Government of Malawi

DEPARTMENT OF CLIMATE CHANGE AND METEOROLOGICAL SERVICES

AGROMETEOROLOGICAL UPDATE

FOR FIRST ROUND 2009/10 AGRICULTURALPRODUCTION ESTIMATES

Released 4th February 2010

2009/10 Season Preparedness

The Department of Climate Change and Meteorological Services issued the 2009/10 Seasonal Rainfall Forecast on 1st September 2009. At that time, weak El Niño conditions had established over the tropical Pacific and were projected to strengthen to moderate El Niño in the first quarter of 2010. El Niño conditions are usually associated with below normal rainfall over a greater part of Southern Africa and above normal over Eastern Africa. However, El Niño events bring mixed rainfall patterns over Malawi for instance good rainfall performance was experienced in 1997/98 and yet that was a strong El Nino season and localised droughts were experienced during 2004/05, 1994/95, 1991/92 and 1982/83 and most of these droughts started in the south.

In summary climate models suggested that during 2009/2010 rainfall season, a greater part of Malawi would experience normal total rainfall amounts. However, being an El Niño season, extreme weather events such as prolonged dry spells and flood were expected to occur

The Start and Progress of 2009/2010 Rainfall Season

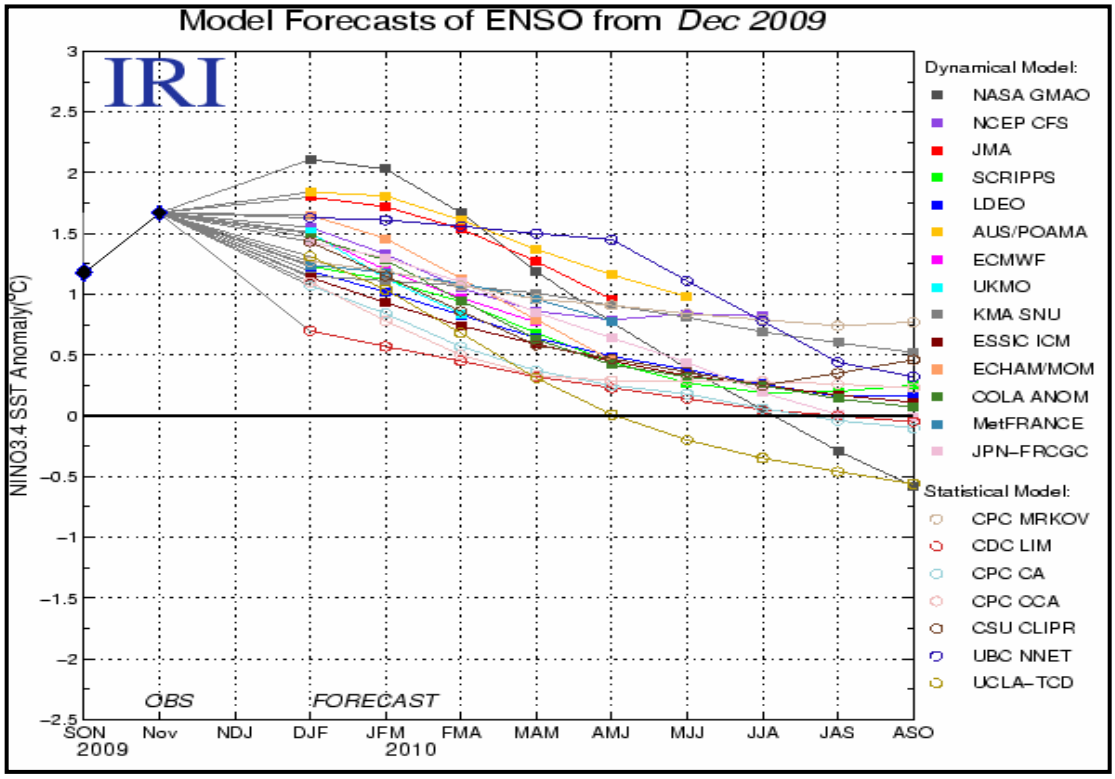
El Niño conditions have affected normal rainfall patterns over Malawi. The start of the main rains has been mixed. The rains started early in some districts and late in others. The main rains in the north came during early November which was one month earlier than normal, in the south and western parts of central Malawi the onset was between middle and end of November which was about normal. In the lakeshore districts of Nkhota Kota, Salima and some parts of Mangochi effective rains came between early and mid December 2009.

