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Crop yield monitoring in Eastern Africa

Bulletin for rain-fed maize, sorghum and pasture yield prospects in 2004

MARS-FOOD

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PASTURE SEVERLY AFFECTED, MAIZE AND SORGHUM YIELD PROSPECTS BELOW AVERAGE

The main 2004 crop season is characterized by a drought that affected during the first months the eastern part of the IGAD region and during the last months Eritrea and northern and eastern parts of Sudan. The drought lead to a critical food security situation for the agro- pastoralists of whole region. The maize and sorghum yield are forecasted lower than the 2003 yield according to the decrease in vegetation activity captured by SPOT VGT sensor (Figure 1).

Maize

The maize yield estimate is overall lower than the 2003 yield for the whole region, due to scarce and badly distributed rainfall. Ethiopia (mainly in the low production areas of Somali, Afar and southern part of Oromiya) and Kenya, which are the largest maize producing countries in the region, are affected by the dry spell.

Sorghum

A large decrease in vegetation performance mainly in the northern and eastern part of Sudan indicates a reduction of sorghum production in the region. The agricultural areas of Eritrea were also seriously affected (Figure 1, a).

Pasture

Figure 1, b shows that most pastoralist areas in the region present a large decrease of vegetation activity as captured by the SPOT VGT sensor. The pastoralist areas were defined using the Africover land cover database, with the exception of Ethiopia which was not involved in this project.

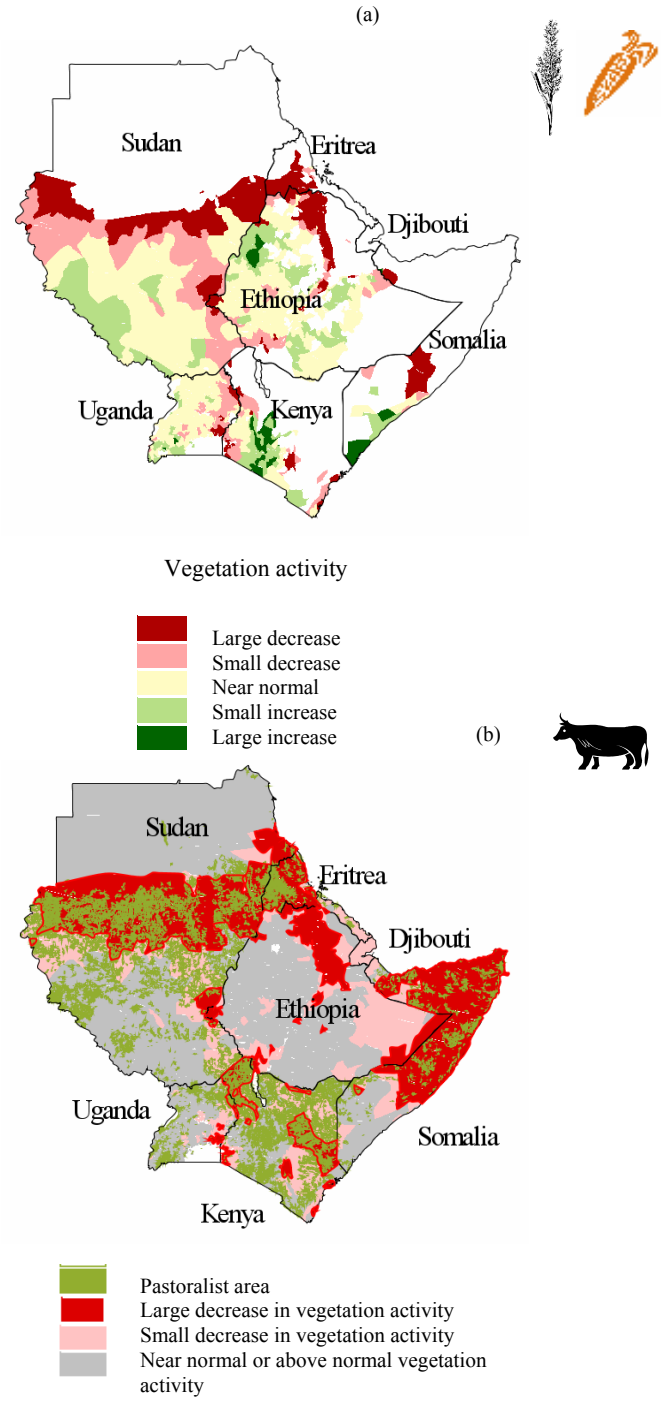


Figure 1 (a) Vegetation activity in the areas cultivated with maize and sorghum. (b) Areas in red, showing mainly the pastoralist areas, present a large decrease in vegetation activity captured by the VGT sensor of the SPOT satellite. Pastoralist areas from Africover land cover database, these data are not available for Ethiopia.

COUNTRY OVERVIEW[1]

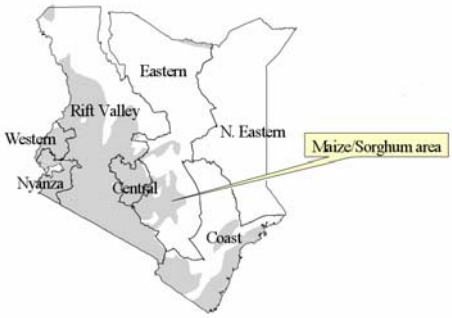
Eritrea

Below normal rainfall during two consecutive months affected the main sorghum areas. The NDVI profiles show a large decrease in vegetation activity for the whole country.

Ethiopia

The Somali region, even if normally a dry area, is the most affected region of Ethiopia having experienced consecutive drought for the last five years. Pastoral areas of Somali and Afar regions were also affected by the poor rainfall. Good maize and sorghum yields are expected in the highlands of Ethiopia.

Kenya



A decrease in maize yield is forecasted for the current crop season. Pastoralist areas are the main concern and the most affected provinces are: Coast, North Eastern, Eastern and the north of Rift Valley (mainly Turkana district).

[1] The areas where maize and/or sorghum are grown are show here for information. The current crop situation maps corresponding to the text are given at the end of the bulletin.

Somalia

Somalia is having the most critical food insecurity situation of the whole region. The drought affects the agricultural and pastoralist areas. For the latter, two very dry years have led to extremely hard conditions. SPOT VGT satellite images show that most of the country presents below normal vegetation activity (Figure 10).

Sudan

The northern and eastern parts of Sudan have been affected by a drought that decreases the vegetation activity. An important reduction in sorghum yield can be expected. The decrease in vegetation activity that causes concern is concentrated in the following districts: Gedaret, Rufaa, Dinder, Es Suki, Ma Tuq, Kawa, Dilling, Kosti, El Dewiem, Bara, Rabak, Singa, Umm Ruwaba, Sennar, El Obeib, En Nuhoud, Omkadada, El Fashir, Keb Kabiya, El Gyneina, Zainge, El Managuil, El Hawata, Goz Regeb, El Renk and Kapoeta.

