Agriculture in Zambia

By

Lusekelo Kasunga

National Remote Sensing Centre (NRSC) - ZAMBIA

Agriculture - Zambian Scenario

▸ In Zambia, agriculture sector has been identified as one of the key main drivers for economic diversification and resilience (Ministry of Development Planning, 2017).

▸ It is the largest employer in the informal sector (Indaba Agricultural Policy Research Institute, 2020).

▸ Majority rural populations' livelihood depends on agriculture.
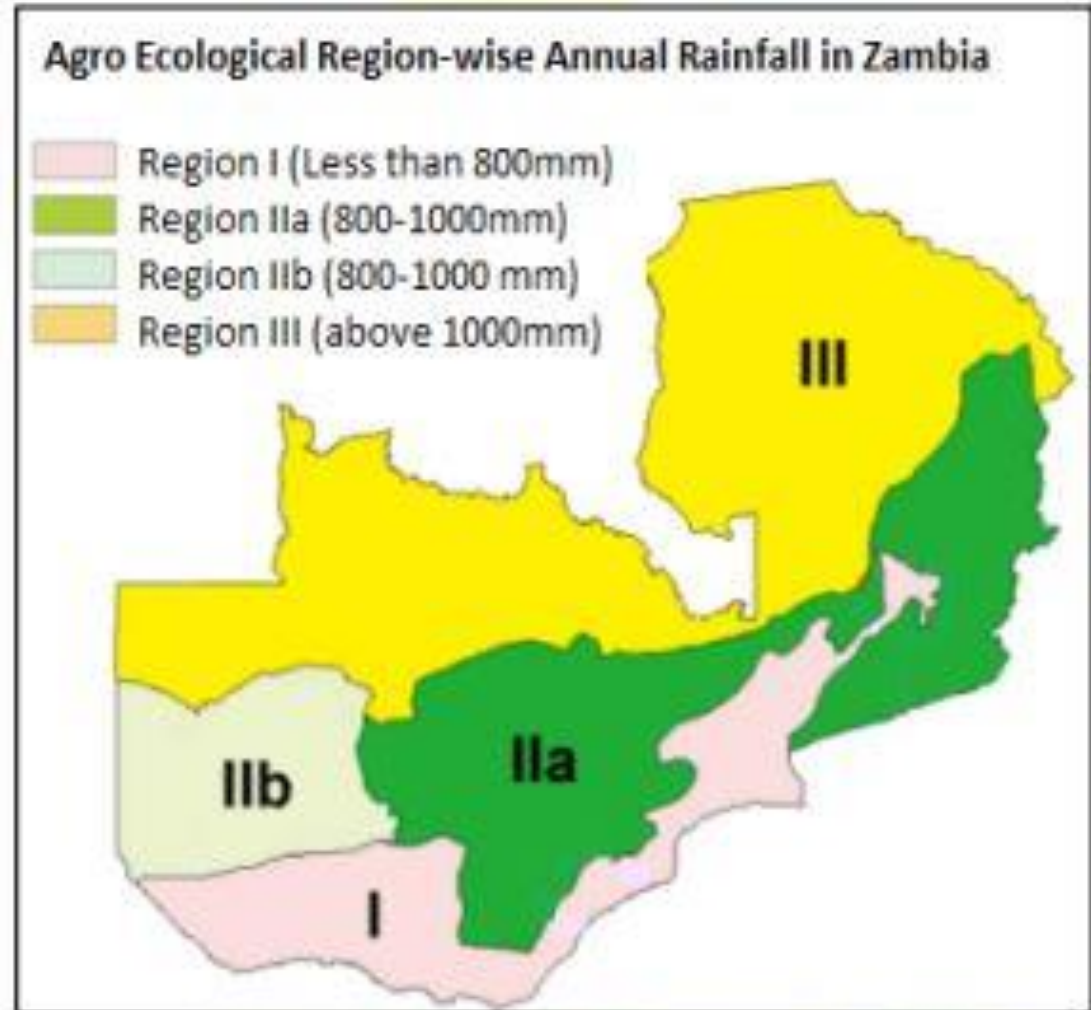
Agriculture - Zambian Scenario

- Like in many other African countries (FAO, 2018), agriculture in Zambia is dominated by smallholder farmers who largely depend on rainfall (Kabisa, 2019) and.

