



Western Cape
Government

WESTERN CAPE BI-ANNUAL AGRICULTURAL DISASTER RISK ASSESSMENT REPORT: NOVEMBER 2021



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ABBREVIATIONS

4 th IR	Fourth Industrial Revolution
APSD	Agricultural Producer Support and Development
CK	Central Karoo
CW	Cape Winelands
CSD	Central Supplier Database
DALRRD	Department of Agriculture, Land Reform and Rural Development
DRR	Disaster Risk Reduction
GR	Garden Route
GPS	Global Positioning System
LSU	Large Stock Unit
MDMC	Municipal Disaster Management Centre
NDMC	National Disaster Management Centre
NDVI	Normalized Difference Vegetation Index
PASG	Percentage of Annual Seasonal Greenness
PDMC	Provincial Disaster Management Centre
RTDS	Research and Technology Development Services
SRUM	Sustainable Resource Use and Management
VCI	Vegetation Condition Index
WCDOA	Western Cape Department of Agriculture
WC	West Coast
WCP	Western Cape Province
WUA	Water Users Association

1. SUMMARY

In order to adequately prepare and respond to the needs of farmers facing disasters, the Western Cape Department of Agriculture established its Disaster Risk Reduction (DRR) programme. The DRR Programme would focus on ensuring that farmers receive adequate support to prevent, mitigate and reduce the impact of disasters. Previously the department's primary focus was on providing post disaster recovery, which proved costly and unsustainable. In addition to the drought, farmers have had to deal with floods, fires, hail, avian influenza, locusts and Covid-19. Climate change has resulted in the increase in both the frequency and intensity of disasters. To better build resilience within the farming sector, the DRR officials needed to understand not only the impact of the drought on the veld condition, but more importantly the impact of the drought and other disasters on farmers, their families and their agri-workers.

Initially the department conducted a 'drought tour', which allowed the department to assess and categorize the veld conditions across the Western Cape Province (WCP). This veld assessment is a crucial part of the long-term dataset and is a good indicator of a slow-onset drought. Based on the outcomes of the veld assessment, the department was able to determine which farmers should receive drought support. Should the veld conditions recover or deteriorate over time, the department could reclassify the area and adjust the required drought support accordingly.

Whilst the veld assessment provided a good indication of the veld condition, it failed to take into account the impact of the drought on farmers. What was needed was a farmer-centred approach. By engaging with farmers and other key stakeholders, the department would be in a position to fully understand what interventions were needed to mitigate against future disasters. Our stakeholder engagements allowed farmers to engage openly with DRR officials and together, we were able to identify key enablers and area specific interventions.

The combination of the veld assessments and the stakeholder engagements resulted in establishment of the bi-annual provincial disaster risk assessments.

2. PURPOSE

To demonstrate the disaster interventions and the categorisation of drought areas based on the August/September 2021 Drought Veld Assessments and the stakeholder engagements.

3. MOTIVATION

Albeit the Covid-19 restrictions, the department was able to conduct its winter rainfall region veld assessments in the three districts that receive mainly winter rainfall, and its stakeholder engagements in all five districts. The outcomes of these veld assessments and stakeholder engagements contributed significantly to the decision-making process in relation to the provision of drought support.

Whereas the veld assessments focuses exclusively on the condition of the veld, the stakeholder engagements provides the WCDoA's disaster risk reduction programme, the PDMC, Organised Agriculture and Municipal Disaster Management Centre staff the opportunity to understand the impact of the drought on the farmers, their families, agri-workers and the farming community. Simultaneously, as a collective, we are able to discuss, formulate and implement disaster risk reduction measures.

The department recognises that the persistent drought has had a devastating impact on not only the veld conditions across the province, but also on the farming community at large. It is thus vital that we implement projects and programmes that recognises the significant impact of climate change on both the frequency and intensity of disasters. Climate change has altered the agricultural landscape and to ensure that the Disaster Risk Reduction Programme is better prepared to respond to the effects of climate change, the Department's climate change specialist, Professor Stephanie Midgley, forms part of the bi-annual disaster risk assessments.

These disaster risk assessments play a crucial role in assisting the department to direct its limited resources to beneficiaries who are most in need. Whilst the veld assessments could be utilised as a decision making tool, it was too narrowly focused on the drought and its impact on the veld. The DRR's farmer-centred approach resulted in the evolution from veld assessment to disaster risk assessment, incorporating the veld assessments, M&E visits and stakeholder engagements.

4. INTRODUCTION

Over the last couple of years, the Western Cape Department of Agriculture has experienced an increase in both the frequency and intensity of natural disasters. The prolonged drought, which is in its eighth year, has had a devastating impact on not only the agricultural sector, but on the broader economy as well. The May 2021 flash floods experienced by farmers in the Overberg and Cape Winelands districts has only exacerbated the current struggles of the Western Cape farmers. The 2017/2018 Garden Route veld fires has not only caused major agricultural infrastructure damage, but also sadly claimed the lives of 16 people. Additionally, farmers are having to deal with large locust swarms, which have proven very difficult to contain.

The department recognises the role that climate change is playing within the agricultural landscape and as such, its dedicated Disaster Risk Reduction (DRR) Programme is working with all stakeholders to implement risk reduction and mitigation strategies within the agricultural sector.

The bi-annual provincial risk assessments, a combination of the department's veld assessments and stakeholder engagements, is proving to be a valuable tool in ensuring that the Department's Disaster Risk Reduction Programme is responsive to the needs of its farmers. Additionally, the successful implementation of the bi-annual provincial risk assessment, has significantly contributed to relationship building between the department and all its stakeholders.

5. PROVINCIAL RISK ASSESSMENTS

5.1 Section A: Stakeholder Engagements

5.1.1 Introduction

The success of an organisation must be measured by the ability of the organisation to respond adequately and timeously to the needs of its key stakeholders. Within a disaster management context, any delays in responding to the needs of one's stakeholders could have dire consequences.