The spatial and temporal distribution and amount of the rainfall have been poor in some parts of the country especially in the south. The prolonged dry have negatively affected both crop and livestock production because in some areas crops reached permanent wilting point and pasture that started growing dried up. The worse affected districts are in southern Malawi and these include Nsanje, Chikwawa, Mwanza, Neno, Phalombe and some parts of Thyolo, Mulanje and Blantyre. Prolonged dry spells have caused stunted crop growth, wilting of crops resulting in varying degrees of yield losses, hampered farm operations like fertiliser application. Total crop failure has been reported in some districts especially in the south. The sporadic nature of rains coupled with soaring temperatures facilitated outbreaks of armyworms that attacked crops in 14 out the 28 districts.

At the end of January 2010, cumulative rainfall performance indicated that significant rainfall deficits exited in some parts of the country particularly in the south.

El-Niñ0 Update - Weak Warm Episode Forecast

Most of dynamical and statistical model forecasts from global climate prediction centres indicate a continuation of the EL Nino conditions through April/May 2010.



Rainfall Forecast for January to March 2010

Climate models continue to suggest that despite the dry spells experienced in January the greater part of Malawi should expect normal to above rainfall amounts by March 2010. The normal to above normal rainfall expected over Malawi could support water resources and growth and development of root and tuber crops.

Malawi Maize Yield Assessment using FAO Crop Specific Water Balance Model

The Crop Specific Water Balance Model was developed by Food and Agriculture Organization (Frere & Popov 1979, 1986). The Water Balance model is a very simple and physically sound soil water balance which is used to assess the impact of weather conditions on crops in any developing countries of the world. The water balance model is a calculation technique which compares available water (rainfall) and water requirements of a given crop for each 10-day period of the growing season.

A shortfall or large excess of water in any 10-day period will result in a reduction of the water requirement satisfaction index which the model generates as a means of monitoring crop conditions and forecasting yields. The model is used as a maize crop monitoring and yield assessment tool but can also be adapted for other crops. The model is used as an early warning tool for food security and it has been in use in Malawi since late 1980's

The Crop Specific Water Balance model requires data for rainfall, potential evapotranspiration, crop coefficient, soil water holding capacity and crop data such as planting dates and cycle

length. Efforts are underway to improve the water balance based models by incorporating crop productivity models. One of the potential candidates for this is the FAO AquaCrop Model.

2009/10 MODEL CHALLENGES

The sporadic performance of rainfall during the start of 2009/10 season challenged the model particularly when defining planting dates using weather station information. In some areas, this required a dense network of weather stations and considering a number of planting scenarios. The negative impact of external factors like armyworm attack could not be modelled. If we consider the fact that the localised poor rainfall performance this season has followed three consecutive good rainfall seasons, obviously the sensitivity of the model is being challenged. Some of the challenges were compounded by lack of fortnightly field reports from the extension officers in the Ministry of Agriculture and food security.

TABLE 1: 2009/10 LOCAL & COMPOSITE MAIZE PRODUCTION ESTIMATES

CROP YIELD ASSESSMENT BASED ON THE WATER SATISFACTION INDEX (WRSI)
YIELD: kg/ha WRSI: % AREA: Hectares PRODUCTION: Tonnes
90% CONFIDENCE INTERVAL: Y(est)+/-t(0,10)*Std. Err. of Y(est)
AREA BASED ON FIRST ROUND 2009/10 CROP ESTIMATES FIGURES

	09/10	09/10	YIELD	YIELD	09/10	09/10	PROD	PROD
ADD	**WRSI**	**YIELD**	**LOW**	**HIGH**	**AREA**	**PROD**	**LOW**	**HIGH**
SHIRE VALLEY	89	1034	713	1355	27821	28757	19823	37690
BLANTYRE	89	2146	1513	2779	144688	310524	218964	402083
MACHINGA	92	1417	1010	1824	217205	307827	219379	396275
SALIMA	98	2036	1373	2698	32626	66412	44807	88016
LILONGWE	97	1458	1081	1836	222760	324888	240744	409032
KASUNGU	99	2011	1559	2462	209314	420889	326403	515374
MZUZU	97	1484	857	2111	87720	130163	75155	185172
KARONGA	98	2081	1376	2785	27635	57497	38028	76965
NATIONAL	**95**	**1698**	**1220**	**2176**	**969769**	**1646955**	**1183302**	**2110608**

