LAND CAPABILITY
&
CROP SUITABILITY

Presentation to Agbiz

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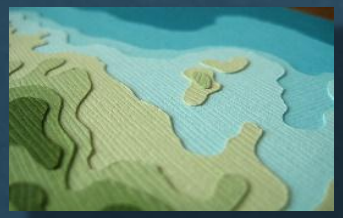
STUDY BACKGROUND AND OBJECTIVES

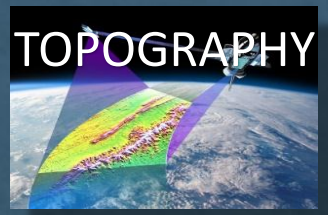
Legislation:

SALA and CARA to be replaced by PDALB. Protected Agricultural Areas and High-Value Agricultural Land.

Objectives:

1. To develop standardized spatial land capability and agricultural zone models based on the best available published Agricultural and Geographic Information System (GIS) Sciences.
2. To improve the data through field work.
3. Apply, test and calibrate the models to create land capability, crop suitability, livestock- and rangeland suitability datasets that defines agricultural zones datasets.
4. To present the results in a vector data format linked to a spatial viewer and reporting tools.

	Source	Empirical	Derived	Calculated
Agro-Climate 	South African Atlas of Agro-hydrology and – Climatology Database; *13,174 Climate Stations;* *484,856 pixel values/attr.* *@ 1,6 km resolution*	1. Rainfall; 2. Temperature; 3. Evaporation.	4	45(264)
Agro-Soil 	The Improved National Land Type Soils Database; *301,901 Site Associations;* *145 Million pixel values/attr. @ 90m resolution.*	1. Soil Form; 2. Soil Series; 3. Soil Depth; 4. Topsoil Clay %; 5. Subsoil Clay %; 6. Soil Colour.	10	11
Agro-Topography 	The Shuttle Radar Topography Mission (SRTM) DEM; *145 Million pixel values/attr. @ 90m resolution resampled from a 30m pixel resolution.*	1. Altitude	1. Slope Gradient; 2. Slope Aspect	1. Flow Direction; 2. Flow-Accumulation; 3. Curvature; 4. Drainage density; 5. Relative Relief.



Moisture Supply Cap.

Plant Avail. Water

Moisture Accumulation

Physiological Cap.