  - constrained by limited access to quality inputs, markets and access to credit (FAO, 2018)
  - low use of appropriate production technologies.

- Hence, climate change has posed serious challenge to the agricultural sector (Ministry of Development Planning, 2017).

- Govt set deliberate policies to promote agriculture and productivity (lower yield gaps).

  - Farmers Input Support Programme (FISP)

Agriculture - Zambian Scenario

Zambia is divided into agroecological zones

Agro Ecological Region-wise Annual Rainfall in Zambia

- Region I (Less than 800mm)
- Region IIa (800-1000mm)
- Region IIb (800-1000 mm)
- Region III (above 1000mm)

Crop phenology for main crops - Zambia

▸ The main crops produced, by consumption, are corn (maize), cassava, sorghum & millet, groundnuts and soya beans.

▸ The farming rain season runs between October and April.

▸ This constitute the main growing period for most crops grown by majority small-scale farmers.
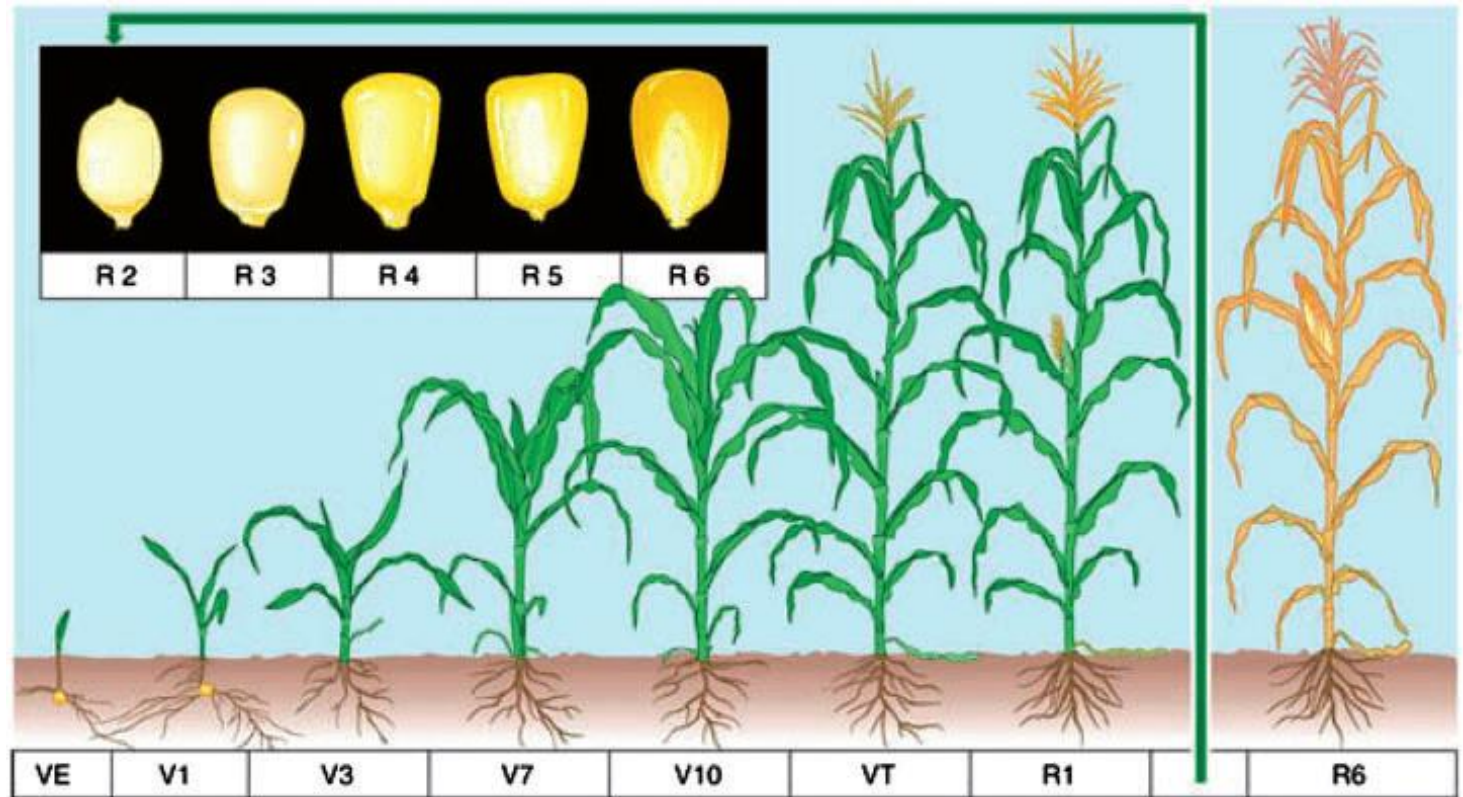
Crop phenology for main crops - Zambia

