

The how and why of crop estimates

By Ursula Human

Aerial surveys are conducted by a field observation team in a very light aircraft, to determine area estimations. (Source: DAFF)

According to crop forecasts for the 2016/2017 summer crop season, a record crop of 15,63 million tons for maize and 1,34 million tons for soya beans is expected.

Each month the agricultural sector awaits the revised forecast estimates to keep updated with production figures as the season progresses. But why are these forecasts so significant and what exactly is measured? How are crop estimates conducted and who is involved in the estimate processes?

Why are crops estimated?

Crop forecasts are primarily undertaken to give an early indication of the expected production of grains to decision-makers in the agricultural sector. Crop estimates provide all role-players in the grain and oilseeds industries with data that aids them in planning and make informed decisions for the trading, transport, storage and marketing of crops.

Crop estimates in South Africa became especially important when the agricultural

market converted to a free market system. A reliable crop estimate also ensures that buyers and sellers have equal bargaining power. It also allows the government to plan imports for staple grains such as maize, as was necessary during the 2015/2016 production season, when imports were required following a much lower crop production figure following the severe drought.

What is measured?

A production forecast (tons) requires knowledge of the area planted (hectares) and the crop yield (tons per hectare) of the crop. Production figures are derived by multiplying the planted area by the yield. Summer crop forecasts are done for white maize, yellow maize, sorghum, groundnuts, sunflower seed, soya beans, and dry beans.

Winter crops include wheat, malting barley and canola. Forecasts published are monthly area and production figures for each of the crops at a provincial and national level. Final production estimates are released at the end of the season.

The committee is made up of members that do not have a vested interest in the outcome of the estimate. Currently the CEC consists of the members from government and research organisations such as DAFF, one representative from each of the nine provincial departments of agriculture (PDAs), the Agricultural Research Council (ARC), Statistics South Africa (SSA), and the Bureau for Food and Agricultural Policy (BFAP).

The Crop Estimates Liaison Committee (CELC) acts in advisory role to the CEC and evaluates the results of the CEC forecasts and final estimates. Any interested party in the industry can be part of the CELC.

Currently, its participants include producers organisations such as Grain SA (GSA), seed companies, JSE Equity Derivatives Market (formerly Safex), South African Grain Information Service (Sagis), National Chamber of Milling (NCM), Agbiz Grain, the South African Cereals and Oilseeds Trade Association (SACOTA), CEC members, and DAFF.

DAFF, the PDAs and the National Crop Statistics Consortium (NCSC) are the main suppliers of data to the CEC. The NCSC was formed in 2001 and supplies the primary area estimate and yield forecast data to the CEC. The NCSC is a public-private sector consortium consisting of the ARC, SIQ (Pty) Ltd, and GeoTerraImage (Pty) Ltd. The CEC also receives information from various organisations and institutions such as agricultural risk specialists, fertiliser companies, financial institutions, producer organisations, traders and trade organisations.

Area estimations

The CEC uses two main sources for area estimations. The first is a postal/email/telephonic survey undertaken by DAFF

Who determines estimates?

In South Africa, the Crop Estimates Committee (CEC), together with the Department of Agriculture, Forestry and Fisheries (DAFF) acting as secretariat, deliver the official crop forecasts of commercially produced summer and winter field crops.



to determine the intentions to plant and preliminary area estimate. For the remainder of the forecasting season it uses the second and main source of area estimates, namely the Producer Independent Crop Estimates System (PICES).

PICES is a method developed by the NCSC to estimate the areas planted to summer and winter grain crops combining and integrating satellite imagery, remote sensing, point frame statistical platforms, GIS and aerial observations from light aircraft.

Each season an aerial survey with light aircraft of sample points is conducted to determine the crop planted on the field represented by each sample point. Using this methodology, an area of approximately 13 million hectares of fields can be covered in a two-month period using three field observation teams. An added advantage is that it is a much more cost-effective system than a ground based system that uses motor vehicles.

The CEC estimates the area planted for all purposes and not only the area harvested for grain. For summer field crops, the first area estimate is made in January and may be adjusted in February and March, if there is sufficient evidence to support a revision. For winter field crops, the first area estimate is in July and the area may still be adjusted in August.



A light aircraft and the crop estimates team in action. (Source: SIQ and Grace Air)