Whilst the veld assessment is an effective tool to identify the veld conditions, it fails to take into account the impact of the drought on farmers, their families and their staff (agri-workers). What was needed, was a farmer-centred approach. Critical to a farmer-centred approach, is recognising that every intervention must be geared towards supporting farmers and building resilience within the agricultural community

The stakeholder engagements allows the department to hear first-hand the impact of the drought on the livelihoods of the beneficiaries, ascertain the impact of the current support initiatives on the farming community and how the Department, specifically the Disaster Risk Reduction (DRR) Office, could better support the farming community with respect to disasters.

5.1.2 Climate Change

The importance and impact of Climate Change within the agricultural sector cannot be overstated. Hence, the department's climate change specialist, professor Stephanie Midgley, forms part of the stakeholder engagements. There has been an increase in both the frequency and intensity of disasters affecting the agricultural sectors. Engaging farmers on climate change issues resulted in very open and frank discussions between the various role-players.

Farmers re-iterated their commitment to farming sustainably within a climate change environment. Professor Midgley indicated that the interaction with the farmers and listening to their experiences has been fruitful in that she has a very good understanding of the climate change knowledge and perceptions existing within the agricultural space.

The DRR programme and the Climate Change Unit will continue to work together to ensure that we position ourselves to adequately support our farmers, specifically within a climate change and disaster management environment.

5.1.3 Engagements

During the months of August and September 2021, the DRR programme undertook stakeholder engagements in all five (5) Western Cape districts. Whilst this process is both taxing and exhaustive, the insights gained from personally interacting with farmers, their families and workers, proved invaluable.

Listening to personal accounts of how the drought has affected farmers, only serves to motivate us as civil servants to want to do more. Whilst the ongoing drought has caused severe economic loss within the agricultural community, it has also provided an opportunity for the Western Cape Department of Agriculture, through its Disaster Risk Reduction programme, to advance some of the core values of the Western Cape Government. These values include caring, responsiveness, innovation and competence. Based on the feedback from our farmers, we believe that the Western Cape Department of Agriculture has lived up to these values.

During these stakeholder engagements, the DRR and PDMC officials reiterated the Department's and both NDMC and PDMC's renewed focus on risk reduction and mitigation strategies. The department is implementing a number of interventions, including:

- I. River protection works.
- II. Alien clearing projects
- III. Seed projects
- IV. Fencing infrastructure projects

5.1.3.1 Garden Route District Stakeholder Engagement

The team engaged with both commercial and small-scale farmers in the district. Ostrich farming plays a vital role in the Garden Route District economy and farmers were at pains to express the need for disaster support for ostrich farmers. The current National Disaster Framework excludes ostrich farmers from receiving drought support as ostrich,

pig and chicken farming are classified as intensive farming. The department will continue to engage with the Department of Agriculture, Land Reform and Rural Development (DALRRD) to re-evaluate this current position. Ostrich farmers have been as hard-hit by the ongoing drought as livestock farmers.

Additionally, the drought has had a severe impact on businesses reliant on a successful and vibrant agricultural sector. It has been reported that pickup truck (bakkie) sales in the region has been negatively affected to such an extent that businesses working in this space have closed down.

Farmers in the region raised the following concerns, which they felt needed immediate attention:

- I. Payment of WUA fees and not receiving any water.
- II. The costs of Electricity.
- III. The overgrazing on the Commonages. All agreed that we need to address both the historical and systemic issues in order for the commonages to be successful. The department needs to engage with the municipalities as a matter of urgency. Failing to do this would only exacerbate the current situation on the commonages.
- IV. Farmers upstream are building illegal structures, which is having a negative impact on downstream farmers. The department must engage with relevant sector departments to adequately address this illegal practice.
- V. The widening of water channels is imperative, as this would allow the much needed rain water to flow to the dams.
- VI. The groundwater reserves are depleting and the quality of groundwater is deteriorating. This is a result of excessive use of groundwater and little to no replenishment, due to the ongoing drought.

Farmers indicated that due to the ongoing drought, they have had to re-look at their farming practices. There is now a bigger focus on sustainable farming and building resilience within the agricultural sector as a whole. As part of the Garden Route District

stakeholder engagement, the DRR team met with one of the co-operatives to discuss the concerns around the raising of feed prices whenever the department issues fodder vouchers. The co-operative confirmed that they do not raise feed prices in response to the issuing of fodder vouchers. The co-operatives requested the department to give prior notice of any fodder support so that they are able to procure sufficient fodder stock.

Drought support largely focussed on livestock farmers, resulting in fruit and crop farmers being largely neglected. The department committed itself to supporting both livestock and fruit farmers. Fruit farmers provide seasonal employment to a number of agri-workers, as such it is vital that the department provides much needed disaster support to these farmers.

5.1.3.2 Overberg District Stakeholder Engagement

The DRR and PDMC officials met with both commercial and small-scale. These farmers were predominantly from the Barrydale area. In addition to the drought, predation was fast becoming a real threat to livestock in the area. Farmers were concerned about the large number of baboons in the area.

From previous engagements with farmers across the province, predation management, or the lack thereof, is having a negative economic impact on their farming. Farmers have indicated that they have lost up to 40% of their herd due to predation. In response to Professor Midgley's comments regarding planting drought resistant crops and better-suited cultivars, the farmers indicated that in addition to reducing their livestock numbers, they have experimented with planting different cultivars, which seem to grow better in these climatic conditions. Farmers in the region are discussing climate change and they have acknowledged its impact on farming.

As with the other districts, fruit farmers in the area highlighted their plight. These farmers employ up to 80 seasonal workers and the ongoing drought has had a detrimental effect on their ability to continue employing seasonal workers. Commercial farmers in the area continue to work with and provide support to small-scale farmers.

