agriculture, land reform & rural development
Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

PROTECTED AGRICULTURAL AREAS FOR CULTIVATION: MPUMALANGA PROVINCE, 2020

BACKGROUND

Agriculture and all is related activities are the cornerstone for any developing country. Not only is agriculture an economic asset, as it assists in the creation of jobs and the alleviation of poverty, but it is also crucial in **feeding a nation**, which is essential for the well-being and growth of its citizens.

Knowledge of the land (and its potential), the short comings and possibilities forms the basis of any successful and sustainable farming production. Due to extreme climatic conditions, variance in terrain topography as well as limited availability of soil capable for production, land with a capability to be used for sustained long-term production is a very limited resource in South Africa.

It is therefore of the utmost importance to identify and demarcate agricultural land areas, based on its inherent capability and suitability (agricultural potential) for continued sustained production purposes, especially *high value agricultural land*[1], for it to be preserved for exclusive agricultural use.

One mechanism available for the effective and efficient protection of especially high value agricultural land is through legislation, with the support of applicable and relevant information systems to aid in effective decision making.

The Sub-division of Agricultural Land Act, 70 of 1970 (SALA) has the main objective to manage the sub-division of agricultural land (agricultural land as defined within the context of the said act) in order to prevent injudicious fragmentation of agricultural land and the creation of uneconomical farming units. In addition the Act is also responsible for the protection of agricultural land, especially high potential agricultural land, through the supporting or non-supporting of rezoning related applications from agriculture to other non-agricultural related land uses.

Processes are underway to possibly replace SALA with the Preservation and Development of Agricultural Land Bill (PDALB). This bill has the objective to preserve and promote the sustainable use and development of agricultural land for food production. The bill recognises the scarcity of high potential agricultural land and the importance to preserve this limited resource.

In addition the bill makes provision for the demarcation of "*Protected Agricultural Areas (PAA)*".
These areas are regarded of specific importance to the agricultural sector given its capability and potential to contribute significantly towards the production of food for the country. Specific emphasis is placed on especially high potential (arable) land due to the scarcity thereof for production purposes in the country.

In view of the above-mentioned the Department of Agriculture, Land Reform and Rural Development (DALRRD) has embarked on a process to identify and demarcate high value agricultural areas suitable for continued long-term agricultural production purposes given the combination of the natural agricultural resource's capability and suitability. These demarcated areas are called the **Protected Agricultural Areas** (PAAs) and will be gazetted under PDALB, with supporting procedures and processes as well as permitted, conditional and non-permitted land uses for each of the PAAs.

From a national perspective the PAAs focus is on the identification and demarcation of areas having a high capability and potential for cultivation that has the potential to contribute significantly towards

[1] Refer to definition of "high value agricultural land" in this document

national food security, whilst on a provincial level, areas having the production capability to meaningfully contribute to economic growth and job creation (best available land).

The “Protected Agricultural Areas” is defined as a:

“cartographic delineated area of agricultural land, preserved for purposes of ensuring high value agricultural land is protected against non- agricultural land uses in order to promote long-term agricultural production and food security”.

PAAs are therefore regarded as *large, relative homogeneous* portions of high value agricultural land that has the potential to sustainably, in the long-term, contribute significantly to the production of food.

The aim of these areas is to:

- Be included and gazetted as PAAs as defined under PDALB, when it is inacted;
- Be incorporated within current spatial planning mechanisms such as:
    - Spatial Development Frameworks as prescribed under the Spatial Planning and Land Use Management Act, 16 of 2013
    - Agricultural Sector Plans
    - Rural Development Plans
    - Etc.

This metadata data document describes the approach for the delineation of the “Protected Agricultural Areas” (PAAs) spatial data layer for the province.

TERMINOLOGY

Cognisance should be taken of the following terminology that is applicable to the data layer in question:

- Agricultural Land capability

Agricultural land capability is defined as the most intensive long-term use of land for purposes of **rainfed** farming determined by the interaction of climate, soil and terrain.