	September	October	November	December	January	February	March	April	May	June	July	August
Sowing		███	███	███								
Growing			███	███	███	███	███	███	███			
Harvesting								███	███	███		

Phenological growth period for Maize,   Source: Waldman et. Al., 2018

Crop phenology for main crops - Zambia

Phenological growth period for Maize, Source: Zhao et. Al., 2011

➢ However, with climate change, this period is shortening and hence affecting crop productivity. Potentially contributing to, among other things, observed yield gaps.

Basic information for agriculture and current problems - Zambia

- As critical for economic growth and diversification (Ministry of Development Planning, 2017).

- Agriculture sector is key to provision and improving of livelihoods (Indaba Agricultural Policy Research Institute, 2020).

- Hence, need to adopt and employ advanced measures, tools and mechanisms to enhance the monitoring and management of the sector.

- Tools should be capable of accurate, timely and cost effective mapping of **agricultural crops.**

- For such applications as crop inventorying, crop yield estimation and forecasting (Zhu, et al., 2017).

Basic information for agriculture and current problems - Zambia

‣ However, in Zambia, the annual agricultural sample surveys are spearheaded by Zambia Statistic Agency (ZamStAts)(CSO, 2015).

‣ Through the Post-Harvest Survey (PHS) exercise, field figures pertaining to individual crop area planted and production quantities are collected.

‣ PHS is conducted by solicitation of personal interviews with respondents within selected Standard Enumeration Areas (SEAs).

Basic information for agriculture and current problems - Zambia

▸ The method, though archaic, is a well-established technique for collecting agricultural field data and it has proven itself in terms of reliability and, in some cases, accuracy.

▸ However, in order to attain reliably accurate national agricultural estimates there is need to acquire large number of samples and field measurements (Sharifi, 2000).

▸ High costs of executing the exercise.

▸ Highly prone to error due and subjectivity.

▸ Lack of detailed crop map showing the spatial distribution of the various crop types grown (Sharifi, 2000).

▸ Hence, need for improvement, with the great potential shown through RS and ML.

▸

Agricultural projects related to remote sensing

▸ Govt interest in RS was expressed with the establishment, through an SI, of NRSC in 1999.

▸ NRSC promotes the application of RS for socio-economic development.

▸ NRSC thus took up an institutional task to apply an integration of RS and ML in agricultural crop type mapping, yield estimation and forecasting.

▸ For promotion of agricultural management and productivity in face of climate variability.