Soil Fertility

Photosynthetic Capacity

Climate Constraints

Soil Constraints

Topographical Constraints

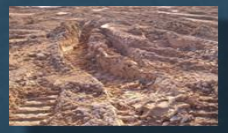
Rainfall

Wind Erosion

Mechanical Limitations

Temperature

Water Erosion



Ground Strength

Compaction

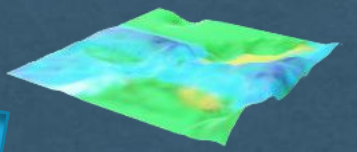
Erodibility

Surface Crusting

Flooding Risk

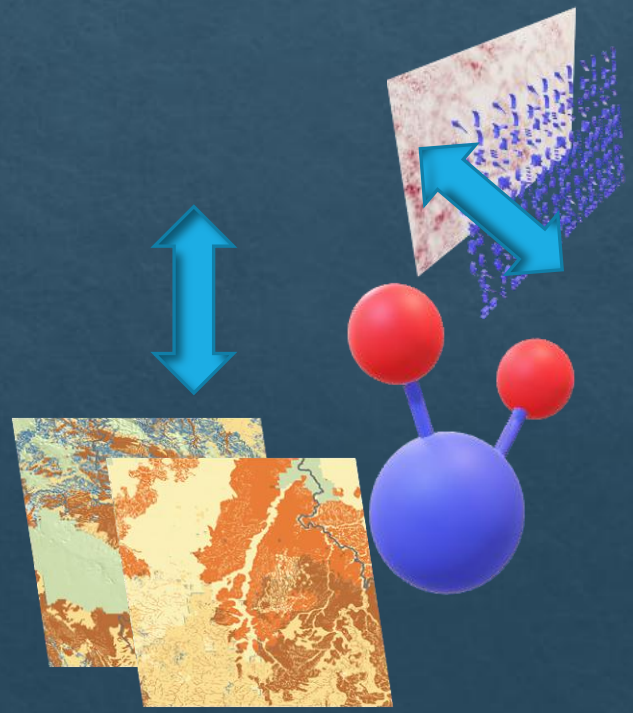
Expert-knowledge; Literature

Integrated GIS Data Base



Crop-Geographical profiling- Bio-physical variables