5.1.3.3 Central Karoo District Stakeholder Engagement

The DRR and PDMC officials met with farmers from the Leeu Gamka and the Murraysburg areas. Farmers expressed their gratitude for the drought support, and many indicated that had it not been for the department's drought support, many of them would not have survived.

The Department emphasised that it will be focusing on disaster prevention and mitigation strategies and encouraged the farmers to implement projects, which are relevant and specific to their region. Soil erosion is a real concern in the Central Karoo and farmers felt that the department must provide the necessary support in erecting soil erosion structures. As the department has both the expertise and the capacity to design soil erosion structures, the department will support such an implementation.

The drought has resulted in many farmers having to reduce their stock numbers. As such, it will take a number of years before they are able to replenish their stock. Farmers have raised concerns regarding the lack of young people pursuing farming as a career. This phenomenon has played out across the province and should this trend continue, the Western Cape would be left with an ageing farming sector, devoid of young people. The DRR programme will engage with relevant programmes and sector departments to focus its recruitment drives on attracting young people to pursue a career in farming.

Farmers have been encouraged to submit a priority list of projects to the department. Based on the availability of funding, the department will support these initiatives, thereby implementing projects, which are area specific and relevant.

The value of these stakeholder engagements were once again emphasized during our engagement with the Murraysburg farmers. During the 2020 Veld Assessment, it was recommended that Murraysburg be removed from the drought support list, as the veld had recovered sufficiently. Subsequently, the department removed Murraysburg from the drought support list. Upon interacting with the farmers, observing the current veld conditions across the region, and understanding the weather patterns within the area, it

became evident that before any area is removed from drought support, we need to engage with the farmers and district officials in that area. This would allow the DRR team to take into consideration additional factors, in conjunction with the veld report, before making a decision. Farmers indicated that even-though certain parts of Murraysburg, at the time in 2020, might have shown recovery, the majority of Murraysburg farmer's veld did not recover sufficiently. The March 2021 veld assessment recommended that the department once again provide drought support to the Murraysburg farmers. As such, funding permitted; the entire Central Karoo will receive drought support.

Farmers have been encouraged to build fodder banks. In addition to providing drought support, the department is supporting a number of farmers within the Central Karoo with seed. This will contribute to the establishment of a fodder bank.

The department re-iterated its commitment to supporting area specific interventions and assured the farmers that projects implemented must, as far as possible, utilise local labour. This will lessen the negative impact of the drought on agri-worker employment.



Leeu Gamka (Central Karoo) Stakeholder Engagement



One of the Leeu Gamka farmers



Murraysburg Farmers Stakeholder Engagement



Murraysburg Veld Condition, September 2021

5.1.3.4 Cape Winelands District Stakeholder Engagement

The DRR and PDMC officials met with farmers in the Tankwa region of the Cape Winelands. These farmers are predominantly livestock farmers, as such; they shared their appreciation for the department's ongoing drought support. As with the previous engagements, the DRR programme manager emphasised the need for farmers to submit a priority list of risk reduction and mitigation projects. This will ensure that all projects implemented, will be relevant to the Tankwa region.

In combatting the rising fodder and feed transport prices, farmers who have access to water and can grow lucerne or other feed, can register on the SA Government Central Supplier Database (CSD) and in so doing, supply fodder directly to farmers in the region.

The Tankwa region is the only area in the Cape Winelands who is currently receiving drought support. Farmers highlighted predation as a challenge. The department will continue to work with the Tankwa farmers to ensure that they receive the much-needed support.



DRR Programme Manager Ms Jody Wentzel with one of the Tankwa Karoo farmers. No available veld for livestock grazing.

5.1.3.5 West Coast District Stakeholder Engagement

The DRR and PDMC officials met with farmers from the Bitterfontein, Kliprand, Stofkraal and Kotserus areas. Once again, farmers thanked the department for the ongoing support.

The West Coast farmers raised a number of concerns:

- I. The threat to the biodiversity on the area, due to the stealing of large quantities of plant species by syndicates.
- II. The water licence issued to the mining company.
- III. The poor quality of underground water.
- IV. Farmers want a more scientific approach to farming.
- V. The impact of predation.
- VI. Poor market access and the relatively high transport costs, specifically the feed transport costs.
- VII. Farmers based in the commonages have little support. These commonages will need to be supported on a broader scale. The DRR programme manager

will engage with the municipality and relevant sector departments to support commonage farmers. For these farmers to transform from subsistence/small-scale farmers to commercial farmers, it will require the intervention of the Department.

The West Coast farmers acknowledged the impact on climate change on their farming and as such, they have adapted the way they farm. Farmers in this region have always farmed sustainably, however, the prolonged drought has had a severe impact on production and farming economically in the Matzikama region has become especially challenging.

The DRR Programme Manager encouraged the Matzikama farmers to submit their project priority list. These projects must focus on disaster prevention, reduction and mitigation. In addition, projects implemented in the region must as far as possible utilise local suppliers and labour. Specifically fencing projects in the area have utilised external contractors and labourers, which farmers in the area felt undermined their struggle in the midst of the ongoing drought.

The DRR and PDMC officials re-iterated their support to utilise local labour and have undertaken to engage with relevant programme managers and sector departments. Due to the ongoing drought, many farmers had to reduce their labourers and this in turn, has placed a severe burden on the social services within these communities.

5.2 SECTION B: Veld Assessments

5.2.1 Introduction

As mentioned earlier, the ongoing drought has had a devastating impact on the agricultural community. As a result of the ongoing drought, the veld especially has suffered extensive damage and in 2018, the department developed its veld condition map. Based on the veld assessments performed by the department's plant scientists, the department was able to document the conditions of the veld across the province. The 2018 conditions was used a baseline. This would enable the department to have a reference with which to compare all future veld conditions. The department could then

ascertain whether the veld conditions have improved or deteriorated over time. This veld assessment is a crucial part of the long-term dataset and is a good indicator of a slow-onset drought.