The FAO (1976) stated that the process of assessment of land performance when used for specified purposes, involves the execution and interpretation of surveys and studies of *land forms, soils, vegetation, climate and other aspects of land* in order to identify and make a comparison of promising kinds of land use applicable to the objective of the *evaluation*. Land evaluation and land use planning evaluation include concepts such as land management, current land use, the characteristics of the land, land use requirements and the improvement thereof. Van Niekerk (1981) stated that a land capability map should enable the user to attain the best long-term utilization of the land.

Land capability should not be seen as a substitute for the interpretation designed to show land suitability or agricultural potential.

- Land suitability

Land suitability is a statement of the adaptability of a given area for a specific kind of land use.
Land suitability is depended on the proposed land use.

- Crop suitability

Crop suitability describes the suitability of a given area for the sustained and continued production of a given crop with the required level of management and skills.

- Unique agricultural land

Unique agricultural land is land that is important to agriculture and used for producing economically viable sustained high quality or high yields of a *specific crops* due to a special combination of location, terrain features, climate and soil properties.

It is usually not prime, but important to agriculture due to a specific combination of location, climate or soil properties that make it highly suited for a specific crop when managed with specific farming or conservation methods. Included is agricultural land of high local importance where it is useful and environmentally sound to encourage continued agricultural production, even if some or most of the land is of mediocre quality for agriculture and is not used for particularly high-value crops (Schoeman, 2004).

- Agricultural potential

Agricultural potential is defined as a measure of potential productivity per unit area and unit time achieved with specified management inputs which, for a given crop or veld type and level of management, is largely determined by the interaction of climate, soil and terrain.

Productivity is regarded as an indication of the agricultural potential for a given crop under a management level and for an identified portion of land as being dependent on precipitation, temperature, soil conditions, terrain and crop characteristics (Schoeman & Scotney, 1987).

- High value agricultural land

High value agricultural land means agricultural land, capable of producing significantly higher levels of agricultural goods or, best suited to produce acceptable levels of high value agricultural goods within a defined geographical area, in a sustainable manner and includes—

(a) agricultural land with a land capability rating of above moderate;
(b) agricultural land with an agricultural potential of above moderate;
(c) unique agricultural land; and
(d) irrigated agricultural land;

- Agro-ecosystems (to define the holistic relative homogeneous area of the PAA within the concept of an agro-ecosystem)

An agro-ecosystem means a spatially and functionally coherent unit of agricultural activity, that can be defined on varying spatial scales, and includes the interactions between the living and non-living components of the unit as contained within larger landscapes.

METHODOLOGY

The approach followed for the delineation of the PAAs is through a spatial planning exercise defined by a set of *guiding* principles and procedures and with the support of a number of related data sets.

In considering aspects pertaining to spatial planning one has to ensure that the natural resources are utilised optimally but managed in such a manner that the needs of present and future generations are met. Planning should be seen as an integrated and comprehensive approach in order to rationalize the appropriateness of land use activities, to promote sustainable development and to ensure the sustainable utilization of the natural agricultural resources.

The following principles as well as supporting information and related data layers were used in the delineation of the PAAs. It should be noted that all of the principles discussed below should be seen in a holistic approach and not as per individual factors.

INPUT PRINCIPLES:

- *Land Capability*

Land capability, as a combination of soil climate and terrain capabilities pertaining to the natural agricultural resources form one of the primary factors that were taken into consideration for the delineation of the PAAs. The Land Capability 2016 data layer was used in this instance.

Land capability was classified into **<u>three</u>** dominant evaluation classes:

- *Land capability evaluation values 11 to 15* are regarded as having a High to Very High land capability and are therefore highly capable to ensure sustained production. All areas with the mentioned land capability values will *by default be incorporated within a* PAA – *depending availability*.

- Secondly*, Land capability evaluation values 9 & 10*, regarded as having a Moderate to High land capability.

