked and characteristics of the equipment used infield.

The impact of stool damage on ratoonability is likely to be an issue for any push-piler that is not matched to suit row spacings. Such adjustments should be made to the push-piler prior to field entry to minimise stool damage by ensuring that the push piling tines are constrained to the inter-rows only. In addition to position, floating tine designs are advantageous by not penetrating the soil and thus minimising the risk of uprooting cane or causing stool damage

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Peter Tweddle | | |
| Resource /Centre: | PERC | Date: | June 2018 |

| **Communication Plan Reference Number:** | 18RD18 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 18 |
| Region: | Northern Irrigated | Programme Area: | SDO |

**Communication Plan Outline:**

*Please indicate with a tick-mark the <u>traditional</u> Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged)*.

| <u>Publications</u> | | <u>Presentations</u> | | <u>Discussions/Workshops</u> | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | x |
| Extension Newsletters | | SASTA | x | Grower Study Group | x |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |

*Please specify any <u>non-traditional</u> Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Grower Day | Growers | Presentation | March 2018 | Grower feedback, interest, follow up requests for information or farm visits |
| Grower Study Group | Growers | Presentation | 2017 | Grower feedback, interest, follow up requests for information or farm visits |
| SASTA | Growers | Poster presentation | August 2018 | Poster feedback |
| Grower Day | Growers | Field visits | TBC – later in 2018 | Field surveys, estimate of field yield losses, follow up dissemination of information |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Trip to Komatipoort in 2018. Field surveys. Analysis of data. | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| High accuracy GPS units for loaders and extraction units. GIS support to process and analyse? Alternatively – can view and estimate approximate field traffic extent and impact of equipment using photographs, measurements and cane mass removed per load. | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| N/A | | | | |

| Nutrition requirements in the Lowveld<br><br>(SASRI Reference: Issue 19) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

**Background**

The recent change in the recommendations for certain nutrients in the Lowveld needs to be justified.

**Desired end result**

Field trials to investigate / demonstrate optimum rates of nutrition.

**SASRI COMMUNIQUÉ**

**Summary**

Recent changes in the FAS recommendations have resulted in some concern and dissatisfaction by growers, largely due to differences in nutrient recommendations from what may have been prescribed before. These changes reflect the adoption of current research findings and technologies into the FAS laboratory and recommendations package. The key considerations for the major nutrients are described along with explanations of their role in adjusting the recommendations.

The main considerations for nitrogen (N) are target yield, soil organic matter content (and clay to a lesser extent) and use of green manures before replanting. Additional warnings are given where high N volatilisation risk is present. The main considerations for phosphorus (P) include sample density (which is a reflection of clay and organic matter content). The recommendations thus account for the ability of a soil to sorb P, where soils high in clay typically hold onto P more strongly than sandy soils, and thus usually have a higher P requirement than a sandy soil would.

The main considerations for potassium (K) are target yield, clay content, crop removal factors, mulching and most recently, K-reserve adjustments. K-reserve reflects the ability of certain soil minerals to provide a steady supply of K to the soil solution for plant uptake. By accounting for this supply, K fertiliser requirements can be lowered in proportion to the supply potential. Along with an explanation of K-reserve chemistry, several examples of studies demonstrating the supply from high K-reserves soils are provided.

For the other nutrients, no specific soil-test rate adjusted recommendations exist. This is partly due to inconsistent responses during trials for nutrients required at low levels. In this regard more generic recommendations are given, variously available in the SASRI Information Sheets and Soils Management Handbook.

A Knowledge Exchange project to review, revise and update existing Information Sheets as well as approaches to increase their availability and accessibility is to commence in 2019. Several issues referred to in this communiqué will be addressed under that project.

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18KE01
*Update and revision of crop nutrition and soil management info sheets with development of interfaces to enhance accessibility*

Project Manager
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**Introduction**

This specific issue was raised at a previous RD&E workshop (Irrigated Northern Areas Communique 2016 Issue 30: Validity of FAS recommendations?). Aspects of this issue also relate to a more general nutrient management issue raised (Issue 7, this communiqué) and the reader is referred to that Issue for further clarity. Key responses extracted from the 2016 communiqué are highlighted here with additional clarity provided.

The FAS recommendations are continually being examined to identify needs and gaps in the recommendations with the aim of ensuring optimal use of fertilisers. In recent years some major changes were adopted in the FAS to achieve this objective. These changes were based on new research outcomes from local and international research where an improved understanding of crop responses and the behaviour of soil applied nutrients (such as potassium (K)-reserve) are taken into consideration when revising recommendations. Inclusion of wider ranges of target crop yields (currently 50 to 200 t cane/ha) and recognising different management practices (such as green manuring to adjust nitrogen (N) recommendations) have also been fully adopted. Furthermore, to ensure efficiency, accuracy and

cost-effectiveness of the FAS, several improvements to laboratory methods (resin extractable P and S, MIR predictors of several soil properties) were adopted and/or under development. However, it is recognised that these changes have variously resulted in differences to the typical recommendations growers received before, where a key concern appears to be with the lowering of the recommended rates of particular nutrients (notably K). Thus, with respect to current recommendations the following considerations apply:

**Nitrogen**

Nitrogen reserves in the soil are readily transformed between different forms (organic, ammonium and nitrate) and are largely influenced by soil organic matter (OM) content. Recommendations for N are thus based on expected crop demand (yield target), soil organic matter content and contributions to N pools through the use of green manures.

- *Target yield adjustments*

  Current recommendations are adjusted for targets yields between 50 and 200 t cane/ha (both plant and ratoon crops), with further division based on the soil OM category (see below). Past research has established expected N demand of different crop yields, and these form the basis of the target yield adjustment. Thus N requirement (and consequently N recommendation) is adjusted upward as target crop yield increases.

- *Soil organic matter category*

  Research has clearly demonstrated that soils higher in organic matter are able to release more N than low organic matter soils. Laboratory methods to estimate the N release from organic matter are laborious and not practical for routine testing. Thus the more general, but well established (from long-term field trials) organic matter N supply relationships are adopted as four categories. By taking this into account, in conjunction with the target yield (see above), a more accurate N requirement can be estimated.

  Developments currently underway are testing an indirect estimator (MIR) of total nitrogen in the soil that can replace the soil OM category, which will provide a more accurate and continuous (as opposed to category based) classification for N requirement. This will provide further refinement to the N recommendations.

- *Green manure adjustments*

  Where green manures are planted between sugarcane cropping cycles, these have the potential to increase both soil OM and N content. This is particularly true where legumes are included in the green manure mix. After incorporation of the green manure into the soil this biomass will mineralise and release accumulated N which can be used by the subsequent plant crop. To accommodate this in the recommendations, N recommendations are adjusted based on whether a cover crop was used and the yield of the cover crop.

- *Other considerations*

  While not specifically leading to adjustments in the recommendations, consideration is given to risks associated with the use of volatilisation prone fertilisers (notably ammonium-based formulations). These risks are highlighted in the fertiliser reports as risk factors for recognition when choosing

fertiliser blends. Key considerations here are the use of an N-volatilisation risk rating, use of lime in the ratoon, as well as mulching.

Due to these various criteria being used to estimate N recommendations, it is essential that growers ensure they supply all necessary details requested on the sample submission form. Where crucial information is not supplied, default values are applied that may not accurately reflect the crop needs, leading to possible yield losses or wasteful expenditure on inputs.

Leaf testing for N is also particularly useful later in the season and before application of split N dressings, as it allows adjustments to split application rates based on crop performance at that time.

**Phosphorus**

Soil properties, notably sample density (which is a reflection of texture and OM content), are taken into account in deriving the phosphorus (P) recommendations. Thus P requirement is adjusted in accordance with the tendency of soils to 'fix' or hold onto P (rendering it partially unavailable for crop uptake).

It is worth noting that in the last few years the "resin-extractable P" method was adopted by FAS to replace the previously-used acid extractable Truog P. The distinct advantage of the resin P method is that it better simulates soil-root interactions in the soil over a very wide range of soil types. While the previous chemical extractant had certain advantages when used on specific soil types, it would severely over estimate P availability when used in alkaline soils. This was highly apparent in the alkaline soils of the northern irrigated regions. The key reason for this is that the Truog extraction uses acids, intended to desorb P from iron and aluminium oxides in near-neutral to acid soils, these forms typically being accessible to plant roots. However, in near-alkaline to alkaline soils (pH > 6.5) the acid would result in the dissolution of mostly calcium-P complexes and carbonate minerals holding P, liberating very high levels of P that are not available to plants under those conditions. This would result in over estimates of P availability and thus an under-estimation of P requirement.

**Potassium**

Potassium recommendations are based on several factors which include target yield (similarly to nitrogen), clay content, base status (which largely accommodates the northern irrigated areas) and most recently K-reserve (an estimate of K supply potential from the soil). Additional adjustments are made for crop removals and mulching.

- *Clay content*

  Much of the available soil K is driven by exchange reactions on clay surfaces and research has shown large difference in requirements for soils of varying texture. Soil threshold values are primarily controlled by the clay content of the soil.

- *Base status*

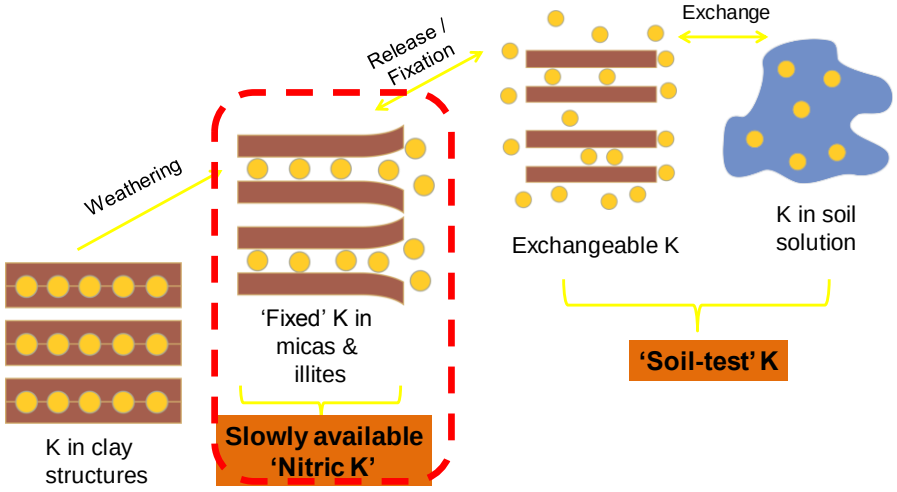
  It has been recognised that many of the soils in the irrigated regions are of high base status (and usually associated with high clay content). The high base status soils (i.e. high Ca and Mg content) have a higher threshold requirement, partly due to higher K sorption potential by clays, and partly due to competitive effects of high Ca and Mg in soil solution reducing the effective availability of K to the plant. Setting higher K thresholds for these soils is thus necessary to ensure adequate K supply for the plant.

- *Crop removal factors*

  As sugarcane has a high K demand and considerable amounts are removed during harvesting, this is taken into account in adjusting the K requirement established from the soil properties. In developing the K recommendations, therefore, the target yield supplied when submitting a sample for analysis is taken into account, again emphasising the need to ensure this is included and realistically estimated when submitting samples.

- *Mulching adjustment*

  Crop residue (mulch) has been shown to retain considerable amounts of K in the leaf and top material which is returned to the soil under mulching situations. Where it is indicated that mulching is practiced, K recommendations are lowered to accommodate this.




- *K-reserve adjustment*

  This is the most recent major change in the fertiliser recommendations package, where in many instances K recommendations have been greatly reduced or even indicated to be zero when high K reserves occur in soils. This has led to confusion and dissatisfaction by growers who previously had been accustomed to receiving much higher recommendations. The aim with this adjustment is to balance the K requirement (as determined from the test value and the thresholds established for the soil sample) and the ability of that particular soil to provide K from non-exchangeable reserves (K-reserve). The following aims to explain the concepts related to K-reserve as well as the value and validity of the K-reserve adjustment used in formulating recommendations. Early findings for South African soils were reported by Wood and Schroeder (1991) with development of the laboratory based analysis reported by Miles and Farina (2014).

  Potassium for crop uptake is typically derived from exchange complexes on the soil clay particle surfaces. This is the readily available form of K (solution and exchangeable K) and is measured as the exchangeable fraction in a fertility analysis. However, K is also present as ions held in between clay layers (so-called interlayer K or non-exchangeable) or in the lattice structure in soil minerals (non-available). These non-exchangeable pools of K are released into soil solution at a rate proportional to the removal of the exchangeable and solution K, thereby replenishing available K pools in the soil. In high clay soils, and particularly those with expanding mineralogy (usually associated with high base status soils such as in the irrigated areas in the Lowveld or alluvial deposits, such as Umfolozi), these potential reserves of K can be very high, effectively lowering the need for high K applications (with cost saving benefits on fertiliser, and no loss of yield or quality).

These reserves are often estimated using acidic extractants to drive the release from the clay minerals in a short space of time. Diagrammatically this can be represented as:

Numerous research studies in South Africa have demonstrated that generally there are no responses to applied K when K-reserves exceed 1.5 $cmol_c$/kg. For instance, in a trial in Mpumalanga on a Glenrosa soil form with high K-reserve (2.6 $cmol_c$/kg and a test value of only 150 mg/L) there was no response (i.e. the unfertilised control soil had the same yield as the fertilised plots) to K (supplied at rates of 75, 150 and 225 kg/ha over three ratoon crops), despite an estimated K removal rate of 250 kg K/ha/annum.

The long term fertiliser trial BT1 at Mt Edgecombe, on an Arcadia soil form with a K-reserve of 1.5 cmolc/kg has not shown any significant response to K fertiliser for over 18 years.

A study on the Umfolozi flats on a Dundee soil form with 42% clay, a K-reserve value of 3.8 $cmol_c$/kg and soil test value of 110 mg/L, showed no response to applied K over two seasons of testing. In addition, the grower on whose field the trial was located had not applied K for over five years, and yet remained one of the top yielding growers in the area.

A recent demonstration trial on a high K-reserve soil in Umfolozi investigated the use of green manures to supplement N nutrition in sugarcane (with no additional fertiliser applied). As part of this study a “monitor-plot” was installed in the demonstration field where large amounts of additional N, P and K were applied during the growing cycle. At harvest it was found that there was no yield benefit in the fertilised plot over that of the green-manure only area, while leaf analysis showed that there was no difference in leaf K between unfertilised and K-fertilised treatments. This highlights the potential of high K-reserve soil to adequately meet the K demands of a sugarcane crop (see Link May 2018, Volume 27, Issue 2).

**Other nutrients**

Base cations, micronutrients and silicon, and most recently sulphur, are routinely measured in all soil samples submitted to FAS. Specific recommendations are not given for these nutrients; however, where deficiencies are detected, general recommendations are available from Information Sheets and the soil management handbook (available on the SASRI InfoPack 2018).

Where growers are concerned about the nutritional status of their crops, it is strongly advised that they make use of FAS’s leaf testing service. Research has repeatedly shown that leaf testing is very valuable for gauging the adequacy of nutrient supplies to an actively growing crop. In addition growers can make use of “monitor plots” to test higher rates against those recommended from the fertility analysis and refine the application levels based on the monitor plot crop response. This is particularly effective for N and K, since responses to applications of these nutrients occur relatively quickly.

**Developments moving forward**

Recently an extension specialist has been appointed in the Komatipoort area and is seeking opportunities with the local growers to install demonstration and monitor plots to highlight several of the concerns relating to adequate crop nutrition and the FAS recommendations. Growers will be informed of these activities as they are developed. Further plans are to evaluate existing information sources and develop these so they are more readily available to growers and extension specialists (see Issue 7, this Communique, for more details on this proposal). This will include more newsletters that better explain and highlight changes to recommendations and how these impact on growers.