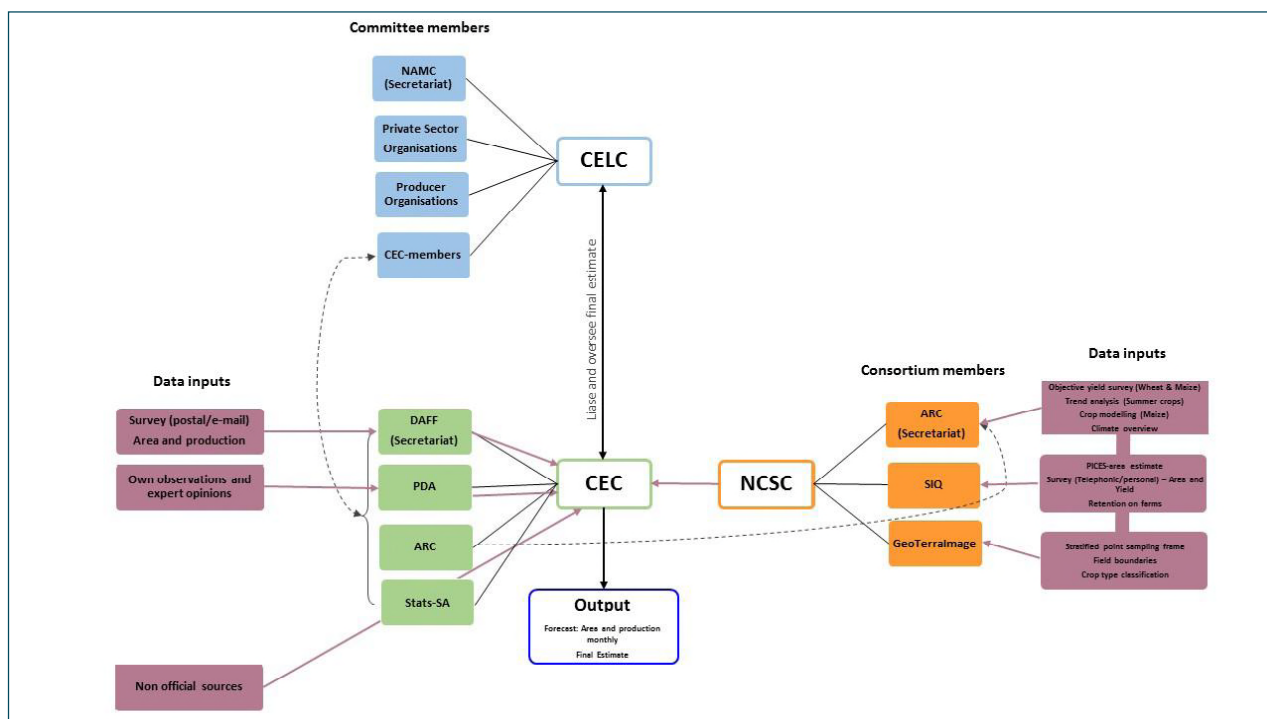
Yield forecasts

For yield forecasts the CEC uses three or more sources: surveys done by DAFF (through the post, email and per telephone), an objective yield survey (OYS) for wheat and maize – coordinated by the ARC through the NCSC, and a producer interview telephonic survey by the NCSC.

DAFF sends questionnaires to a non-probable sample of co-operators, approximately 2 000 questionnaires for summer crops and 1 000 for winter crops. The farmer is requested to provide a production estimate of the planted crops on his or her fields, based on the prevailing production conditions. The estimated production by the respondents for the present month with their declared area planted is taken to reach an average yield in a magisterial district or province.

The telephonic survey collects information regarding estimates of expected yields of farmers during February and March (summer crops) and during August and September (winter crops). Farmers must indicate the expected yield for each crop on his or her farm.

OYS locations are selected from the point frame where crops of interest were found. OYS samples are selected within each province with a probability proportional to size, making it a self-weighting sample. Enumerators visit the selected fields and collect background information relating to the crop planting. This is followed by measurements of plants and cobs within randomly selected sites on the field, while following a strict set of procedures.



Cutting-edge technologies and the collaboration of many role-players are the foundation of producing a reliable crop production forecast and estimate. (Source: ARC)



A median is determined to derive an average size of maize cobs in a selected site during an objective yield survey. (Source: ARC)

Enumerators undergo hands-on practical training. The OYS for maize is undertaken annually, covering the three major maize producing provinces of Mpumalanga (April), Free State and North West (May) where 700 locations are sampled. The annual wheat survey, with 600 sampling locations, is undertaken during October in the Western Cape and

November/December in the Free State.

Other yield inputs are obtained from the provincial representatives, whilst crop yield modelling and trend analysis results are supplied by the ARC through the NCSC.

Production forecasts

The CEC releases eight monthly production forecasts for summer field crops from February to September, and seven

production forecasts for winter field crops from August to February the following year. For summer field crops, there is an "intentions to plant" survey in October followed by a preliminary planted-area estimate in January, whilst for winter field crops this is in April and July respectively.

Final production estimates are released at the end of a production season when

there is a finalisation of the crops, which for the summer field crops is in February the following year and for the winter field crops in May following the season.

The estimate is based on actual producer deliveries (as reported by Sagis), projected future producer deliveries and the retentions on farms for own use. This figure is submitted to the CELC for approval. The calculated production for both summer and winter field crops is compared to the monthly production forecasts and final production estimate.

According to the CELC accuracy parameters, the final crop numbers should be within 8% for the first to the fourth production forecast and within 5% from the fifth to the final production estimate. In the last couple of years, the CEC has been within its mandate of a 5% accuracy to the final production estimate. 🟢

For more information, contact the CEC committee on 012 319 8454 or DAS@daff.gov.za.

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