- Thirdly*, Land capability evaluation values 7 - 8* (and less, depending supporting factors) has been evaluated but within the context of agricultural land use (crop types), production yield, crop suitability as well as production type (rainfed / irrigation).

In addition, the Soil capability data layer, as subset of the Land capability data layers were used as an additional source of information for delineation.

(Data layer = Reference name: Land capability 2016)

- *Crop Suitability*

Although land capability is a very good indicator of the capability of the resources to sustain agricultural production, another factor to take into consideration pertaining to agricultural potential is the number of crops that are suitable to be planted within a certain geographic area.

An area that is suitable for the planting of 10 different crop types, based on its soil, climate and terrain parameters in relation to a crop's environmental parameters is regarded as of higher importance in comparison with an area that has the suitability for only 2 types of crops.

A total of 43 identified crops were used to develop crop suitability layers for each of the crops. These crops were identified based on its importance towards contributing to sustained food security but also as dominant crops currently being planted in South Africa. Provision has however been made for "niche-type" crops in order to have a comprehensive representation of crops planted in the country.

The Crop type classes used to inform the crop suitability data layer include (the crops for which suitability layers were developed are indicated in brackets):

- Grain crops (Maize; Sorghum; Wheat; Barley; Oats)
- Beverage crops (Coffee; Rooibos; Honeybush)
- Oil seed crops (Soya beans; Canola; Ground nuts; Sunflower)

- Sugar crops (Sugar beet; Sugar cane)
- Fibre and Industrial Crops (Cotton)
- Forage and planted pastures (Kikuyu; Lucerne; Ryegrass; *E. curvula* (Oulandsgras)
- Tropical and Subtropical Fruits (Pineapples; Mango; Avocado; Banana; Litchi; Olives)
- Citrus Fruits (generic)
- Stone and Pome fruits (Peaches; Apples; Plums)
- Nuts (Macadamia; Pecan nuts)
- Viticulture (Grapes)
- Melons (Water melon)
- Vegetables (Potatoes; Tomatoes; Cabbage; Carrots; Drybeans; Pumpkins; Sweet potato)

(Data layer = Reference name: Crop suitability 2016)

- *Agricultural Land Use*

In addition to land capability and crop suitability, agricultural land use was further used as a source of information to identify areas of high agricultural potential, specifically in relation to matters of scale, cultivation practices and intensity but also to identify areas adhering to unique crop requirements that were not sufficiently identified through the already mentioned data layers.

(Data layer = Reference name: Field Crop boundaries 2015 - 2019)
(Data layer = Reference name: Crop types planted (various years); Land use classification for Limpopo; Gauteng and Western Cape)

- *Irrigated Agricultural Areas*

The availability of water for irrigation purpose contributes significantly towards the production potential of agricultural land. All larger areas under irrigation, especially Irrigation Schemes in South Africa are demarcated as PAAs.

Where an “individual” or “single” irrigated field (not a large area under irrigation) does not fall within the guiding principles it has not been delineated within a PAA (unless it adheres to the above- mentioned criteria), but this does not mean this field is discarded but it is seen as the exception rather than the rule.

(Data layer = Reference name: Irrigation suitability 2016)
(Data layer = Reference name: Field Crop boundaries 2015 - 2019)

- *Plantations*

The presence of plantations has been individually highlighted within the classification approach in relation to the other mentioned guiding principles. Areas that are under plantations and located on land capability evaluation values 9 - 15 will be flagged.

Should it happen that a plantation be abolished in the future these areas will be evaluated in terms of its capability and suitability towards agricultural production where after, depending on the outcome of the evaluation, the area concerned be re-classified accordingly.

This delineation will not be relevant to areas that have a lower land capability evaluation value under plantations.

(Data layer = Reference name: Plantations 2011)

Note:
It is acknowledged that there will be variance to a certain extent pertaining to the above–mentioned within a PAA (not all land capability and suitability evaluation values or land uses within the proposed area is homogeneous). However, the delineation of the areas is based on the **presence of dominant** features for the area to be a sustainable productive entity, thus an agro-ecosystem approach.