**Useful articles and resources**

- Information Sheets 7.1 to 7.18 (available on the SASRI InfoPack 2018)
- SASRI (2013). Understanding and managing soils in the South African sugar industry. ISBN 1-874903-40-9(See Chapters 7, 8 and 9)

**References**


- Miles N and Farina MPW (2014). Towards the more efficient use of fertiliser potassium: prediction of 'slowly-available' potassium reserves in soils. *Proc S Afr Sug Technol Ass 87: 330 – 333*
- Wood RA and Schroeder BL (1991). Release of non-exchangeable potassium reserves from a range of sugar industry soils. *Proc S Afr Sug Technol Ass 65: 47-52.*


**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | L Titshall & N Miles | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD19 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 19 |
| Region: | Mpumalanga | Programme Area: | CPM |

| **Communication Plan Outline:** | | | | | |
|---|---|---|---|---|---|
| *Please indicate with a tick-mark the <u>traditional</u> Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged)*. | | | | | |
| <u>Publications</u> | | <u>Presentations</u> | | <u>Discussions/Workshops</u> | |
| The Link and/or Ingede | | Staff Colloquium for Extension Specialist s | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |
| See plan in issue 7 | | | | | |
| *Please specify any <u>non-traditional</u> Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).* | | | | | |
| N/A | | | | | |
| *Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.* | | | | | |

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| See plan for issue 7 | | | | |

| Communication Plan Budget and Resources Requirements: |
|---|
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* |
| See plan for issue 7 |

| |
|---|
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* |
| See plan for issue 7 |
| General |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* |
| See plan for issue 7 |

Root development and management

(SASRI Reference: Issue 20)

Click here to return to index

**RDE ISSUE DESCRIPTION**

**Background**

More information is required on the rate of root development in relation to time of planting and harvesting. This is important for irrigation scheduling.

**Desired end result**

- Make data from past research studies on root development available for further analysis.
- Provide guidelines on management strategies to optimise root development.

**SASRI COMMUNIQUÉ**

Sugarcane root development and their distribution has been studied in great detail at SASRI and other sugarcane research institutes. The compilation of a detailed document summarising options to manage fields for optimum root development and functioning is to be compiled. Of note is that the task is anticipated to require a significant amount of time due to the extensive literature available from numerous disparate sources. As a result, a project to compile the information will commence in 2019. The objective of the project will be to document how to create and manage soil conditions that will favour the development of a healthy root system.

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18KE05
*Management of fields to optimise root development*

Project Manager
*Dr Rian van Antwerpen*
*(Rianto.vanAntwerpen@sugar.org.za )*

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | R van Antwerpen | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD20 |
|---|---|

| **RDE Issue Details: Root development and management** | | | |
|---|---|---|---|
| **Year:** | 2018 | **Issue Number:** | 20 |

| **Region:** | Mpumalanga | **Programme Area:** | CPM |
|---|---|---|---|

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | Yes | | | | |
| Booklet on the topic. | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| SASRI booklet | All growers | To make growers aware of field management systems that will promote the growth of roots. | 2019 | Extension receiving questions on the topic. |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

Publishing costs to be accomodated from KMU budget

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

Editing and graphic design services to be provided by KMU

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

None

## NDVI imagery for pest and disease surveys

(SASRI Reference: Issue 21)

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**RDE ISSUE DESCRIPTION**

**Background**

Research on the use of NDVI imagery to detect certain pests and diseases in the field is required.

**Desired end result**

Pilot study on eldana using GIS interpolation to predict the location and severity of eldana infestations based on stress factors and survey results from other fields in the vicinity. If successful, this would assist with the planning of more effective and efficient eldana surveys and could be extended to other pests and diseases.

**SASRI COMMUNIQUÉ**

SASRI appreciates the value that the collection and analysis of production and other physical data could have in informing on-farm and mill-level management decisions. To this end, many of the mill groups in the industry have already embarked upon programmes to collect production, soils, variety and other data. In most cases, this is integrated into a GIS to enable geo-spatial presentation of data. SASRI has a research and support oriented GIS section, staffed by a GIS specialist and a small staff complement, consisting mainly of interns. The primary role of the SASRI GIS Unit is to provide support to SASRI research and services. It has never been the intention that SASRI should directly support any industry-wide data collection or GIS. Rather, through the GIS and other subject specialists, the intention was to direct industry in the most effective and appropriate use and presentation of data. It is acknowledged that such analysis will clearly better inform critical issues such as pest and disease management, variety choice and the determination of realistic production potential, amongst others, and therefore provide a critical support to the progress of the industry.

SASRI, through its Biosecurity function, collects extensive pest, disease and variety data. Another area where SASRI collects extensive data is in soil analyses carried out by FAS. Other data repositories at SASRI include farm and field boundaries and soil parent materials, although in some instances, these last mentioned data are incomplete.

The integration of all available data sets, both from SASRI and the mill regions, could provide an immensely powerful management tool which would be of use to growers. Regarding the data which SASRI has control over, these could be shared, subject to industry protocols, and integrated into systems such as a regional GIS, with the permission of the individual growers. These data could then be available for the grower's own use or, by specialists who, in aggregated form, could perform various area-based comparisons and analyses.

It is in this wider use of data, beyond individual access by the grower or SASRI specialist responsible for the data collection, that there are some concerns. For example pest and disease data often dictate the need for remedial actions, which are of particular and individual concern to the grower. Wider access therefore needs to be carefully controlled. Similarly, the interpretation of particular sets of data or comparisons e.g. FAS data, also needs to be carried out under the supervision and with the approval of those responsible for their original collection and processing, and with understanding of the necessary norms and statistics. Analyses and conclusions made by third parties without the necessary input from specialists could easily lead to the spread of misinformation and cause unnecessary confusion.

In the event that data collected by SASRI are provided to regional databases such as a GIS, agreements will need to be reached between the grower, SASRI and the data managers/administrators regarding levels of access and permissions. These will also need to be considered in the light of current legislation relating to the protection of personal data. Legal advice will need to be sought.

**Communication plan**

- Meetings with relevant decision makers on the integration of P&D and FAS data into the RCL GIS, including SASA/SASRI management, RCL GIS Committee, RCL management, various cane grower associations and SASRI extension. Simultaneously consultations with SASA legal advisors to determine legal implications of data usage. Responsible persons: R Stranack; M Adendorff; K Trumpelmann; P Brenchley. Time period: July to October 2018
- Outcome of above to be communicated to Malelane and Komati grower associations and RCL data administrators and development of protocols. Time period: November to December 2018
- Implementation of data integration January 2019

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | RA Stranack | | |
| Resource /Centre: | Extension & Biosecurity | Date: | 5/06/2018 |

| **Communication Plan Reference Number:** | 18RD21 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | Issues 3, 4, 21 & 40 |
| Region: | Irrigated North | Programme Area: | N/A |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | X |
| Other (specify below) | | | | Discussions with stakeholders | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Identifying the appropriate roleplayers and initially hold informal discussions to determine the extent of data integration required and which is possible and legal to implement

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Informal discussion/information gathering | SASRI – GIS, data management, Extension & Biosecurity, local grower groups | Determine the respective needs of various parties, the potential uses and applications of GIS integrated data. Also investigate possible methods | July - November 2018 | All stakeholders reached and engaged with. Report compiled detailing all possibilities |

| | | | | |
|---|---|---|---|---|
| | | of data capture and sharing | | |
| Informal discussion/information gathering | SASA Industry Affairs (legal support) | Determine the legalities and implications of data access & sharing | July – November 2018 | Clarity on legal implications of access to and sharing of personal data |
| Formal meetings | Local grower associations, LPD&VCC & RCL | Share possibilities for data access and sharing as well as potential benefits thereof | January – April 2019 | Permissions agreed and formal protocol written up agreed and implemented |

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| Communication Plan Budget and Resources Requirements: |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* |
| N/A |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* |
| N/A |
| **General:** |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* |
| N/A |

## Water allocation for Komati Research Station needs to be secured during times of drought

(SASRI Reference: Issue 22)

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**RDE ISSUE DESCRIPTION**

Water allocation for Komati Research Station needs to be secured during times of drought.

**SASRI COMMUNIQUÉ**

The Malelane and Komati grower leadership, together with the relevant local authorities, have agreed that irrigation water allocation to the SASRI Komati Research station is to be prioritised into the future. The decision was taken by the Komati River Irrigation Board to limit the negative effects of low irrigation water availability on the selection of new varieties for the region.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | MW Adendorff | | |
| Resource /Centre: | Extension | Date: | 2018-05-04 |

| | |
|---|---|
| **Communication Plan Reference Number:** | 18RD22 |

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 6 |
| Region: | Komatipoort Mpumalanga | Program Area: | BFRU |

| **Communication Plan Outline:** |
|---|

*Please indicate with a tick-mark the <u>traditional</u> Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged)*.

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | X | Grower Day | |
| Extension Newsletters | X | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | X | | | | |
| Letters to the RD&E committee members and relevant SASRI personnel and departments. | | | | | |

*Please specify any <u>non-traditional</u> Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Stay in contact with the Komati River Irrigation Board and together with the Komatipoort Farm Manager communicate irrigation needs when required.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Communicate the decisions taken by the Komati River Irrigation board to the relevant stake holders | RD&E Committee members, relevant SASRI personnel and grower community | Secure water supply to the Komatipoort Research Farm and seedcane mother block at all times | After the final decision has been taken by the Komati River Irrigation Board | Get water supply to the Research farm to be placed as an agenda item of the Irrigation Board meetings. |
| Develop a communication protocol with the Irrigation Board to ensure full irrigation supply. | Research Farm Management structures, researchers and Irrigation Board | Set clear protocal for communication of needs when they occure. | After the final decision has been taken by the Komati River Irrigation Board | Get water supply to the Research farm to be placed as an agenda item of the Irrigation Board meetings. |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

Limted time required for MW Adendorff, W Roberts and S Ramgareeb

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

Limted time require for MW Adendorff, W Roberts and S Ramgareeb

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

The SASRI research farm needs to keep records of water use and scheduling to be able to demonstrate effective use of water.

| Field layout for big trucks to limit turning damage on SSG farms – 3 m between farms not big enough for trucks to turn around<br><br>(SASRI Reference: Issue 23) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Field layout for big trucks to limit turning damage on SSG farms – 3 m between farms not big enough for trucks to turn around

**SASRI COMMUNIQUÉ**

For a 2.5 m wide road, the recommended turning circle radius is 8 m (inner radius) for heavy vehicles requiring a 90 degree turn. The outer radius design norm for the same road is 12.8 m to allow for an off-tracking allowance by the heavy vehicle. (i.e. a widening of the road from 2.5 m to 4.8 m. The tangential taper widening will occur over a 14 m distance.

All such details confirm the need for site specific planning with regards to land use, access and extraction routes servicing fields and farms. This is particularly required for smaller scale operations with smaller fields and route constraints. In addition, strategic and well planned and prepared trans-loading zones may be required to service some highly constrained access routes. All such main access routes and zones should ideally be hardened with suitable and locally available quarry material. The local extension specialists in the area should be consulted with regards to site specific requirements. Various land-use plan guidelines are also available in the SUSFARMS® manual.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Peter Tweddle | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 17RD23 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 23 |
| Region: | Northern Irrigated | Programme Area: | SDO |

| **Communication Plan Outline:** | | | | | |
|---|---|---|---|---|---|
| *Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).* | | | | | |
| Publications | | Presentations | | Discussions/Workshops | |
| The Link and/or Ingede | X | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |
| | | | | | |
| *Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).* | | | | | |
| N/A | | | | | |
| *Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.* | | | | | |

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Ingede article | SSG, isiZulu | Field layout planning for heavy vehicles | December 2018 edition of Ingede | Feedback from SSG Extension personnell |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| None – time for extension and GIS interns to follow up. | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| N/A | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| N/A | | | | |

RSD spread on contractors' cane knives – knives not necessarily disinfected between fields and farms

(SASRI Reference: Issue 24)

Click here to return to index

**RDE ISSUE DESCRIPTION**

RSD spread on contractors' cane knives – knives not necessarily disinfected between fields and farms

**SASRI COMMUNIQUÉ**

It is well known that RSD is spread on cane knives (SASTA: Bailey and Tough, 1992; Info Sheet 2.1: RSD). Cleaning cane knives with a disinfectant such as Jeyes Fluid (10% solution) or methylated spirits (75% solution) when cutting cane minimises the risk of RSD spread. A contact time of approximately five minutes is required for Jeyes Fluid to be effective. A knife-cleaning device (see RSD Info Sheet 2.1) can be used to remove soil and plant debris from the knife blade to facilitate disinfection. Methylated spirits should be prepared in a knapsack sprayer to reduce the risk of evaporation and can be sprayed onto the knife blade – a few seconds is required for effective disinfection. Alternative disinfectants for use on farm equipment are currently being tested in a current SASRI project (16TD02).

In a commercial situation where in-field cleaning is not always practical, knives should at least be disinfected when moving from one field to another and at the end of each day. The RSD bacterium has been shown to survive and remain infectious for up to 48 hours on the knife blade. More frequent disinfection (preferably after every metre of row cut) is necessary when harvesting seedcane. Extra knives should be allocated to each cutter to ensure that knives are disinfected properly. Knives used for cutting seedcane should be kept separate from those used in commercial fields.

It is critical that contractors follow these recommendations, particularly when moving from one farm to another, to mitigate the risk of RSD spread to farms where growers have invested heavily in the management of RSD.

## SASRI COMMUNICATION ACTION PLAN

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Sharon McFarlane | | |
| Resource /Centre: | CBRC | Date: | 30 May 2018 |

| **Communication Plan Reference Number:** | 18RD24 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 24 |
| Region: | Komati | Programme Area: | Crop Protection |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | X | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | X |
| Other (specify below) | | | | Contractor study group? | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

There is a need to:
1) create awareness amongst SSGs of the importance of RSD and the risk of spread onto their farms
2) inform contractors of the importance of RSD and their role in reducing the risk of spread, particularly when moving from farm to farm.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Ingede | SSG | Make growers aware of the importance of RSD and the risk of spread onto their farms | September 2018 | Feedback from Extension |
| Discussions with key stakeholders | e.g. Extension Simamisa, RCL, Illovo | Develop an approach to address lack of awareness / commitment amongst contractors to disinfect cane knives during harvesting operations | July-Oct 2018 | Strategy developed to facilitate engagement with contractors |
| Engagement with key contractors | | To increase awareness amongst contractors to disinfect cane knives during harvesting operations | Dec 2018-Feb 2019 | Increased adoption of practice by contractors based on feedback from |

| | | | | |
|---|---|---|---|---|
| | | | | Extension and SSG. |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| No budget required | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| KMU – publication of Ingede<br>Extension – assistance with discussions with key stakeholders | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| | | | | |

| Test water-use efficiency in different varieties<br><br>(SASRI Reference: Issue 25) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Test water-use efficiency in different varieties

**SASRI COMMUNIQUÉ**

While it is acknowledged that varieties exhibit different responses to reduced irrigation, differences in water-use efficiency of varieties are subtle in comparison to effects of other management factors such as irrigation systems or mulching. Very often, commercial observations of varietal responses to reduced irrigation are confounded with effects of irrigation system and soil type. Very detailed and expensive experimentation is required to elucidate "real" genetic differences in drought tolerance, and to understand the mechanisms involved. Such a high level of investment is not justified for an irrigated region, where drought is an exception rather than the norm. Research in other crops has shown that drought tolerant varieties usually perform poorly in "normal" years. The actual genetic trait that is of value is therefore "stability" i.e. minimal yield variation between years. Such stability is routinely evaluated in SASRI's breeding program, as varieties are tested over 12-15 seasons before being released. Any variety that is unable to cope with reduced irrigation supply during the selection period is dropped from the program. This ensures that only stable varieties are taken forward to release. With regard to water use efficiency, the closest estimate of this is from existing variety trials. In these trials, all varieties are irrigated with the same amount of water. Therefore, the highest yielding varieties in those trials are essentially those with the highest water-use efficiency. The results from such trials will be routinely communicated to growers in various forums moving forward.

