



EC/FAO FOOD SECURITY PROGRAMME - 'INFORMATION FOR ACTION'

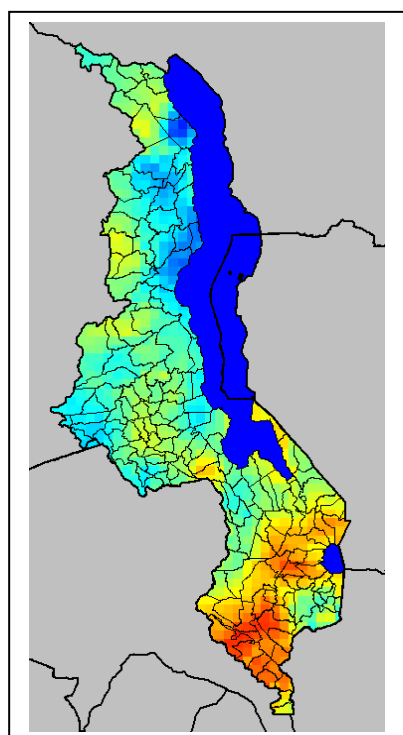
CM Box

Turn-Key crop monitoring and forecasting tool to support national food security analyses

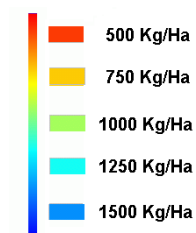
1. The concept

Crop condition monitoring and forecasting techniques have made enormous progress from the days of empirical statistical methods using weather variables that were very popular in the fifties and sixties. Using modern tools of agrometeorology and remote sensing it is now possible to issue a forecast of the likely outcome of the cropping season starting at the time of planting.

The CM Box is fed in real time with weather, satellite and crop information. It generates a set of indicators that are relevant for food security. The indicators can be presented as text, maps and tables by provinces or districts. An example of a anticipated yield map is illustrated below.



N-S extension of mapped area is approximately 800 km



Forecast of yield of local maize varieties in Malawi (Southern Africa) in 2005, based on ground data and satellite information

Advance knowledge of crop production is an essential input to food security planning, and maps comparing current yield expectations with average conditions constitute an ideal crop monitoring tools, particularly when they can be compared with population distribution and other relevant variables,

The national *turn-key crop monitoring and forecasting systems* (called "CM Box" hereafter) is an automated software suite that analyses

weather data to assess their impact on crop production¹.

Interested countries receive a combination of training, hardware, software customized for local use, as well as the real-time data required to operate the system in-country. The package can be tailored to suit the countries' specific requirements, based on national preferences as well as available expertise, methods and data

The CM Box is meant to offer an easy solution to rapidly setting up an operational crop monitoring and forecasting system. In the initial phase, reference data as well as real-time satellite and weather data can be provided by FAO headquarters based on international sources, but the idea is that, over the duration of the project, more and more national data will be used, as local know-how increases while the institutional set-up of the national food security system is improved.

By the end of the Project, it is planned that a sustainable crop monitoring and forecasting system has been set up, including hardware, software, institutions and personnel.

2. Development and implementation of the CM Box

The development of the CM Box includes activities at FAO HQ and at the national level. The relative importance of the two components varies a lot according to national circumstances. In the most favourable situations, countries have quality local data, hardware and know how, in which case the CM Box provides training only, software as well as yield functions². The CM Box is operated independently at the national level, with only occasional remote technical backstopping. The other extreme is a CM Box operated nationally with data provided from FAO HQ by email or by the regular despatch of CD-ROMs. In both cases, however, the analyses are done nationally based on the standard outputs of the CM Box. Although this is not anticipated, the worst case in absolute would be that all the data are processed at FAO HQ and only maps and tables are regularly send to the country for analysis.