EXCLUSION AREAS:

Within the delineation of the PAAs, certain areas (exclusion areas) or land uses, were excluded, *where possible*, from the demarcated areas for a number of reasons.

Exclusion areas can include:

- Permanently transformed areas such as built up areas (residential; industrial; commercial), mined areas (and associated infrastructure) – especially open cast mining - as well as waterbodies (dams; pans; lakes).
  (Data layer = Reference name: Land cover 2013/14 & 2018)
- Urban areas (Non-agricultural land) as defined under CARA. This include:
  - Municipal areas that were demarcated prior to 1994 that were regarded as part of the former town planning schemes and managed as such.
  - Formally proclaimed (gazetted) protected areas under National Environmental Protected Areas Act, 57 of 2003 (NEMPA). All formally and gazetted or proclaimed protected areas under the National Environmental Protected Areas Act, 57 of 2003 are excluded from a PAA, irrespective of the capability of the land for production purposes.

    Areas that were gazetted as a "Protected Area / Reserve" but where primarily agricultural related cultivation is visible will not be regarded as an exclusion area and the matter will be taken up with the Department of Environmental Affairs for possible delisting of these areas.
    (Data layer = Reference name: PACA 2019)

Should an "exclusion area" or relevant non-agricultural land use be located within a geographic demarcated context of a PAA and where it was not possible to work around these "exclusion areas" / relevant land uses, they were incorporated within the PAA, but cognisance are given to these areas and existing land uses within the future planning of the PAA.

GENERAL RULES APPLIED:

In addition to the above mentioned approach and supporting data layers a number of additional principles were used during the delineation of the PAAs:

These include:

- For the demarcation of a PAA, a legalised (administrative) boundary was used (as far as possible) as "delineation line".
  By using legalised boundaries as basis, it will assist with the spatial demarcation of these areas from a legal perspective in the future. **Therefore cadastre boundaries (farm portions) were used as position boundary for the PAA demarcation line.**
  In the absence of a legal boundary other existing "man-made" or natural features were used.

Examples of these include:

- Rivers
- Roads

In using predefined boundaries it may result that a PAA is larger than the determined land capability / crop suitability / high value agricultural land area and may therefore include areas of lower potential, especially on the edges of the area e.g. valley area located within a mountainous area. However, although these areas may not render in itself suitable for production purposes it forms part of the larger agro-ecosystem and supplies the required ecosystem services that enables the PAA to function as a holistic unit.

In only a limited number of occasions there was a deviation from using legalised (administrative) boundaries, even if it was available, due to the fact that the existing farm portions were simply *too large* to give an accurate representation of the agricultural potential area / agro-ecosystem. In these instances the PAA was demarcated without using any of the mentioned. This was however the exception rather than the rule.

(Data layer = Reference name: Cadastre data / Farm boundaries)
(Data layer = Reference name: Roads data layer)

- The demarcation approach was done per province (provincial PAAs data layers). There was however in a few limited instances a PAA that distinctly followed the delineation of an agro-ecosystem as a holistic unit that may slightly cut across provincial boundaries and therefore, from a logistical approach, the area was not aligned according to provincial boundaries.

- A PAA is regarded as a larger, non-fragmented primary agricultural land use area.
  Size of the area concerned was therefore not taken into consideration in the demarcation but only the mentioned data layers were used to inform the delineation within the mentioned cadastre boundaries.

CLASSIFICATION USED FOR THE HIGH POTENTIAL AGRICULTURAL AREAS

Based on the methodology described and a combined evaluation of the mentioned data layers, a **PAA Classification Type** matrix was developed. A separate PAA Classification Type matrix was developed for Rainfed and Irrigated PAAs.
There is thus a Rainfed PAA Classification Type as well as an Irrigation PAA Classification Type.
Each Classification Type within the mentioned matrixes had a unique set of criteria.