TABLE 2: 2009/10 HYBRID MAIZE PRODUCTION ESTIMATES

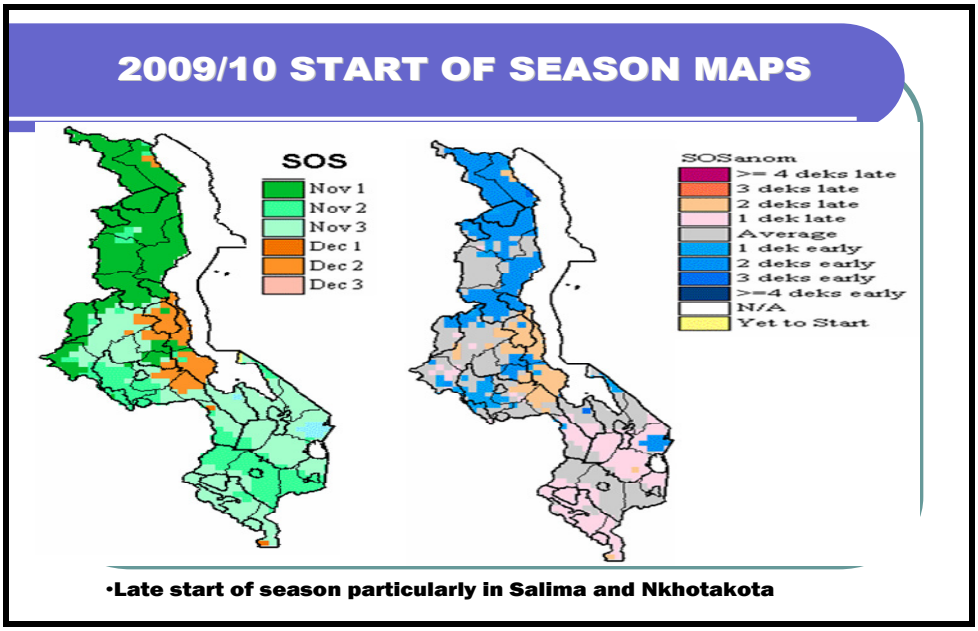
CROP YIELD ASSESSMENT BASED ON THE WATER SATISFACTION INDEX (WRSI)
YIELD: kg/ha WRSI: % AREA: Hectares PRODUCTION: Tonnes
90% CONFIDENCE INTERVAL: Y(est)+/-t(0,10)*Std. Err. of Y(est)
AREA BASED ON FIRST ROUND 2009/10 CROP ESTIMATES FIGURES