Uganda

In general the crop situation is good, with some pocket areas where a yield reduction could be expected, mainly in Lira, Soroti, Apac, Kumi, Mamuli and Iganga regions.

Rainfall analysis

Figure 2 shows the dekadal rainfall of October. Eritrea continues receiving very low rainfall during this month too. Two consecutive months with low rainfall could seriously affect the crops.

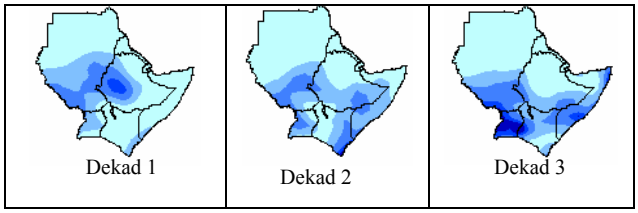


Figure 2 Dekadal rainfall in mm during September 2004. Data derived from the ECMWF model.

The difference between current and normal cumulated rainfall is shown in the map of Figure 3, Page 4.

The graphs in Figure 3 represent the comparison between cumulated current rainfall and cumulated normal, spatially averaged by country and taking into consideration only the areas planted with maize and sorghum.

Vegetation index analysis

The difference in the vegetation index (NDVI) between October 2004 and the same month of the previous year shows some areas with negative differences mainly in Ethiopia and Sudan. (Figure 4, Page 5).

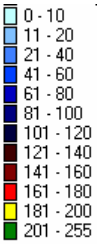
The negative differences observed are due to the irregular and insufficient rainfall during the month of October.

Figures 7 to 12 show the results for administrative regions the temporal analysis of the NDVI. The analysis includes even administrative units outside the maize and sorghum growing areas to give information about pasture conditions.

Crop water requirement

Figure 5 and 6 show the Water Requirement Satisfaction Index (WRSI), a yield indicator obtained by using the FAO Crop Specific Water Balance (CSWB) model.

Figures 5 and 6 represent a forecast of WRSI for maize and sorghum respectively at the end of the growing season. Long-term average climatological data are used to calculate the WRSI for the period between the current dekad and the end-of-season.



In general the regional maize situation seems worse than the previous crop season. The maize yield expectation for Somalia, Kenya and Ethiopia is lower compared to 2003.

Even if the WRSI shows a very good yield expectation for Uganda, the NDVI temporal analysis done at administrative level, reveals some units with large decrease of vegetation activity which should lead to important yield reduction (Figure 12).

Due to a large decrease in vegetation activity mainly in Sudan, below normal sorghum yields are forecasted for the whole region (Fig. 6, Page 7). A critical situation in food security is expected in Eritrea.

The JRC, in collaboration with FAO is pleased to present this issue of "Crop yield monitoring in Eastern Africa" for the 2004 crop season.

MARS-FOOD will provide regular monthly updates on the progress of the 2004 crop season. The bulletin will be available in the "Crop and Rangeland Monitoring Network for the Greater Horn of Africa": http://agrifish.jrc.it/Africa/ or ftp://agrifish.jrc.it/bulletin/ Also MARS-FOOD crop monitoring products will be available through the JRC Digital Map Archive: http://dma.jrc.it.

Another useful product for Somalia is available on: ftp://agrifish.jrc.it/Bulletin/Somalia

Comments and remarks for improvement of this bulletin are welcome.

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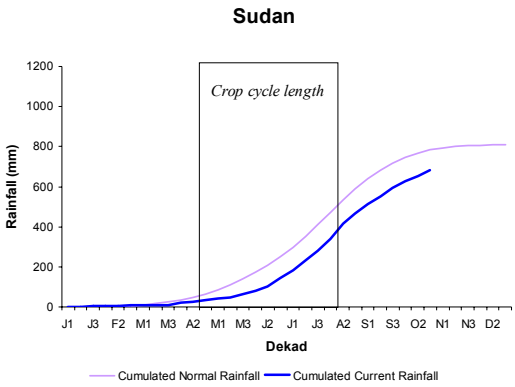
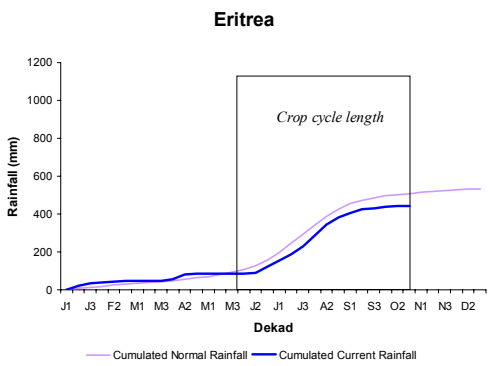
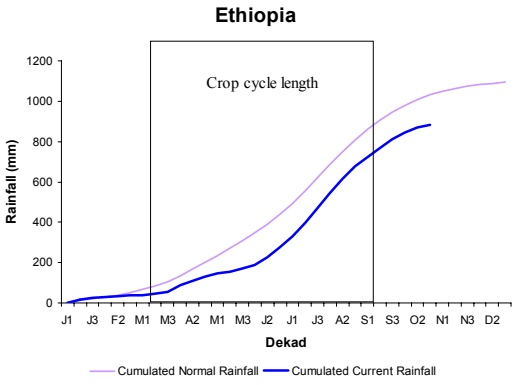
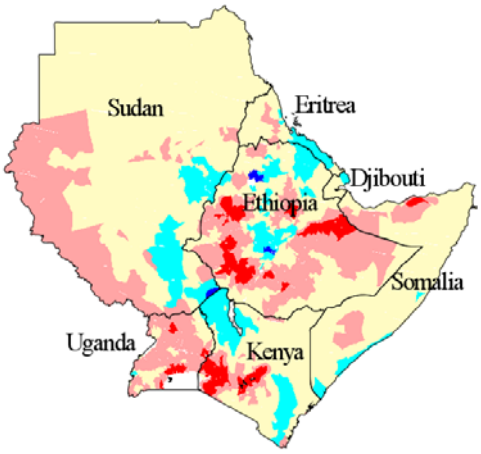
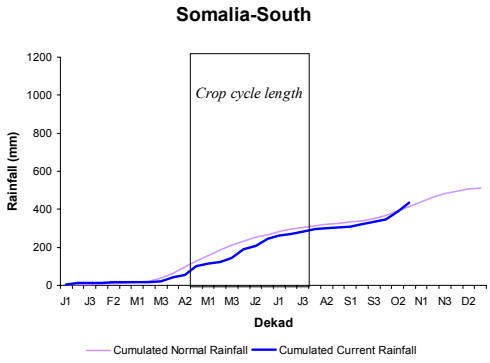
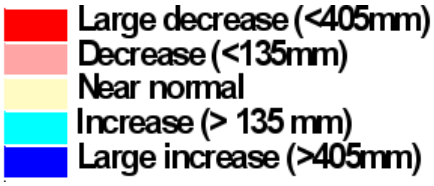