Since 2018, the department has produced veld maps for 2019, 2020 and 2021. From these assessments, we are able to clearly see an improvement in the veld conditions across most parts of the Western Cape Province. Concurrently, the veld condition maps highlights the areas, which have not improved or have deteriorated over time. This allows the DRR programme to target these vulnerable areas, thereby utilising its scarce resources more effectively and efficiently.

Additionally, the veld assessments enables the department to implement specific risk reduction and mitigation interventions for each area.

5.2.2 Veld Categorisation

Key: Drought status/condition according to vegetation:

Extremely critical (score 1)	Critical (score 2)	Very Dry (score 3)	Dry (score 4)	Fair (score 5)	Good (score 5+)
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1. Extremely Critical Dry

- The extremely critical dry areas are the plants that are black and some already turning white.
- This means that that the veld is in the worst possible condition with little to no signs of life.
- The extremely critical dry areas, marked red, would require monthly support, as the conditions are highly unfavourable in terms of the veld conditions and water availability.

2. Critical Dry

- The critical dry areas, in orange, are areas that are still affected by the current drought conditions.
- These areas however have experienced very little plant growth.
- The critical dry areas however still require support every month, as the conditions are highly unfavourable in terms of the veld conditions and water availability.

3. Very Dry

- Majority of the plants are living, but are very dry.
- The plants don't break easily and there are still leaves present, although brown.
- Little to no flowers present are visible. Grasses are dry (yellow), but not yet black
- The very dry areas require support every alternate month.

4. Dry, with signs of recovery

- Majority of the plants in the area are dry, with most of them bearing leaves.
- The area consists of plants that are still green, some have flowers and show signs of regrowth.

5. Fair Condition

- The area is still in a fair condition with most of the plants green with flowers and regrowth.
- Grasses are dry, but still bear culms and inflorescence.

6. Good condition (5+)

- Areas listed in the "green" column are classified as good, meaning that the veld conditions have improved to such an extent that the farmers can be removed from the drought support.

Should the veld conditions in any area in the Province deteriorate or improve over time, the department will reclassify the area and adjust the required drought support accordingly.

5.2.3 Evaluation Criteria

The department performs two (2) veld assessments annually. During the March/April period, the department focusses on the summer rainfall regions, when optimum veld conditions are expected at the end of its rainfall season, and similarly during August/September, the department focusses on the winter rainfall regions, when optimum veld conditions are expected at the end of its rainfall season. The areas that were prioritised during September included the Overberg, Cape Winelands and the West Coast districts.

The following criteria was used to determine this evaluation:

- Climate
 - Rainfall history (monthly precipitation records)
 - Seasonal rainfall distribution (NDVI and PASG)
- Rangeland
 - Quality of grazing
 - Grazing capacity and production potential
 - Reserves available
 - Conservation status
 - Cover/trampling
 - Vegetation Conditions Index (VCI)
- Livestock¹
 - Condition
 - Percentage stock reduction at the time of drought-evaluation
 - Dependence of livestock on planted pastures
- Water¹
 - Water-table
 - Boreholes.

5.2.4 Supporting Documentation

The Vegetation Condition Index (VCI) compares the current NDVI to the range of values observed in the same period in previous years. The VCI is expressed in % and gives an idea of where the observed value is situated between the extreme values (minimum and maximum) of the previous years. Lower and higher values indicate bad and good vegetation state conditions, respectively. This was the map preferred by the drought-relief prioritisation committee. See the VCI map in Appendix B.

5.2.5 September 2021 Veld Assessments

5.2.5.1 West Coast District

Table 1. Final prioritization list for the West Coast District

Priority	Area visited
1. Swartland	Good
2. Sandveld	Good
3. Agterpakhuis	Fair

¹Livestock and water was used as supportive information to the other criteria used.

4. South of Vredendal	Good
5. Knersvlakte – South	Fair
6. Knersvlakte - North	Dry
7. Kliprand - East	Very dry
8. Kliprand – West	Fair
9. Hardeveld	Fair
10. Northwest of Vredendal	Fair

Veld Assessment Outcomes.

- The **Swartland and Sandveld** regions are currently in a good condition with good crop stands across the region. The veld is also in a good condition.
- Full recovery of the veld might take more than two years of above average rainfall and low animal numbers should be maintained to give the veld a chance to recover, as there are many dead plants.
- The **Matzikama and Cederberg** regions are in a very dry to good condition. The north-eastern parts of the area received below average winter rainfall and many plants have died due to the prolonged drought.
- The surviving plants in the Knersvlakte and Kliprand areas that have to some extent recovered after the winter rain of 2021, will struggle to survive in the dry summer. The situation might revert back to critically or extremely critically dry by the end of the summer. The DRR sub-programme will continue to engage with the farmers in this region.
- Full recovery of the veld might take more than two years of above average rainfall and low animal numbers should be maintained, to give the veld a chance to recover.

5.2.5.2 Cape Winelands district

Table 2. Final prioritization list for the Cape Winelands district.

Priority	Status
1. Witzenberg – west	Fair
2. Witzenberg - east	Dry

Veld Assessment Outcome

The Cape Winelands district is in a fair to dry condition. The **Witzenberg** region ranges from fair in the western parts of the region to dry to the east of the region and according to the VCI map (Appendix A) the northern areas are still very dry. Taking into account that this is at the end of their rain season, it might become critically dry towards summer.

5.2.5.3 Overberg district

Table 3. Final prioritization list for the Overberg district.