▸ See draft crop type map on next page

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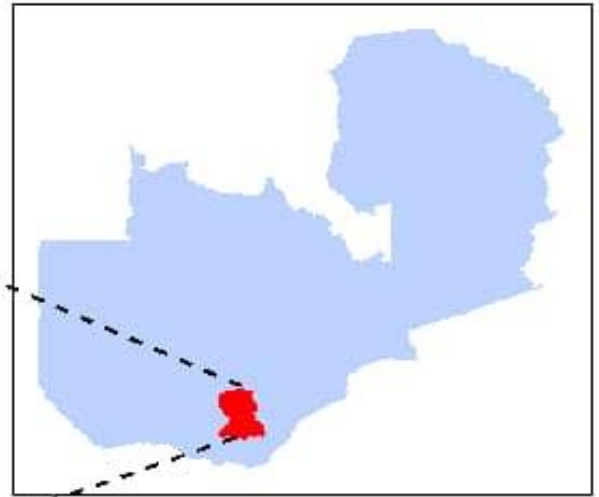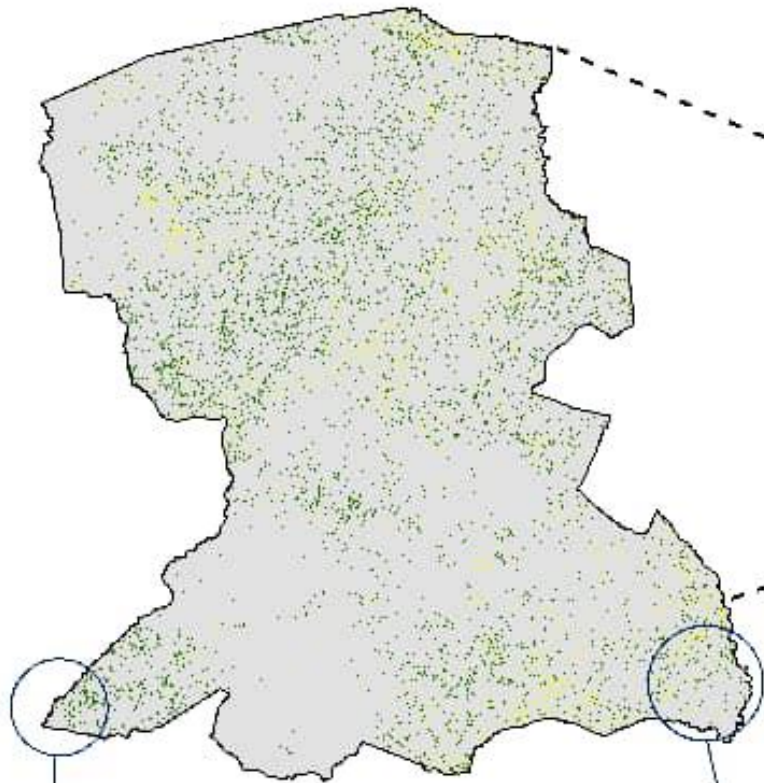
Legend

☐ Kalomo

Crop

■ Maize

■ Soya Beans

■ Sun Flower

■ Other Features
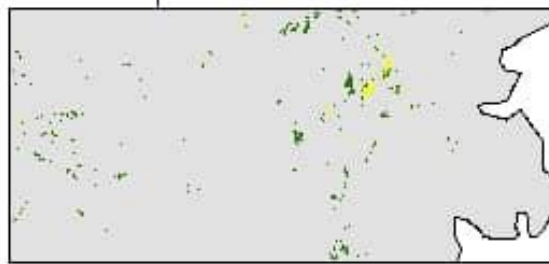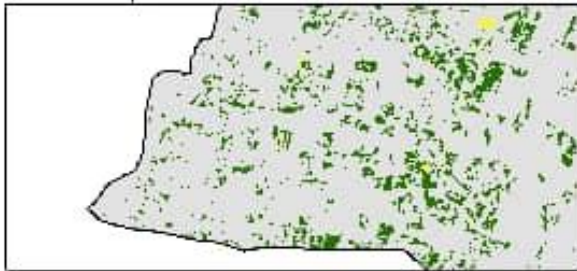
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Requirements and expectation

‣ Requirements
  ‣ Capacity building e.g. skillset and equipment
  ‣ Resources for extensive field exercise
  ‣ Improved methods of monitoring and management of agricultural sector.

‣ Expectations
  ‣ Learn best practice from other countries on application of RS in agriculture mapping and managements.
  ‣ Networking for common goals and aspirations.

▸

References

▸ Central Statistical Office, 2015. *Post Harvest Survey 2014-2015 Agriculture Season (Small and Medium Scale Farms),* Lusaka: Central Statistical Office.

▸ FAO, 2018. *Guidelines on the use of Remote Sensing products to improve Agricultural Crop production forecast statistics in Sub-Saharan African countries,* Rome: s.n.

▸ Indaba Agricultural Policy Research Institute, 2020. *Zambia Agricultural Status Report 2020,* s.l.: Indaba Agricultural Policy Research Institute.

▸ Ministry of Development Planning, 2017. *7th NATIONAL DEVELOPMENT PLAN 2017 - 2021.* s.l.:s.n.

▸ Sharifi, M. A., 2000. Crop Inventory and Production Forecasting using Remote Sensing and Agrometological models: The Case of Major Agricultural Commodities in Hamadan Province, Iran. *International Archives of Photogrammetry and Remote Sensing,* Volume 33, pp. 1364-1372.

▸ Zhu, L., Radeloff, V. C. & Ives, A. R., 2017. Improving the Mapping of crop types in the Midwestern U.S. by fusing Landsat and MODIS satellite data. *International Journal of Applied Earth Observation and Geoinformation,* Volume 58, pp. 1-11.