Water use efficiency is an important consideration in rainfed and irrigated sugarcane production because of low and erratic rainfall and limited and erratic irrigation water supply in South Africa.

**Commonly used terminology and acronyms**

- *Crop level water-use efficiency*: WUE defined as biomass or cane yield produced per unit of evapotranspiration or water used (rainfall + irrigation)
- *Leaf level water-use efficiency*: TE defined as carbon fixed per unit of transpiration

- Crop level radiation use efficiency: RUEc defined as biomass produced per unit of intercepted solar radiation
- Leaf level radiation use efficiency: RUEl defined as carbon fixed produced per unit of incident solar radiation
- Canopy (crop level) and stomatal (leaf level) conductance for gaseous exchange, dynamically determined by soil water supply, atmospheric evaporative demand and plant canopy and rooting characteristics

Research shows that genotypes exhibit different WUE under similar conditions, but that WUE also depends strongly on agronomic factors, such as soil mulching (Olivier and Singels, 2015) and nutritional status. Generally, genotypes with high WUE are also high yielding. Variety evaluation identifies top yielders with a given water supply (rainfall and irrigation), therefore most selections would have relatively high crop WUE. So in an indirect way we are testing for WUE.

Research also shows that genetic variation exists in TE (Jackson et al., 2015) but that high TE does not necessarily produce high yields. In fact, TE is often inversely correlated with yield in well-watered and mild stress environments. It may be positively correlated with yield in severe stress situations, due to the inverse relationship with stomatal conductance (Blum 2009; Jackson et al., 2015). SASRI and other research suggest that under well-watered and mild stress environments, genotypes that capture more radiation and water produce highest yields, as opposed to genotypes that save water through stomatal sensitivity, and that high TE is less important (Eksteen et al. 2014; Basanayanke et al., 2015; Liu et al., 2016).

It is difficult to measure TE and given its weak link with yield, it is not feasible to test for this trait at this stage. SASRI is conducting research (projects 11CM02 and 15CM02) to phenotype breeding populations for WUE, TE and drought tolerance (actually for stomatal conductance and RUE). If the technology is developed successfully, WUE and TE could be phenotyped routinely for breeding populations, and WUE and TE information will be available for released varieties.

Up to now we have been collecting RUE and conductance information for genotypes on an ad hoc basis in physiology projects (Smit and Singels, 2006; Olivier and Singels, 2015; Eksteen et al. 2014). We also have RUE estimates (RUE is strongly related to WUE and TE) and estimates of drought tolerance based on anecdotal information from variety trials (Singels et al., 2016).

**References**


- Basanayanke et al. (2015). Sugarcane for water limited environments. Variation in stomatal conductance and its genetic correlation with crop productivity. J Exp. Bot. 66: 3945-3958
- Blum (2009). Effective use of water and not water use efficiency is the target of crop yield improvement under drought stress. Field Crops Research 112: 119-123
- Eksteen, A.B., Singels, A. and Ngxaliwe, S. (2014). Water relations of two contrasting sugarcane genotypes. Field Crops Research 168:86-100
- Jackson et al. (2015). Genetic variation in TE. J. Exp. Bot. 67: 861-871
- Liu et al. (2016). Growth and yield of sugarcane genotypes are strongly correlated across irrigated and rainfed environments. Field Crops Research 196: 418-425
- Olivier, F.O, and Singels, A. (2015). Increasing water use efficiency of irrigated sugarcane production in South Africa through better agronomic practices. Field Crop Research 176: 87-98
- Singels, A., Hoffman, N., Paraskevopoulos, A. and Ramburan, S. (2016). Sugarcane genetic trait parameter estimation. Proceedings of the iCROPM2016 International Crop Modelling Symposium held from 15 to 17 March 2016 in Berlin, 143-144.

- Smit, M.A. and Singels, A., (2006). The response of sugarcane canopy development to water stress. Field Crops Research 98:91-97.


**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Sanesh Ramburan | | |
| Resource /Centre: | PERC | Date: | 11 May 18 |

| **Communication Plan Reference Number:** | 18RD25 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 25 |
| Region: | Irrigated North | Programme Area: | CPM |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged)*.

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | x |
| Extension Newsletters | | SASTA | | Grower Study Group | x |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | A grower day proposed for issues 17 and 26, will be used to convey the information contained in the communiqué. | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Grower day | Growers | Inform growers of the message conveyed in the communique. Present results from trials that experienced droughts. Explain difficulties associated with determining WUE experimentally, and how high WUE does not necessarily scale up to better | October 2018 | Issue not listed in the next RD&E issue list (or following a period of water scarcity) from the region would be an indicator of success. |

| | | | | |
|---|---|---|---|---|
| | | commercial production. | | |

| **Communication Plan Budget and Resources Requirements:** |
|---|
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* |
| No additional budget needed. The event could piggy-back on currently scheduled trips to Komatipoort by SR. |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* |
| |
| **General:** |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* |
| |

## Climate change in relation to varieties

(SASRI Reference: Issue 26)

Click here to return to index

**RDE ISSUE DESCRIPTION**
Climate change in relation to varieties

**SASRI COMMUNIQUÉ**

Climate change projections suggest greater seasonal variability in weather conditions. As the plant breeding selection process spans over a period of 12-15 years, potential varieties are exposed to such variability routinely. Only the varieties that exhibit stable yields across selection stages are carried forward to commercial production. In essence, the plant breeding process therefore "tracks" climate change. Additionally, simulated results from research projects 08RE14 and 11CM06 suggest that genotypes that maximize radiation and water capture (as opposed to "water savers") are likely to perform the best under current and future climates. A caveat to this is the uncertainty of future rainfall predictions.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Sanesh Ramburan | | |
| Resource /Centre: | PERC | Date: | 11 May 18 |

| **Communication Plan Reference Number:** | 18RD26 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| **Year:** | 2018 | **Issue Number:** | 26 |
| **Region:** | Northern Irrigated | **Programme Area:** | CPM |

Communication Plan Outline:

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | x |
| Extension Newsletters | | SASTA | | Grower Study Group | x |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |

| | | |
|---|---|---|
| | | A grower day proposed for issue 17, will be used to convey the information contained in the communique. |

*Please specify any <u>non-traditional</u> Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Grower day | Growers | Update growers on latest variety performance under irrigation. Provide recommendations for different conditions. Explain the plant breeding process and how it accounts for current and future climates. Present data from past research projects highlighting variety characteristics likely to perform better under future climates. | October 2018 | Better adoption/request for newer varieties by growers in the area. This issue not listed in the next RD&E issue list (or following the next period of water scarcity) from the region would be an indicator of success. |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

No additional budget needed. The event could piggy-back on currently scheduled trips to Komatipoort by Sanesh Ramburan.

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

| Benefits of different alternative crops (during fallow periods or through crop rotation) for soil and subsequent cane crops<br><br>(SASRI Reference: Issue 27) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Benefits of different alternative crops (during fallow periods or through crop rotation) for soil and subsequent cane crops

**SASRI COMMUNIQUÉ**

**Summary**

Cover cropping, green manuring, intercropping, rotational cropping and crop diversification are all aspects of crop production that consider the use of different crop species to either impart benefits to soil quality and health or for use as income generation beyond growing a single crop. Concerns over the benefits on soil and subsequent cane crops were raised. This communique highlights key differences between these systems, and discusses in greater detail the reported benefits of green manuring and intercropping with case study examples given. Rotational cropping and crop diversification are outside of the scope of SASRI and links to relevant information is given.

Cover cropping and green manuring are used to provide soil protection and improve soil health between sugarcane plough out/replant fallow periods. Reported benefits include increased erosion protection, improved soil organic matter status, better soil microbial health, N-fixation where legumes are grown, enhanced soil physical properties such as infiltration and water retention characteristics, as well as pest, disease and weed control. Case studies have shown improvements in several soil properties, but the specific benefits depend on existing soil properties and health and extent of management inputs. Several studies report that there are economic benefits of green manuring in the plant crop and up to the third ratoon crop.

A special instance of green manuring is where salt tolerant crops are used in an effort to recover salt-affected soils. In such situations, it is usually advised to remove cover crops at harvest so that salts extracted by the cover crop are not returned to the soil. The key benefit with such crops is to enhance water movement in the soil profile to aid with leaching of salts from the rooting zone.

Intercropping aims to grow different crops between sugarcane rows with the intention of increasing economic return from an area of land. Sometimes the intercrops are also intended to impart some of the soil health benefits reported for green manuring. While such systems have been shown to be viable under specific conditions and with higher value intercrops, it has been found that the intercrop will often depress sugarcane yield. Such systems have been largely advocated for small scale grower situations where short term cash flow and subsistence requirements dominate.

Regardless of the system that a grower wishes to adopt, it is essential that they devise a management strategy that considers their unique situation, where soil types, existing management practices, crop cycles and economics are taken into account. This will ensure that the correct crop species for the intended purpose are selected and that they are appropriately managed for maximum benefit.

**Introduction**

While specific issues were not given at the workshop, a general query from growers related to the potential benefits to soil and sugarcane production when using alternative crops during fallow or as part of the sugarcane cropping cycle. There are several, potentially inter-related issues raised within this

broader context. To aid understanding a brief definition of key concepts are given and feedback cover cropping/green manuring and intercropping is provided thereafter.

**Definitions**

*Cover crops*

- A crop planted between plough out and replant of cane and is grown for the protection of the soil.
- Purpose: To reduce erosion.

*Green manuring*

- The growth of a crop for the specific purpose of retaining it on the soil surface or incorporating it into the soil while green (Figure 1).
- Typically only possible prior to a replant cycle.
- Purpose: To improve the soil and benefiting subsequent crops.

**Figure 1: Green manuring involves planting cove crops during fallow periods for the purpose of incorporating the vegetative biomass back into the soil prior to replanting sugarcane.**

Note: Cover cropping and green manuring are often considered as part of the same management system.

*Intercropping*

- A crop grown simultaneously amongst another crop or crops, planted within a month or two of the latter (Figure 2).
- Purpose: To improve income/ha and sometime impart green manure benefits

**Figure 2: Intercropping involves planting cover crops (and sometimes cash crops) between sugarcane rows to maximise use resource of a piece of land.**

*Rotational cropping*

- This is a system of planting successive but different crops in a systematic order (Figure 3).
- Purpose: To prevent build-up of soil borne diseases and promote soil fertility and it may allow for multiple crop production cycles within a single season (higher income).


**Figure 3: Rotation cropping entails planting different crops on a piece of land in a rotational cycle across successive growing seasons.**

*Crop or production diversification*

- To grow different crops within a farm with the advantage of access to different or additional markets for products compared to a single product system (Figure 4).
- It provides some degree of risk mitigation (balancing income) if one of the crops underperforms.
- Purpose: To generate income from a number of cropping enterprises.

**Figure 4: Crop diversification is the planting of different crops within a farming system, where the chosen combination allows the grower to improve seasonal cash flow, access different markets and reduce risks associated with monoculture cropping systems.**

**Notes on Rotational cropping and crop diversification**

Where growers wish to undertake rotational cropping or crop diversification, it is essential they consider the implication of using sugarcane fields for the production of alternative crops. In the case of rotational cropping, this may be possible during the fallow period if this is sufficiently long. A prerequisite for rotational cropping is a period of sufficient length to grow at least two different crops before the field is replanted to sugarcane. To achieve this a period of about 12 months will be sufficient for back-to-back summer and winter crops. However, where crops are harvested and removed from the fields, additional inputs may be required to balance nutrient supply for the following sugarcane crop. It is also worth considering that cropping sugarcane consists of several years of monoculture due to ratooning, with potentially shorter periods between sugarcane cropping cycles (between crop eradication and replanting) for rotational cropping. Where rotational crops are used as cover crops during plough-out/replant, then consideration must be given to managing fields for cover cropping or green manuring (see below section for more detail on cover cropping and green manuring).

Crop diversification requires that areas of land be allocated to alternative crops that aim to improve the diversity and economic viability of the farming operation. Selecting these crops will depend on the requirements of those crops in relation to the conditions and resources available to the farmer, as well markets for the target crop. It is not possible to provide agronomic best practices for all potential crop options and growers investigating such options are advised to seek assistance from their extension specialists.

Additional information on specific crops can be found on the Department of Agriculture Forestry and Fisheries (DAFF) website (http://www.daff.gov.za/daffweb3/Resource-Centre) with crop specific searches.

Further information is available from the KZN DAFF website: http://www.kzndard.gov.za/resource-centre/fact-sheets-brochures-and-leaflets; and http://www.kzndard.gov.za/resource-centre/guideline-documents

**Overview of cover crops and green manuring**

The specific benefits of green manuring during fallow on soil properties have been previously reported and several resources are available to growers highlighting potential options and benefits (see end of

document). The review article by Schumann et al. (2000) (see reference list) is referred to for a useful overview of the key benefits, but these are more broadly summarised here:

- *Protecting the soil surface during fallow periods*

  The average rate of soil erosion in SA is about 12.6 tons soil/ha/year which is higher than the average maize yield of 5.5 ton/ha (in April 2017 the National Crop Estimate Committee pegged South Africa's average maize yield at 5.5 tonnes per hectare, which would be the highest on record). The global rate of soil forming is about 1.7 ton/ha/yr, as calculated from the following resources:

  https://soe.environment.gov.au/theme/land/topic/2016/soil-formation-and-erosion;
  http://www.grainsa.co.za/soil-erosion-in-south-africa---its-nature-and-distribution; and
  https://agriorbit.com/wp-content/uploads/2017/05/Agbiz-Morning-Market-Viewpoint-on-Agri-Commodities-24-May-2017.pdf).

  Thus, from a soil management and conservation perspective, providing a soil cover is possibly the most important aspect when introducing green manuring and cover crops during fallow. Bare exposed soil is prone to erosive forces, where high intensity rainfall can lead to excessive water runoff and loss of soil and nutrients. Bare soils are also prone to crusting (which results in greater runoff and reduce infiltration) and high soil temperatures (that can increase evaporation and inhibit stalk sprouting at planting or ratooning). A cover crop intercepts rainfall and slows water movement over the soil surface, which promotes infiltration. The damaging effects of raindrop impact on the soil surface are also eliminated, and so crusting is reduced. Apart from the in-field benefits, further benefits are obtained from cleaner runoff water (less dam and river contamination with sediment and nutrients).

  Thus, if only a single reason is required for cover cropping and green manuring, it is for the purpose of soil surface protection during fallow.

- *Contribute to soil organic matter levels*

  Where a cover crop, especially high biomass varieties, are grown and either left on or incorporated back into the soil before replanting sugarcane, there is typically an increase in the soil organic matter levels in the soil. While this benefit is often not large or persistent (as the added organic material will decompose in the new sugarcane cropping cycle), this additional organic matter is essential for promoting improved nutrient cycling, enhanced soil physical properties (notably infiltration and water retention), enhancing soil microbiological populations and activity and offering protection against erosive forces.

  It is also worth noting that vigorous root systems from cover crops also contribute organic molecules to the soil through root exudates that promote soil stability, while the root material itself provides physical binding of aggregates in the bulk soil. This benefit will persist for a period after the crop is mowed or incorporated into the soil.