Priority	Status
1. Cape Agulhas	Good
2. Theewaterskloof	Good

Veld Assessment Outcome

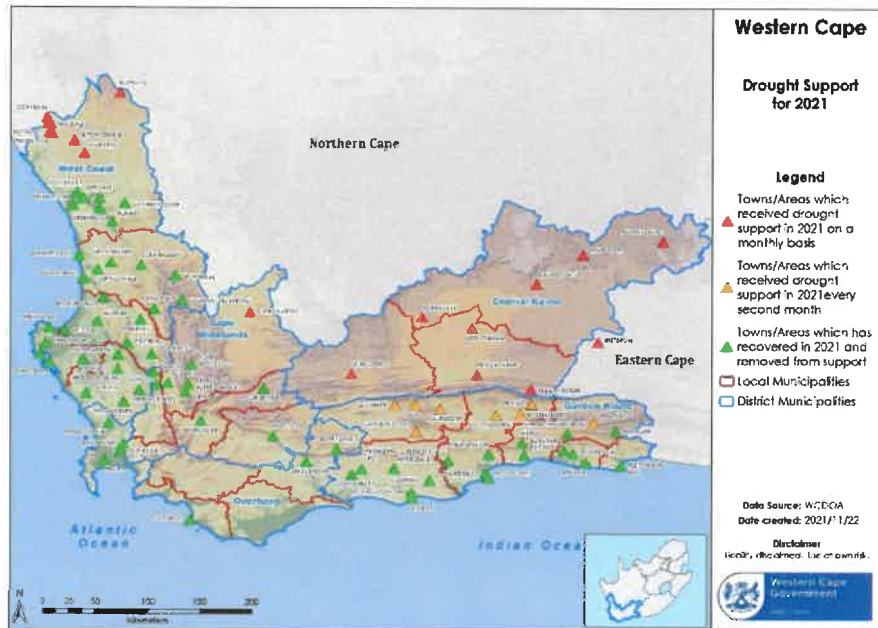
The **Overberg** district is in a good condition, with normal to above-normal crop stands across the region. The poor grain stands in some areas was caused by the excessive rainfall these areas received earlier in the year, resulting in some areas becoming water-logged.

5.2.5.4 Central Karoo & Garden Route districts

The last veld assessment in the Central Karoo and Garden Route Districts were conducted in March 2021. However, the DRR team, in partnership with the PDMC, MDMC & Organised Agriculture, met with the local farmers as part of the bi-annual stakeholder engagements and we can confirm that the veld conditions in both these districts have not recovered.

5.2.5.5 Veld Maps (Annexure A, Maps 2018-2021)

- V. Areas marked in green do not need drought support.
- VI. Areas marked Orange will need drought support every second month.
- VII. Areas that are marked Red will receive drought support every month.



6. Conclusion

In light of the fact that disasters are increasing in both intensity and frequency, the department has shifted its focus to disaster reduction, mitigation and prevention.

Due to the crippling eight (8) year drought, farmers are re-focussing their efforts on disaster mitigation projects. Emerging from the stakeholder engagements, it is clear that the ongoing drought has had a detrimental impact on not only the agricultural sector, but also the community at large. In a bid to stem the unemployment of agri-workers, the decision was taken that all future agricultural disaster mitigating projects should use local farm agri-workers. The DRR team is looking at a holistic approach, which will consider the impact of the drought and other disasters on all stakeholders.

Fruit farmers have also been negatively affected by the ongoing drought. The department recognises the disparity in the level of support given to the fruit farmers when compared to the support given to livestock farmers.

Through the provincial disaster risk assessments, the DRR Unit identified a number of risk factors, which could potentially destabilize the farming community. These risk factors include, but are not limited to, climate change, predation, resistance to the adoption of

new technologies, alien vegetation, unjustified animal feed and transport costs and unsustainable farming practices.

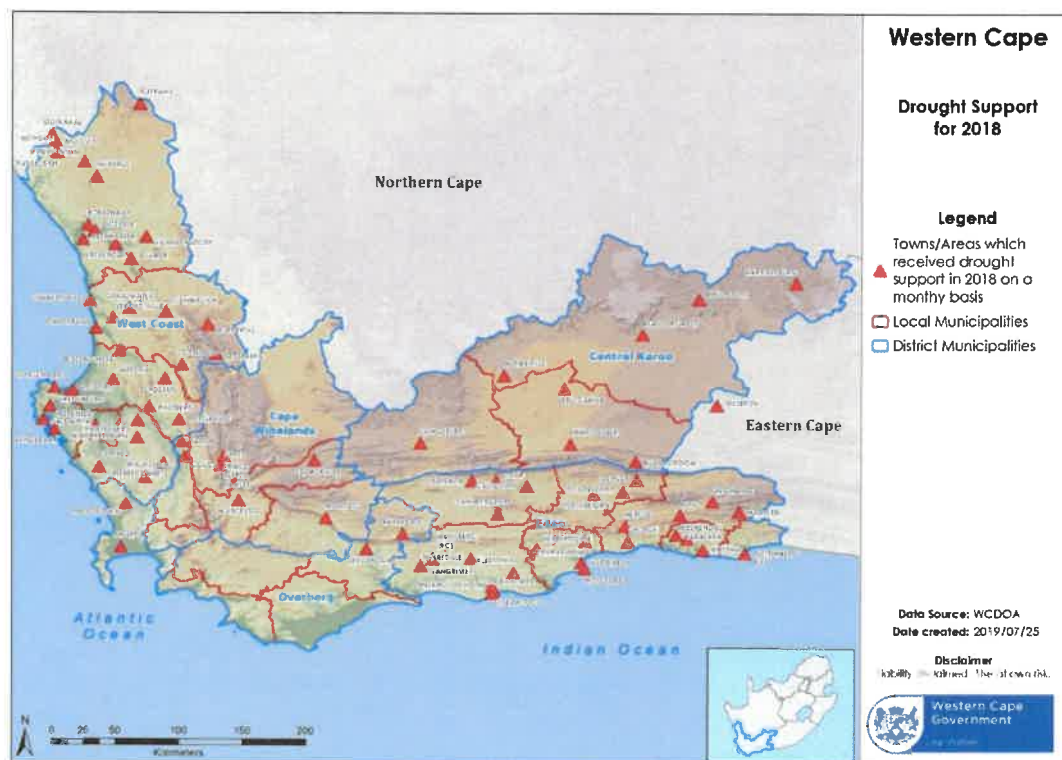
The department, through its dedicated Disaster Risk Reduction Programme will continue to build and maintain resilience within the farming community, thereby protecting its farmers from future disasters.