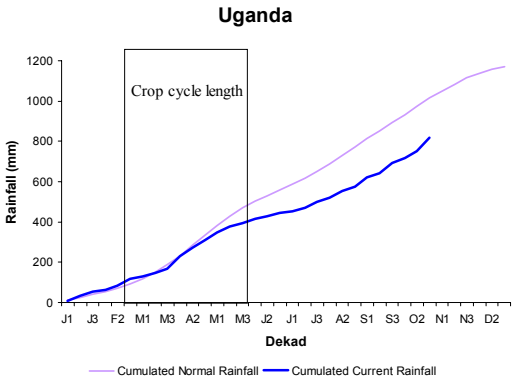












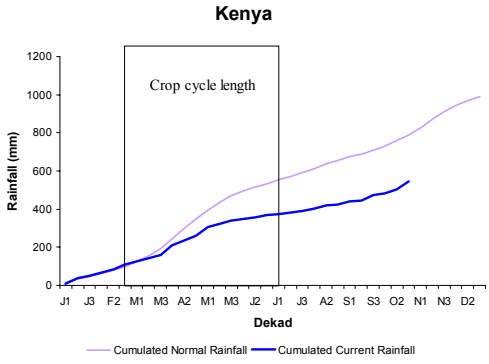
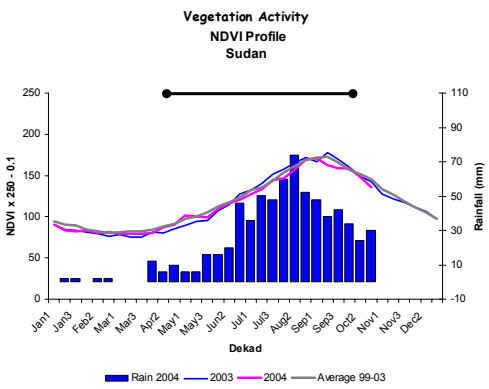
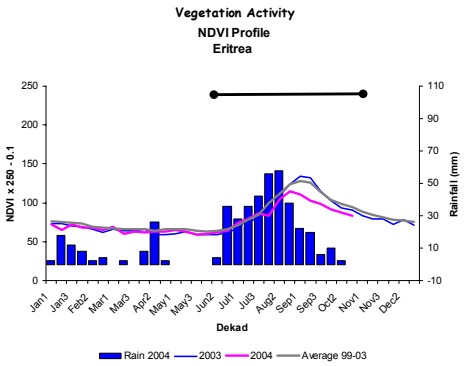
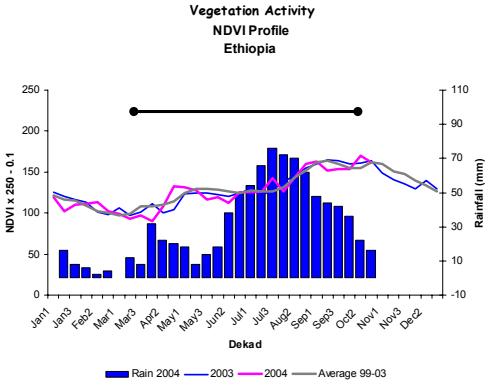
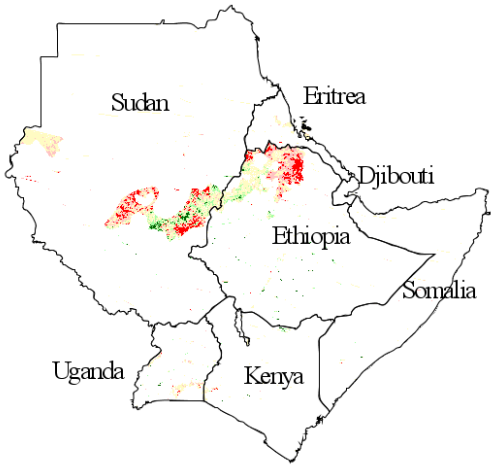


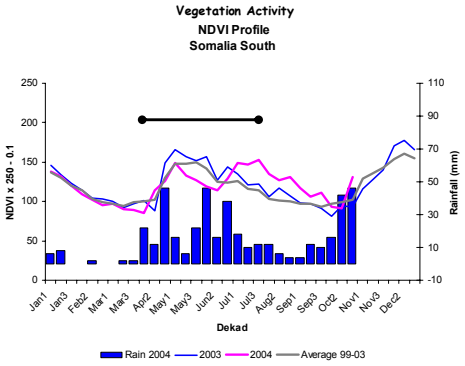
Figure 3 Rainfall difference with the cumulated normal up to the 3rd dekad of October 2004. Data are derived from the ECMWF model. Cumulated actual rainfall compared with normal in the graphs was spatially-averaged taking into consideration only the areas cultivated with maize and sorghum.

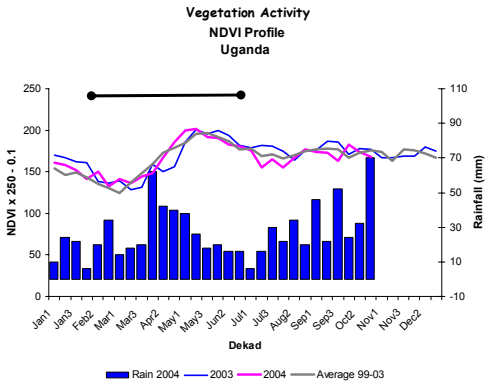


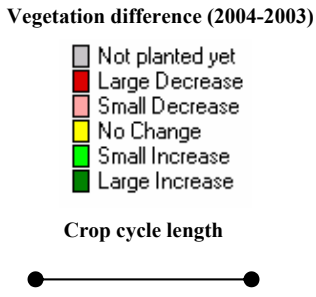












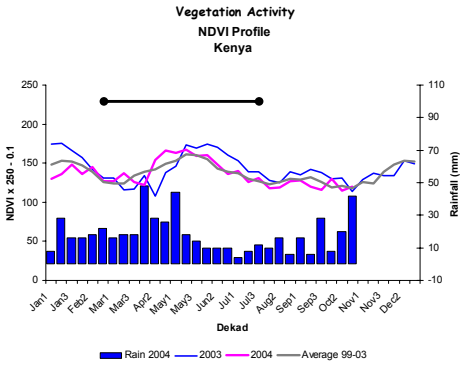


Figure 4 Normalized Difference Vegetation Index (NDVI). Absolute difference between October 2004 and the same month of the previous year. The areas that were not planted with sorghum and the areas, in which the crop cycle is completed, have been masked-out.