- *Improve nutrient supply and dynamics*

  Some have argued that cover crops and green manures introduce nutrients to the soil. With the exception of nitrogen introduced by growing leguminous N-fixing cover crops, this is not true or possible. However, different cover crops, due to difference in their rooting systems and ability to take-up nutrients, are able to: (a) retain nutrients in the upper soil layers; (b) scavenge nutrients from soil sources that sugarcane may not be able to access (either through mycorrhizal/bacterial

associations and/or deep rooting); and (c) mobilise non-available pools of nutrients from the soil. In all cases, where the cover crop has taken up additional nutrients, these will ultimately be returned to the soil when the crop is harvested and returned to the soil.

In the case of leguminous crops, these have associations with organisms that are able to fix free form nitrogen from the atmosphere into forms that can be utilised by the plant in the soil environment. This “fixed’ nitrogen is either made available in the soil directly by the microbes involved in fixation or it enters the soil from the breakdown of the cover crop when returned to the soil at the end of the crop cycle.

- *Enhance soil microbial dynamics*

  By introducing different crops (and thus sources of organic material) into the soil, microbial diversity and activity is increased. These improvements in microbial populations are frequently associated with better soil health and subsequent crop performance due to their role in improving soil physical and chemical attributes. These organisms are also often cited as being competitive to pest and diseases and disruptive to their life cycles.

- *Enhance soil physical properties*

  Enhanced soil physical attributes is noted as one of the most important benefits of introducing and retaining cover cops as green manures. Introducing organic matter and roots systems in the soil help increase aeration (porosity) and improve infiltration and water retention. In clay soils, pores are opened, while in sandy soils organic matter provides binding to improve pore structures. Compaction can be alleviated especially in instances where the use of strong and deep rooting crops can penetrate and create porosity through compacted layers. Some tuber crops are reported to exert high breaking forces on compacted zones as the tubers grow, leaving voids and water pathways when the tuber decomposes. Benefits to soil aggregation are through enhanced binding of soil particles by roots, organic matter and the derivatives from these. Improved aggregation is essential for better water infiltration and protection against erosive forces.

A severely compacted soil planted to grazing vetch and triticale for 12 months created a fine structured soil.

Several other reported benefits of cover crops include:

- *Provide weed control*

  Numerous studies highlight that densely growing cover crops can effectively outcompete weeds, largely through competition for soil resources and light (smothering). A few instances of allelopathic

inhibition of either weed seed germination or weed growth are also reported (notably species such as oats and several brassica species that produce mustard oils). An example is the use of oats to control *Digitaria abyssinica* (African couch grass) for up to two years.

A struggling sugarcane field infested with *Digitaria abyssinica*.

- *Assist in pest and disease control*

  A key mechanism here is the breaking of disease cycles in monoculture crops such as sugarcane. Introducing different crops to a soil disrupts the life cycles of obligatory pests, and can reduce or eliminate them from treated areas. In addition, as for weed control, some cover crops also produce toxic compounds that deter or kill certain pests and diseases. Several studies have shown that many brassica varieties will reduce fungal infestations, while several other cover crops varieties (i.e. cabbage, marigolds, mustard, sorghum and sunn hemp) can reduce nematode infestations.

- *Encourage beneficial insects*

  By providing diversity in food sources and habitats, cover crops encourage several beneficial species of insects. These may be pollinators, which are useful where other flowering crops are also grown in the farming system, or predators of pest insects, thereby assisting in population control.

**Regional case studies on the benefits of green manuring on soil properties under sugarcane**

Some South African studies report changes in soil properties due to green manuring and cover cropping. The benefits are predominantly influenced by the type or mix of cover crop, length of growth cycle and existing soil properties.

A pot study conducted by SASRI in 2002 investigated the effect of several cover crop species (as compared to sugarcane variety N12) on changes in key soil nutrients of a grey sand after growing the cover crop for four months. Table 1 summarises the main findings.

A 2005 SASRI field study tested the effects of different green manures (black oats/Rhodes grass, sunn hemp/velvet beans, and a white oats/cowpea mix) and length of green manure fallow (three, six, 12 and 18 months) on soil properties of a Longlands/Westleigh soil form. The study included a mown or incorporated green manure treatment. The study showed that generally green manuring resulted in increase in pH, P, Ca, Mg with the magnitude of the increase tending to be higher the longer the green manure was kept, though species specific variations did occur. Green manuring was found to decrease K availability with no marked difference in organic matter content. No marked differences between mowing the crop and leaving this on the soil surface and incorporation were found. The study concluded that the benefit of green manuring was achieved at least after six months of cover crop planting with

sunn hemp/velvet beans and black oats/Rhodes grass having the greatest influence, while the benefit of the crop could be achieved even if left on the soil surface after mowing.

**Table 1**

**Summary of soil properties that were either significantly increased or decreased after four month growth of the given cover crop.**

| Species tested | Element concentration significantly increased | Element concentration significantly decreased |
|---|---|---|
| Sunn hemp | P, K, Ca, Mg, S | Al |
| Marigold | K, Ca, S | Al |
| Oat | K, Ca, Mg, S | Al |
| Dolichos bean | Ca, Mg, S | Al |
| Velvet bean | P, S | No effect |
| Groundnut | Ca, Mg, S | Al |
| Cowpea | No effect | No effect |
| Tomato | P, K, Ca, Mg, S | Al |

**Case studies on the benefits of green manuring on subsequent sugarcane crops**

The benefits of green manuring on the subsequent sugarcane crop have been reported by Australian researchers who found that long-term sugarcane monoculture had led to yield decline which was associated with decline in soil quality. They tested various cropping breaks using either pastures, legumes, alternate crop or bare-fallow for periods ranging from 6 to 42 months over 5 different site types (including two fully irrigated sites). Of interest from this study was that at all sites the lowest yield from the plant crops were found on the plough-out/replant crop cycles (no fallow or green manure), while there were variable responses to bare-fallow or green manuring across the sites (benefits ranging from 14 to 84% increase in yield compared to plough-out/replant), with several instances of the benefits carrying to at least the second rotation. They attributed the yield improvements primarily to improvements in soil biological health (increased microbial populations). They do note that the benefits were larger on sites with lower management inputs (notably the rainfed sites) compared to sites that had high yielding potential due to irrigation and adequate radiation. This highlights the point that each situation is unique and growers should consult their extension specialist for advice on their situation.

In Swaziland, research in the 1980s of the benefits of green manuring on irrigated duplex soils showed mean improvements of 45% in plant crops after green manuring compared to plough-out/replant situations, with further 25% benefit measured in the first and second ratoon crops. An economic analysis over 30 years for that study suggested that it was 12.4% more profitable to green manure when compared to conventional cropping. In follow-up studies in the 1990s the benefits of green manuring (sunn hemp and cowpeas) were confirmed for the plant crop (46% increases in yield over conventional cropping), with about a 25% residual effect in the first and second ratoon, but dropping to 5% by the third ratoon. In this study, the yield enhancements were attributed to improved soil physical properties, notably: (a) air-filled porosity that increased by 12 to 16% in the green manured treatments; (b) improvement in soil organic matter levels in the topsoil; and (c) improvements in nitrogen availability. The magnitude of the responses was larger on poorer quality sites that were likely more responsive to the inputs.

**Key considerations for cover cropping and green manuring**

The decision to use green manures and cover crops depends on the grower objectives, which may include soil erosion protection, organic matter build-up, legumes to increase N, forage materials and pest cycle control. It is essential the grower consult specialist cover crop advisors to guide on the feasibility of a chosen objective and the best species and management options to meet the desired

objectives. The specific benefits of green manures and cover crops to soils depends on several factors which include:

- choice of cover crop species (e.g. legumes vs non-legumes, annuals vs perennials, deep rooted vs shallow rooted, low biomass vs high biomass);
- performance of the planted cover crop (low vs high yields);
- management of the cover crop (e.g. removed for forage vs in-field grazing by cattle; cash-crop harvesting vs retention, mowed and left on surface vs incorporated into soil);
- time available (length of fallow) to establish and grow a cover crop;
- season planned for the cover crop (summer vs winter crops);
- availability of equipment to manage cover crop for intended purpose; and
- current state of soil health and inherent properties.

In some instances, the cover-crop used can provide additional income where a product is harvested or material is used for grazing or forage baling or harvested as a cash-crop. In these instances, some of the benefits of retaining the green manure are lost and the advantages and disadvantages of the different cropping systems must be evaluated on a case by case basis. Several guides and decision support tools are freely available online that can assist in deciding on the purpose of the cover crop/green manure and possible species suited to the conditions. These are listed in the additional reading section at the end of the document.

**Cover cropping and green manuring under saline and sodic conditions**

Salinity and sodicity problems are encountered in irrigated agricultural areas. Given the potential benefits of cover crops on various soil properties that may also be beneficial for ameliorating saline/sodic conditions, it is worth highlighting these and associated considerations.

A key step to establishing cover crops under salt-affected conditions is the selection of salt tolerant varieties. Several resources highlight species with varying degrees of salt tolerance (see online resources list at the end). As the interest in selecting tolerant species is usually to aid site remediation (i.e. reduce negative effects of salts), there are several considerations to keep in mind. It is unlikely that planting tolerant crops will eliminate the salt problem, thus it is necessary to use these in conjunction with other practices aimed at reducing the salt loads in a soil. These are to ensure good drainage along with adequate leaching. Selecting crop varieties that are deep rooted and can promote water permeability are useful in assisting in improving drainage and leaching from affected soils. It may also be necessary to remove cover crop biomass to prevent reintroducing high salt loads from decomposing residue. This has the disadvantage that biomass and potential organic matter is removed from the field, while possibly exporting considerable amounts of nutrients that would require replacement. Nonetheless, this may be advantageous in the longer term where soil salinity or sodicity levels can be considerably reduced for improved sugarcane cropping thereafter.

**Resources for further reading on cover cropping and green manuring**

All of the following SASRI reports and documents are available on the most recent SASRI InfoPack (InfoPack 2018).

The “Green Manuring” manual published by SASRI (SASRI 2010), provides a comprehensive overview of the key aspects of green manuring and briefly describes commonly used cover-crop species (for summer crops see Pages 7 to 16 and the table on Page 22, and for winter crops see Pages 17 to 21 and the table on Page 23).

Additional information on several key cover crops is described in the SASRI soils management book (van Antwerpen et al. 2013; Chapter 8 page 100-101).

The issue of green manuring and cover cropping has also variously been raised at other RD&E workshops with several feedback communiqués having been prepared. These include an overview of some common crops used for intercropping in the sugarcane growing areas in South Africa (but with high relevance to green manuring and cover cropping too) (SASRI Communiqué 17RD18: *Beneficial cover crops for intercropping*), a comprehensive guide to establishing lucerne as a green manure (SASRI Communiqué 17RD26: *Lucerne as a green manure*) and the impacts of residual herbicides on cover crop performance (SASRI communiqué 17RD17: *Herbicide residue affecting cover crops*).

Several articles related to green manuring and cover cropping have also been written for the LINK magazine (See Table below for list of articles specifically discussing green manuring/cover cropping).

Link articles relating to green manuring

| Year | Month | Volume | Number | Topic |
|---|---|---|---|---|
| 2005 | February | 14 | 1 | Green manuring |
| 2006 | September | 15 | 3 | Green manure crops and nematodes |
| 2010 | May | 19 | 2 | Green manures: Which crop, for how long? |
| 2012 | January | 21 | 1 | Green manures for winter |
| 2015 | September | 24 | 3 | Impact of green manures on nematode control |
| 2017 | September | 26 | 3 | Tips for growing lucerne as a green manure! |
| 2018 | May | 27 | 2 | Be wise, don't over-fertilise |

**Overview on intercropping in sugarcane**

While green manuring is confined to the period between removal of the ratoon crop and replanting a new sugarcane crop (every eight to ten years), intercropping utilises growing space between the sugarcane rows to establish another crop species. This is typically done with cash crops with the intent to obtain income in the shorter term (weeks to months), while the farmer waits for the longer growing sugarcane crop to mature for harvesting. In some instances the intercrop is selected for specific effects it may have for the sugarcane crop such as N-fixation by legumes, or toxic effects of some brassicas on pests and diseases. Some have suggested it can be used to achieve some of the benefits of green manuring during the sugarcane crop cycle itself, with benefits associated with a soil cover, organic matter, improved soil physical attributes being partially introduced. As general rule-of-thumb, intercrops are selected so as not to be excessively competitive with the sugarcane crop, and typically are required to yield a harvest before the sugarcane is too large causing shading of the intercrop and also limiting access for harvesting.

Intercropping is practiced in several parts of the world with varying degrees of success (e.g. Pillay and Mamet 1978; Govinden et al. 1984; Leclezio et al. 1985; Govinden 1990). While not currently a research focus at SASRI, past research has variously investigated the potential to intercrop. A key study in this context was the work by Parsons (1999; 2003; see picture below), who reported on the planting of several cash crops (maize, beans, cabbage, cowpea, sweet potato, potato, sweetcorn) between sugarcane rows in six different trials (rainfed regions) to evaluate benefits for land use efficiency and profitability. Generally, it was found that intercropping reduced cane yields compared to monoculture sugarcane, but that intercropping was profitable where specific management strategies were adhered to. For instance, in ratooned sugarcane, maize was the only crop to yield profit, this attributed to the aggressive growth of the ratooning sugarcane that could easily outcompete the less aggressive vegetable crops tested. It was also found that in plant cane, cabbages tended to be the most profitable

crop, partly because the cabbage could grow larger once some shading from the cane occurred, while legumes tended not to be profitable as intercrops. It was suggested to minimise competition to the sugarcane crop by the intercrop, strategies such as alternate row planting could be adopted, while delaying planting of intercrops into established cane did not yield notable benefits either.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | L Titshall & R van Antwerpen | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD27 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 27 |
| Region: | Mpumalanga | Programme Area: | CPM |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | X | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | X | | | | |

A new Knowledge Exchange (KE) project will be initiated in 2020/2021: Revision of green manure manual to update list of crop species, expand sections on impacts on soil and subsequent sugarcane crop and provide simple decision guidance on considerations for green manuring. Consider incorporation of intercropping section.

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| The Link | Growers and extension (English/Afrikaans) | Highlight benefits of green manring, outline key consideratons and suggest useful | Decided by KMU – propose next issue (September 2018) | Feedback from M Adendorff and other extension specialists |

| | | | | |
|---|---|---|---|---|
| | | information sources | | |
| Updated and revised Green manure manual (Propose as KE project for 2019) | Extension and growers (English) | Update and expand existing green manure manual | Propose as KE project for 2019 | Feedback from growers and extension |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Staff time | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Article: Soil Scientists, KMU – staff time<br>Project proposal: Soil Scientists, KMU – staff time | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| None | | | | |

Optimal yield for varieties grown under different conditions. When is the cane too big? Tons RV rather than tons cane needs to be optimised

(SASRI Reference: Issue 28)

Click here to return to index

**RDE ISSUE DESCRIPTION**

Optimal yield for varieties grown under different conditions. When is the cane too big? Tons RV rather than tons cane needs to be optimised

**SASRI COMMUNIQUÉ**

The optimal cane yield to maximise profitability will vary between production conditions. Factors such as harvesting and transport costs and RV price are key considerations to determine the optimal cane yield. This issue has led to the realisation that growers require assistance with quick economic calculations to inform management decisions. SASRI has developed an MS Excel based tool to compare the economics for different experimental treatments (CaneTEC). The tool lends itself to conversion into an application format. A technology development project is to be implemented in 2019 to convert CaneTEC into an application for growers. The tool will allow growers to compare the economics of different management interventions (chemical products, fertilisers etc.) and calculate break even cane and RV yields.