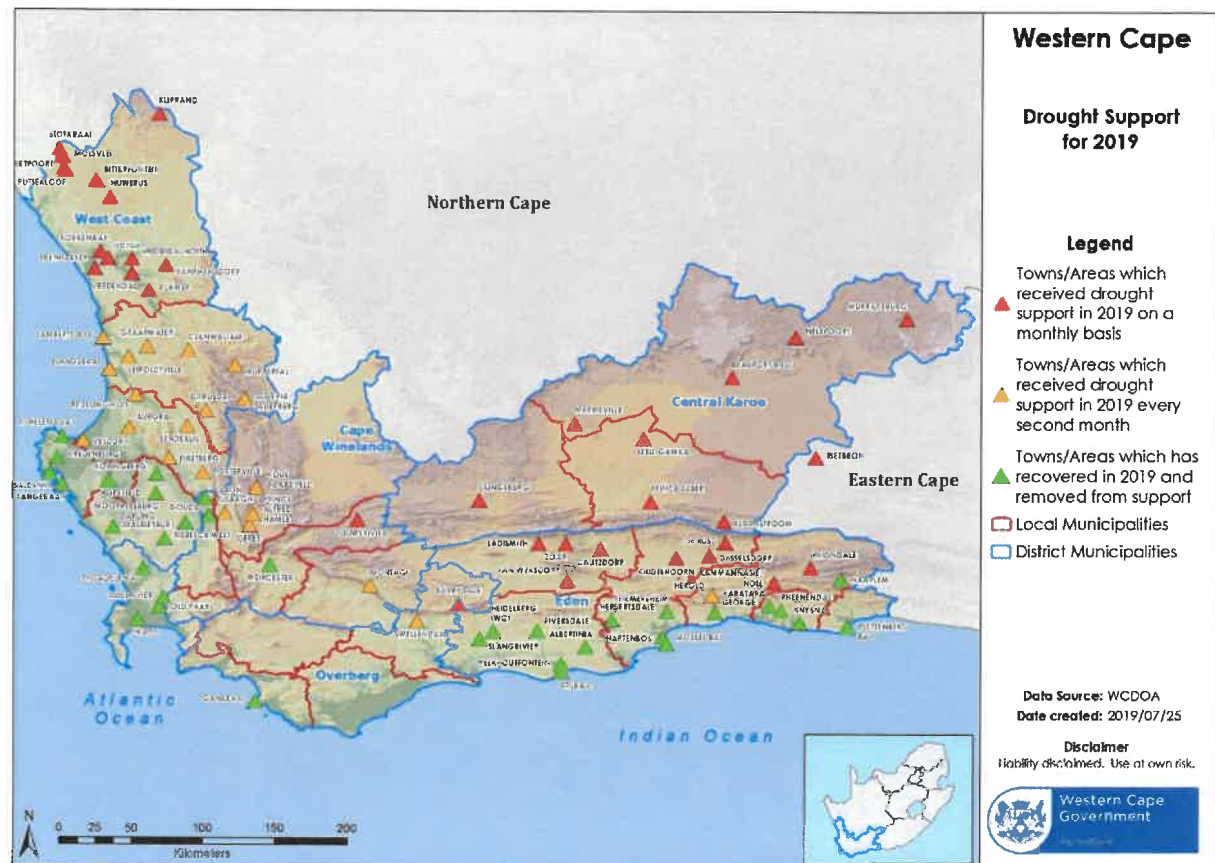
7. ANNEXURES

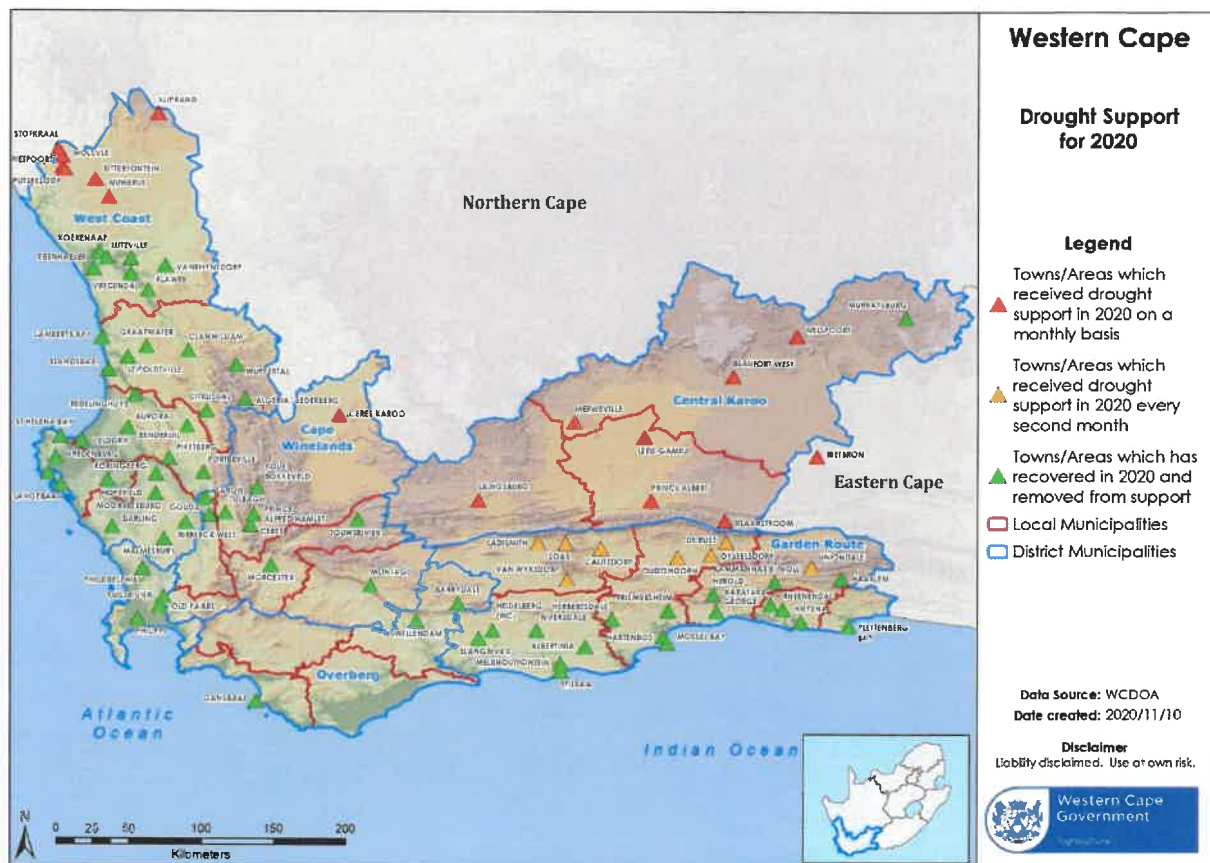
Annexure A: Identifies the veld conditions in the areas across the province and the resultant level of drought support. (2018 -2021)