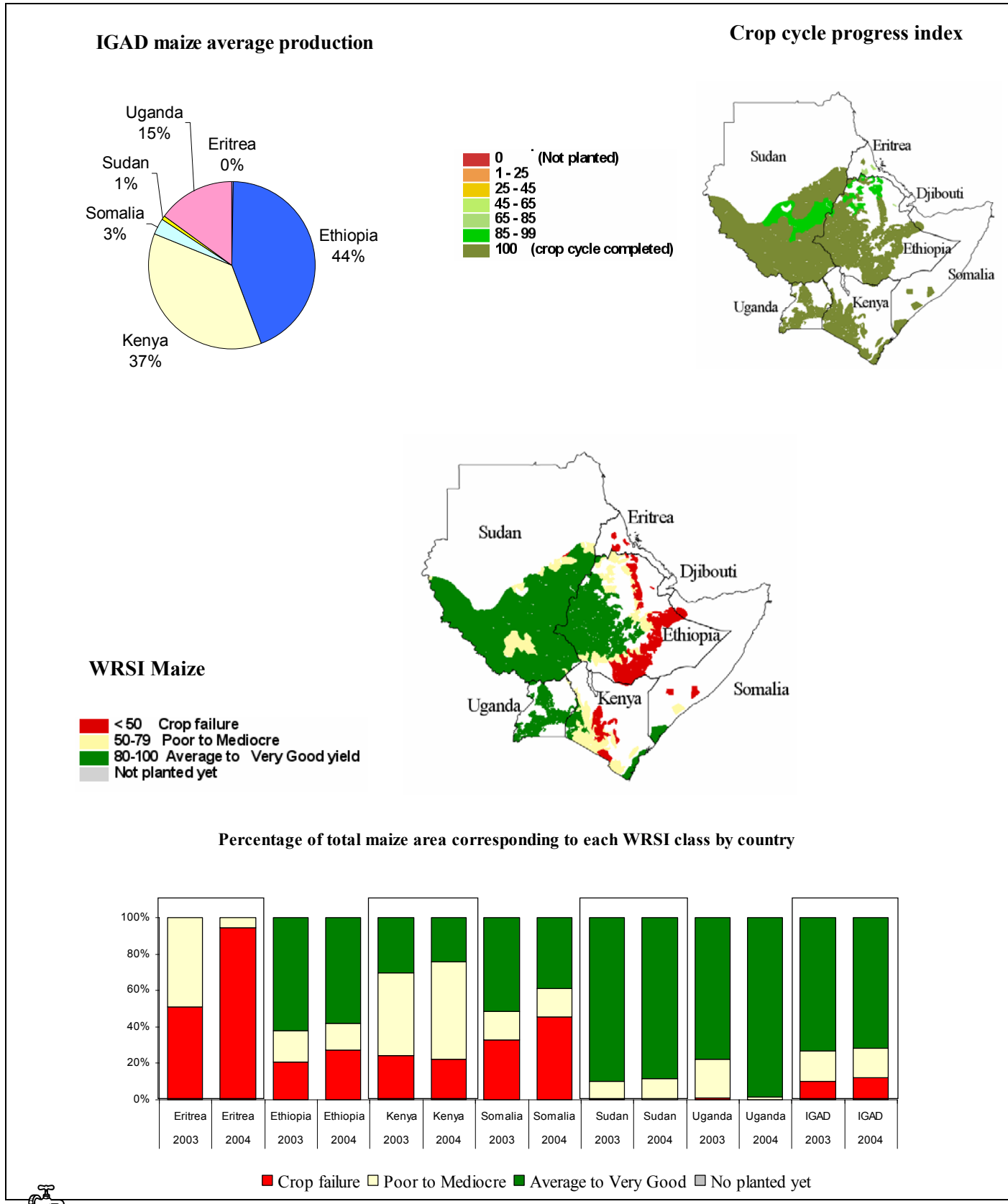


Figure 5. Water Requirement Satisfaction Index for maize 2004 (central Map) and comparison between WRSIs 2003 and 2004 (Bar graph)**.** For the whole region the situation of the rain-fed maize seems slightly worse than in 2003. In the areas where the maize cycle is not completed, normal rainfall was used to obtain the final value of WRSI. For these areas the WRSI values have to be considered as an early forecast for the crop yield situation (see Crop cycle progress index).