For rainfed areas 12 possible PAA Classification Types (referenced as RF in the spatial data) were classified and for irrigated areas, 4 possible PAA Classification types were classified (referenced as IR in the spatial data).

Each of the PAA Classification Types was assigned a **Priority Rating**, based on mathematical calculated evaluation values given to the classification criteria of the input data layers as well as a **unique provincial number and name.** The assigned name referenced the relevant area within which the PAA is located.

For Rainfed PAAs the Priority Ratings ranges from A – F with A being the highest priority level and F the lowest Priority Rating pertaining to the Rainfed PAAs demarcation.

For Irrigated PAAs the Priority Ratings ranges from A – D with A being the highest priority rating and D the lowest Priority Rating pertaining to the Irrigated PAAs demarcation.

Therefore the Priority Ratings are based on a sliding scale from A downwards in terms of the priority of the area from a cultivation perspective.

Two additional classification indications were however added the assigned to the Priority Rating, where applicable / relevant.

- In instances where the larger part of the PAA is utilised for forestry (plantation) purposes a "P" was added in front of the Priority Rating e.g. P_B where the "P" indicates the dominant land use as under Plantations and "B" indicates the Priority Rating in terms of the potential.
- In instances where a PAA is located within a rural area where the land use is mainly small scale farming activities with intermittent areas of high density rural housing, a "Z" was added in front of the Priority Rating e.g. Z_C where the "Z" indicates the intermittence agricultural / rural housing land use and the "C" indicates the Priority Rating in terms of the potential.

The above additional classification indices will assist with the future planning of agricultural land uses.

It should be stated that the possibility still exist for limited cultivation potential outside of the demarcated PAA. This relates to current cultivation or future use and can either be larger areas or smaller pockets of land. However these areas were not found of being able to significantly contribute towards national food security and were therefore not demarcated as such. These areas may however be of economic value to the relevant province and / or local municipality in terms of best available land to generate income and create jobs and therefore it is possible that these areas may be included in future provincial protected areas. Care should however be exercised pertaining to correct management practices so as to not degrade the resource due its marginal potential or limited size for cultivation purposes.

DISCLAIMER

The approach for the demarcation of the Protected Agricultural Areas was based on a *spatial evaluation exercise through the assessment and classification of the mentioned data layers and verified through workshops with the provincial Departments of Agriculture*. Where needed it was supported by in field verifications.

The final data layers were therefore subjected to a process of spatial interrogation and combination of the data, as well as the scale of the input data and were based on published scientific principles as encompassed within the spatial evaluation exercise and dominantly using administrative boundaries (mostly cadastre) as delineation line.

The data is usable at a scale of 1:50 000 and is not suitable for farm level planning.

Although utmost care has been taken in the preparation of the data, neither the Department of Agriculture, Land Reform and Rural Development nor it employees shall be held liable for any loss, damage, inconvenience, misinterpretation or any other liability suffered as a consequence of the use of this data.

In field verification and local level assessments are strongly recommended before using it for detail planning purposes.

PROTECTED AGRICULTURAL AREAS FOR CULTIVATION, 2020

MPUMALANGA PROVINCE

VECTOR DATA

Metadata Date Stamp: **July, 2020**

DATASET DESCRIPTION

Dataset Title: ***Prot_Agric_Areas_MP_d24062020_Albers***

Dataset Reference Date: ***2020/06/24***

Data quality: ***Good***

Dataset Responsible Party: ***Department of Agriculture, Land Reform and Rural Development / Directorate: Land Use and Soil Management***

Geographic Location of the Dataset: ***Mpumalanga***
Xmin*: *28.23
Xmax*: *31.98
Ymin: -24.48
Ymax*: *-27.53

Projection coordinates based on Albers-Equal, WGS 84, meter.