As indicated above, the CM Box has the following components: training, hardware, software customized for local use, as well as the real-time data.

a. Training

The training includes the principles and the practice of the operation of a national crop yield monitoring and forecasting system in a food security context, in particular the interpretation of the maps and other outputs produced by the AgroMetShell. By the end of the training, national experts are expected to be able to operate the software independently, including inputting crop and weather data, and the integration of ground and satellite information. For the less developed countries, the national staff should be able to import into the AMS the standard data files that will be provided regularly by FAO HQ. In all cases are the trained technicians familiar

¹ The CM Box is centred around the standard FAO crop monitoring tools known as the AgroMetShell, AMS.

² Yield functions are statistical functions that relate crop yield with meaningful variables derived using crop models. For instance, two such variables computed by AMS are water stress at flowering time and excess water during the crop ripening phase.

enough with the methods and software to be able to interact meaningfully with the backstopping team based in Rome.

One essential ingredient of the training is the development of the capacity to prepare crop and weather reports for the national food security system.

The training makes use of national datasets that are prepared by the trainees themselves before the training actually starts.

b. Hardware

Hardware requirements are modest: one or two PCs with the usual UPS and power stabilizer, printers. Trainees have so far been provided by portable computers funded by the EU/FAO project.

c. Software

The software includes a customized version of AMS. This includes:

- manuals and, if necessary, local language menus³
- reference climatic data for the main cropping areas in the country, based on the FAOCLIM and national sources for the most advanced countries
- standard crop data (normal phenology and crop distribution)
- other reference data such as soil types and use of farm inputs
- historical satellite imagery
- yield functions derived by FAO HQ with recent national data

Ancillary software used for spatial interpolation or disaggregation of district-wide data, determination of the growing season characteristics, processing of satellite imagery etc is also made available to participants in the CM Box training.

d. Real-time data

Ideally, countries use their own real-time data for such variables as rainfall and other weather information, crop planting dates etc. In the extreme case, the information is downscaled by FAO HQ from international data sets that are routinely available. Obviously, such data are not comparable in quality to locally measured ones, but they can be made available and used to help establish the routine of a national crop yield monitoring and forecasting system.

It is a common observation that national crop monitoring systems fail to develop into sustainable structures because, during the early stages, they have to invest too much time into solving data and institutional issues at the same time. The use of synthetic data⁴ during early phases may help focus on institutional issues. The synthetic data can then be gradually phased out as the local expertise builds up. In fact, it should

³ This is relatively easy in the case of western scripts.

⁴ For the purpose of this document, we arbitrarily distinguish "actual data", "processed data" and "synthetic data". Actual data are actually observed, such as weather data, climate data, satellite imagery. Processed data are those that have undergone more or less intense preprocessing, such as maps based on point data, missing data based on actually observed data etc. "Synthetic" data differ from "processed data" by the amount of pre-processing. In most cases this will involve a change of geographic scale from coarse to detailed, typically station rainfall data derived from a global rainfall grid at a resolution of 0.5 degrees.

be easy to gradually improve upon the synthetic data by replacing at least some of them by actual data as they became available.

Normally, In those countries where crop statistics are unavailable or of extremely poor quality, the CM Box nevertheless delivers yield and crop condition estimates that are be consistent over space and time and, therefore, constitute valuable inputs to national food situation assessments.

3. Modular approach

The CM Box is presented as individual modules of which countries can select only a part. Thei duration of the CM Box training is variable. For instance, a country that decides to take advantage only of the training component will be involved during a short time only. If remote backstopping or synthetic data are required, the interaction between FAO HQ and the implementers of the CM Box will of course be longer.

4. Links

A general overview of the CMBox can be found on the website of the EU/FAO Food Security Information for Action Programme:

http://www.foodsecinfoaction.org/News/tools_cw_02.htm

The CM Box on-line training material is available from

http://80.69.76.153/wiki/index.php?title=Main_Page

The AgroMetShell (AMS), which constitutes the core of the CMBox is described here

http://www.foodsecinfoaction.org/News/tools_cw_02.htm

It can be downloaded from

<ftp://ext-ftp.fao.org/SD/Reserved/Agromet/AgroMetShell/>

while

<http://www.hoefsloot.com/agrometshell.htm>

has a number of additional information on applications of the software in a very broad context.