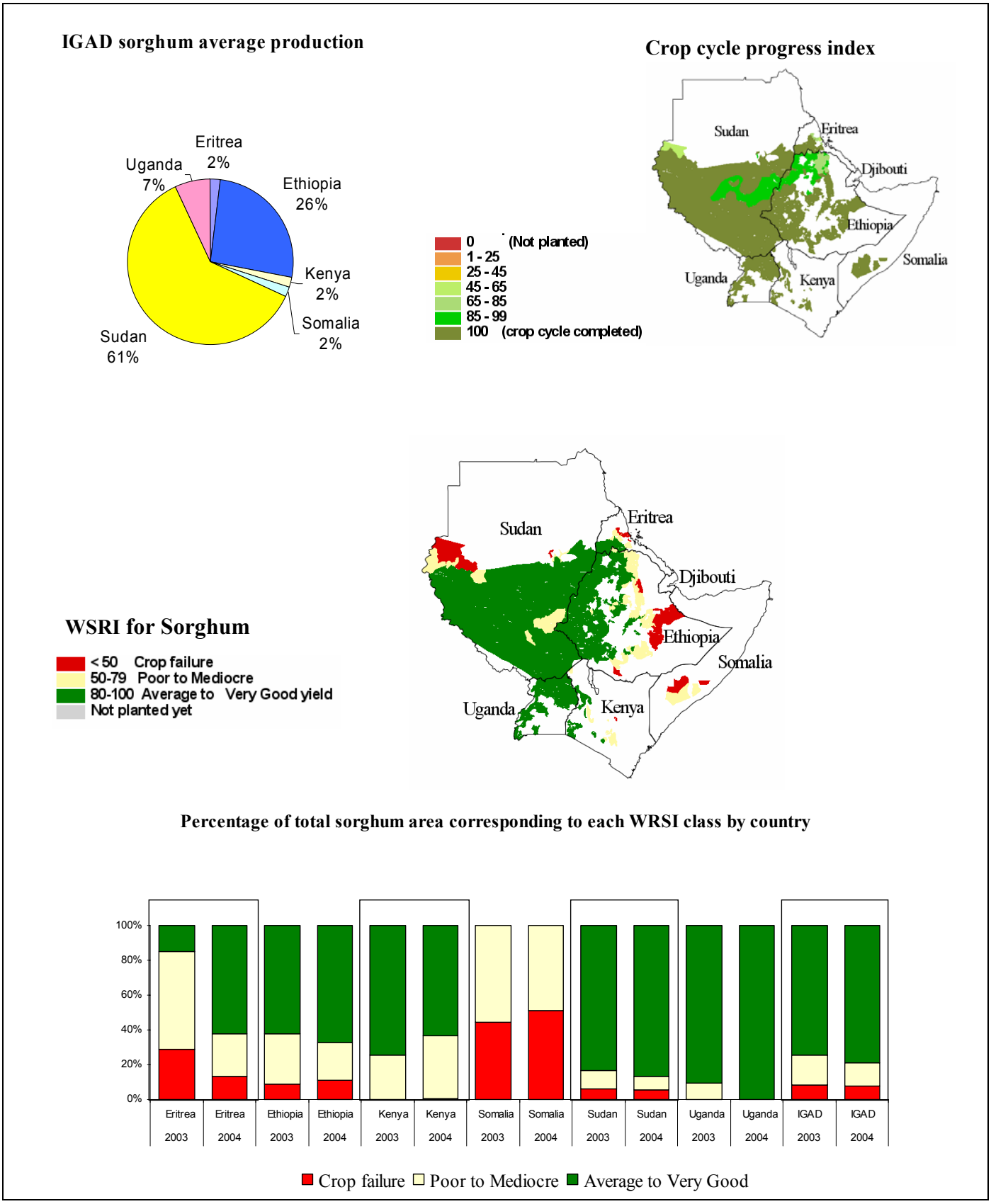


Figure 6 Water Requirement Satisfaction Index for sorghum 2004 (central Map) and comparison between WRSIs 2003 and 2004 (Bar graph)**.** For the whole region the situation of the rain-fed sorghum seems slightly better than in 2003. In the areas where the sorghum cycle is not completed, normal rainfall was used to obtain the final value of WRSI. For these areas the WRSI values have to be considered as an early forecast for the crop yield situation (see Crop cycle progress index).

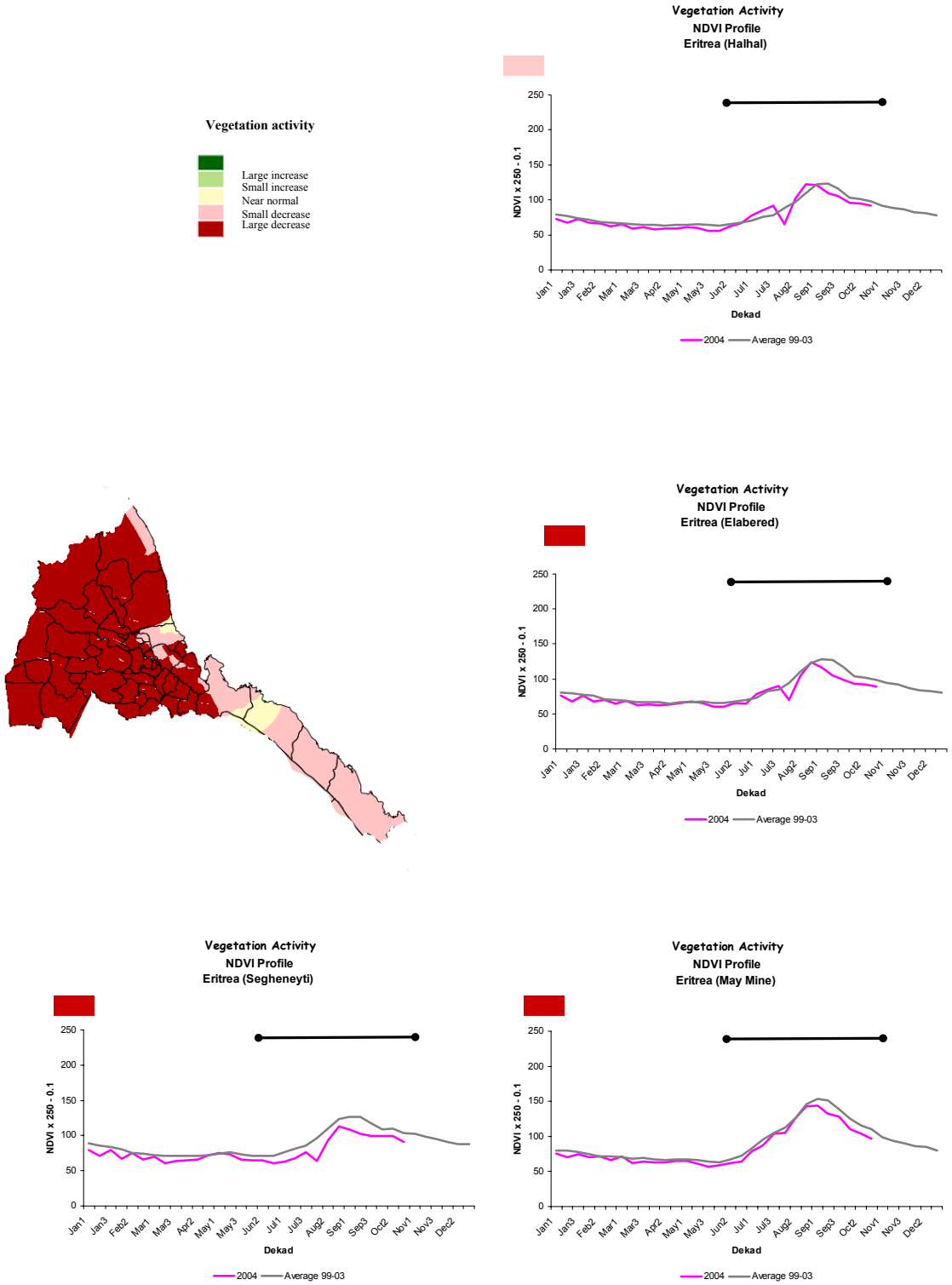


Figure 7 NDVI profiles for the administrative areas of Eritrea. For most of maize and sorghum areas the vegetation activity is classified much below normal based on the NDVI profiles.