Multi-Criteria Evaluation within a GIS Environment



Multi-Variable Suitability Layers

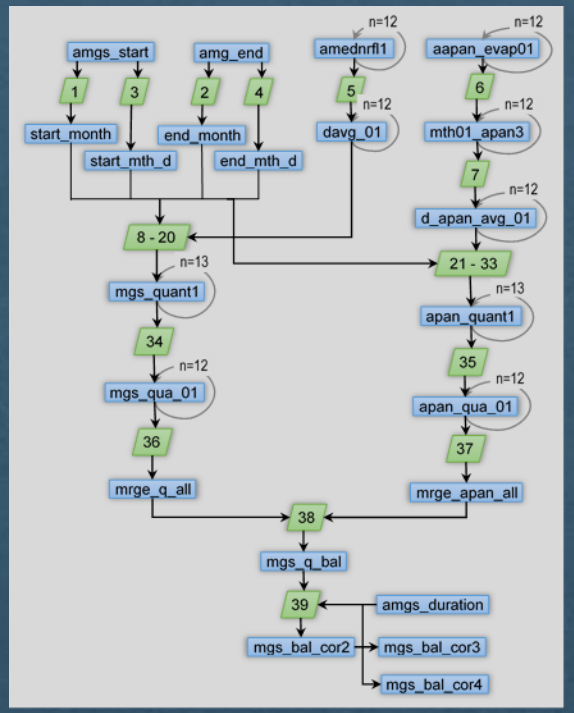
Integrated GIS Model Base

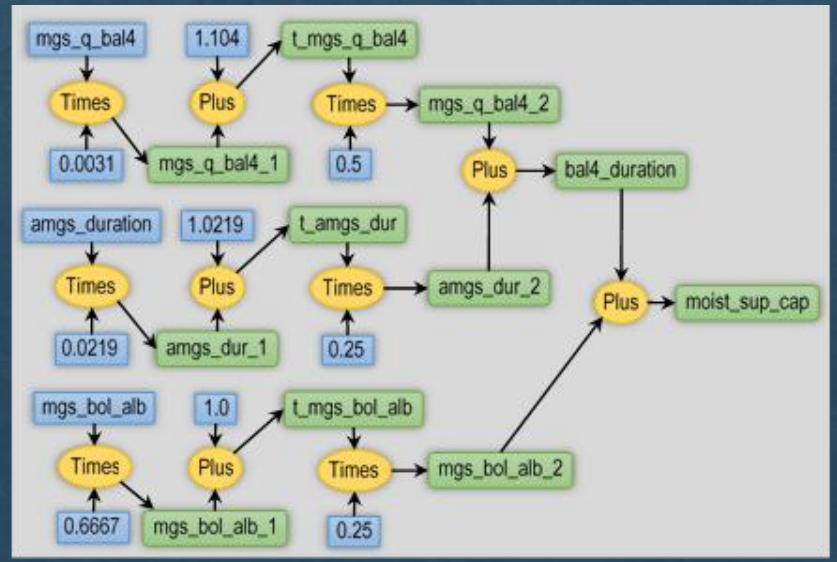
DATABASE

Integrated spatial raster, vector
&
non-spatial attribute data

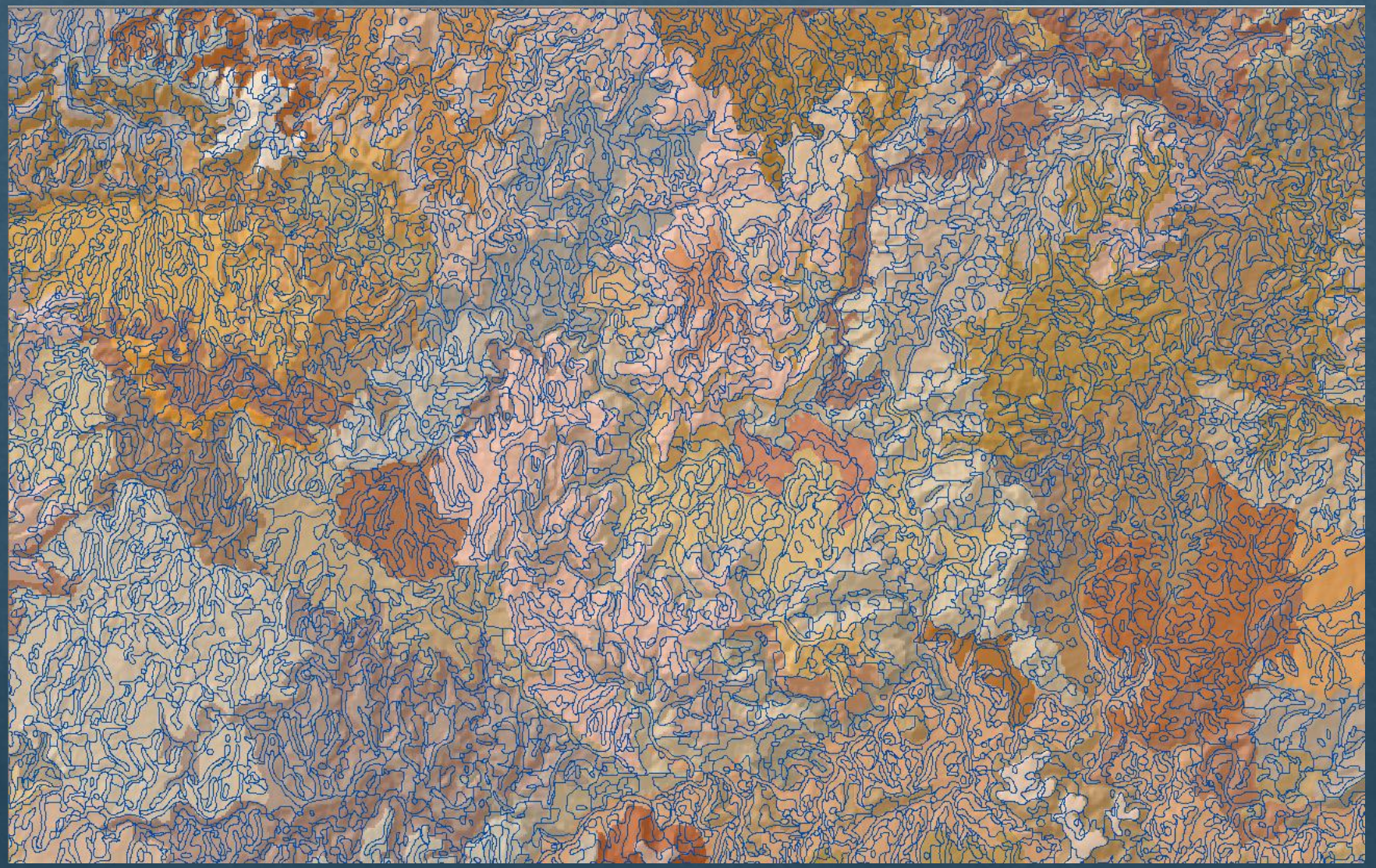
Procedures to calculate data

Procedures to derive data





LAND CAPABILITY DATA COMPARISON:
1 745 Land type polygons
vs
301 901 Land capability polygons