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18TD06
*An online economic calculator for sugarcane*

Project Manager
*Dr Sanesh Ramburan*
*(Sanesh.Ramburan@sugar.org.za)*

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Sanesh Ramburan (prepared by Derek Watt) | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD28 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 28 |
| Region: | Northern Irrigated | Programme Area: | SDO |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | x | Staff Colloquium for Extension Specialists | x | Grower Day | x |
| Extension Newsletters | | SASTA | x | Grower Study Group | x |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |
| . | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| The Link | Growers, MCP estate managers, MCP technologists and extension specialists | To publicise the the online economic calculator for sugarcane | Upon completion of online economic calculator development. | Assessment during informal interactions of awareness of on-line tool by extension specialists, selected growers and MCP estate managers |
| SASRI Staff Colloquium | Extension specialists | To workshop the online economic calculator to upskill extension specialists.<br>To receive input from extension to enable the tailoring of the online economic tool to end-user requirements. | At completion of the beta version of the online economic calculator. | Feedback from extension specialists via a questionaire on the effectiveness and usefulness of the online economic calculator. |
| SASTA | Sugarcane technologists | To present the online economic calculator for technical evaluation by peer cohort | Following workshopping of the beta version of the online calculator | Natue of the feedback from technical peer cohort. |

| | | | | |
|---|---|---|---|---|
| Grower Day | Growers, MCP estate managers and MCP technologists | To introduce growers to the online econmic calculator through demonstration of potential contextualised applications. | Upon completion of online economic calculator development. | Assessment of perceptions of value of online economic calculator expressed by growers and MCP estate managers. |
| Grower study groups | Growers, MCP estate managers and MCP technologists | To train growers, MCP estate managers and MCP technologists in the use of the online economic calculator | Upon completion of online economic calculator development and following grower days. | Assessment of the extent of use of the online economic calculator by growers and MCP staff attending study groups. |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Staff time | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Activities to be primarily funded through extension (grower days, grower stdy groups) and KMU (Link article, staff colloquium) budgets. Participation in SASTA to be funded through PERC travel and conference budget. | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| None | | | | |

| Alternate uses of cane e.g. as a source of energy<br><br>(SASRI Reference: Issue 29) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Alternate uses of cane e.g. as a source of energy

**SASRI COMMUNIQUÉ**

**Policy**

For several years, the sugar industry grower and miller leadership has been actively campaigning government to create an enabling environment for the industry's viable participation in the renewable energy arena. Now there are some signs of hope that this may come to fruition. After years of uncertainty and delays (and possibly prompted by changes in political leadership at government level) the new Energy Minister has fast-tracked the process by signing 27 renewable energy projects involving Independent Power Producers (IPPs) in April this year. While none of these agreements are for sugarcane biomass projects, it is a positive sign as it reflects government improved appetite for renewable energy from IPPs.

Engagements by our industry are continuing with the relevant government departments. One of the main concerns for sugarcane cogeneration projects is the high tariffs proposed by energy producers. In addition to renewable energy projects, other opportunities will continue to be pursued e.g. biofuels. Investigations are also under way for other bio- products such as bioplastics and biochemicals, and for other programmes such as waste recycling.

**SASRI Programme of Work**

Investigation of alternative uses of sugarcane biomass has been a SASRI strategic objective since 2007. Hence, over the past decade, SASRI, on behalf of the industry, has explored alternative uses of sugarcane biomass, primarily as feedstock for bioenergy applications. The research has produced outcomes in four broad impact areas, as summarised in the adjacent diagram. Details of the research are contained in the 2018/2019 SASRI Programme of Work, which is available from your extension specialist.

The research has been primarily conducted by research service providers through research agreements between SASA/SASRI and Stellenbosch University (Professor Jens Kossmann (Institute of Plant Biotechnology) and Professor Johann Görgens of the Department of Process Engineering).

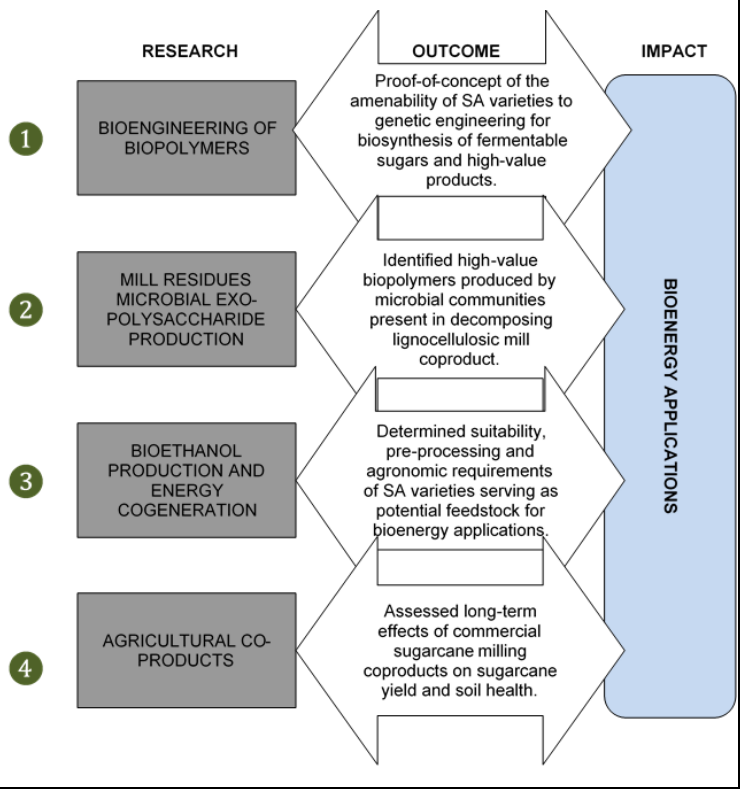
Although the collaboration with Johann Görgens has concluded, he retains an intense interest in the research area and SASA/SASRI have recently supported a grant application that he has submitted to the UK Biotechnology and Biological Sciences Research Council (BBSRC) in conjunction with a consortium of UK universities (University of Manchester, University of York and Imperial College) (SASA/SASRI also in the past engaged with Imperial College on this topic through a data sharing agreement with Dr Miao Guo).

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18VI01
*Development of expression-based genetic markers for marker-assisted sugarcane breeding: Lignin composition as a case study.*

Project Manager
*Dr Shailesh Joshi*
*(Shailesh.Joshi@sugar.org.za)*




**Second-generation bioethanol production from bagasse**

Currently, there is significant international interest in cellulosic biomass as a feedstock for ethanol production and sugarcane is a potential source of feedstock. The chemical composition of feedstock determines its quality, with high structural carbohydrate content (cellulose and hemicellulose) and low lignin content being the most desirable for ethanol production. Glucans represent the cellulose portion of the bagasse, lignin the insoluble portion and xylose and arabinose the hemicellulose component. These lignocellulose traits offer potential for breeding and

selection of suitable varieties but, at present, the differences among breeding populations for these variables is not known. Of note is that SASRI is to commence a study in 2019 to investigate the development of genetic markers to select for lignin composition during breeding.

The objective of the research conducted by Johann Görgens on behalf of the industry was to estimate the cellulose, lignin and hemicellulose content of sugarcane bagasse from breeding populations, evaluate variability among these populations, and determine potential for indirect selection for these traits. Two populations were used, one comprising cultivars and advanced genotypes and the other of genotypes from stage 2 of a breeding programme. At sampling, twenty stalks were collected for each genotype, and were shredded and washed 3 times to remove approximately 90% of all soluble matter. The samples were dried at 35$^{o}$C for 72 hours, after which 1 kg subsamples were analysed for lignin, glucan, xylose arabinose and cellobiose. Data were analysed using Statistical Analysis System (SAS) to determine genotype differences and to estimate variance components for the calculation of broad sense heritabilities.

Results showed that the genotypes studied were significantly ($P<0.0001$) different for all the bagasse chemical components analysed. This indicates that there is a large variation present in the SASRI breeding germplasm which can be exploited to select and breed varieties suitable for biomass production. Heritability values calculated for the traits ranged from 0.83 to 0.99 for both populations, indicating: (a) larger genetic differences amongst genotypes within the populations; and (b) that potential exist for achieving selection gains for these traits. There was a positive and significant (0.93, $P<0.0001$) correlation between arabinose and cellobiose. These traits were significantly and negatively correlated ($r = -0.90$ to $-0.96$, $P<0.001$) to lignin, xylose and glucan. Lignin, xylose and glucan were significantly and positively correlated (0.94 to 0.96, $P<0.0001$). The results suggest possible indirect selection for any of lignin, xylose and glucan traits using one trait because they were highly significantly and positively correlated. Positive selection for arabinose will reduce lignin content because of the significant negative correlation. These data can be used to create a selection index for choosing varieties suitable for biofuels production.

**Resource-use requirements of bio-energy cane**

There are indications that high-fibre sugarcane genotypes may produce more biomass and use resources more efficiently than conventional sugarcane cultivars. The objective of this SASRI research was to gather quantitative information on resource use for selected conventional and high-fibre sugarcane genotypes and benchmark it against other bioethanol crops. Although conventional sugarcane initially grew slower than sorghum and Napier grass, it produced very high biomass (about 70 t ha$^{-1}$) and theoretical ethanol (first- and second generations) yields (about 27 kL ha$^{-1}$) at 12 months, and used water relatively efficiently (about 5 kg m$^{-3}$ and 2 kL m$^{-3}$), out-performing all other crops except sorghum. The contribution of cellulosic ethanol to total ethanol yield varied hugely, from 89% for the high-fibre sugarcane hybrid to about 48% for conventional sugarcane, to as low as 14% for sugar beet. The high-fibre sugarcane hybrid grew faster initially and produced more biomass at eight months (56 t ha$^{-1}$ vs 45 t ha$^{-1}$) than the conventional types, but then flowered, reducing its growth rates markedly thereafter. It was also less sensitive to mild drought conditions. The results suggest that cellulosic ethanol production may be a feasible option that could be incorporated into conventional or biomass sugarcane production systems.

**List of potential contacts**

Several institutions in KZN are actively engaged in investigating alternative uses of agricultural biomass. The following may be useful contacts.

- Biorefinery Industry Development Facility (BIDF) at the Council for Scientific and Industrial Research (CSIR) campus in Durban (Drs Doug Trotter DTrotter@csir.co.za and Bruce Sithole BSithole@csir.co.za);
- CaneGrowers (Richard Howes; Innovation Group); Richard.Howes@sacanegrowers.co.za)
- Professor Anne Stark (SMRI Sugarcane Biorefinery Research Chair, UKZN; StarkA@ukzn.ac.za)
- Mangosuthu University of Technology (http://www.riep.co.za/center-for-green-technologies/).

**Additional suggested reading**


- Benjamin Y, Görgens JA and Joshi SV (2014). Comparison of chemical composition and calculated ethanol yields of sugarcane varieties harvested for two growing seasons. Industrial Crops and Products 58: 133–141.
- Olivier FC, Singels A and Eksteen A (2016). Water and radiation use efficiency of sugarcane for bioethanol production in South Africa, benchmarked against other selected crops. South African Journal of Plant and Soil 33:1-11


General purpose versus niche varieties. There was a policy shift from general purpose varieties such as NCo376 and NCo310 to niche varieties in the 80s/90s. Many of these 'niche' varieties are being grown under a wide range of conditions. Should this policy be changed to focus once again on general purpose varieties?

(SASRI Reference: Issue 30)

Click here to return to index

**RDE ISSUE DESCRIPTION**

General purpose versus niche varieties. There was a policy shift from general purpose varieties such as NCo376 and NCo310 to niche varieties in the 80s/90s. Many of these 'niche' varieties are being grown under a wide range of conditions. Should this policy be changed to focus once again on general purpose varieties?

**SASRI COMMUNIQUÉ**

The two niches that SASRI Plant Breeding focus on in the irrigated regions are early and late season adaptability. Results show significant differences associated with cane yield, RV and smut infection in the early and late season among varieties being tested in Plant Breeding trials. Varieties adapted to early season must have high RV while those adapted to late season must have high cane yield, moderate RV and much higher smut resistance. However, RV in the early season can be increased by ripening. In terms of general purpose, most of our varieties have shown to be widely adapted to different soil types, irrigation systems and other growing conditions prevailing in the irrigated regions. For example, varieties such as N36, N41 and recently N53 and N57 have shown wide adaptation to several soils types and other growing conditions, a testimony to their suitability as general purpose varieties. Varieties such as N36, N41 and N53 have produced high RV yields in both early and late seasons under wide range of growing conditions, a testimony to wide adaptability and general purpose. Therefore, SASRI still produces general purpose varieties for irrigated regions but with an attempt to release varieties that perform best in early or late season.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Marvellous Zhou | | |
| Resource /Centre: | BFRU | Date: | 16 May, 2018 |

| **Communication Plan Reference Number:** | 18RD30 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2019 | Issue Number: | 30 |
| Region: | Mpumalanga | Programme Area: | VI |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | X |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Grower day | Growers | Provide information available | September/October, 2018 | Feedback from Extension specialist |
| | | | | Responses of growers to questionaire |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

No budget required, grower day will be linked with normal Plant Breeding trial activities in Mpumalanga and will be done at the cultivar demonstration plot planted alongside a Plant Breeding trial in Mpumalanga.

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

Assistance from Extension Specialist/Extension Manager in organising and calling farmers to the event

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

The grower day will provide information to growers on the best positioning of cultivars to maximise cane yield and RV%.

| Soil characterisation – site specific soil type recommendations for irrigation and varieties<br><br>(SASRI Reference: Issue 31) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Growers require better recommendations on varieties for different soil types, thus:

- Site specific varieties
- Suitable types of irrigation
- Better specialised advice on soil types

**SASRI COMMUNIQUÉ**

In general, irrigation systems with larger cycle times or with greater dependency on labour (furrow, draglines, semi-permanent sprinkler, travelling big guns) will tend to apply larger volumes of water per irrigation event and will therefore be less suitable to soils with lower water holding capacities (sandy or shallow soils). Automated (or less dependent on labour) systems, such as centre pivots, drip and permanent sprinklers, are more flexible and offer a wider array of operating thresholds and, are therefore easier to match to the specific/local soils (albeit with costs, skill and management implications).

Standard irrigation design norms and principles are applicable. Qualified and/or SABI accredited designers are preferred. Any irrigation designer, irrespective of the type of system, should ensure that:

- the application rate of the system (rate at which water is applied) is less than the soil infiltration rate (rate at which the soil can absorb the water); and
- the depth of water applied by a single irrigation event (target application depth), as per the designed operating rules (stand time), is less than the allowable depletion (usually expressed as a percentage of the soil Total Available Water (TAW)).

The above mentioned SABI design norms and standards can be found on the SABI website (www.sabi.co.za). The allowable depletion is usually in the region of 50% of the soil TAW, but can deviate for specific circumstances and system capabilities.

In addition, the first section in the SABI norms and standards document provides a list of criteria to assess the suitability of irrigation systems. Included in this section is a comprehensive account of limitations/constraints for all the irrigation systems for categories such as climate, topography, salinity, water quality, soil texture and soil depth, and soil infiltration rate amongst others (see Table 1, p.7, 8 and 9, SABI design norms and standards, www.sabi.co.za)

The above information on matching systems to soils is well documented in the irrigation module of the SUSFARMS® manual and Information Sheets 5.1 (Irrigation Fundamentals), 5.3 (Basics of Irrigation Scheduling) and 5.8 (Irrigation System Selection, see especially Table 2).