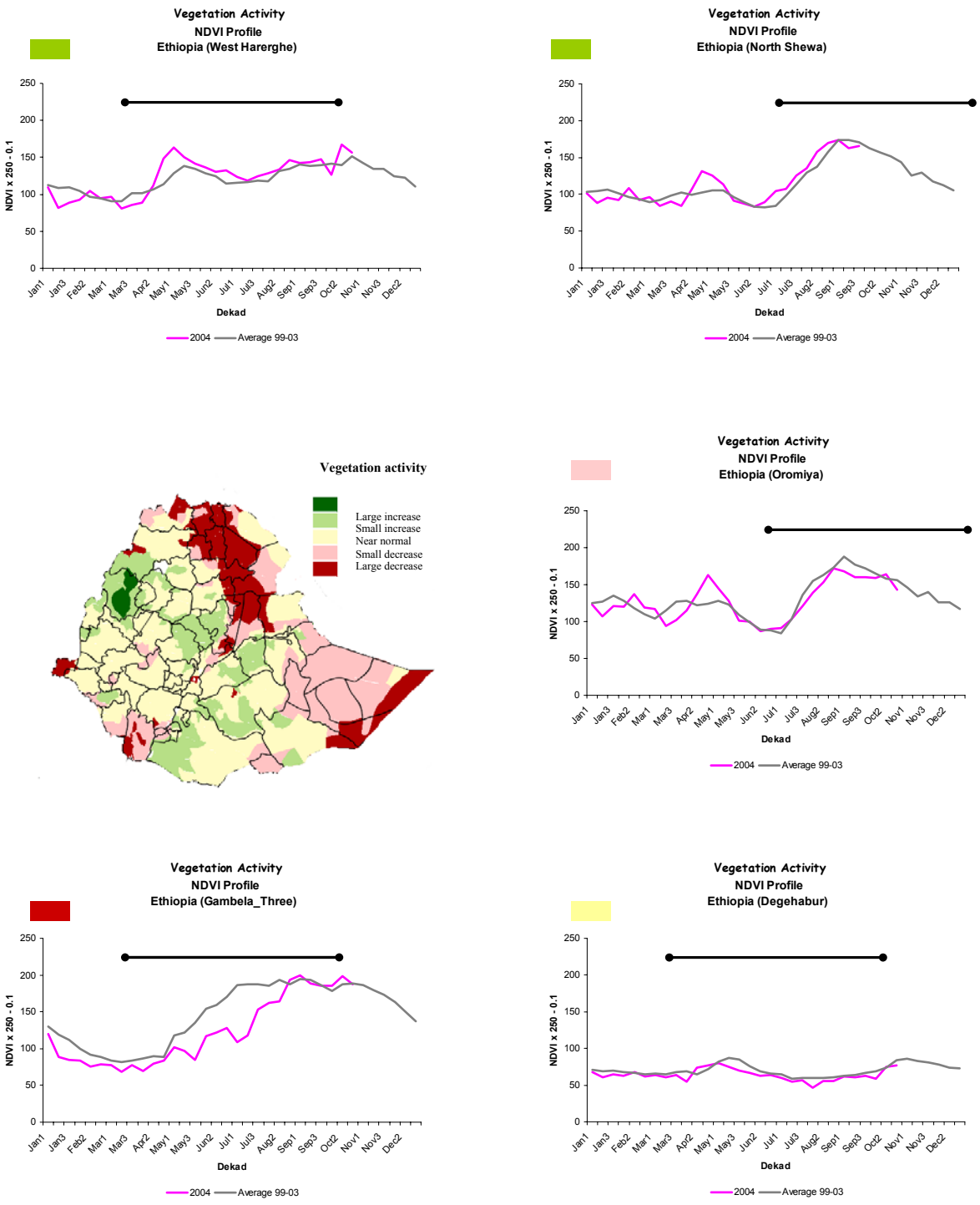


Figure 8 NDVI profiles for the administrative areas of Ethiopia. Mainly the districts of Somali, Gambela and western part of Oromiya regions are affected by drought showing a decrease of the vegetation activity.