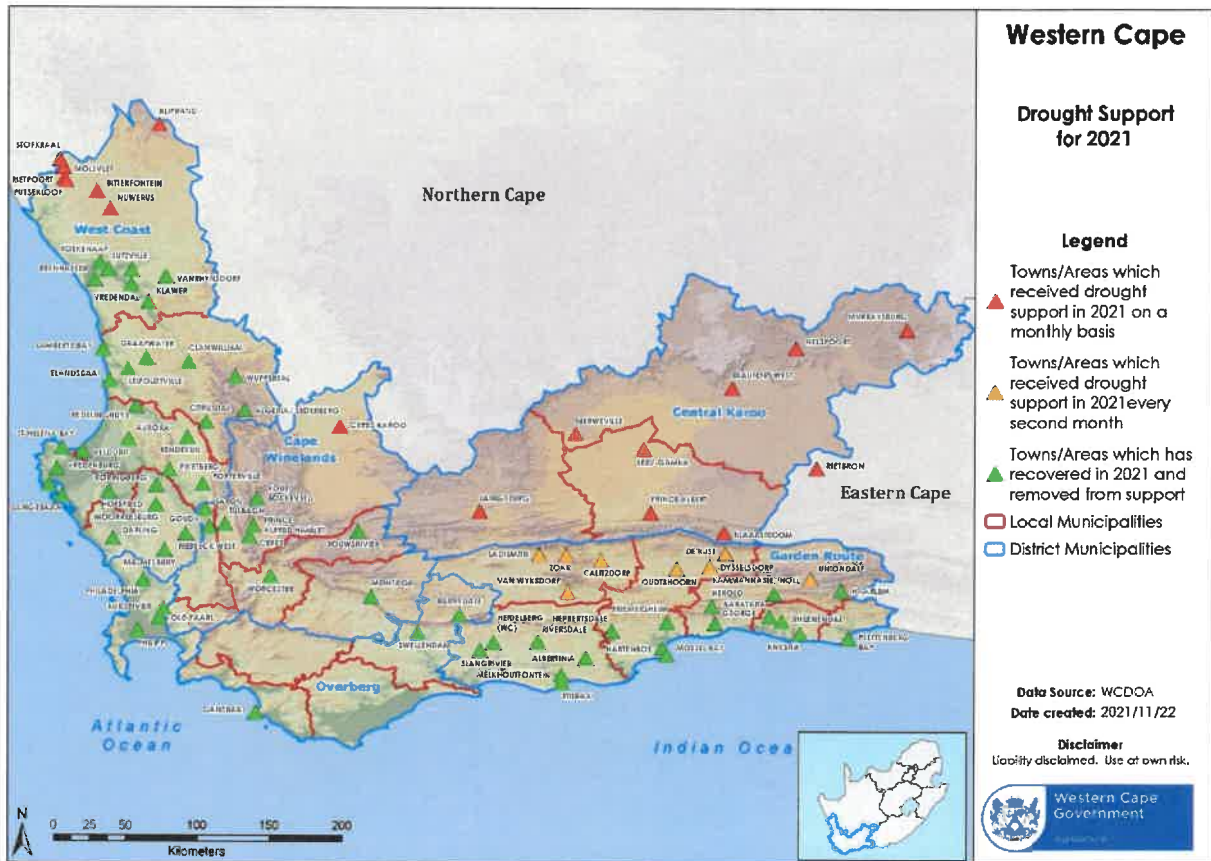
- Areas marked in green do not need drought support.
- Areas marked Orange will need drought support every second month.
- Areas that are marked Red will receive drought support every month.