Keywords: **agricultural potential; high potential agricultural areas; high value agricultural land**

Dataset Language: ***English***

Dataset Character Set: ***N/A***

Dataset Topic Category: ***007 = Environment (ISO 19115 Topic category)***

Scale of the Dataset: *1:50 000 – 1:100 000*

Data Release classification: *Release: 2020*

Citation Information:

Originator: ***Department of Agriculture, Land Reform and Rural Development***
Publication Date: ***2020/06/24***
Title: **Protected Agricultural Areas, Mpumalanga Province**
Geospatial Data Presentation Form: ***Vector digital data***
Other Citation Details: ***See official citation***
Online Linkage*:* None

Abstract:
The Protected Agricultural Areas, Mpumalanga Province 2020 data layer is a spatial demarcation of high value agricultural areas within the province, for rainfed and/or irrigated areas, from a cultivation perspective. It includes the Priority Rating and Classification Type of the Area.

Purpose:
To represent the demarcation of high value (potential) agricultural areas within the Mpumalanga province using a described methodology.

Read the detailed description on the compilation of the data layer for more information.

Supplemental Information:
See detailed description.
In the Mpumalanga province 49 PAAs have been delineated.

Lineage Statement:
Read the detailed description on the compilation of the data layer for more information.

ATTRIBUTE INFORMATION

Attribute Description:

Field name	Data Type	Description	Example
ID	*Double*	*Identification number for the PAA*	*1*
MP_No	*String*	*Unique provincial assigned number for the PAA*	*MP_1*
Type	*String*	*Description of the type of PAA based on the classification matrix used*	*"RF" – Rainfed* *"IR" - Irrigation*
PRate	*String*	*Priority Rating assigned to the PAA based on the classification matrix* *Rainfed: A – F* *Irrigation: A – D* *In addition:* *P = Plantations* *Z = High density rural areas*	*A;* *P_C;* *Z_B*
PAA_Name	*String*	*Unique name assigned to the PAA – usually based on a well-known geographic feature present in the relevant area.*	*Mbombela PAA*
Area_ha	*Double*	*Calculated size in hectares of the PAA*	*16517.34*

SUPPLEMENTARY INFORMATION

DATA MAINTENANCE

Dataset last updated: ***2020***

Time Period of Content: ***Continuous***

Progress: ***Version 2.1***

Maintenance and update frequency:
The data layer will be updated as newly refined data used within the spatial delineation approach becomes available that can make a significant difference in the demarcated area. No formal update frequency is available.

Any feedback regarding the quality and accuracy of the data will be appreciated and can be forwarded to the Metadata Point of Contact.

DISTRIBUTION AND CONSTRAINTS

On/line Resource: *None*

Distribution Format: *ArcGIS 10.2 shp file*

Access constraints:
The data can be obtained from Department of Agriculture, Land Reform and Rural Development. The Department must be acknowledged in the use of the data as per citation information.

Distribution constraints:
Use limitations:
Please refer to the signed Data Request Agreement. The user shall not sell, distribute or license the spatial data for any purpose.

The Department of Agriculture, Land Reform and Rural Development cannot give any warranty on the accuracy of the data. The Department of Agriculture, Land Reform and Rural Development shall in no way be liable for results related to the use of the data. Users of the data must acknowledge the copyright.

Source: Department of Agriculture, Land Reform and Rural Development (as per citation)

METADATA INFORMATION

Metadata Point of Contact: *Directorate: Land and Soil Management - NRIA*
Ms. Anneliza Collett

Metadata Email Contact: *AnnelizaC@dalrrd.gov.za*

Postal Address:
Department of Agriculture, Land Reform and Rural Development
Directorate: Land and Soil Management
Private Bag X 250
Pretoria
Gauteng
South Africa
0001

Physical Address:
Delpen Building
Cnr Annie Botha and Union Streets
Riviera
Pretoria
0083

Telephone: *+27 12 319 7508*

Additional Extent information for the Dataset (Vertical & Temporal): *N/A*

Spatial Representation Type: *Vector*

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Projection – WGS_1984_Albers
Coordinate Reference – D_WGS_1984

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(once formally gazetted the citation will be amended accordingly)

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