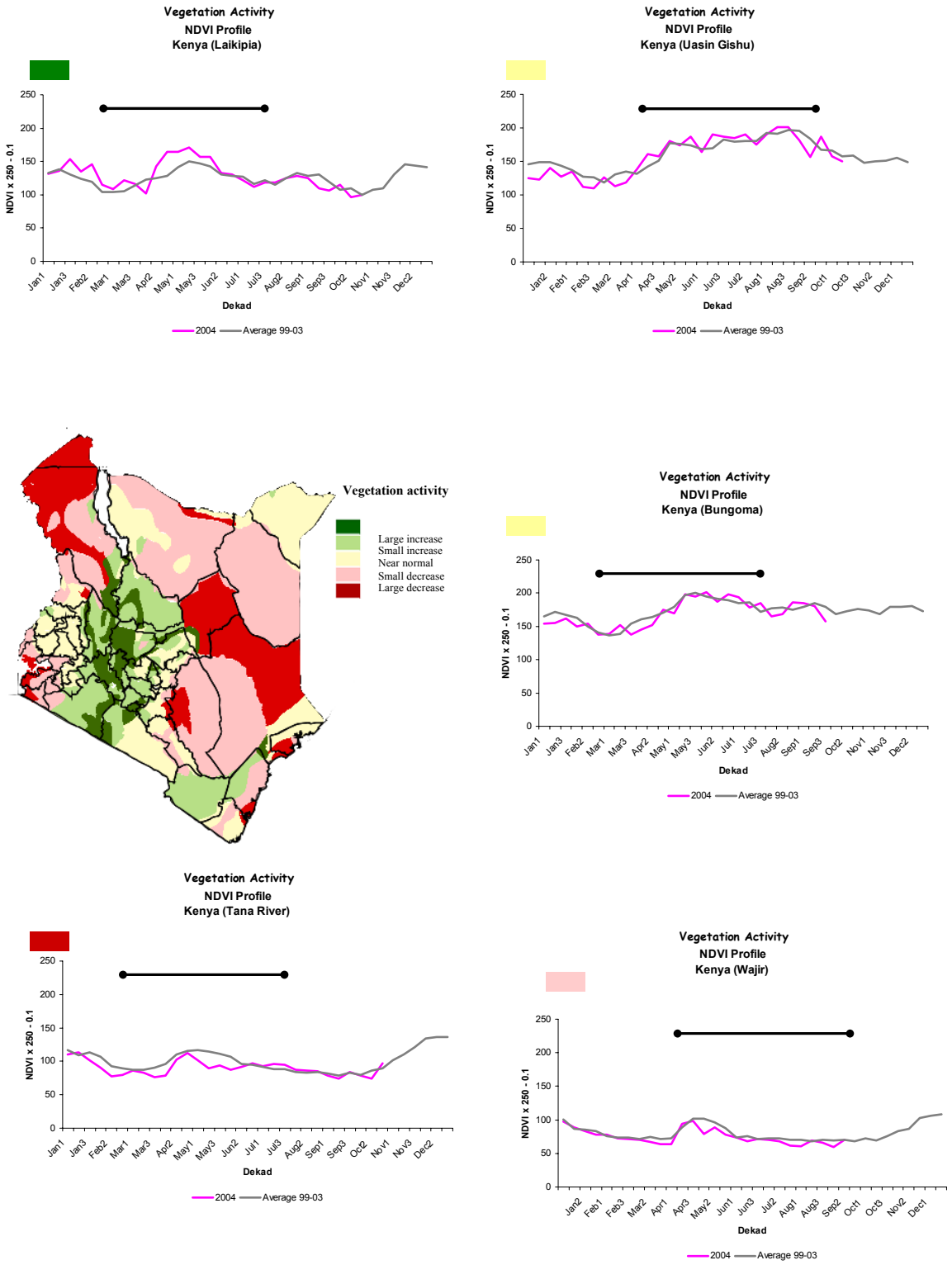


Figure 9 NDVI profiles for the administrative areas of Kenya. Mainly the districts of Coast, Nyanza, and northern part of North Eastern, Eastern and Rift Valley are affected by drought showing a decrease of the vegetation activity.

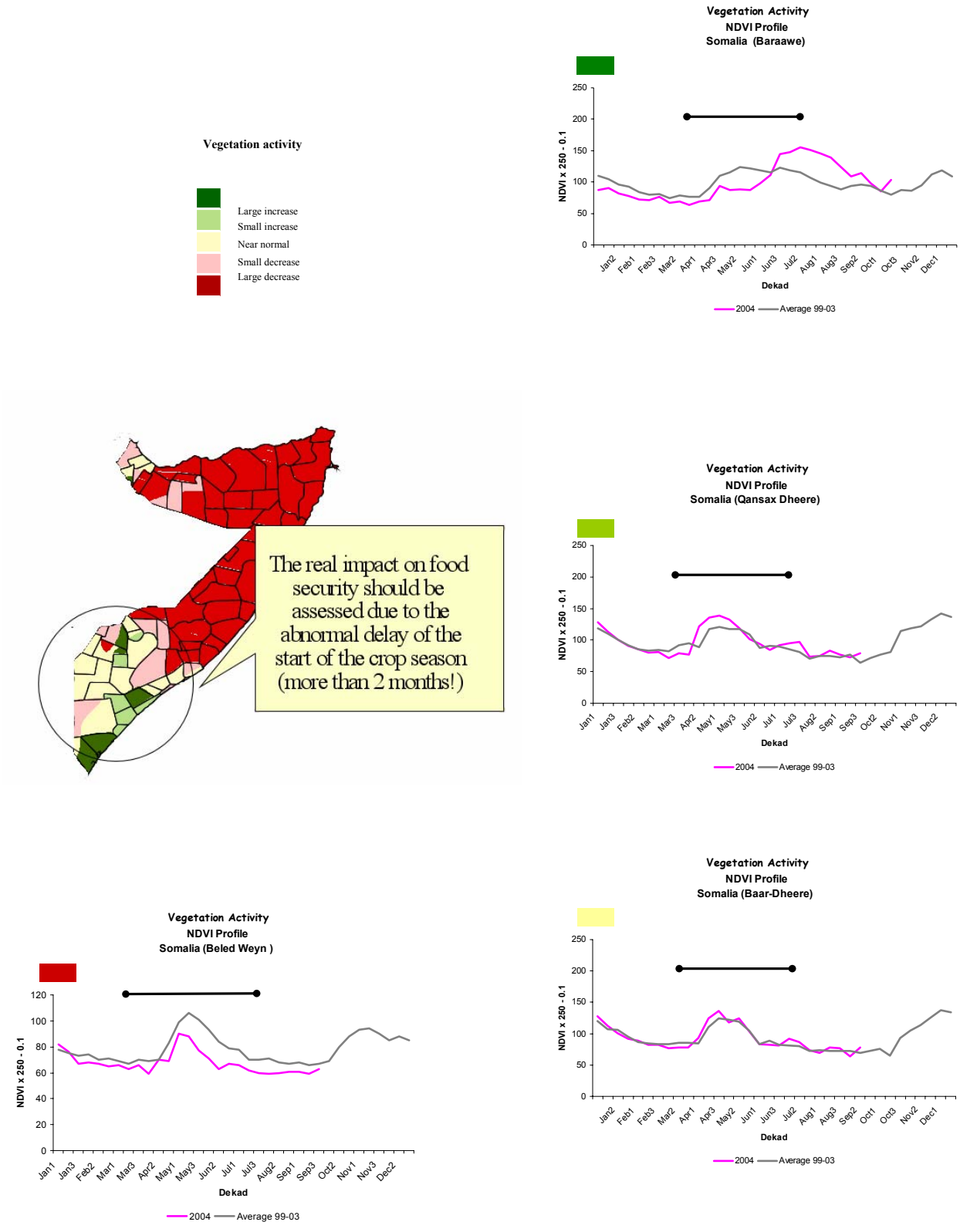


Figure 10 NDVI profiles for the administrative areas of NDVI profiles for Somalia. Most of the country is affected by the drought.