WCDOA: Drought Support Map 2018

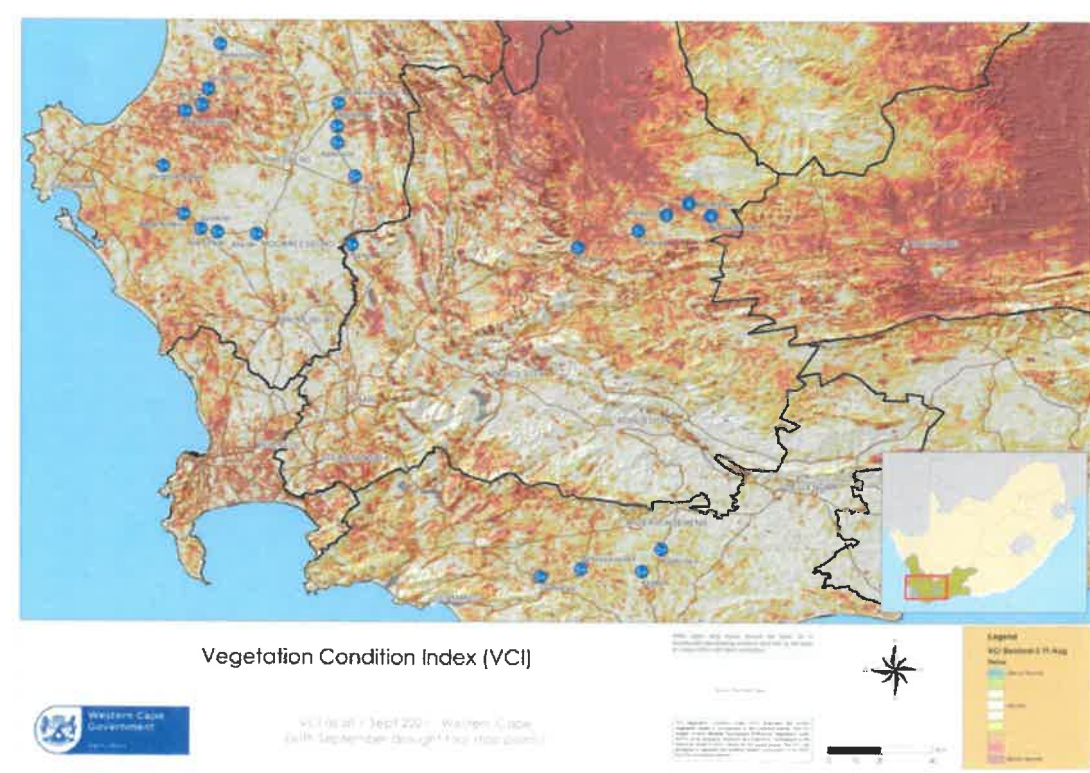
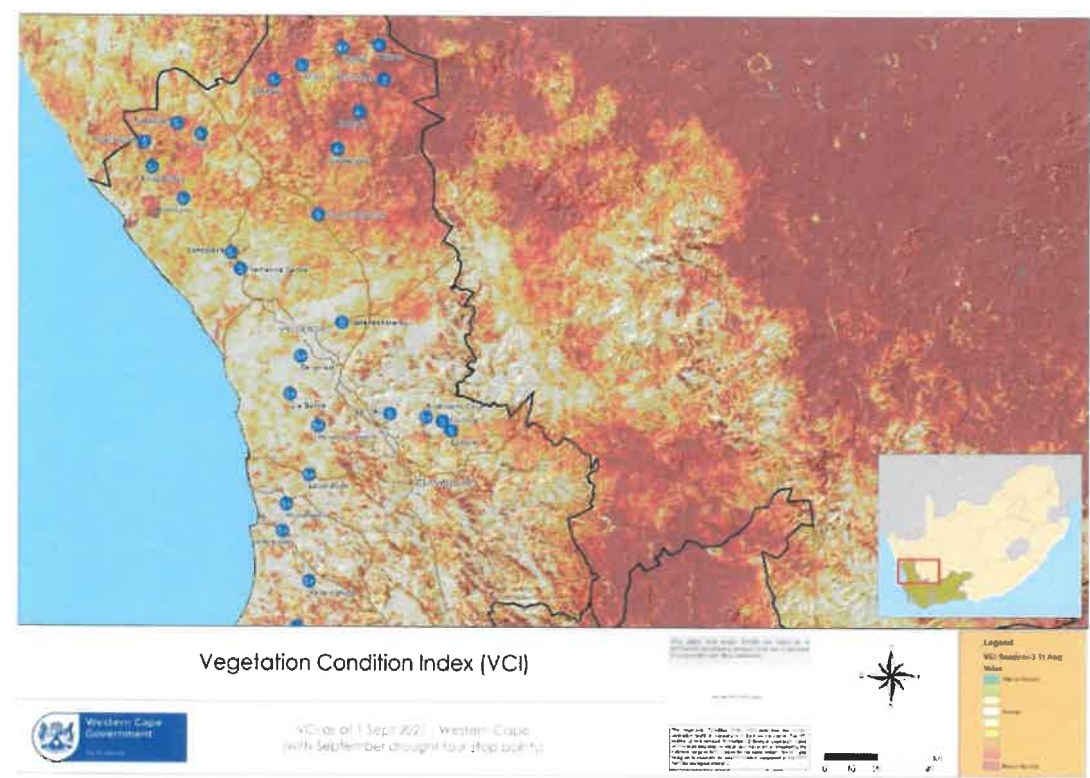








Annexure B: Vegetation Condition Index (VCI)



COMPILED BY:



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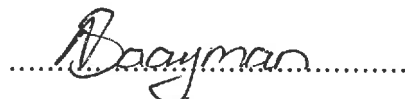
DISASTER MANAGER: LM MARTHINUSSEN

DISASTER RISK REDUCTION: SUSTAINABLE RESOURCE USE AND MANAGEMENT

27/01/2022

DATE:

TECHNICAL INPUTS PROVIDED BY:



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MS NELMARIE SAAYMAN (Pr. Sci. Nat.)

PROFESSIONAL SCIENTIST (RANGELANDS): RESEARCH AND TECHNOLOGY DEVELOPMENT
SERVICES

28-01-2022

DATE:



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SUB PROGRAMME MANAGER: JN WENTZEL (Pr. Techni Eng)

DISASTER RISK REDUCTION: SUSTAINABLE RESOURCE USE AND MANAGEMENT

28-01-2022

DATE: