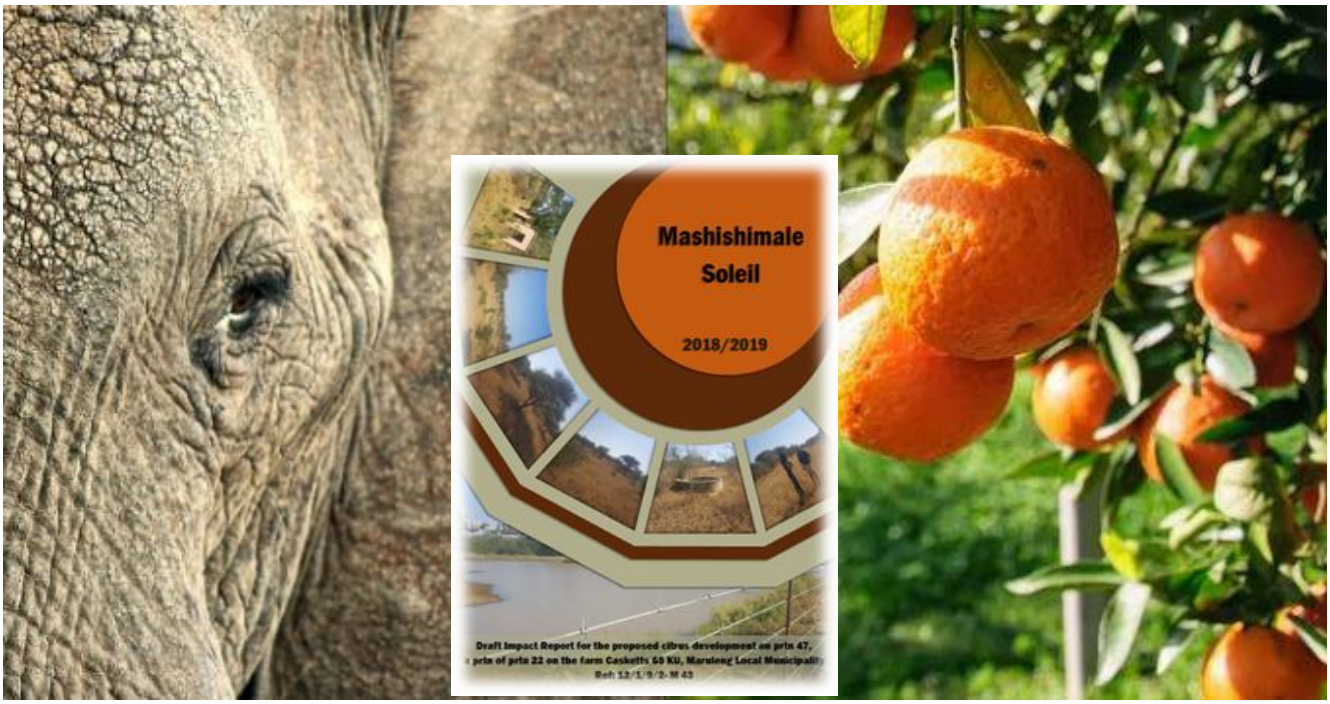
The consequences of citrus: Assessing the quality of a Draft Impact Report for a proposed citrus development project in Limpopo Province, South Africa



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5 April 2019

Elephants, Bees, Trees & People

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ACCRONYMS/ABBREVIATIONS

EAP – Environmental Assessment Practitioner

ECO – Environmental Control Officer

EIA – Environmental Impact Assessment

EIR – Environmental Impact Report

EMPr – Environmental Management Programme

HWC – Human Wildlife Conflict

NEMA – National Environmental Management Act

SUMMARY

Environmental Impact Assessment is used to determine and mitigate any adverse impacts that a proposed development might have on the environment, essentially ensuring sustainable development.
The proposed development involves converting 120 hectares of natural vegetation into citrus orchards. The site falls within an area that is earmarked for Protected Area expansion which aims to promote the ecological integrity of the area. Not only would the proposed development prevent this expansion, but it would have cumulative negative impacts on the Nature Reserves which it borders. Using Lee Colley's Review Package, it was determined that the Draft Environmental Impact Report (EIR) scored satisfactorily in the descriptive components of the report, while scoring poorly in the analytical components, a pattern that has been noticed throughout South Africa's EIA 20-year history. These findings resulted in the Report receiving a D, deeming it unsatisfactory because of omissions or inadequacies. This score was largely due to the Report insufficiently identifying: (1) possible alternatives to the one proposed, preventing any inferences from being made about its suitability; and (2) adverse impacts and specific measures required to prevent or reduce the identified impacts.

INTRODUCTION

Environmental Impact Assessment (EIA) is internationally recognised as a tool to identify potential environmental impacts of proposed development projects and implement mitigation measures to either prevent or reduce them (Cele, 2016, Sandham *et al.* 2005). It is a planning and management tool to ensure long-term sustainable development, a topic that is becoming more urgent as the human population continues to grow. Sustainable development encompasses achieving socio-economic goals without degrading the natural environment. Additional factors such as the potential physical, biological and health impacts of the proposed development are also assessed to allow for an objective decision to be made. The decision is based on the Environmental Impact Report (EIR), which is essentially the most crucial aspect of the EIA process as the quality and accuracy largely affects the final decision (CALS 2013, Sandham and Pretorius 2008).

In South Africa, EIA was first practiced on a voluntary basis since the mid-1970s as part of the country's Integrated Environmental Management framework, only becoming a legal requirement in 1997 (Sandham *et al.* 2005). Since then, EIA Regulations, under the National Environmental Management Act (NEMA) No. 107 of 1998, has evolved significantly in outlining which projects require an EIA and the required steps to follow.

The EIA process is divided into three broad sections namely the preliminary assessment, the detailed assessment and the follow-up (Cele 2016). The first two steps involve pre-development components to determine potential impacts and possible mitigation measures to reduce them. The last step, and globally the most neglected, involves post-decision monitoring and auditing (Alers 2016). This step is vital in determining the efficiency of the suggested mitigation measures while implementing additional actions to prevent unexpected impacts. The purpose of follow-up should be to allow for adaptive project management, feedback on the EIA process and communication about environmental performance, as a lack thereof would result in the EIA process to remain a static, linear exercise. This stagnation would be to the detriment of the environment as a result of the cumulative effects of climate change. In addition, follow-up ensures compliance to the conditions and regulations, since without it, the primary role and effectiveness of an EIA is jeopardized (Cele 2016). The importance of follow-up should also be recognised in terms of the role EIA plays in shaping future development policies in ensuring sustainable planning. Follow-up involves the appointment of an ECO (Environmental Conservation Officer) who's key role includes compliance monitoring, implementation and enforcement, ensuring legal compliance, advising and/or consulting, communication, reporting and raising awareness. Important to note is that these roles can only be fulfilled if the ECO is assigned these responsibilities during the project. Recent studies found compliance monitoring and enforcement of the Environmental Management Programme (EMPr) to be the greatest challenge of South Africa's EIA system (Alers 2016).

The effectiveness of EIA in ensuring sustainable development is frequently questioned, especially in cases where detrimental development projects are approved. One method of measuring its effectiveness involves reviewing the quality of the EIR (Sandham and Pretorius 2008). There are various methods available, but the method most commonly used is the Lee and Colley Review Package, which involves subdividing the evaluation tasks into four broad "Review Areas" to resemble a hierarchical structure as shown in Fig. 1 (Wiley *et al.* 2018). This package is easy to use and allows for thorough quality reviewing. Due to the extensive participatory process and legislative requirements of South Africa's EIA system, a few adjustments were made to the review package with several new sub-categories incorporated as guided by Sandham and Pretorius (2008) and Wiley *et al.* (2018) (Appendix 1).

The review process entails assigning a symbol ranging from A-F to each review topic within each level (see Table 1). It starts at the lowest level, which is the simplest criteria relating to specific tasks and procedures, progressively moving upwards to the higher levels which are the more complex criteria for broader tasks and procedures. The last step is assigning the report an overall symbol (Alers 2016). These scores are recorded on a collation sheet (Appendix 2).

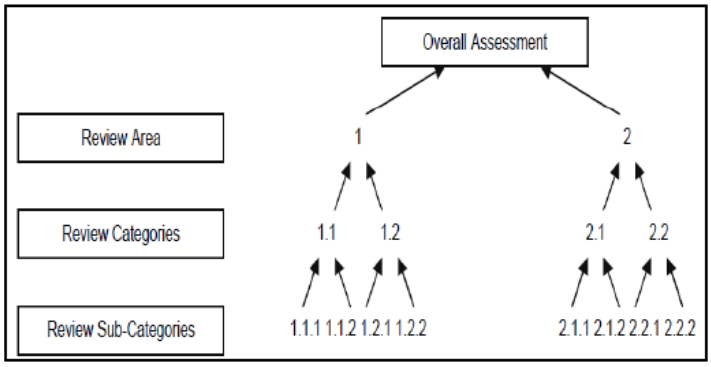

Figure 1 - The hierarchical structure of the Lee Colley Review Package (Lee and Colley 1002)

Table 1 - List of assessment symbols (Lee and Colley 1992)

Symbol	Explanation
A	Relevant tasks well performed, no tasks left incomplete
B	Generally satisfactory and complete, only minor omissions, admissions and inadequacies
C	Can be considered just satisfactory despite omissions and / or inadequacies
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies
E	Not satisfactory, significant omissions or inadequacies
F	Very unsatisfactory, important task(s) poorly done or not attempted
N/A	Not applicable. The Review Topic is not applicable or it is irrelevant in the context of this Report.

Grades for the higher levels are not determined by numerical averages, but rather by an overall performance grade per category and review area (Sandham 2008 and Pretorius).

A. The Case Study: Mashishimale Soleil Citrus Farm Development

1. Project Description

Convert 120 hectares of natural vegetation into a citrus orchard

a. The land has undergone a certain degree of modification with 80-85% of the land cultivated ten years ago in addition to it currently being used to breed buffalo and lions.

b. The property occurs in an area where the main land use is either wildlife-based tourism or wildlife economy initiatives. The property is surrounded by two Nature Reserves: 600m from the northern perimeter and 2km from the eastern perimeter (Fig. 2).

c. The area is earmarked for Protected Area Network expansion in order to create larger open systems that will promote the ecological integrity of the area.

d. The project is currently in its second phase of the EIA Report process with comments on the Draft Impact Report due on the 6th April. In addition to the Draft Report, the following was also included: Plan of Study, Final Scoping Report, Specialist Reports, Draft Environmental Management Programme and the Interested and Affected Party (I&AP) Comments.

2. Project Concerns

a. The property falls within a protected vegetation type and two biodiversity buffer zones.

b. Due to its proximity to the Nature Reserves: human-wildlife conflict (HWC), security in terms of poaching and its impact on tourism are of concern.

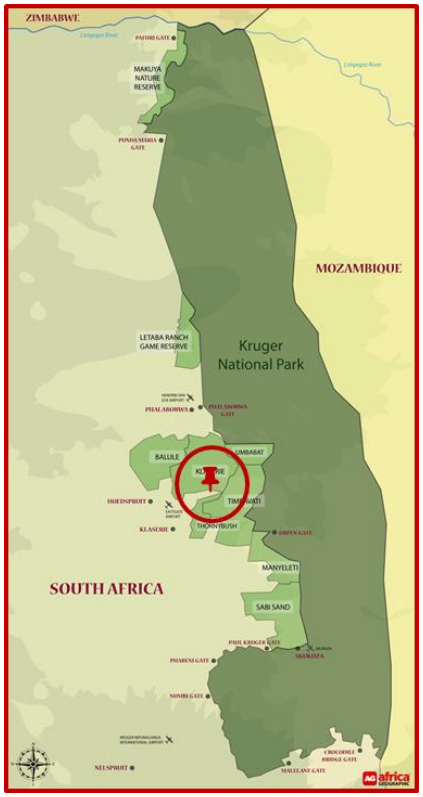

Figure 2 - Position of proposed development site in relation to Protected Areas

c. The property borders an important river which feeds into the Nature Reserve, so any chemicals and fertilizers used during production will negatively impact the downstream ecosystem. The area is also known to experience occasional droughts so the increased pressure on the already-scarce water source will decrease the water volume availability downstream, subsequently increasing competition for water. In addition, climate predictions depict a drastic change in the rainfall pattern allowing one to assume an increase in drought frequency and severity.

Biodiversity loss has become a major global issue, and the current rates of species decline (and subsequent extinction) are unprecedented. The impacts of intensive agricultural practices and habitat conversion is often not extrapolated to non-charismatic species, such as insects. Yet the cumulative impacts of chemicals (pesticide, herbicide, insecticide) on Limpopo's rich entomological diversity requires urgent consideration. This has become ever more evident with a recent study highlighting that almost half of the known insect species are rapidly declining while a third are being threatened with extinction (Sanchez-Bayo and Wyckhuys 2019). If that doesn't set-off alarm bells, then it should be remembered that insects form the base that supports intricate food webs – without insects, many of the vertebrates which are deemed more worthy of conservation efforts will not exist, due to eventual ecosystem collapse. Specialist species are being replaced by adaptable, generalist species. Similarly, among aquatic insects: habitat and dietary generalists, and pollutant-tolerant species are replacing the large biodiversity losses experienced in waters within agricultural and urban settings. This exponential species loss has been attributed to (in order of importance) (1) habitat loss and conversion to intensive agriculture and urbanisation; (2) pollution, mainly synthetic pesticides and fertilisers; (3) biological factors such as pathogens and invasive species and (4) climate change. It's a known fact that our intensive monocultural practices have led to a great simplification of insect biodiversity among pollinators, insect natural enemies and nutrient recyclers, while creating the ultimate conditions for agricultural pests to flourish. Intensive agriculture involves the widespread use of pesticides for controlling crop pests (insecticides), competing weeds (herbicides) and fungal infections (fungicides). Insecticides have been found to be the most toxic to all insects and other arthropods. Detrimentally, it readily translocates to pollen, nectar, guttation drops and all tissues of the treated crops and adjacent parts, impacting nectar-feeding biota such as bees, butterflies, hoverflies and parasitic wasps. **Herbicides, which are found to be the most detrimental overall, reduces the biodiversity of vegetation within the crops and in surrounding areas through drift and runoff, thus indirectly impacting the arthropod species which depend on wild flowers.**

B. Review Package Evaluation Results

1. Description of the environment (Grade: B)

The overall quality of the physical baseline data is satisfactory, as it includes site description, applicant information, EAP details, required legislation and need for project. However, there are several topics which are poorly covered: a detailed description of the layout of the project, the total amount of raw materials required, duration of each phase and number of workers which will be present on site. An important topic that is almost completely ignored is the management of waste, an important consideration due to the site's proximity to a vital river and Nature Reserve. In addition, very little attention is paid to impacts which will occur away from the immediate environment.

To highlight just a few of these impacts which will affect neighbouring Protected Areas:

   a. Noise and light pollution affecting the tourism experience
   b. Chemical drift which will have huge direct and indirect implications on the insect biodiversity as previously mentioned. This will eventually have subsequent impacts on vertebrate species (an example of cumulative impacts which is poorly investigated in the report)
      i. This chemical drift will also have an impact on the people living adjacent to the property

2. Aquatic pollution (chemicals and fertilisers) and the subsequent impacts on the aquatic insect diversity downstream Identification and evaluation of key impacts (Grade: C)

As an ecologist, I feel the impacts are very superficial and biased towards the Specialists opinions. A reader who has no knowledge of the field would not be able to make a fair judgement based on the information provided. Cumulative impacts are not thoroughly investigated nor is the impact of climate change acknowledged. The magnitude of impacts is also severely underestimated, specifically regarding habitat loss, which was indicated to shift from high to moderate through protecting "a few specific trees" or translocating where possible. Although the method used does predict and evaluate the significance of impacts, none of them were expressed in measurable quantities. The main argument in favour of the project is the meniscal socio-economic benefits through employment of only 8 permanent staff. On a positive note, the public participation process was well covered, despite only specific Interested and Affected Parties (I&AP) concerns being fully addressed.

3. Alternatives and mitigations (Grade: D)

Due to the poor quality of the determined impacts, the subsequent mitigation measures and a definite commitment for implementation are also poor. Other than casual suggestions as to when proposed mitigation methods should be applied, no detailed timeline is provided. This Review Area's biggest weakness is its lack of alternatives. Despite not being able to draw comparisons between suggested alternatives and subsequent impacts and mitigation measures, the proposed crop is still considered the most viable. This is after I&AP offered several crop alternatives for consideration, so the deliberate omission reaffirms the high level of bias within the report

4. Communication of results (Grade: A)

Overall the results are sufficiently communicated, even though the format for the various reports aren't consistent and includes several errors. Due to bias being present throughout the Specialist reports, bias is also visible in the summary, in addition to there being a few contradictory statements between the Draft Impact Report and the Specialists findings/ impact magnitude predictions. Regarding the non-technique summary, although it covers the main factors, its lack of detailed descriptions would prevent any reader, who only has time to read the summary, to gain a full understanding of the proposed project. Additionally, a summary of the I&AP concerns is not included, although all communication could be found either in the Scoping Report or as separate documents.

In conclusion it was found that the report performed better in the descriptive parts of the EIA report in comparison to the analytical requirements (impact significance, mitigation methods and alternatives). As a result, the Report was awarded a D, deeming it unsatisfactory due to omissions or inadequacies. Unfortunately, these findings correspond to similar studies which analysed the quality of South African Environmental Impact Reports (EIR) (Wiley *et al.* 2018). With reference to the obvious bias found within the EIR, Sandham and Pretorius (2008) found a lack of objectivity due to the requirement that the Environmental Assessment Practitioner (EAP) be independent of the developer. It's suggested that if an EAP were to recommend the "do nothing" option, he/she would lose favour and employment with future developers.

The consequence of this bias also has the potential of influencing the success of follow-up activities. A recent study highlighted a few shortcomings of South Africa's EIA system regarding follow-up activities:

1. The success of the regulation is largely reliant on the competency of the EAP, whom has monopoly in determining several important factors (Alers 2016):
    a. the level of the public participation process in the development of follow-up programs in the pre-decision phase
    b. the requirements for the management, monitoring and reporting of the activity's impact
    c. identifying performance criteria to assess follow-up actions
2. In the case where an independent audit uncovers any failures regarding environmental management decisions, it's up the to the proponent to recommend improvements. The additional costs of involving Interested and Affected Parties (I&AP) may result in no recommendations being sought-out (Alers 2016).

EIAs are the primary source that the competent authorities use to base their decisions on, therefore it is imperative that these decisions be based on accurate and non-bias scientific environmental findings, able to withstand critical analysis and scrutiny (CALS 2013). Decisions should not be based on an isolated impact, but rather attention should be paid to the possible cumulative effects of the development. Although the EIA Report provides a clear description of the proposed development and met the public participation requirements, the most important element of ensuring sustainable development was largely ignored.

Considering the current environmental crisis that we are facing, economic benefits should not be ranked as the top priority in determining the feasibility of a proposed development. This is especially true in cases such as these where only one person will ultimately benefit financially and the employment benefit to people can also be considered minimal. With reference to this specific case, should we not be prioritising protection to assigned areas to ensure ecosystem resilience and our ultimate survival, instead of increasing our agricultural footprint for the benefit of a few?

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APPENDICES

Appendix 1: Adapted Lee Colley review criteria for the case study
Appendix 2: Interested and Affected Parties Comments on Draft Impact Report

Appendix 1: Adapted Lee Colley Review criteria for the case study

1. DESCRIPTION OF THE ENVIRONMENT

1.1 Description of the development

1.1.1 Purpose and objectives
1.1.2 Design and size – co-ordinates, whether an activity is linear (description of the route of the activity)
1.1.3 Presence and appearance of completed development
1.1.4 Nature of production processes
1.1.5 Nature and quantity of raw materials
1.1.6 Identification of applicant
1.1.7 Details of EAP
1.1.8 Identification of all legislation and guidelines considered
1.1.9 The need and desirability specified

1.2 Site description

1.2.1 Area of development site
1.2.2 Demarcation of land use area
1.2.3 Duration of phases
1.2.4 Number of workers/visitors
1.2.4 Means of transporting raw materials

1.3 Wastes

1.3.1 Types and quantities of wastes
1.3.2 Treatment, disposal and disposal routes
1.3.3 Methods of obtaining quantities of wastes

1.4 Environment description

1.4.1 Area to be affected by development: geographical, physical, biological, social, economic and cultural aspects
1.4.2 Effects occurring away from immediate affected environment

1.5 Baseline conditions

1.5.1 Important components of the affected environment
1.5.2 Existing data sources
1.5.3 Local land use plans, policies consulted, and other data collected

2. IDENTIFICATION AND EVALUATION OF KEY IMPACTS

2.1 Definition of impacts

2.1.1 All possible effects on environment – cumulative, short, medium and long-term, permanent and temporary, positive and negative
2.1.2 Interaction of effects on human beings, flora and fauna, soil, air, water, climate, landscape, material assets and cultural heritage
2.1.3 Impacts from non-standard operating conditions – accidents, etc.
2.1.4 Impacts from deviation from baseline conditions

2.2 Identification of impacts

2.2.1 Impact identification methodology – project specific checklists, matrices, panels of experts, consultations etc
2.2.2 A brief description of impact identification methods used

2.3 Public participation process

2.3.1 Contact general public and special interest groups
2.3.2 Proof of advertising and noticeboards etc. to notify I&APS
2.3.4 Collect opinions and concerns of I&APs and notify I&APs
2.3.5 Key Impacts
2.3.6 List of all persons registered as I&APs
2.3.7 Summary of issues raised by I&APs

*2.4 Predict*ion of impact *magnitude*

2.4.1 Data to estimate magnitude of main impacts
2.4.2 Methods used to predict impact magnitude
2.4.3 Predictions of impact in measurable quantities

2.5 Assessment of impact significance

2.5.1 Significance of impacts on affected community and society in general
2.5.2 Significance of impacts in terms of national and international quality standards
2.5.3 Justification of proposed method of assessing significance – assumptions and uncertainties

3. ALTERNATIVES AND MITIGATION

3.1 Alternatives

3.1.1 Description of alternative sites
3.1.2 Description of alternative processes, designs and operating conditions
3.1.3 For severe adverse impacts rejected alternatives identified
3.1.4 Comparative assessment of all alternatives identified

3.2 Scope and effectiveness of mitigation measures

3.2.1 Consider mitigation of all significant adverse impacts
3.2.2 Mitigation measures
3.2.3 Extent of effectiveness of mitigation when implemented

3.3 Commitment to mitigation

3.3.1 Record of commitment to mitigation measures
3.3.2 Monitoring arrangements
3.3.3 Draft EMP

4. COMMUNICATION OF RESULTS

4.1 Layout of report

4.1.1 Introduction
4.1.2 Information logically arranged
4.1.3 Chapter summaries for very long chapters
4.1.4 External sources acknowledged

4.2 Presentation

4.2.1 Presentation of information
4.2.2 Technical terms, acronyms, initials defined
4.2.3 Statement presented as an integrated whole

4.3 Emphasis

4.3.1 Emphasis to potentially severe impacts
4.3.2 Statement must be unbiased
4.3.3 Opinion as to whether activity should/should not be authorized
4.3.4 Record of minutes of meetings by EMP with I&APs and response of EMP to comments and issues raised

4.4 Non-technical summary

4.4.1 Non-technical summary of main findings and conclusions
4.4.2 Summary must cover all main issues

Appendix 2: Interested and Affected Parties Comments on Draft Impact Report

Summary

Although the report covers the baseline data fairly well, the analytical requirements are severely lacking – a report without the consideration of sufficient alternatives, its impacts and subsequent mitigations can't draw any conclusions regarding the feasibility of the proposed development. Since Impact Assessment Reports are the primary source that the competent authorities use to base their decisions on, it is imperative that these decisions be based on accurate and non-bias scientific environmental findings, able to withstand critical analysis and scrutiny. Unfortunately, a clear bias is present in this report as possible impacts are not thoroughly investigated due the perceived impression that they won't occur. In order to ensure the feasibility of a proposed project, all impacts should be acknowledged to ensure detrimental impacts don't occur.

- Socio-economic benefits can't be disputed, even if it's a small number of permanently employed staff members, however the question of how many South African citizens will be permanently employed requires clarification
- Should agricultural development be allowed in an area where the majority of the land-use is wildlife based with the view of extension and improving on linkages between Protected Areas?
- The proposed development should not be assessed in isolation:
    - Regardless of water rights, should any water-dependent development alongside an important water source be approved with the predictions of a shift in rainfall pattern, allowing one to assume either increased droughts or increase in severity?
    - Should development alongside a tourism hotspot be allowed, when tourism is the main income-source in the area?

The following report highlights all the aspects of the reports that are missing. To ensure that the ECO, I&AP as well as the competent authorities are able to measure compliance of the proposed mitigation methods and suggestion, sufficient, measurable details (when and how) are required.

General queries

1. Presence and appearance of completed development
    a) What would be the appearance of the development once completed? Is there a layout plan for the orchards? How close are the citrus trees planted to the i) fence; ii) river; iii) no-gone zones?
2. Nature of production processes
    a) How often will heavy machinery be travelling up and down the orchards?
    b) If spraying in done in the evening, what is the duration of the spraying since it's been compared to a game vehicle's headlights which doesn't stay in one position for hours?
    c) If pesticides are used, what will be used and how safe are they in terms of their potential effects on the surrounding entomological diversity of the area. How and when will the pesticides be applied and how will pollution be prevented if carried by the wind to nearby water sources and Protected Areas?
    d) What is the timeline or schedule for planting, pruning, harvesting?
3. Accommodation for two permanent employees at mentioned in the meeting on 22 November 2018: where will the residence quarters be? Would the building require any construction or repairs?
4. What management practices are carried out regarding the lions? What other practices are occurring on the property?
5. Why was Dr Gioia's (neighbouring property which borders KPNR) application to consolidate his land into KNPR denied? If this is one of the main arguments used against the proposed property forming part of the proposed Protected Area expansion project, more information is required to substantiate the claim
6. Why is the impact on the Blyde River as part of the aquatic impact discussed? pg. 77 and again on pg. 84

Alternatives

According to the NEMA EIA Regulations 3(h) it is required to **thoroughly investigates alternatives** to the proposed development: to highlight the requirements -

(iv) "the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects"

(v) "the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which theses impacts can be reversed; may cause irreplaceable loss of resources; and can be avoided, managed or mitigated

This report does not fulfil the above-mentioned requirements:

- No specific crop is investigated nor are any mitigation methods for the various alternative crop impacts discussed, preventing any impact comparisons from being made
- Without detailed alternatives, the proposed crop can't be justified as being the better option as there is nothing to compare to
- Pg. 56 "The proposed development will not have a prodigious effect on any species that is protected or has a high conservation value" is an incorrect statement as several protected tree species were found on the property. Species which are threatened are put under protection, so allowing the proposed development would exacerbate the species extinction risk
    - Alongside this misleading statement is the fact that a few ecological surveys were only carried out during winter – the most inappropriate time to determine species diversity, specifically insects, so the report can technically not account for possible diversity loss

Human Wildlife Conflict

Conclusions drawn from the HWC Report is based on insufficient data since none of the case studies used presented a similar scenario. The focus of Report is also more aligned towards elephants, while the HWC potential with warthogs, baboons, vervet monkeys and porcupines is largely ignored. Reference to the few exceptions of elephants breaching electrified fences without being attracted by a food source should be viewed with caution, one could theoretically presume that if elephants are already breaching fences without being enticed by a food source, in a case of an attractant food source would only exacerbate the problem.

- What implications would this have on the neighbouring establishments as well as the Nature Reserve?
- The impact on tourism has not been thoroughly investigated, comparing the lights of the tracker to those of a game viewer is far from sufficient
    - Has dust pollution been considered, specifically during the construction phase?
    - Has much noise pollution is estimated during the dam-wall repairs?
- Who would take responsibility for the DCAs?
- How much of the PA's constrained budget would have to be used for repairing their fences?
- Is the owner of the proposed development prepared to match that budget since it would be due to the development that fence breaks do occur?

Further enquiries about the EMPr Report and Specialists Reports are discussed below

EMPr Report

Pg.19 "…During the construction phase these reports should be submitted bi-weekly and during the first year of the operational phase…"

1. Will the I&AP be involved and how will they gain access to the audits?
2. Why are the reports only for the first year of operational phase?
3. Will the ECO be an independent body to ensure non-bias?

Pg. 19 "…Attend regular meetings to discuss progress, non- compliance and other relevant issues. The ECO will ensure that proper minutes are kept of such meetings."

"Keep a record of all communication with external interested and affected parties"

4. How often is regular?
5. Who will be in attendance during these meetings?
6. If a mitigation method is deemed ineffective, what process will follow to rectify this?
7. If an additional impact which was not originally accounted for is observed, what process will follow to ensure mitigation measures are immediately implemented?
8. How will the effectiveness of the mitigation measures be tested?

Pg. 19 "…remove them [alien plants] by the most effective mechanical or chemical method recommended in the relevant literature."

9. What chemicals will used? This statement is very vague. Specific management practices will be required due to the proposed development being next to a protected area and important water source

Impact/Objective	Mitigation (Action or control)	Responsible	Time Frame
Compliance	➢ Appoint an ECO who will be responsible to ensure compliance to the EMPr	➢ Landowner	➢ Prior to commencement of the project
Planning	➢ Design the layout of the citrus orchard	➢ Landowner ➢ Manager	➢ Prior to commencement of the project
	➢ Design the irrigation system for the proposed citrus development	➢ Landowner ➢ Manager ➢ Irrigation specialist	➢ Prior to commencement of the project
Protection of Flora	➢ Identify trees of interest to be protected prior to clearance of vegetation	➢ ECO	➢ Prior to Construction Phase
	➢ Demarcate "no-go" zones	➢ ECO	➢ Prior to Construction Phase
	➢ The removal of smaller succulent and bulbous plant species for relocation purposes (according to legal requirements) by any interested parties should be considered and encouraged prior to any clearing activity.	➢ ECO ➢ Manager	➢ Prior to Construction Phase

Comment: *According to cash-crop as an alternative (pp. 12): "citrus production will allow leeway to protect some of the larger protected trees" Could you please elaborate on how this will be done?*

Response: Citrus production require micro- or drip irrigation as apposed to centre pivot irrigation for cash crops. In centre pivot irrigation all trees need to be removed for the installation of the centre pivot.

[Meeting 22 November 2018]

Ian: Can water saving irrigation measures be considered – a drip system as opposed to the micro irrigation system?

Kobus: Drip Irrigation does not work in the Hoedspruit area.

1. According to the minutes taking from the meeting with the Private Reserve Wardens on 22 November 2018 **drip irrigation is not a viable option** – Which irrigation system is going to be implemented as the response to citrus production allowing leeway to protect some trees through micro- or drip irrigation is being contradicted? Please elaborate on the irrigation method to be used as indicated on as a mitigation method on p. 27 in the EMPr.
2. Timeline for translocation of succulent and bulbous plant species? Where will the flora be translocated to if not used for site rehabilitation? And interested parties pertains to who?
3. When will the fence design be planned/ investigated? And who will be responsible for that? What would be the management schedule for that? How much area will be cleared for the fence? Has that been accounted for in the 120ha proposed area?
4. With the addition of two "no-go zones" (and buffer zone?) - What is the new size in hectares of protected vegetation type to be removed?

Impact/Objective	Mitigation (Action or control)	Responsible	Time Frame
Site Accessibility – Construction of Roads	➢ The site is accessed by the Argyle Road and extant unpaved management roads on the property.	➢ Not Applicable - Extant	➢ Not Applicable - Extant
	➢ Construct unpaved roads on the perimeter of the proposed site and to access the citrus blocks	➢ Manager	➢ Construction Phase
	➢ Construct mitre drains on unpaved roads on the property to manage storm water runoff and to prevent degradation of these roads.	➢ Manager	➢ Construction Phase

1. What are the specifications for the unpaved roads to be constructed? No information is included in either reports. Where will the roads be placed? Is there a map detailing the layout?

Impact/Objective	Mitigation (Action or control)	Responsible	Time Frame
Protection of Flora	➢ Monitor the cleared area as well as adjacent habitats for the presence of alien plant species and implement an eradication programme if required.	➢ ECO ➢ Manager	➢ Construction Phase ➢ Continuous
	➢ Rehabilitate disturbed areas post construction phase to prevent habitat degradation. Succulent and bulbous plants identified for relocation can be used for this purpose.	➢ Manager	➢ Construction Phase ➢ Continuous
	➢ Comply with relevant CARA (Conservation of Agricultural Resources Act – (43 of1983) legislation.	➢ Landowner ➢ Manager ➢ ECO	➢ Construction Phase ➢ Continuous
	➢ Comply with GLOBAL G.A.P. regulations.	➢ Landowner ➢ Manager ➢ ECO	➢ Construction Phase ➢ Continuous
	➢ Submit an audit report during the clearing process.	➢ ECO	➢ Construction Phase
Protection of Fauna	➢ Preserve the integrity of the riparian zone along the seasonal drainage line and demarcated no-go areas to provide habitat/shelter for affected faunal species.	➢ ECO ➢ Manager	➢ Construction Phase ➢ Continuous
	➢ Consider the relocation of arboreal and fossorial faunal species (e.g. baboon spiders and reptiles) prior to the clearing of vegetation – use knowledgeable people. All legal requirements must be considered prior to any relocation attempt.	➢ Eco ➢ Specialists ➢ Manager	➢ Construction Phase ➢ Continuous

1. What does the alien plant species monitor program entail? What is the plan with the removed vegetation (debris)? An outline is required to ensure compliance
2. "Rehabilitate disturbed areas post construction…" – How will this will be achieved?
3. What are the GLOBAL G.A.P regulations?

Impact/Objective	Mitigation (Action or control)	Responsible	Time Frame
Prevent ground water contamination and manage storm water	➢ Maintain service roads to drain storm water into existing drainage channels.	➢ Manager	➢ Construction Phase ➢ Continuous
	➢ Establish citrus saplings as soon as possible after the preparation of land and allow re-establishment of the grass layer between the citrus rows.	➢ Manager	➢ Construction Phase ➢ Continuous
Loss of CBA Area	➢ Avoid development in the indicated "no go" areas and preserve the integrity of the riparian zone along the seasonal drainage line.	➢ ECO ➢ Manager	➢ Construction Phase
Minimize potential Noise Impacts	➢ Use heavy machinery during normal working hours.	➢ Manager	➢ Construction Phase
	➢ Keep a register to document complaints and appropriate actions.	➢ ECO	➢ Construction Phase
Prevent excessive dust pollution	➢ Cleared areas should be covered as soon as possible.	➢ Manager	➢ Construction Phase
	➢ Implement measures to prevent wind erosion, and soil desiccation e.g. topsoil must be wetted or stabilised, especially during windy days.	➢ Manager	➢ Construction Phase
Uncontrolled Fires	➢ Do not burn uprooted trees. ➢ Do not allow open fires on site, ➢ Appropriate fire-fighting equipment should be available on site.	➢ Manager	➢ Construction Phase
Minimize Visual Impact	➢ Remove uprooted tree stumps and rock stock piles. ➢ Re-establish grass layer between citrus rows.	➢ Manager	➢ Construction Phase

1. "Maintain of service roads…" – What does this entail? How often will this occur? Have methods to prevent oil/fuel spills during construction phase been accounted for?
2. What are "normal working hours"?
3. "Cleared areas…covered…" - How will this occur? Will grass physically be replanted and fertilizer used to stimulate regrowth?
4. "Implement measures to prevent wind erosion" - What other measures will be used other than wetting the soil? How will the soil be stabilised in a short time-scale?
5. Fire: will there be a fire belt? Where will the fire-fighting equipment be stored?
6. "Remove uprooted tree stumps and rock stock piles" – What is the management plan for the debris? Where is the **waste management plan**? Detailed management practices should be outlines to ensure compliance

Social-Economic Impact Health and Safety Risk	➢ Control access to site ➢ Vehicles must keep to appropriate speed limits ➢ A first aid facility and a trained first aider must be on site ➢ Temporary labour should commute to the property.
Social-economic Impact Job Opportunities	➢ Job opportunities will be available on site during the construction phase of this project. Source local labour to maximise the economic benefits of the local community.
Fencing	➢ Erect a suitable fence to keep wildlife from entering the orchard

7. General

Edwin: Staff – are you going to use local labour?

Kobus: We are going to employ local labour but we have a corporate to employ Mozambique citizens – CEZA accredited.

1. "Control access to site" – how will this be implemented? Will there be a gate guard?
2. "Vehicles must keep to appropriate speed limits" – What is the appropriate speed limit?
3. Where will permanent staff reside? If on the farm, is new infrastructure required? Is this included in the report?
4. Employment opportunities is used under the desirability for this development, yet it was noted during the meeting on 22 November 2018 that the owner has a corporate to employ Mozambique citizens – how many South African citizens will be permanently and temporarily employed in comparison to Mozambique citizens?
5. What is the timeline for the fence construction? How often will the fence be checked for weak points, electricity voltage be checked? What is the maintenance schedule? Detailed descriptions are required to ensure compliance
6. **There is no mention about repairing of the dam wall** –What practices are going to be implemented to ensure impact of refurbishment is localised as it'll be occurring in the sensitive "no-go zone"? How much impact is estimated to occur on the natural vegetation occurring in the drainage line?

Impact/Objective	Mitigation (Action or control)
Protection of Flora	➢ Keep a buffer zone between the natural vegetation of the seasonal drainage line and the proposed agricultural activity to avoid accidental spraying of natural vegetation with herbicides.
	➢ The citrus development and adjacent habitats should be kept clear from Alien Plants.
	➢ Do not apply herbicides or pesticides under excessive windy conditions.
	➢ Use bio-degradable chemicals such as pyrethroid chemicals, use registered chemicals and adhere to Global G.A.P. requirements
	➢ Restrict proposed agricultural activities to the identified footprint area.

1. "Keep a buffer zone between the natural vegetation of the seasonal drainage line…" - Clarification as to whether the "no go zone" is the buffer zone? Or is there an additional buffer zone around the "no go zone"? As an additional buffer zone would be required to protect the "no go zone" from spray drift. Was is the specifications of the buffer zone? Details are required to ensure compliance
2. What is considered "excessive windy conditions"?

	➢ Implement a programme to monitor for and remove snares.
Manage storm water and avoid groundwater contamination	➢ Implement an irrigation schedule that will conserve water and enhance drainage.
	➢ Drain storm water into existing drainage points.
	➢ Use bio-degradable herbicides and pesticides such as pyrethroid chemicals to reduce potential groundwater contamination.
Erosion Protection	➢ Construct mitre drains on site management roads to reduce run off.
	➢ Monitor possible erosion and rehabilitate erosion sites immediately.
	➢ Re-establish grass layer between citrus trees to stabilize soil
Protection of Water Resources	➢ Preserve the buffer and "no go" zone to serve as a buffer to prevent possible chemical drift into the seasonal drainage line.
	➢ Implement an irrigation schedule to conserve water
	➢ Implement a monitoring protocol to ensure responsible use of water resources.
	➢ Monitor pipeline network and repair leakages immediately.
	➢ Adhere to water restrictions if implemented by Klaserie Irrigation Board

1. What entails the program to monitor and remove snares? When? How often? Who is in charge? Why is there a possibility of snares if an appointed guard is used as motivation for the proposed development? Is there a risk that staff will put out snares for bush meat? Has this risk been accounted for?
2. What constituents an irrigation schedule that will conserve water? Timing? Season? What will be the management practise be when there is too little water to extract from the river? If there are regulations to be implemented by the Klaserie Irrigation Board, what will be the consequences for the production? Various scenarios need to be investigated to ensure compliance. Will there be water tanks on the farm for water storage?
3. How will the allocated water allowance be measured? Is there a water meter? Who would regulate that?

Prevent Ground Water Contamination	➢ Chemicals such as herbicides and pesticides to be safely stored and access to be controlled.
	➢ Mixing of chemicals and re-fuelling of vehicles must be done in a bunded area according to GLAOBAL GAP prescripts.
	➢ Ensure that responsible employees have proper training in the handling and application of chemicals
	➢ Contain accidental spills immediately to prevent leaching into surrounding areas and remove as per prescribed legislation.
	➢ Use bio-degradable herbicides and pesticides such as pyrethroid chemicals to reduce potential effects on the environment. These chemicals break down within hours after application, dissolve poorly in water and are known to bind tightly to soil and organic matter; therefore, it does not penetrate soil effectively.
	➢ Apply fertilizers at the right time and required quantities. (July/August)
	➢ Consult specialist in agricultural chemicals to use best available products and reduce associated risks.
	➢ Conform with GLOBAL G.A.P. and adhere to all specification of good agricultural practices.
Prevent Pollution	➢ Solid waste must be disposed of in the municipal waste stream.
	➢ Dispose harmful waste according to relevant protocols.
	➢ Maintain noise pollution level within limits set by other agricultural activities within the surrounding area.

1. What the details of the storage room? Where is it located, does it require maintenance?
2. How will accidental spills be contained? Detailed description is required to ensure compliance
3. "Dispose harmful waste according to relevant protocols" – What are the relevant protocols?
4. "Maintain noise pollution level…" – What are the levels? Detailed descriptions are required to ensure compliance? A breakdown of the proposed production schedule would aid in this regard
5. "…within the surrounding area" – What distance is considered as surrounding? If a complaint is received, what would be the procedure?
6. "Consult specialist in agricultural chemicals…" – Should this not be done during construction when saplings are established? Additionally, should these details not already be known if the developer is working in the citrus sector?

Potential Human Wildlife Conflict	➢ Boundary fence of the property should be suitably fenced. ➢ The proposed citrus orchard should be suitably fenced to prevent wildlife access, including elephant. ➢ Fence line should be patrolled daily and any breeched fence line repaired. ➢ Fence must be designed to not present a hazard to non-targeted species – e.g. pythons, pangolins and tortoises. ➢ Spoilt fruit, that may attract elephants, should be removed from the orchards. ➢ Guards must be appointed especially during the fruiting season to deter species such as baboon and vervet monkeys.

Oddly enough it has been reported that in Sri Lanka elephants are kept from entering rice paddies by planting rows of citrus trees. A published report by Project Orange Elephant in Sri Lanka indicates that elephants cause millions of dollars' damage to crops in rural communities. The solution to this conflict is the planting of orange and lime trees around the croplands. There is an added benefit to the farmers as once the trees start bearing fruit, the harvest is sold to a grocery chain that is committed to the project. (http://juniperyogafitness.com/help-juniper-yoga-fitness-save-wild-elephants-in-sri-lanka/)

1. "Boundary fence…should be suitably fenced." - What are the specifications? Those discussed in Annexure D p.36-39? Detailed specifications are required to ensure compliance. Especially if the fence is being regarded as adequate to prevent most human-wildlife conflict (HWC)
2. What species, other than elephants are predicted to cause damage? The impact of insects and birds has not been thoroughly investigated. What are the mitigation methods for those species?
3. "Spoilt fruit…should be removed from the orchards" – Removed from the orchards or the property? And how soon after it's fallen on the ground will it be removed? Detailed plans are required to ensure compliance, especially as it will influence HWC potential. It should also be acknowledged that it won't only be elephants attracted to the fruit.
4. "Guards must be appointed…" – What is the role of the guards? How will they "deter" species? Is there a safety risk? How many guards will be appointed and how often will they patrol? When is the fruiting season as only harvesting period is mentioned? Detailed plans are required to ensure compliance
5. What other conflict mitigation measures will be implemented to prevent conflict? Extensive measurements are severely lacking, no constructive, detailed plans are included. Who will be in charge of establishing HWC mitigation methods? Is there any leniency towards DCA applications?

Annexure A, pg. 36
"Of importance are the mitigation measures applied by the landowner to protect orchards from damage by wildlife (Wiggins, pers.comm)" – further emphasises the importance of clearly defined HWC mitigation measures

   a. Annexure D mentions beehives as a possible mitigation method but detailed plans are missing. Beehives can't be hung next to electrical lines as they are sensitive to the electrical current. Neither can bees be proposed where deadly pesticides are being used. Hence, beehives can technically not be used along the boundary fence. The possible use of beehives is actually questioned in the report due to the detrimental effects of pesticides, but the suggestion of first sealing the hives before spraying in addition to placing the hives "some 100-150m from the orchard" is considered sufficient in preventing pesticide poisoning. Unfortunately, either method would be highly insufficient due to herbicides readily translocating to pollen and nectar of treated crop. Reference to studies done by King *et al.* (2011) is unrelated as those studies involves protecting (1) a completely different crop within a small patches of subsistence farming, (2) in an area not surrounded by an electrical fence, (3) in an area not subjected to commercially used pesticides (4) very time consuming
   b. Capsicum oleoresin is also mentioned in Annexure D but again no detailed plans are mentioned as to how it will be used. This method although effective is resource intensive and dependent on external factors such as wind and rain as well as the size of the area you wish to protect
   c. Similarly, deer repellent is mentioned but is this suggestion even feasible or cost effective? What is the feasibility of sourcing deer repellent in a region where deer don't occur?

6. Referring to the statement about orange trees being used as a deterrent in Sri Lanka – the word "orange" in Sinhalsese refers to a sour citrus unlike what we're familiar with, so little comparison can be drawn from this research

Annexure A: Ecological Baseline Data Report

1. Species of High Conservation Concern (Flora). Impact: Destruction of protected species (Development phase).					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Very Low	Permanent	High	Definite	High
Description of the impact: The establishment of the orchards may require the removal of all natural vegetation. Even though most of the area has lain fallow for many years the environment has not recovered entirely. The vegetation in the southern part of Lion Camp 2 is considered the most 'natural' as it has been largely protected against grazing and browsing due to the presence of the lion and has no history of crop farming. A number of protected tree species were left during the initial clearing operation for agricultural purposes. Large specimens are to be found in areas not previously cleared e.g. along access roads and around structures, and will be destroyed by clearing. All bulbous and succulent protected species will be uprooted.					
Mitigation Measures: • Where possible leave large protected trees in place when clearing the area. • Transplant small protected species to a secure area. • Avoid areas identified as no-go zones i.e. drainage-line. • Plant replacement trees in areas not designated for orchard establishment. • Remove and transplant all bulbous and succulent species.					
Significance with mitigation					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Very Low	Permanent	Moderate	Definite	Moderate

Participatory comments and responses

Comment: *According to cash-crop as an alternative (pp. 12): "citrus production will allow leeway to protect some of the larger protected trees" Could you please elaborate on how this will be done?*

Response: Citrus production require micro- or drip irrigation as apposed to centre pivot irrigation for cash crops. In centre pivot irrigation all trees need to be removed for the installation of the centre pivot.

1. According to the EMPr report p.47 mitigation methods during the destruction of protected species will result in the magnitude and significance of the impact changing from high to moderate – how is this possible with the protection/ translocation of a few species? Whatever the mitigation method, the impact is still significant, whether the vegetation is still recovering or not – 18-24ha of apparent natural vegetation is still going to be destroyed
2. p. 44: What does "efforts should be made to locate and remove as many individuals as possible prior to proposed operations." entail? What steps will be taken to locate and remove faunal species? And where will these specimens be moved to? What would these efforts entail? When will this occur? Who will be in charge of this? How much time will be spent on faunal removal as this would have an impact on operations?
3. Is there a map indicating where species are located and those that are to be protected from being uprooted/ destroyed as suggested on p. 43? Where will succulent plants be translocated to? Is there an indication of how many will be translocated? How will the "ECO decide how to deal with each individual case" p. 43, what criteria will be used to make a decision?
4. Why is the magnitude of impact from moderate and not long term? The composition of flora species will be permanently altered no matter the mitigation strategies

1. Cash crop as an alternative is dismissed because the proposed citrus development will allow for certain trees to remain in comparison to all removed for cash crops, yet in the EMPr Report p.10 it's indicated that permits for protected tree removal is being applied for – which basically nullifies the above-mentioned argument. How many protected trees will be removed vs not? What is their age structure?

Pg. 9 "Initially, due to the presence of lions…"

"Following the relocation…and enlargement of the survey areas…focussing mainly on protected trees"

2. Baseline data is required by NEMA EIA regulations in order to determine the proposed development's impact on the environment, if the lions could be moved at a later stage, why was this not done during the initial survey so allow for a uniform assessment of the veld? The lion camps cover more than 60% of the proposed area so vegetation surveys of that area should be a priority. Surveying from a vehicle is highly inadequate and allows misrepresentation. The follow-up survey was done during the driest season allowing one to assume extensive plant identification was nearly impossible. What supplemental information was used to close this gap?

Pg. 12 "According to legislation bush clearing is not allowed 30m both sides of the flow-area…"

3. Where is this referred to in the Draft Impact Report under "Policy and Legislative Context"?
4. What is the specific legislation?
5. Is that why the no-go zone was allocated?

Table 17 pg. 69 "At the locality…of the derelict bird cages…"

6. There is no mention of these structure or the proposed management of them in the Draft Impact Report. What is the management plan for the cages?

Pg. 35 "The ECO may have to co-opt an expert for assistance in identifying the relevant plants prior to informing…."

7. When will this be feasible (pre-construction, construction or operational phase) and what are "relevant plants"?

Protected Tree Species

The importance of ***Elaeodendron transvaalense*** is quickly dismissed with the argument that the species is abundant in KZN: Pg. 41 "Some plant species are protected…however these species are mostly relatively abundant in the region and not of conservation concern."

This statement completely circumvents the role of protecting a species, just because the species is present somewhere else doesn't mean it can be eradicated elsewhere. The species is protected because its survival is threatened throughout the country, without protection the species would probably be extinct. The report then contradicts its previous statement by mentioning on pg.17 that *Elaeodendron transvaalense* is threated in KZN and the population is not only threatened in Mpumalanga but also restricted + on pg. 17 "*Elaeodendron transvaalense* is threatened by harvesting…Mpumalanga will not be able to absorb the harvesting pressures….isn't very abundant in the province and 2-5% of the trees are observed to have been debarked.", which further strengthens the argument of the importance of protecting the population in the Lowveld.

On pg. 18 "*Elaeodendron transvaalense …t*he majority were recorded in the areas previously cleared for agricultural purposes indicated a process of re-colonisation with the assistance of fruit-eating birds." highlights the importance of allowing previously disturbed land to recover to a more natural state.

Importantly, several protected species (*Ballanites maughamii, Combretum imberbe, Boscia albitrunca)* including **S***enegalia nigrescen*s which were found during the surveys are important raptor nesting sites. Since the area is known to support vulture populations and individuals were sighted on the neighbouring properties, large trees will become important for nesting sites, especially if, as mentioned, the elephant population is growing and having "adverse effects on the vegetation".

Mammals

2. Species of High Conservation Concern (Fauna).					
Impact: Destruction of protected species (Development phase).					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Very Low	Medium-term	High	Highly Probable	High
Description of the impact: The establishment of the orchards may require the removal of all natural vegetation. A variety of organisms e.g. baboon spiders, would have colonized the areas modified by agriculture and then allowed to lay fallow. Parts of the area are still considered natural and not modified by previous land-use. Organisms may probably have occupied refuges available to them as the habitat recovered. Species such as Aardvark are known to occur in the immediate area. Refuges such as termitaria are used by mammal species e.g. aardvark and pangolin, and will probably need to be flattened for the activity. Active nests of raptors may be destroyed if clearing done in breeding season.					
Mitigation Measures: • Preserve large termitaria wherever possible. • If a termitarium is problematic, ensure that it is unoccupied before removing. • Be aware of signs of the presence of protected species i.e. burrows, tracks or foraging activity. • Any trees containing active raptor nest should be protected till chicks have fledged. • Provide staff awareness training on the protection of species thereby sensitizing them to the safety of such species.					
Significance with mitigation					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Very Low	Medium-term	Moderate	Highly Probable	Moderate

1. "preserve large termitaria where possible" - Is there any indication as to how many will be protected and/or how many are active? "If a termitarium is problematic, ensure that it is unoccupied before removing" – How realistic is this statement as it could take months if not longer for a nest to become inactive. Will the development be stalled until a nest becomes inactive? Has the impact of pesticides on termitarium survival been evaluated? Or the consequence of removing natural vegetation/ naturally occurring detritus? If a fence design incorporates preventing deaths of i.e. pangolins, why is its food source not also being considered/protected?
2. Why does the magnitude of impact change from high to moderate? No mitigation methods can prevent faunal habitat loss & faunal deaths due to the proposed development. Adaptable species might migrate back after the original disturbance, but the abundance and diversity change will be permanent. Nesting sites will also be permanently destroyed where the development waits for chicks to fledge or not.

8. Where were the surveys done, when, and why only on accessible parts?

Pg. 40 "The observations conducted to determine the presence of fauna species that may be of concern, did not indicate the presence of any species of any particular conservation concern."

9. This statement is very misleading as observations were firstly restricted to vehicle observations after which it was then only completed during the winter

Pg. 41 "Not many reptile species…fossorial or nocturnally active species may also occur in the area thus continual monitoring during the proposed activities…"

10. This state is also misleading as previously it was mentioned that many weren't seen because of the timing of the survey. What does continual monitoring entail? When will monitoring occur and how will this affect management of the proposed development?

7. Timing of project implementation.					
Impact: Disruption of fauna breeding periods (Development phase).					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Low	Very Short	High	Highly Probable	Moderate
Description of the impact: Most birds are summer breeders. However, most vulture and raptor species start breeding in late winter. Implementing the project at this time will disrupt the breeding season of these species and could disturb chicks that are not fully fledged. Reptile and amphibian species are also mostly dormant at this time of the year and will be unable or reluctant to flee from any disturbance caused by the development.					
Mitigation Measures: • Avoid late winter and early spring to implement development. • Survey the area for any active or newly constructed nests. • Provide staff awareness training to sensitize them to the plight of nesting birds and hibernating reptiles and amphibians.					
Significance with mitigation					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Neutral	Low	Very Short	Moderate	Improbable	Low

1. What is the timeline of proposed development?
2. What is the management plan if nests are located before construction begins?
3. What is the timeline and details of surveys for detect raptor nests? Who will do the surveying?

Aquatic

6. Impact on aquatic systems.					
Impact: Water pollution and collateral poisoning (Both phases).					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Low	Long-term	High	Probable	Moderate
Description of the impact: Silt generated by uncontrolled erosion will affect the capacity of the irrigation dams located along the drainage-line. Water quality in the Klaserie River will be affected if precautions are not implemented to curtail or prevent excessive erosion especially in the development phase. The use of heavy machinery increases the potential of pollution through fuel and lubricant spills from such machines. During the operational phase the possibility exists of collateral damage to organisms in the adjacent drainage systems, dams and natural vegetation from plant protection products used in the orchards.					
Mitigation Measures: • Erosion control program implemented from the onset of the development and continually monitored. • Appropriate measures put in place to manage refuelling and maintenance of heavy machinery. • Specific site identified where maintenance products are stored and machinery serviced. • Global G.A.P. prescripts applied to all aspects of the proposed development especially with the storage and application of plant protection products. • Provide staff awareness training to ensure correct procedures are applied with all the above functions.					
Significance with mitigation					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Very Low	Long-term	Moderate	Improbable	Low

1. "Appropriate measures put in place to manage refuelling and maintenance of heavy machinery" / storage of pesticides/ herbicides – What does this imply? What type of storage method is going to be used? Detailed steps are required in order to ensure compliance
2. Recognition of water contamination is required – no matter what type of "plant protection product" is going to be used, the water is still going to be contaminated by a new product, in addition to the potential of increase nutrient content due to fertiliser runoff. The probability can only be reduced not prevented

Map indicating locations of Protected Tree Species (Report had no visual representation and quality of Google Earth Image was poor

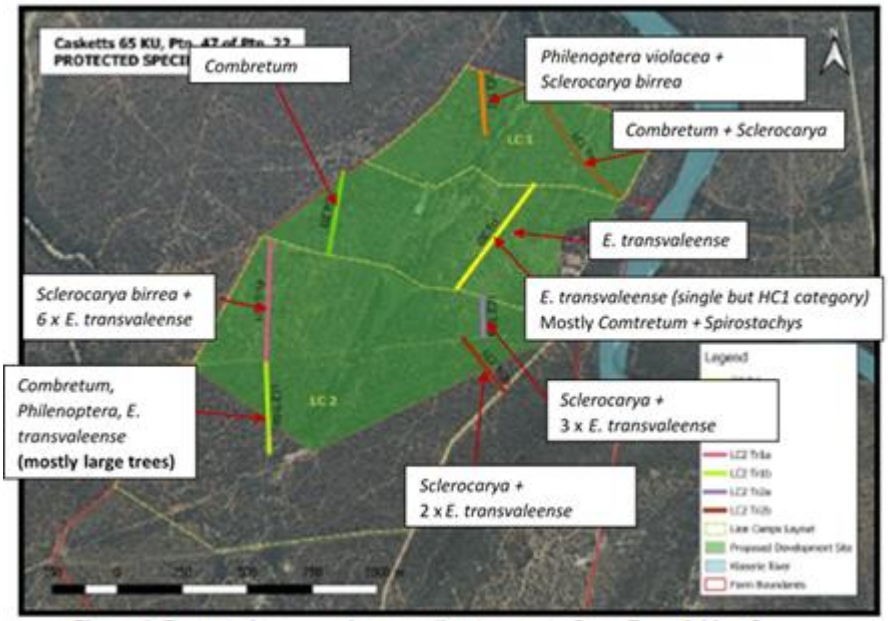

Figure 4. Protected tree species sampling transects Open Zone & Lion Camps.

Annexure D: Human Wildlife Conflict

1. Land-use Change from Wildlife Production to Agriculture.					
Impact: Destruction of habitat and protected species (Development phase).					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Very Low	Permanent	High	Definite	High
Description of the impact: The establishment of the citrus orchard will require the removal of all existing vegetation. Even though most of the area has lain fallow for many years the environment has not recovered entirely. Parts of the area are still considered natural and not modified by previous land-use. A number of protected tree species were left during the initial clearing operation for agricultural purposes. Large specimens of both protected tree species and 'trees of interest' are to be found in areas not previously cleared and will be destroyed by clearing. All bulbous and succulent protected species will be uprooted.					
Mitigation Measures: • Where possible leave large protected trees and 'trees of interest' in place when clearing the area. • Transplant small protected species to a secure area. • Avoid areas identified as no-go zones i.e. the drainage line. • No-go areas will serve as refuge for animal species displaced by the proposed activity. • Plant replacement trees in areas not designated for orchard establishment. • Remove and transplant all bulbous and succulent species					
Significance with mitigation					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Very Low	Permanent	Low	Highly Probable	Moderate

1. "Plant replacement trees…" – further details are required to ensure compliance. Where will these trees be planted, how many, which species?
2. Significance of habitat destruction will remain high and not change to moderate after mitigation because the area would still be converted to agriculture no matter the management of it. As mentioned in Annexure A and C, the soil will require destructive ripping or ridging to break-up the more compacted soil layers

2. Potential attraction of citrus crop to elephants.					
Impact: Breaching of protected area boundaries (Operational phase).					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Low	Permanent	Low	Probable	High
Description of the impact: The establishment of the citrus orchards in close proximity to protected areas may specifically attract elephants to such areas. Damage to the boundaries of the protected areas will occur if elephants break out. Should this occur conflict situations will arise where elephants consume fruit or damage trees within the orchard. Furthermore, infrastructure associated with the orchard could be damaged as some individuals may try to attain water from irrigation systems.					
Mitigation Measures: • Boundary fences of the protected areas are electrified and regularly patrolled. • The proposed orchard is to be suitably fenced that it can be considered effective in keeping elephants out. • A buffer zone created between the proposed orchard and the protected areas will serve to curb a direct visual line to the orchards for passing elephants. • Other types of deterrents applied as a combined "toolbox" to ensure that conflict situations are kept to the barest minimum. • Maintenance of hygienic good practices within the orchard environment to prevent situations that may attract elephants to the orchard e.g. dumping of spoilt fruit.					
Significance with mitigation					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Neutral	Very Low	Short-term	None	Improbable	Low

1. The management of the PA's fence can't be considered a mitigation method for this proposed project as it's independent to this EIA – no reliance should be on another management's infrastructure
2. "a buffer zone created…" – what are the specifications of this buffer zone? There is no mention of a buffer zone in the northern section of the proposed development - is there a map indicating where this buffer zone would be?
    a. How does a buffer act as a visual deterrent if an elephant's main olfactory organ is its sense of smell?

pg. 40 – "Curbing the olfactory behaviour patterns of elephants would be much more challenging." – Refutes any arguments that the buffer zone would be sufficient in preventing HEC

3. What are "good hygienic practices"? Further details are required to ensure compliance
4. How can the probability of human-elephant conflict (HEC) shift from probable to improbable? What evidence is this being based on? The literature review included no similar examples to allow for inferences to be made, subsistence crops have a different attractant value than fruit
    a. Using the limited elephant fence-breaks that KPNR has experienced can't be extrapolated to this situation as this proposed development is completely different to past occurrences – the proposed development will result in <u>food</u> being on the other side of the fence which is highly sought after. In the past, citrus was used as a reward food for semi-habituated elephants, while in other cases it was used to keep elephants either in or out of areas – as in the case of Addo Park – elephants would not eat something they aren't "partial" to, and arguing otherwise is an insult to their intelligence
5. What will the "other types of deterrents applied as a combined toolbox" entail? Specific details are required to ensure compliance, especially if DCA permits will be applied for in the case that these "deterrents" don't work. Who will be applying these deterrents and for how long?

3. Water Allocation from the Klaserie River.					
Impact: Loss of water volume downstream (Operational phase).					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Neutral	Low	Permanent	Moderate	Probable	High
Description of the impact: The establishment of the orchards will require water resources for irrigation purposes. Water will be sourced from the Klaserie River through water allocation permits issued by relevant authorities. Utilization of water from the river may reduce the flow of water into the adjoining protected areas. Reduced water flow may affect the aquatic habitat and therefore a number of animal species that presently occupy the ecosystems along the length of the river. Drinking water availability to wildlife in the protected areas may be problematic especially in the dry seasons.					
Mitigation Measures: • Only the allocated water quantity will be used for irrigation purposes (i.e. 120ha). • The Klaserie Dam was constructed for the supply of water to agricultural activities downstream. • The methods of irrigation for citrus orchards whereby drip systems are used greatly conserve water. • Protected areas have supplementary water provision that mitigates the river being the only water source available to wildlife.					
Significance with mitigation					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Neutral	Low	Permanent	Low	Improbable	Low

1. "Protected areas have supplementary water provision…" - How can another property's management practises be a viable mitigation method? The projects are completely unrelated. This proposed project's EIA needs to deal with its own mitigation methods, not rely on surrounding's properties management practises as support for its approval
2. How can the significance of the proposed impact change form high to low without any indication of how water is going to be conserved because of misleading information?
    a. In addition, how can the probability of the impact chance from probable to improbable – additionally water extraction is going to occur which was not taking place before, regardless if the property always had the rights, downstream areas are going to receive less water

4. Impact on aquatic river systems.					
Impact: Water pollution and collateral poisoning (Development and operational phase).					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Medium	Long-term	Moderate	Highly Probable	High
Description of the impact: The establishment of the citrus orchards will enhance soil erosion. Silt generated by uncontrolled erosion will affect water quality in the Klaserie River if precautions are not implemented to curtail or prevent excessive erosion especially in the development phase. The use of heavy machinery increases the potential of pollution through fuel and lubricant spills from such machines. During the operational phase the possibility exists of collateral damage to organisms in the adjacent natural areas such as the riparian and aquatic habitats from plant protection products used in the orchards.					
Mitigation Measures: • Erosion control program implemented from the onset of the development and continually monitored. • Appropriate measures put in place to manage refuelling and maintenance of heavy machinery. • Specific site identified where maintenance products are stored and machinery serviced. • Apply Integrated Pest Management systems wherever possible. • Global G.A.P. prescripts applied to all aspects of the proposed development especially with the storage and application of plant protection products. • Provide staff awareness training to ensure correct procedures are applied with all the above functions.					
Significance with mitigation					
Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Negative	Low	Long-term	Low	Improbable	Moderate

1. What are the integrated pest management systems to be implemented? Specific details are required to ensure compliance

Unsubstantiated claims, a poor literature review, incorrect information, incorrect intext references and a high bias is clearly meant to misinform not only the authorities in-charge of making sound economic and ecological decisions but also registered interested parties. How can any conclusions be drawn about the possibilities of human-wildlife conflict occurrence on the proposed development if the literature review is based on (1) 35 references, most of which don't involve similar scenarios which prevents substantive inferences, and (2) of that 35, a few are not even published scientific articles?

A specialist report is supposed to be objective and unbiased in order to allow the reader an opportunity to reach his/her own conclusions, inferring that citrus production will only be an issue due to the increasing elephant population can't be used as an argument in favour of the proposed development as it doesn't offer any mitigation methods.

How can conclusions be drawn with regard to the low elephant break-outs that KPNR has experienced as a sign that the proposed development won't influence this number? A citrus farm (and thus a food source) adjacent to a NR creates a different scenario than the one the specialist is repeatedly extrapolating from. The possibility of increased occurrence should at least be acknowledged. If break-outs are already occurring without the presence of a food source on the other side of the fence, it's only logical to think this might exacerbate the current problem, especially in the dry season and during droughts. Stating that elephants are not partial to citrus in the Lowveld is a misleading statement as all citrus production occurs along the Blyde Mountain – an area where elephants are not found. As proof with regards to the poor literature review: 2018 there was a case of three young bulls breaking out of the APNR, travelling more than 30km to reach orange and later mango orchards. They had to be translocated back twice before they decided to stay within the reserve. Why was this incident not included in the report?

How thorough were the investigations into the past DCA permit applications? Previous research showed that in one year alone, between 2016-2017, more than 47 elephant DCA permits were allocated in Limpopo.

pg.16 - “Research by Anthony *et al* (2010) showed that in the Limpopo Province there were 482 DCA incidences recorded along the boundary of the KNP for the period from 1998 – 2004. The most problematic animals were buffalo, lion, elephant hippo and crocodile. During those years professional hunters were often used to address cases but widespread abuses were reported. The associated procedures were found to be highly flawed due to species ambiguity, poor reporting, slow response times, overlapping responsibilities and corruption” – these high incidences were due to poor fence management and in an area completely unrelated to the proposed development

pg.18 - “Even as far back as the sixties, rangers from the KNP had to deal with citrus-raiding elephants along the Sabi River near Hazyview (Van Vuren, 2007).” – can’t investigate reference as the article is not referenced

pg.19 - “Thornybush PNR western boundary fence, Osmers (*pers. comm*.) reported that two bulls regularly breached the fence-line moving into neighbouring properties. Even though the inside of the fence was electrified it was considered that the voltage was too low to contain the elephants. A secondary fence of three electrified strand with a higher voltage was erected 5m from the boundary and this has successfully contained the elephants” – Thornybush has experienced several cases of young elephant bulls breaching the fence, sometimes into a property with fruit trees, other cases into Kapama. Clear inference can be made that an electric fence does not always deter elephants from breaching the fence and fruit trees can become an attractant to a 5-ton animal.

pg.19 - “What may contribute to such incidence includes factors such as environmental conditions or the animal population status.” – Since the EIA is not about the contentious elephant population size, from this statement it can be inferred that not only will HEC occur in the area but that it will increase parallel to the elephant population. The specialists statement is contradicted further down in the report: pg.43 - “g. The continued increase in elephant populations in the future just north of the boundary fence of the Casketts farm is not conclusive.” – the reserve north of the proposed property is an open system, thus allowing for a fluctuating elephant population size, so this statement is misleading.

pg.19 - “The prevailing drought is considered to be a major contributing factor but the same could be said for the normal annual dry seasons when food may be hard to come by for many species” – the future impacts of climate change needs more consideration as it’s assumed climatic conditions will become more irregular thus it’s assumed that droughts will occur more frequently and potentially for longer periods as well as a shift in the rainy season: either above- or below average rainfall. What will be in the impact on the surrounding wildlife – will this increase HWC?

pg.21 – “…baboons, vervet monkeys, warthogs and porcupines. Other species may include jumpers such as kudus and fence breakers such as hippos.” - Mitigation methods don’t include extensive management plans for warthogs and porcupines. How will HWC involving smaller mammals be prevented? Is the fence the only mitigation method being relied on? Additional scenarios are required to determine the full impact of the proposed development, otherwise the area outside of the protected area will just become a sink for all species.

pg. 35 – “They further suggested that it may be sensible to build low-specification, low-cost fences and to concentrate on the management of the elephants, treating the fences as demarcations of ‘no-go’ areas rather than physical barriers. This may require the shooting of persistent fence breakers to make such a barrier work. Dealing with DCA incidences in many parts of South Africa already ascribes to these principles in especially communal areas.” – What information can be deduced from this statement as it has no reference to the proposed development, other than insinuating that persistent fence breakers should be shot to make such a barrier work? Is this specialist leaning towards the idea that if fence breaks were to occur, the individual should be shot in the hopes that a fear landscape will develop? This entails considerable ethical considerations not to mention grounds to prove such a theory.

pg. 38 – “In a previous investigation that involved the south-western boundary of the APNR, fencing contractor D. Smith (p*ers. comm*.) indicated that in the ten-year period from 2005 – 2015 there had been no elephant breakouts along this section of the GKNP area. He further indicated that, in his expert opinion, an electrified fence of a lower standard than that which is in place would be sufficient to control elephant movement.” – D. Smith, who is a fence contractor, knows about elephant break-out incidences how exactly? What experience does he have to support such claims? What happened after 2015 that his observations of no fence-breaks stopped there? If a 10-year old fence design is able to prevent fence breaks and as suggested by Mr. D. Smith as too high a standard to keep elephants within a designated area, why has fence breaks occurred in areas where a newer design has been implemented?

pg. 38 - “In the event of authorisation for the proposed development the orchards will also be suitably fenced thus creating a double barrier with an extensive buffer zone (adjacent neighbouring farm) separating the two fences. The structure of the

proposed fence should be designed with the intention to prevent any form of human-wildlife conflict." – how is 400m an "extensive buffer zone"? And what is it buffering against?

pg. 38 - "Researcher M. Henley (*pers. comm*.) stated that following her studies of the movements of large numbers of elephants initially in the Associated Private Nature Reserves (APNR) and then more widely into the KNP and the TFC areas, elephants of this region are conditioned to electric fences and will avoid such barriers." – This statement is purposefully misleading – this research was not investigating the effectiveness of an electric fence in keeping elephants away from a food source. What deductions can be made from this statement? Also, the Researcher in question has delivered comprehensive reports on fence breakages involving collared elephants in the past so this statement has likely been misinterpreted as certain individuals respect fences but not all.

pg. 44 – "Some organisms will be disturbed through the loss of habitat or refuges but it can be reasoned that large tracts of similar habitat, totally natural, do occur in the region as protected areas" – if there are tracts of "natural(ly)" vegetation in the surrounding area, one can assume those habitats are already occupied by organisms so the removal of land, whether degraded or not, will naturally increase competition for habitat and resources elsewhere.

pg.46 – "A practice noticed on certain reserves and game farms where supplementary feeding of game has become necessary, is providing as fodder unwanted citrus fruit or waste material from fruit juice factories. The concern is that in this scenario animal species are conditioned to the taste of citrus and therefore may become potential problem animals in nearby citrus-producing areas. The situation in the Addo NP where elephants were fed citrus in the earlier years is a case to point." – how does this statement have any grounds to this report? This is not practiced in the surrounding area so has no reference to the current situation and contradicts previous statements on elephants avoiding citrus lines as barriers.

pg. 59 – "Even though the general opinion of persons consulted and available statistics in this report indicate that electrified fencing on its own is a suitable barrier…"- Is this the reports final opinion based on one fencing contractor and statistics based on elephants breaking out unrelated to a food source? How can any conclusion be drawn from either?

pg. 61 – "The environmental impact of plant protection products should receive a high priority considering the locality of the proposed development. Indiscriminate use of these products may impact on the immediate natural environment and eventually the nearby Klaserie River system. The fact that the most of the Blyde River system still functions naturally under the onslaught on intensive agriculture activities mitigates the believe that impact on the Klaserie River will be drastic." – This paragraph contradicts itself, what is being considered "drastic"? This statement is further contradicted on p. 59 "Even with the restrictions placed by international trade on the production of agricultural foodstuffs, collateral damage still occurs.". Additionally, cumulative impacts of pollutants through chemical use are not considered at all. Regardless of the current agricultural practices alongside the Klaserie river, the proposed project will have an impact on water quality.