*It is probably worth noting that the shortfall is usually because the time and cost to investigate, classify and map the soils in terms of soil water holding capacity and infiltration rates is usually not invested.*

With regard to site specific variety choice, relevant variety trial data from the Pongola area are available and will be communicated to growers at grower events and through extension in the coming months. Additionally, two new variety trials are planned to be planted in the Nkomazi area in 2018. An existing variety trial on Crookes Brothers estate in Komatipoort will be harvested for the fourth time this season, and the results will be distributed to growers through extension. Data from all trials will be collated and

analysed to develop site specific variety recommendations that will be communicated to growers in the region in various forums (grower days, short courses, field days, Extension interactions). The local efforts to characterise soils in the region and capture their details into the existing database is encouraged. Analysis of this database will further supplement results from variety trials.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Sanesh Ramburan (prepared by Derek Watt) | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD31 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 31 |
| Region: | Northern Irrigated | Programme Area: | VI |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | X | Staff Colloquium for Extension Specialists | X | Grower Day | X |
| Extension Newsletters | | SASTA | | Grower Study Group | X |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |
| . | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

N/A

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| The Link | Growers, MCP estate managers, MCP technologists and extension specialists | To publicise the results of the analyses | Upon completion of analyses. | Assessment during informal interactions of awareness of the outcomes of the analyses. |
| SASRI Staff Colloquium | Extension specialists | To workshop the analyses to upskill extension specialists.<br>To receive input from extension to enable the tailoring the analyses to meet | Upon completion of analyses. | Feedback from extension specialists via a questionaire on the effectiveness and usefulness of the ootcomes of the analyses. |

| | | | | |
|---|---|---|---|---|
| | | end-user requirements. | | |
| Grower Day | Growers, MCP estate managers and MCP technologists | To introduce growers to the outcomes of the analyses through demonstration of potential contextualised applications. | Upon completion of the analyses. | Assessment of perceptions of value of the outcomes of the analyses expressed by growers and MCP estate managers. |
| Grower study groups | Growers, MCP estate managers and MCP technologists | To inform specific interested growers, MCP estate managers and MCP technologists of the outcomes of the analyses. | Upon completion of the analyses and following grower days. | Assessment of the extent to which the outcomes of the analyses inform the practices of growers and MCP staff attending study groups (assessed through informal interactions). |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Staff time | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Activities to be primarily funded through extension (grower days, grower study groups) and KMU (Link article, staff colloquium) budgets. | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| None | | | | |

| Drought management strategies – irrigation/ water management<br><br>(SASRI Reference: Issue 32) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Drought – Irrigation scheduling – pivots took strain

- Guidance on best irrigation strategy to adopt during droughts
- Growers didn't know what to focus on.
- Guidance on best type of irrigation – pivot or drip.
- Water allocation – which areas/ fields to focus on.
- Guidance on best irrigation for different soil types, which systems will work best.
- Irrigation service providers don't offer after sale service
- Guidance required on best service providers to use

**SASRI COMMUNIQUÉ**

- **Irrigation management during drought**

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18KE04
*Implementation of DRIP (Drought Irrigation Program)*

Project Manager
*Dr Abraham Singels*
(*Abraham.Singels@sugar.org.za*)

Irrigation water supply for sugarcane production in South Africa is often limited by drought and managing irrigation under these conditions is complex. The most recent drought spanned at least two seasons and severely tested irrigated growers' sustainability. The problem is how to decide to distribute a limited water allocation over the various fields on the farm. When restrictions are severe, decisions about field abandonment may be required.

A computer program was developed to enable sugarcane farmers to assess the likely impact of their irrigation decisions on crop growth and farm profitability. The Excel program named DRIP (Drought Irrigation Program), uses a crop and water balance model to calculate the impact of specified irrigation strategies on crop yield and survival under assumed future water allocation and climate scenarios. Farm level gross margins for three consecutive years are calculated from simulated yields and production costs at field level. Irrigation strategies that can be explored include: (a) growth phase specific soil water depletion thresholds; (b) reduced irrigation amounts and/or longer irrigation cycles; and (c) abandoning low potential fields.

The program has been implemented on two commercial farms in Komati. Initial set up requires specialist assistance, but program operation thereafter can be performed by farm managers.

A knowledge exchange project is to be implemented in the SASRI 2019/2020 Programme of Work to develop an effective way of implementing the program on a wider scale.

Other resources that are available that can inform growers on how best to deal with limited irrigation supply are:

- Information sheet on "Irrigation strategies for water limiting periods" (5.2)
- Singels, A. Paraskevopoulos A.L. and Mashabela, L.M. 2017. Optimizing the use of limited irrigation water during drought: Impact of irrigation strategies on farm profitability. Netafim's 2nd Irrigated Sugarcane Conference held from 4 - 8 November 2017 in Durban.
- Adendorff, M.W. Lessons to be learnt from the recent extreme drought: Grower experiences and strategic support from extension. Netafim's 2nd Irrigated Sugarcane Conference held from 4 - 8 November 2017 in Durban.
- Farmers weekly Dec 2017. Optimising sugarcane irrigation during times of limited water supply
- Paraskevopoulos, A., Singels, A. and Mashabela, ML. 2018. Software for evaluating sugarcane irrigation strategies during drought. Proc. S. Afr. Sug. Technol. Ass. 91

- **Irrigation systems**

Standard irrigation design norms and principles are applicable. Any irrigation designer, irrespective of the type of system, should ensure that:

- the application rate of the system (rate at which water is applied) is less than the soil infiltration rate (rate at which the soil can absorb the water); and

- the depth of water applied by a single irrigation event (target application depth), as per the designed operating rules (stand time), is less than the allowable depletion (usually expressed as a percentage of the soil Total Available Water (TAW)).

The above mentioned SABI design norms and standards can be found on the SABI website (www.sabi.co.za). The allowable depletion is usually in the region of 50% of the soil TAW, but can deviate for specific circumstances and system capabilities.

In addition, the 1st section in the SABI norms and standards document provides a list of criteria to assess the suitability of irrigation systems. Included in this section is a comprehensive account of limitations/constraints for all the irrigations systems for categories such as climate, topography, salinity, water quality, soil texture and soil depth, and soil infiltration rate amongst others (see Table 1, p.7, 8 & 9).

The above information on matching systems to soils is well documented in the irrigation module of the SUSFARMS® manual and Information Sheets 5.1 (Irrigation Fundamentals), 5.3 (Basics of Irrigation Scheduling) and 5.8 (Irrigation System Selection, see especially Table 2).

*It is probably worth noting that the shortfall is usually because the time and effort to investigate, classify and map the soils in terms of soil water holding capacity and infiltration rates is usually not invested.*

In general, irrigation systems with larger cycle times or with greater dependency on labour (furrows, draglines, semi-permanent sprinkler, travelling big guns) will tend to apply larger volumes of water per irrigation event and will therefore be less suitable to soils with lower water holding capacities (sandy or shallow soils). Automated (or less dependent on labour) systems, such as centre pivots and drip, are more flexible and offer a wider array of operating thresholds and, are therefore easier to match to the specific/local soils (albeit with costs, skill and management implications).

- **Irrigation service providers**

In line with the industry mandate, SASRI does not specifically promote or endorse products or brand names. However, the institute provides a user pays facility for manufacturers and suppliers to have their product independently tested and assessed. This service is usually conducted as a specialist advisory request (SAR). The SASRI Operations Manager, Ms Kerry Redshaw, may be contacted for further information (Kerry.Redshaw@sugar.org.za). In addition, SASRI is able to provide assistance to growers in the evaluation of irrigation designs for technical soundness and adherence to SABI norms and standards. In addition, a SASRI specialist/expert can also be used as an independent and neutral party for tender adjudication where superior design solutions (and or service providers) are identified or selected.

With regards to quality of service providers, it is generally recommended that a SABI approved irrigation designer is used. Accredited designers are listed (for each province) on the SABI website (www.sabi.co.za). The SABI website also lists the professionals who are accredited to conduct irrigation system evaluations.

In 2016, in a previous RD&E communiqué (Issue 23 of 2016), a set of guideline questions were provided for growers to use in their assessment of the quality of irrigation scheduling service providers/products, as follows.

- **Choosing an appropriate service provider**

  Choosing a service provider can be a daunting task. The following checklist outline provides some guidelines as to the key questions to ask before deciding on a specific provider.

  ***What does the product/service entail?***

  - Data/ advice conveyance:
    - Are the data available via direct download to local PC, via web interface on central server, or delivered on PC or smart phone, via web or radio signal?
  - Level of involvement:
    - Can the irrigation advice be applied immediately (when, how much and where to irrigate) or is additional post processing required (soil water deficit calculation)?
  - Format and frequency of advice:
    - Is soil water status reported in index values (not calibrated) or in volumetric units (calibrated)?
    - Is advice provided on hourly, daily or weekly basis?
    - Is weather data also used in the advice to make a forecast?

  ***What is the quality of the equipment and software?***

  - Durability:
    - What is the typical life span?
    - Is there some kind of guarantee?
    - How much of it is exposed above the ground?
    - What is expected from the user regarding maintenance and care?
  - Sensors:
    - What kind of soil moisture sensor is used and can rainfall/ irrigation also be measured?
    - Sensor specifications, number of sensors, sensor depths, accuracy and precision?
  - Battery:
    - What type?
    - How long does the battery last and what is the cost of replacement?
    - Who replaces it?
  - Data logger and transmission:
    - Data logging frequency and data transmission frequency?
    - Data transmission/download method (cell, local radio, Bluetooth/wireless)?
  - How easy is the software package to use?

- What are the initial and annual cost of package?

***Installation and after sales service***

- How are the probes installed (placement in relation to cane row, irrigation applicators, soil variation, depth, angle)?

- What quality control criteria are used?

- After sale service:

  - What after-calibration procedures are done, when and how often?
  - What is the agreement regarding maintenance and repairs?
  - How long to respond to a query and what are the call out fees involved?

- Cost:

  - How much is the initial cost of equipment, software, transmission costs (air time or radio licence), cost of repairs, maintenance costs, data costs, annual licence fee, etc.

***Is the company* reputable*?***

- Local or International:

  - Who and where is the owner/manufacturer of the company, probes, data transmitters, software?

- Do they have a web presence?

- How long have they been in existence?
- Do they have local representatives?
- Are they registered with SABI?

- References from other users:

  - Any feedback from current users?

- Are there local consultants for the company or does someone have to travel far from head office?

- What is the training and knowledge (ET and its factors (weather and canopy), soil water relations, irrigation systems, agronomy and crops, probe principles) of the local rep/agent and company staff?
- How easily contactable are they?
- Sugarcane knowledge:

  - Does the company have knowledge/ done previous work in sugarcane?

***Other considerations***

- Theft or vandalism:

- How conspicuous is equipment (poles, solar panels, rain gauges etc.) in the field?

- Protection during burning and harvesting:
  - What measures are taken to protect the probes from damage during cane burning and harvesting operations?

- Is there good coverage by one or more cell phone provider across the farm?

- Are there any obstructions such as small hills or large trees between fields and the office that could limit telemetry based systems?

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer** | | | |
|---|---|---|---|
| Name: | A. Singels | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number** | 18RD32 |
|---|---|

| **RDE Issue Details** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 32 |
| Region: | Komati | Programme Area: | CPM |

**Communication Plan Outline:**

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| • The Link and/or Ingede | | • Staff Colloquium for Eextension Specialists | X | • Grower Day | X |
| • Extension Newsletters | | • SASTA | X | • Grower Study Group | |
| • Information Sheet update | | • Other (specify below) | | • Short Course | |
| • Information Sheet new | | | | • Other (specify below) | |
| • Other (specify below) | | | | Meeting with small group of Mpumalanga growers were held in April 2018 to demonstrate SWOP program | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as Canegrowers and SAFDA], one-on-one-meetings with growers identified as early-adopters).*

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| SASTA paper | SASTA members | Describe the DRIP program and its application | August 2018 | Requests for further information |
| Staff Colloquim | Extension specialists | To inform extension specialists about the DRIP program | July 2018 | Postive feedback and a workable |

| | | | | |
|---|---|---|---|---|
| | | and its potential applications, and to work out an implementation plan | | implementation plan |
| | | | | |
| **1. Communication Plan Budget and Resources Requirements:** | | | | |
| *a. Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| SASTA registration fees already covered | | | | |
| b. *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Time and effort required from scientific programmers, principal agronomist and extension staff. | | | | |
| **2. General** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| A proposal will be submitted for a follow-up TD project to refine the DRIP program to fit user needs, to work out ways of effective implementation, and to market the program. | | | | |

| Late season varieties<br><br>(SASRI Reference: Issue 33) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Reasons for late season yield loss

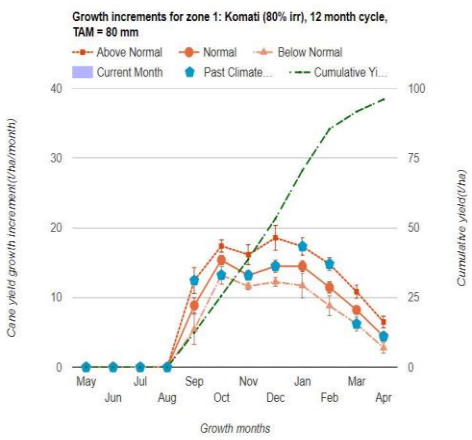
**SASRI COMMUNIQUÉ**

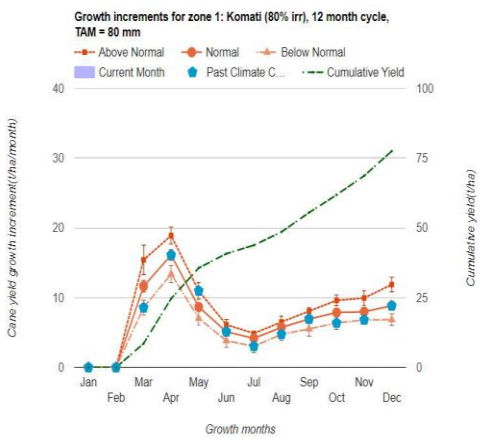
One of the key requirements for adaptability to late season for a variety is the ability to produce high cane yield when harvested in the late season months (October to December). The phenomenon of late season yield loss is not a result associated with the loss of cane yield but rather a result of a variety not accumulating high yield under growing conditions prevailing during the growth of crops planted and harvested in the late season. Initial results from assessing plant breeding data suggest that varieties that sustain stalk elongation in winter or accelerated stalk elongation after winter will produce high cane yield and generally show better adaptability to late season. Results from SASRI research (Donaldson et al. 2008) showed lower radiation interception of late season crops compared to early season. The results showed lower biomass accumulation in late season crops because rapid stalk elongation in late season crops coincides with winter and lower temperatures. There were cultivar differences in biomass accumulation across seasons. Long-term weather data indicates that minimum temperatures in Mpumalanga and Pongola are much lower than for the coastal areas in winter, further suggesting the seasonal effects on early and late season cane yield will be more pronounced in the irrigated north than on the coast.

There are current efforts to address adaptability to early and late season during sugarcane breeding for the irrigated regions. Evaluation of populations for early and late season adaptability has started in the 2018 season where first field stages of selection were planted in March (early season) and are to be planted in December (for late season). These trials will identify crosses as well as parents that have a high proportion of high cane yield progenies (high breeding values) in the early and late season. Selections from these trials will be further advanced to trials planted in the early and late season. Final stage trials will continue to be planted and harvested in the early and late season to evaluate commercial potential and seasonal adaptation.

Can our models explain the late-season yield loss?

- The models account for temperature and radiation effects – and the model can be run in various ways to show how temperature and radiation affect yield accumulation in late-season vs early- and mid-season crops at Komati.
- However, the 'Reduced Growth Phenomenon' (RGP, van Heerden et al., 2010; Park et al., 2005; spring-specific RGP – Donaldson et al., 2008) remains essentially unexplained. Reasons speculated include: lodging, flowering, stalk death, reduced specific leaf N, maintenance respiration, negative feedbacks on photosynthesis from high internode/leaf sucrose content (and it is probably a combination of all of these). The models that SASRI use account for lodging and maintenance respiration only.
- Anyone can use the StalkGro tool online (https://sasri.sasa.org.za/agronomy/mogro/gidsp.php) to compare yield accumulation curves. This tool is basically a database of model runs. An example (below) shows that a 12-month crop harvested in April 2017 would have yielded 96 t/ha, while one harvested in December 2017 would have yielded 77 t/ha – with some assumptions about irrigation availability. It is possible that a more accurate / longer-term assessment could be made.