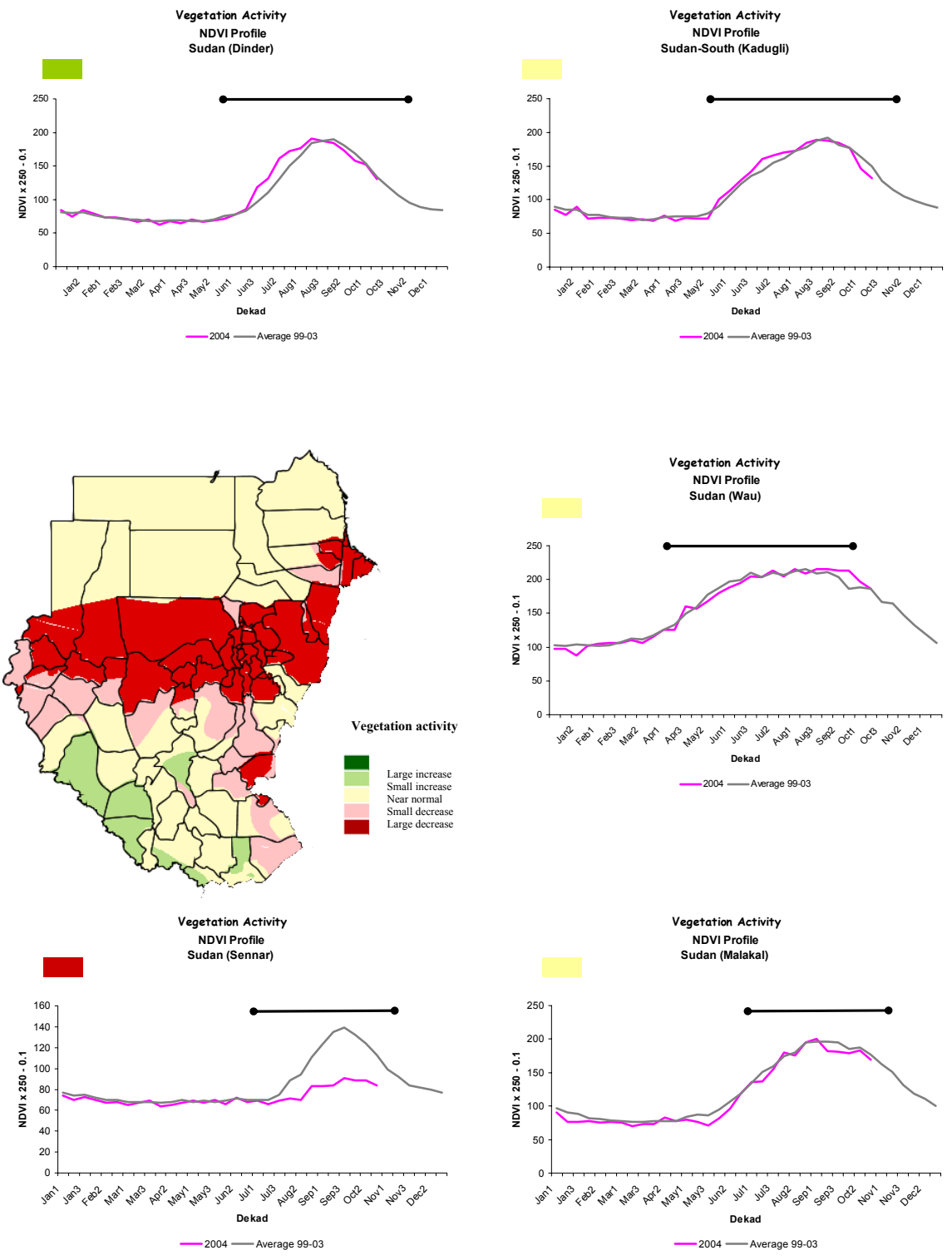


Figure 11 NDVI profiles for the administrative areas of Sudan. The districts of Juba, part of Junglei, Upper Nile and Darfur, Kordofan,White Nile, Sennar, Geraref and Kassala show a decrease of the vegetation activity.

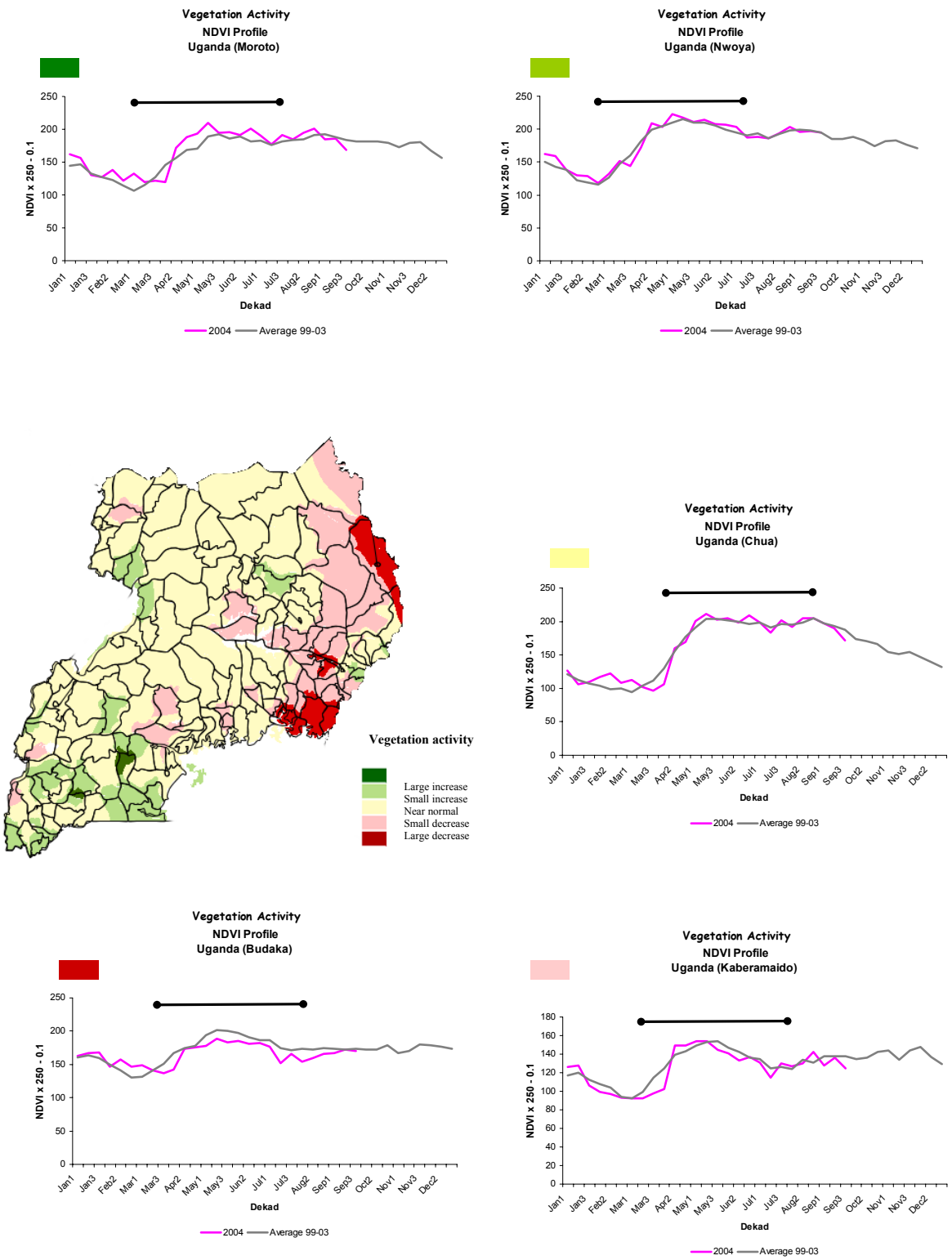


Figure 12 NDVI profiles for the administrative areas of Uganda. Mainly the districts of East Province show a decrease of the vegetation activity.