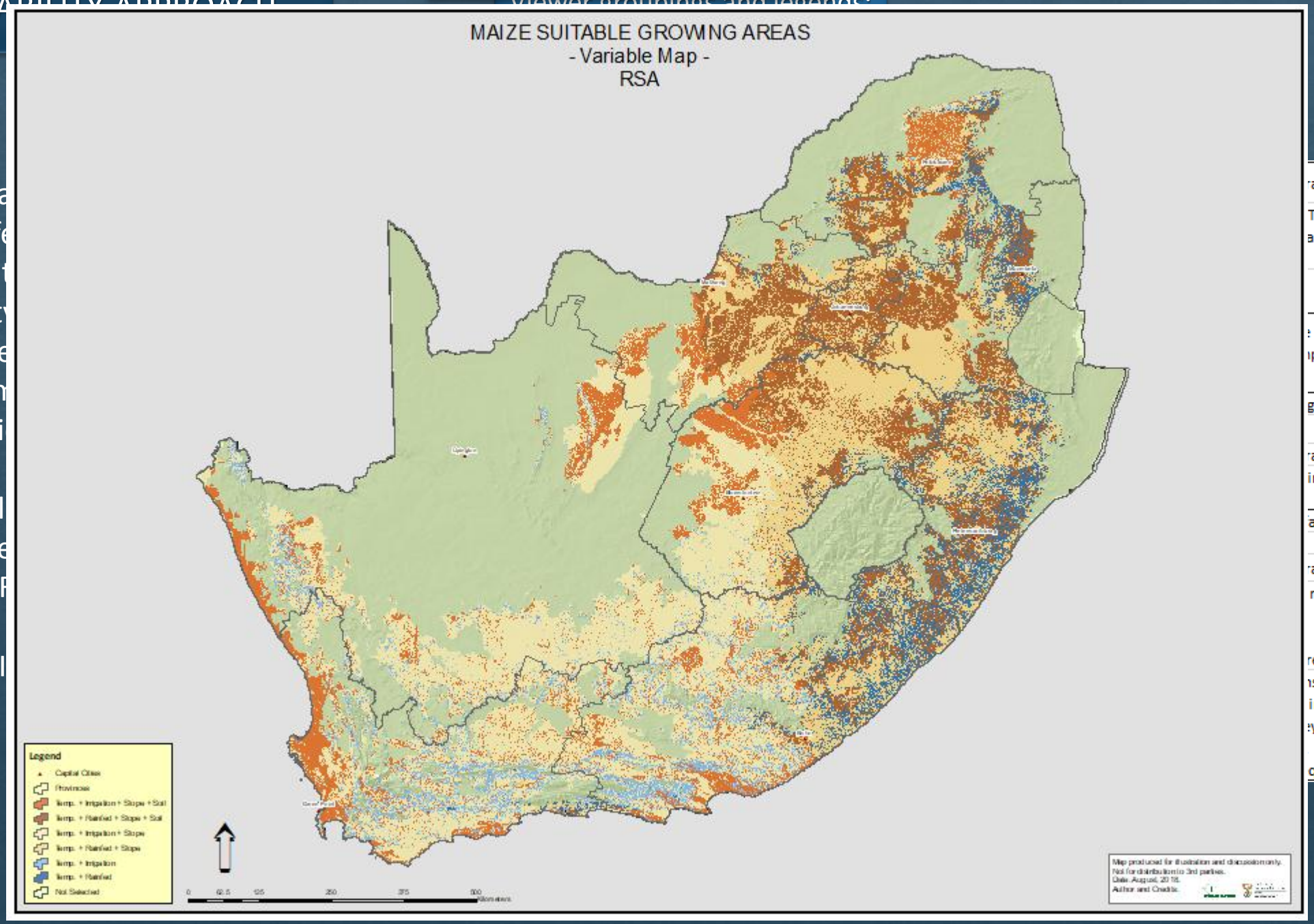


CROP SUITA

Thematic crop suitability map:

1. Agricultura
   1. Rainfe
   2. Irrigat
2. Seasonalit
   1. Winte
   2. Summ
3. Geographi

Barley Exampl
   1. Winte
      1. F
      2. I



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areas, is completely
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gation+slope+soils

rable <= 12%.
infed. Added to

all+slope+soils.

rable <= 12%
requirements

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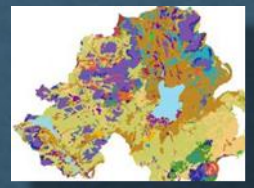
yed in-field.

quirements.

SPATIAL VIEWER

INTEGRATED SPATIAL AND ATTRIBUTE DATABASE

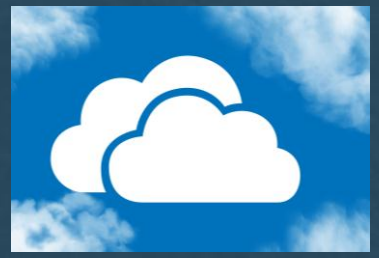
REPORTING TOOL



128 Thematic layers/maps

43 Crops with 231 suitability layers

1 281 987 Million AES polygon legends
433 514 Farm portion legends



SYSTEM BENEFITS

A seamless, standardized system and database assisting multiple users in their business decision-making processes.

Significant cost-savings- For any farm portion/AES polygon in the country-detailed report including 104 variables.

Red-flag indicator variables: e.g. crop suitability predictions to avoid off-site plantings and no-yield probabilities.

Farm-evaluation takes less than 15 minutes using the system tools. A detailed farm feasibility analysis report is possible in less than a day.

Value-chain analysis – multiple inputs, e.g. environmental impact assessment; protected areas, sensitive biodiversity, wetlands, etc.

INDUSTRY USES

1: BANKING

Pre-Screening – All new and existing clients – credit applications:
Land capability; crop suitability; grazing capacity; livestock suitability; rangeland suitability; environmental risk; land use; land cover; etc.

2: AGRICULTURE

On-farm land use planning;
Agricultural risk – climate, soil, topographical;
Crop-, forestry-, and animal adaptability / suitability predictions.

3: GOVERNMENT

Legislation- spatial demarcation; norms and standards; regulations; land degradation; etc.

4: ENVIRONMENTAL

Environmental risk and impact assessments (EIAs);
Identification of sensitive and protected areas (wetlands, biodiversity, etc.)

5: MONITORING

The use of agricultural land, conservation status of agricultural resources;
Impact of climate change on all forms of land use;
Daily monitoring of indicator variables – field level: diseases, yield, etc.

THE ROAD AHEAD

1. Continuously refining the database and models through in-house R & D

2. Complete the online Database & Tools

3. Add a field-crop boundary monitoring module

4. Create a detailed Farm-Crop Suitability Reporting Tool

5. Mobile-based solutions following a modular approach

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