**References**


- Donaldson RA, Redshaw KA, Rhodes R, van Antwerpen R (2008). Seasonal effects on productivity of some commercial South African sugarcane cultivars: I. Biomass and radiation use efficiency. Proc S Afr Sug Technol Assoc 81: 517-527.
- Park SE, Robertson M, Inman-Bamber NG (2005). Decline in the growth of a sugarcane crop with age under high input conditions. Field Crops Research 92: 305-320.
- van Heerden PDR, Donaldson RA, Watt DA, Singels A (2010). Biomass accumulation in sugarcane - unravelling the factors underpinning reduced growth phenomena. Journal of Experimental Botany 61: 2877-2887.


**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Marvellous Zhou | | |
| Resource /Centre: | BFRU | Date: | 16 May, 2018 |

| **Communication Plan Reference Number:** | 18RD33 |
|---|---|

| **RDE Issue Details:** |
|---|

| Year: | 2019 | Issue Number: | 33 |
|---|---|---|---|
| Region: | Mpumalanga | Programme Area: | VI |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | X | Staff Colloquium for Extension Specialists | | Grower Day | X |
| Extension Newsletters | | SASTA | X | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as Canegrowers and SAFDA], one-on-one-meetings with growers identified as early-adopters).*

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Grower day | Growers | Provide information available | September/October, 2018 | Feedback from Extension specialist |
| | | | | Responses from growers to questionnaire |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

No budget required

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

Assistance from Extension Specialist/Extension Manager in organising and calling farmers to the event

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

A SASTA paper can be prepared for presentation in 2019 summarising all the knowledge available on the possible causes of low yield in late season trials. There is a bit of information available from research done and published from SASRI. Putting it together in a SASTA paper would synthesise most of the results in one document. This could be followed up with a Link article.

| Suitable varieties for mechanical harvesting – Ratoonability issues<br><br>(SASRI Reference: Issue 34) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Ratoonability issues – requires a case study on Piet Smith's farm who practices mechanical and hand planting and harvest.

**Description**

Growers require information on plant characteristics suitable for mechanical harvesting.

**Issue Background**

Mechanical harvesting in the region is on the increase due to an increase in labour costs.

**Desired End Result**

- Row spacing – study on best row spacing for mechanical harvest.
- Require variety info sheets to indicate a variety's suitability to mechanical harvesting.

**SASRI COMMUNIQUÉ**

Ideally the sugarcane row spacings should match the harvester track measurement.

**Case IH harvesters**

- For the Case IH harvesters (7000 or 8000 series): Wide throat opening of 1.1 m which is able to receive cane tramline planting up to 500 mm suitably.
- 8000 Wheeled harvester: Wheel track 1.86 m (Front) and 1.83 m (rear). From Figure 1 (brochure excerpt), the dimensions appear to be the outer dimensions/total width.
- 8800 Tracked harvester: Steel tracks - track width of 1.88 m (dimensions obtained from the specifications brochures supplied by the manufacturers).


Figure 1: 8000 Wheeled harvester depicting wheel track dimensions

**John Deere harvesters**

- CH330: (Compact harvester suited for narrow rows) Crop divider opening of 1.3 m. Wheel track width of 1.43 m. Base cutter discs are 610 mm in diameter and are suited for single rows.
- JD3510: The Chopper harvester has a throat opening of 1.0 m. No other specifications available. Suitable tramline spacing's are not specified.
- JD3520 or JD CH570: Crop divider opening of 1.51 m. Base cutter discs 610 mm. Wheel track of 2.08 m (front) and 1.88 m (rear). Steel track width options of 410-457-510 mm. This harvester should be able to cope with tramlines of 400 mm rows, however the maximum tramline spacing limit is not clear.
- JD3522 or JD CH670: This harvester was introduced by John Deere since 2010 and designed for double row and wider tramline harvesting operations (Ma *et al.*, 2014). Specifications are not readily available but the harvester is manufactured in Brazil and able to harvest 0.9 tramlines x 1.5 up to 1.8 m inter rows resulting in a total harvesting swath of up to 2.7 m (Ma *et al.*, 2015). The track width of the harvester is about 2.4 m thus supporting the idea of 0.9 tramlines x about 1.5 m.

Harvester performance indicates that the wider swath improves harvesting operations compared to single row harvesting (Ma *et al.*, 2014). In addition, operating on Controlled Traffic principles, the wider swath will reduce the extent of the field that is compacted and reduce stool damage impacts compared to single row harvesters.

Ideal crop row spacing depends on the wheel track of the harvester and the crop row configuration. For all configurations the crop should be placed meticulously in parallel rows on a flat or ideally on a consistently-shaped slightly raised bed.

For most harvesters, a tramline configuration, 0.4 m x ±1.4 to 1.7 m (to match the harvester track width) is suitable. Wider tramlines tend to be more difficult to harvest, although certain Chopper Harvesters models as already described are supposedly able to cope with tramlines as wide apart as 0.9 m. All harvesting operations should have auto-steer capability to ensure inter-row driving and thereby avoid stool damage. This is most essential when recumbent cane is harvested and the row positions are difficult for the driver to see.

In terms of agronomic considerations, crop characteristics suited to mechanised harvesting are well-known (e.g. stalk straightness, fibre, population, length of top etc.). SASRIs current irrigated varieties will be "rated" for each of these traits and an index of suitability to mechanical harvesting will be developed. These ratings will be included in the variety Information Sheets. It is important to note that these will be “theoretical” ratings. Actual, observed responses of varieties to mechanical harvesting need to be quantified from commercial observations.

**References and suggested additional reading**


- Ma, S, Karkee, M, Scharf, PA and Zhang, Q (2014). Sugarcane harvester technology: A critical overview. Applied Engineering in Agriculture. 30(5): 727-739.
- Ma, S, Karkee, M, Scharf, PA and Zhang, Q (2015). Performance evaluation of a chopper harvester in Hawaiian sugarcane fields. Transactions of the ASABE (American Society of Agricultural and Biological Engineers). 55(2):271-279.


**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Peter Tweddle | | |
| Resource /Centre: | PERC | Date: | May 2018 |

| **Communication Plan Reference Number:** | 18RD34 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 34 |
| Region: | Northern Irrigated | Programme Area: | SDO |

| **Communication Plan Outline:** | | | | | |
|---|---|---|---|---|---|
| *Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged)*. | | | | | |
| Publications | | Presentations | | Discussions/Workshops | |
| The Link and/or Ingede | | Staff Colloquium for Extension Specialistss | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | x | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |
| | | | | | |
| *Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).* | | | | | |
| N/A | | | | | |
| *Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.* | | | | | |

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| N/A | | | | |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| None | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| N/A | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| N/A | | | | |

| Economic threshold – advice of chemical companies<br><br>(SASRI Reference: Issue 35) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Chemical companies are not effectively advising growers on the right chemicals to spray for pests and diseases, they make recommendations for spraying when it is not economically viable.

**SASRI COMMUNIQUÉ**

The injudicious use of agrochemicals is a perennial problem in the sugar industry. This ranges from the illegal use of unregistered generics in an attempt at cost cutting, to arguably overzealous marketing of inappropriate and sometimes illegal agrochemicals by company sales personnel. Frequently these behaviours lead to unnecessary agrochemical use, which is also often off-label and therefore illegal. Hence, growers are strongly advised to seek advice from their extension specialist who has no vested interest in the sale of any agrochemical and will provide rational, objective advice.

- **Smut**

  Bayleton used as a seedcane dip is the only registered (legal) effective chemical control method. Post-germination/ratooning control of smut using several different fungicides has been shown to be totally ineffective in SASRI trials. Recommendations outside of seedcane dipping with Bayleton are both ineffective and illegal.

- **Eldana**

  Spraying for eldana is unlikely to be economically viable in a 12 month crop. However, cane carried over due to suboptimal mill performance will almost certainly benefit from immediate spraying once the carryover fate of a field has been sealed. Covering a two month window (Nov-Dec or Dec-Jan) with one or two applications of registered insecticides, according to their labels, should be more than adequate to ensure minimal damage accumulation by the time the mill re-opens.

- **Rusts**

Observations in the irrigated north show that rust infections are too short-lived to justify the registered two applications of fungicide at a 28-day interval. Single applications do not result in an economic return. In addition, under conditions in the irrigated north, the cane rapidly grows-out of rust infections and it is therefore highly unlikely that the application of fungicides will be economically viable.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | RA Stranack | | |
| Resource /Centre: | Crop Protection | Date: | 04/07/2018 |

| **Communication Plan Reference Number:** | 18RD35 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 35 |
| Region: | Mpumalanga | Programme Area: | Crop Protection |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| • The Link and/or Ingede | X | • Staff Colloquium for Extension Specialists | | • Grower Day | |
| • Extension Newsletters | X | • SASTA | | • Grower Study Group | X |
| • Information Sheet update | | • Other (specify below) | | • Short Course | |
| • Information Sheet new | | | | • Other (specify below) | X |
| • Other (specify below) | | | | Discussions with RD&E on extension's role in this matter. Also discussions with agro-chemical companies and Registrar (see b. below) | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Whenever and wherever possible to raise issues of off-label recommendations made by agents with agro-chemical companies, registration holders and The Registrar

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| The Link | Growers and MCO technologists | To create general awareness of the disadvantages and perils of off-label and uneconomic recommendations | Immediate | Reduced levels of off-label and uneconomic usage of agro-chemicals |
| Follow up discussions | RD&E & local cane grower associations and growers, agro-chemical | To highlight off-label and uneconomic recommendations | Immediate and on-going | Reduced levels of off-label and uneconomic usage of agro-chemicals |

| | | | | |
|---|---|---|---|---|
| | companies and The Registrar | | | |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| N/A | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Consultations with Regional and EVA Extension Specialists. Where newsletters are published, consult KMU and Extension Manager. Relevant specilaists to be involved where off-label and uneconomic recommendations are encountered and responded to. | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| Update The Registrar annually on recommendations made by agrochemical agents to growers | | | | |

Cost effective study between chemical versus manual roguing

(SASRI Reference: Issue 36)

Click here to return to index

**RDE ISSUE DESCRIPTION**

**Background**

The high cost associated with hand roguing and the effectiveness thereof – is it still the best practice, is chemical roguing not more effective?

**Desired End Result**

A trial that encompasses the economics of best roguing method to use.

**SASRI COMMUNIQUÉ**

**NEW PROJECT**

In response to this RDE issue, SASRI is to implement a new project in the 2019/2020 Programme of Work.

18TD02
*Roguing for smut: economics and potential new methodologies*

Project Manager
*Sharon McFarlane*
*(Sharon.McFarlane@sugar.org.za)*

Smut incidence has increased in the industry in recent years, particularly in the irrigated north. To reduce the risk of early crop eradication due to high smut levels, regular roguing is essential in smut-prone fields. Two types of roguing are commonly practised: manual (whips are cut from infected stalks, the entire stool is dug out and, ideally, all infected material is removed from the field and destroyed) and chemical (whips are cut from infected stalks, the stool is sprayed with a 10% glyphosate solution and the cut whips are removed from the field and destroyed).

It is possible to estimate the current cost of manual roguing from two previous investigations. Pearse (1989) conducted three small plot trials with <1% smut and >20% smut and different roguing frequencies. The labour days required per ha were shown to be dependent on the level of smut infection. The minimum labour requirement was 0.5 days / ha and smut levels of 2-3% required approximately 1 labour day. As levels exceeded 3%, the labour requirement increased at a rate of 0.2 days / ha for every 1% increase in stool infection. Using these assumptions and a labour cost of R141.71, the cost of roguing a field with 1% smut is estimated to be R70.86 / ha, increasing to R170.04 / ha for a 4% infection. De Lange and McGugan, (1989) compared the effect of a well co-ordinated roguing operation on an estate in Mkuzi

with voluntary roguing by a small number of private growers in Pongola. In this study, an average of 2.6 labour days per hectare was used for an estimation of costs. The influence of smut incidence was not reported. The labour requirements (0.2 days / ha) for chemical roguing was supplied by one grower in the Lowveld who ensures the operation is carried out routinely on his farm. Average smut incidence is <4% on his farm; labour and chemical costs to rogue a field with 4% smut is estimated to be R48.77 / ha.

While this information is useful, a new project with a more structured approach will be implemented in the 2019/2020 SASRI Programme of Work. The two methods of roguing will be compared in fields of different sizes and with a range of smut levels that would comply with the current P&D roguing rules (fields used in one of the previous studies with >20% infection would have received an immediate eradication order with no option to rogue).

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Sharon McFarlane | | |
| Resource /Centre: | CBRC | Date: | 29 May 2018 |

| **Communication Plan Reference Number:** (***to be assigned by Research and Knowledge Managers***) | 18RD36 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 36 |
| Region: | Komati | Programme Area: | Crop Protection |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | X | Staff Colloquium for Extension Specialists | | Grower Day | X |
| Extension Newsletters | X | SASTA | X | Grower Study Group | |
| Information Sheet update | X | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

If the project is accepted, one-on-one meetings with participating growers will be held to discuss the project objectives, methodologies, including availability of grower data for analysis.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Extension newsletter | Growers | Current cost estimates of roguing | August 2018 | Feedback from Extension and Biosecurity |

| | | | | |
|---|---|---|---|---|
| The Link and Ingede | Growers | Updated information on roguing | January 2020 | Increased adoption of routine roguing, reduction in crop eradcation orders, reduction in smut levels over time |
| Info sheet update | Growers, Biosecurity, Extension | Updated information on roguing | March 2020 | Increased adoption of routine roguing, reduction in crop eradcation orders, reduction in smut levels over time |
| Grower days in all areas | Growers, Biosecurity, Extension | Methods of roguing | Jan-Dec 2020 | Grower participation and increased adoption of routine roguing |
| SASTA | Delegates | Smut management | August 2020 | |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| Grower Days:<br>Travel: arrange events for Lowveld and Pongola during Biosecurity visits. Toll fees for other areas ~R300<br>Food and drinks: link in with other grower days to reduce costs where possible, otherwise R21 000 | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| Extension / Biosecurity to send invitations, arrange food etc | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| | | | | |

| White grubs - biological control<br><br>(SASRI Reference: Issue 37) | Click here to return to index |
|---|---|

**RDE ISSUE DESCRIPTION**

Communication required on what biological control is available.

**SASRI COMMUNIQUÉ**

The Forestry and Biotechnology Institute (FABI) at the University of Pretoria, have a PhD student who will continue for the next 3 years (2018-2020) with the work of Birhan Abate, who found an indigenous entomopathogenic nematode (EPN), *Heterorhabditis bacteriophora* in forestry plantations. It caused high mortality of field collected white grub larvae (85% mortality after 6 days, 93% mortality after 12 days, with a median time to mortality of 4.7 days on *Heteronychus licas.* See Abate, B. 2017. Molecular characterization and evaluation of entomopathogenic nematodes in South African forestry plantations. Unpublished PhD thesis, FABI, University of Pretoria). The new student will concentrate on this and other strains of EPNs, that in the laboratory were very effective against a number of white grub species,

in field trials and host specificity trials on new species of white grubs. Field sites and white grub species to be tested are requested by FABI.

The local isolates of the entomopathogenic fungus (EPF) *Beauveria brongniartii* (C17 for adults, and HHWG1 for larvae) so effective against white grub adults and larvae of the species *Schyzonycha affinis, Pegylis sommeri, Temnorhynchus clypeatus, Heteronychus tristis* and *Schyzonycha neglecta,* were not as effective against larvae of *H. licas.* However, C17 did cause 90% mortality of *H. licas* adults exposed in laboratory trials to this entomopathogenic fungus (EPF). Both isolates now need to be field tested and registered against larvae and adults of the susceptible species of white grub, and tested against more white grub species not yet subjected to infestation, to increase its host range. Mass production and formulation of the EPF is however problematic. Efforts to elicit the interest of commercial biocontrol companies will continue.

Basic ploughing and harrowing techniques, as outlined in the SASTA papers of Conlong and Mugalula (2003), and Mugalula *et al.* (2006), to destroy larvae of a white grub species infesting sugarcane in Uganda has been successfully used in 2016, in a badly infested *H. licas* sugarcane field on heavy soil in the Tugela area, to destroy the population of larvae harboured there, and should be considered a further control option.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | Des Conlong | | |
| Resource /Centre: | CBRC | Date: | 25 May 2018 |

| **Communication Plan Reference Number:** | 18RD37 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 37 |
| Region: | Komatipoort | Programme Area: | Crop Protection |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | √ | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | √ | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | |
| Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| SASTA | Sugar growers | White grub biocntrol advances | Most recent paper was in 2016 congress | Growers asking questions about entomopathogens |
| Link article | Sugar growers | Show what types of biocontrol are available, and summary of lab and field results | Sep 2018 | As above |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| No budget required | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| No resources required | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| | | | | |

Holistic approach to economic analysis – mechanical versus manual harvesting

(SASRI Reference: Issue 38)

Click here to return to index

**RDE ISSUE DESCRIPTION**

**Background**

- The mechanical contractors' advice is the only advice growers have to go by in making a decision regarding mechanical harvesting.
- Growers need to know the pros and cons to make an informed decision.

**Desired End Result**

- Structured trials required in order to get the right information.
- Information can be obtained from private growers doing their own mechanical harvesting (Piet Smith of Noordgrens Landgoed is one such a grower)

**SASRI COMMUNIQUÉ**

Research investigating estimated yield losses caused by infield traffic has been conducted recently by SASRI. In this study a wide range of systems used in the industry were investigated. Those systems that were surveyed are as follows:

High yielding cut and windrow systems (Uncontrolled Traffic):

- Cut and windrow system with 3 wheel grab loaders loading into adjacent low capacity box trailers from field to zone (1 adjacent windrow loaded per tractor trailer swath).
- Cut and windrow system with 3 wheel grab loaders loading into adjacent low capacity spiller trailers from field to zone (2 windrows loaded per tractor trailer swath).
- Cut and windrow system with 3 wheel grab loaders loading into adjacent high capacity spiller trailers from field direct to mill (3 windrows loaded per tractor trailer swath).
- Cut and stack using single and double stack self-loading trailers.

High yielding cut and windrow systems (Controlled Traffic):

- Cut and windrow system with high capacity slewing loaders loading adjacent medium capacity field to zone tip trailers (1 large windrow per swath). Field layout with rows in a tramline configuration of 0.4 x 1.25 m spacing with all wheels travelling on the IR.
- Cut and windrow system with high capacity slewing loaders loading into adjacent high capacity spiller trailers (1 large windrow 8 rows (4 tramlines) per swath).
- Mechanical chopper harvester operating on CT principles harvesting 2 rows (tramline configuration of 0.4 x 1.45 m spacing) per harvester pass with billets loaded into adjacent low capacity tip trailers for field to zone operations.

As indicated, the systems investigated cover a wide range of typical systems. Specific loader and haul out configurations found within the Mpumalanga region should be investigated in conjunction with typical field layouts, the typical extent of the field trafficked and characteristics of the equipment used infield.

The impact of stool damage on ratoonability is likely to be an issue for any push-piler that is not matched to suit row spacing's. Such adjustments should be made to the push-piler prior to field entry to minimise stool damage by ensuring that the push piling tines are constrained to the inter-rows only. In addition to position, floating tine designs are advantageous by not penetrating the soil and thus minimising the risk of uprooting cane or causing stool damage.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | P Tweddle | | |
| Resource /Centre: | PERC | Date: | 09/07/2018 |

| **Communication Plan Reference Number:** | 18RD38 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 38 |
| Region: | Mpumalanga | Programme Area: | SDO |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| • The Link and/or Ingede | | • Staff Colloquium for Extension Specialists | | • Grower Day | x |
| • Extension Newsletters | | • SASTA | | • Grower Study Group | |
| • Information Sheet update | x | • Other (specify below) | | • Short Course | |
| • Information Sheet new | | | | • Other (specify below) | |
| • Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Canegrowers have indicated that they have data for the Northern Irrigated areas in terms of harvesting costs for various systems. This source of information and level of details will inform the degree of involvement from Canegrowers and local extension involvment (and may need to extend to local grower

information) in conducting the case study costing comparisions that are proposed in the RD&E communication.
Local extension may also be consulted to get cost data from individual growers if required.

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Data gathering via Canegrowers and local extension | Growers (English) | Determine typical manual and mechanical harvesting operation and system costs | Upon release and subsequent analysis of the Cane growers grower survey data and database results. Last quarter of 2018? | Collaborative development of a cost comparison report: Manual versus mechanical harvesting. |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

Potentially up to 1 nights accommodation (± R700) and a flight to Mpumalanga (± R5 000) = R 5 700 or,
Shared travel and a minimum of 2 nights accommodation (± R1 400) and associated travel costs = R1 400.

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

Initial data gathering should be through local Canegrowers data sharing and e-mail correspondence (desktop analysis).
Field trip and travel to Mpumalanga may be necessary to gather additional information and to discemminate findings through grower interaction event/s.

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

## SASRI small-scale grower extension

(SASRI Reference: Issue 39)

Click here to return to index

**RDE ISSUE DESCRIPTION**

There is currently no SSG Extension Officer in the Lowveld.

**Background**

The quality of advice small scale growers receive from government extension is questionable, these extension officers are not specifically trained in sugarcane production.

**Desired End Result**

A locally based SSG extension officer is required.

**SASRI COMMUNIQUÉ**

Currently extension to small scale growers in Mpumalanga is provided primarily through staff of RCL who carry out this function together with other, more operational services they provide to small-scale growers.

In the past, a SASRI extension service had been provided to small-scale growers in the Mpumalanga region. However, this was discontinued due to funding and other regional issues which prevented the continuation of the service. Recently however, with the re-introduction of a regional levy-paid extension service at Komati, the possibility of providing a SASRI extension service dedicated to small-scale growers in the region was revived.

The current SASRI regional extension specialist at Komati, is mandated by the grower groups in that region to provide a service to small-scale growers and this has been a reality in the short period of time the service has been in place. However, a full-time dedicated service to small-scale growers would be necessary in order to provide effective knowledge exchange to this group of growers.

In 2014 a meeting with the Mpumalanga Department of Agriculture Land and Environmental Affairs (DARDLEA) raised the possibility of a joint venture in the form of secondment of Department extension staff to SASRI. As this would entail an intensive management commitment on the part of SASRI, one which the industry would have to support, this was not pursued.

More recently, certain of the small-scale grower community have approached the SASRI Director with the request to re-instate SASRI extension. There is clearly a need amongst the community who wish to have closer ties with SASRI and thereby more effective access to knowledge.

An extension service can be provided to small-scale growers from SASRI provided a suitable funding model can be found. Management and other support is available through the SASRI Extension & Biosecurity structures and with the current SASRI presence in the Lowveld, local support for the new incumbent would be readily available.

A process will be embarked on, starting with engagements with local stakeholders such as grower leadership in order to explore the options available.

**Communication Plan**

- Meetings with all relevant stakeholders (Malelane and Komati large- and small-scale grower leadership, including RCL) to determine the detail of the proposed service and to identify specific funding options. Time period: July – November 2018.
- Development of a full-scale implementation proposal to be presented to local grower leadership for approval. Time period: to follow agreement reached under (1) above.
- Potential Implementation: 1 April 2019.

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | RA Stranack | | |
| Resource /Centre: | Extension & Biosecurity | Date: | 05/06/2018 |

| **Communication Plan Reference Number:** | 18RD39 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | 39 |

| Region: | Mpumalanga | Programme Area: | Extension |
|---|---|---|---|

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | X |
| Other (specify below) | | | | | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

Negotiations with Mpumalanga grower associations with a view to introducing a dedicated small-scale grower extension service in the region

*Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.*

| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
|---|---|---|---|---|
| Discussions/meetings | Local grower and miller stakeholders | Establish extension needs of small scale growers and possible funding options | July – November 2018 | Agreeement achieved on key principles including funding |
| Development of a formal implementation proposal & contract | Local grower and miller stakeholders | Written proposal from consideration by local grower associations | January – April 2019 | Proposals agreed |

**Communication Plan Budget and Resources Requirements:**

*Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)*

N/A

*Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).*

Input from the SASRI Director

**General:**

*Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.*

N/A

| | |
|---|---|
| Data information systems collaboration (GIS, P&D info shared) (SASRI Reference: Issue 40)<br><br>Incomplete GIS-based information and decision-making system – require holistic and fully develop management system (SASRI Reference: Issue 3).<br><br>Linked to GIS-system is need for better understanding of the relationship between soil and variety selection (combined with issue above in discussions) (SASRI Reference: Issue 4).<br><br>Research on the use of NDVI imagery to detect certain pests and diseases in the field is required (Issue 21).<br><br>(SASRI Reference: Issues 3, 4, 21 and 40) | Click here to return to index |

**RDE ISSUE DESCRIPTION**

Data information systems collaboration (GIS, P&D info shared)

**SASRI COMMUNIQUÉ**

This issue (Data information systems collaboration (GIS, P&D info shared)) relates to three other issues, as follows:

- Incomplete GIS-based information and decision-making system – require holistic and fully develop management system (Issue 3);
- Linked to GIS-system is need for better understanding of the relationship between soil and variety selection (Issue 4); and
- Research on the use of NDVI imagery to detect certain pests and diseases in the field is required (Issue 21).

SASRI is aware of the value of the collection of production and other physical data for purposes of analysis to inform on-farm and mill-level management decisions. To this end, many of the mill groups in the industry have already embarked upon programmes to collect production, soils, variety and other data. In most cases, this is integrated into a GIS to enable geo-spatial presentation of data. SASRI has a research and support oriented GIS section, staffed by a GIS specialist and a small staff component. It has never been the intention that SASRI should directly support any industry wide data collection or GIS. Rather, through the GIS and other subject specialists, direct industry in the most effective and appropriate use and presentation of data. It is acknowledged that such analysis will clearly better inform critical issues such as pest and disease management, variety choice and the determination of realistic production potential, amongst others, and therefore critical to the progress of the industry.

SASRI, through the Biosecurity function, performs on behalf of the industry, the collection of pest, disease and variety data. Another area where SASRI collects extensive data, is in soil analyses carried out by FAS. Other data repositories at SASRI include farm and field boundaries and soil parent materials. In some cases these last mentioned data are not complete or up-to-date.

The integration of all available data sets, both from SASRI and local, can provide an immensely powerful management tool which growers could make extensive use of. Regarding the data which SASRI has control over, this could be shared and integrated into systems such as a regional GIS, with the permission of the individual growers. These data could then be available for the grower's own use or, by specialists who, in aggregated form, could perform various area-based comparisons and analyses.

It is in this wider use of data, beyond individual access by the grower or SASRI specialist responsible for the data collection, that there are some concerns. For example pest and disease data often dictate the need for remedial actions, which are particular and individual concern to the grower. Wider access therefore needs to be carefully controlled. Similarly the interpretation of particular sets of data or comparisons e.g. FAS data also needs to be carried out under the supervision and with the approval of those responsible for its original collection and processing, with understanding of the necessary norms and statistics. Analyses and conclusions made by third parties without the necessary input from specialists could lead to misinformation and confusion amongst the grower communication.

In the event that data collected by SASRI is provided to regional databases such as a GIS, agreements will need to be reached between the grower, SASRI and the data managers/administrators regarding levels of access and permissions. These will also need to be considered in the light of current legislation relating to the protection of personal data. Legal advice will need to be sought.

**Communication plan**

- Meetings with relevant decision makers on the integration of P&D and FAS data into the RCL GIS, including SASRI, RCL GIS Committee, RCL management, various cane grower associations and SASRI extension. Simultaneously consultations with SASA legal advisors to determine legal implications of data usage. Responsible persons: R Stranack; M Adendorff; K Trumpelmann; P Brenchley. Time period – July to October 2018.
- Outcome of above to be communicated to Malelane and Komati grower associations and RCL data administrators and development of protocols. Time period – November to December 2018. Potential Implementation of data integration – January 2019

**SASRI COMMUNICATION ACTION PLAN**

| **Details of Communication Plan Developer:** | | | |
|---|---|---|---|
| Name: | RA Stranack | | |
| Resource /Centre: | Extension & Biosecurity | Date: | 5/06/2018 |

| **Communication Plan Reference Number:** | 18RD40 |
|---|---|

| **RDE Issue Details:** | | | |
|---|---|---|---|
| Year: | 2018 | Issue Number: | Issues 3, 4 & 40 |
| Region: | Irrigated North | Programme Area: | N/A |

**Communication Plan Outline:**

*Please indicate with a tick-mark the traditional Knowledge Exchange activities you will you use for information dissemination (more than one activity is encouraged).*

| Publications | | Presentations | | Discussions/Workshops | |
|---|---|---|---|---|---|
| The Link and/or Ingede | | Staff Colloquium for Extension Specialists | | Grower Day | |
| Extension Newsletters | | SASTA | | Grower Study Group | |
| Information Sheet update | | Other (specify below) | | Short Course | |
| Information Sheet new | | | | Other (specify below) | X |
| Other (specify below) | | | | Discussions with stakeholders | |

*Please specify any non-traditional Knowledge Exchange activities that you will use to disseminate available information on this RDE issue (e.g. partnering with a service provider [such as SAFDA and Canegrowers], one-on-one-meetings with growers identified as early-adopters).*

| | | | | |
|---|---|---|---|---|
| Identifying the appropriate roleplayers and initially hold informal discussions to dertermine the extent of data integration required and which is possible and legal to implement | | | | |
| *Provide the objectives and desired dates, if known, of the Knowledge Exchange activities you have specified in (a) and (b) above. Also, indicate how you will assess whether the Knowledge Exchange activities have been successful.* | | | | |
| Knowledge Exchange Activity | Target Audience (include language requirement) | Objective(s) | Implementation Date(s) / Period(s) | Measure to Determine Successful Knowledge Exchange |
| Informal discussion/information gathering | SASRI – GIS, data management, Extension & Biosecurity, local grower groups | Determine the respective needs of various parties, the potential uses and applications of GIS integrated data. Also investiogate possible methods of data capture and sharing | July - November 2018 | All stakeholders reached and engaged with. Report compiled detailing all possibilities |
| Informal discussion/infomration gathering | SASA Industry Affairs (legal support) | Determine the legalities and implications of data access & sharing | July – November 2018 | Clarity on legal implications of access to and sharing of personal data |
| Formal meetings | Local grower associations, LPD&VCC & RCL | Share possibilities for data access and sharing as well as potential benefits thereof | January – April 2019 | Permissions agreed and formal protocol written up agreed and implemented |
| **Communication Plan Budget and Resources Requirements:** | | | | |
| *Provide an estimate of the budget required to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary)* | | | | |
| N/A | | | | |
| *Describe the resources you will require to implement the Communication Plan (consult KMU Manager and Extension Manager as necessary).* | | | | |
| N/A | | | | |
| **General:** | | | | |
| *Provide additional information relevant to the development and implementation of the Communication Plan on the RDE Issue.* | | | | |
| N/A | | | | |