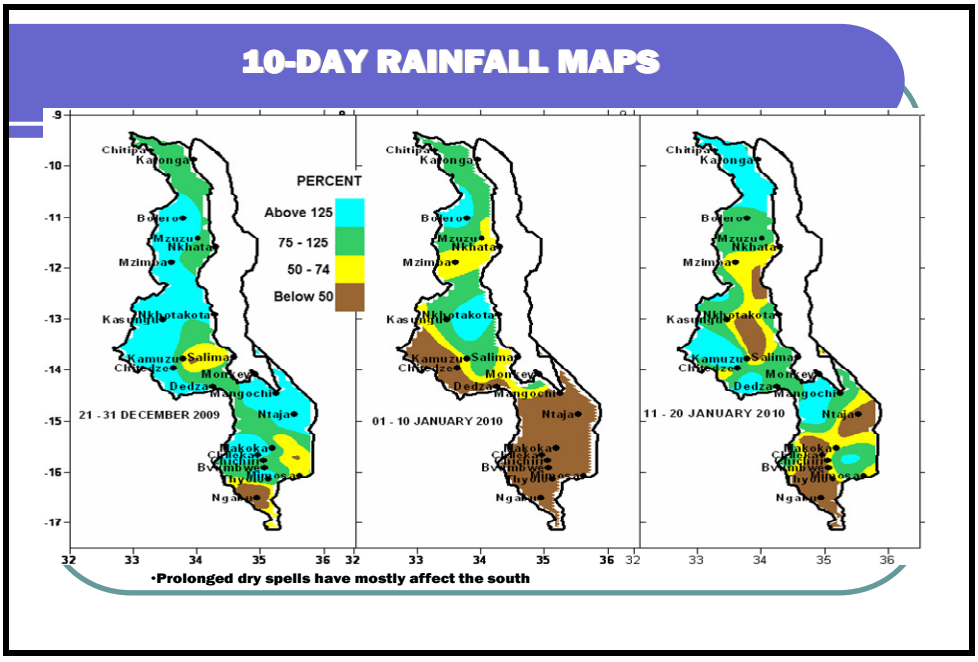
	09/10	09/10	YIELD	YIELD	09/10	09/10	PROD	PROD
ADD	**WRSI**	**YIELD**	**LOW**	**HIGH**	**AREA**	**PROD**	**LOW**	**HIGH**
SHIRE VALLEY	81	1211	705	1717	16419	19880	11569	28192
BLANTYRE	85	2175	1536	2814	106418	231446	163468	299423
MACHINGA	87	1420	883	1958	70184	99687	61971	137403
SALIMA	96	2336	1247	3425	111364	260156	138868	381444
LILONGWE	94	2394	1955	2834	116353	278574	227424	329723
KASUNGU	97	2527	1828	3227	144380	364897	263863	465931
MZUZU	96	2138	1205	3071	57320	122554	69082	176025
KARONGA	96	2687	1521	3852	17999	48355	27369	69341
NATIONAL	**91**	**2226**	**1505**	**2947**	**640437**	**1425548**	**963615**	**1887481**

In summary to come up with results in Tables 1 and 2 the following assumptions have been made:

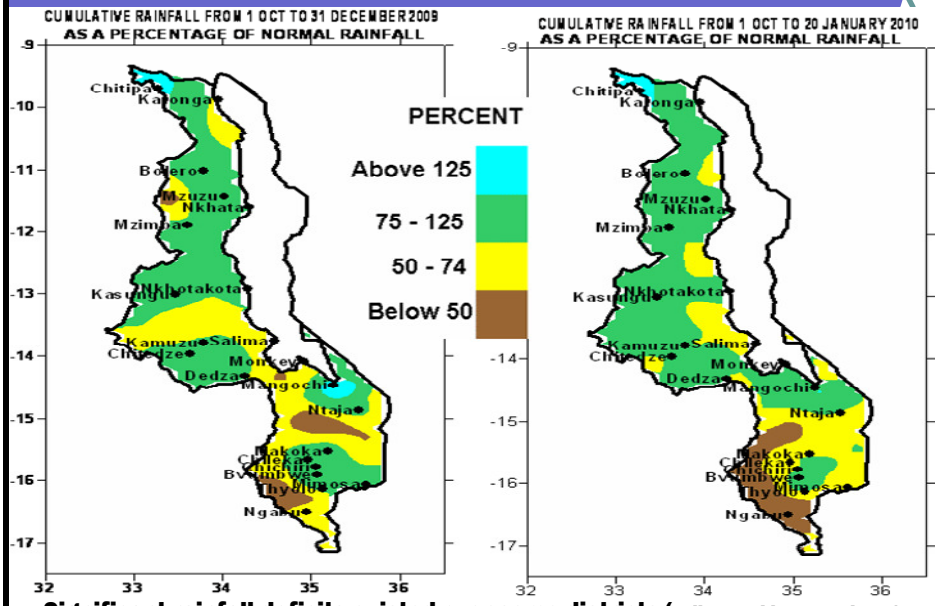
1. The rainfall performance between February and end of the season would be normal,
2. The remaining part of the 2009/10 season would not be affected by external factors like floods and outbreaks of pests and diseases and
3. There would be no changes on the first round 2009/10 figures for area planted to Maize.

Therefore the national level production of Local, Hybrid and Composite maize varieties for 2009/10 season using FAO Crop Specific Water Balance Model is estimated at **3,072,503** Metric Tons. Please note that the official source of agriculture production estimates in Malawi is the Ministry of Agriculture and Food Security.



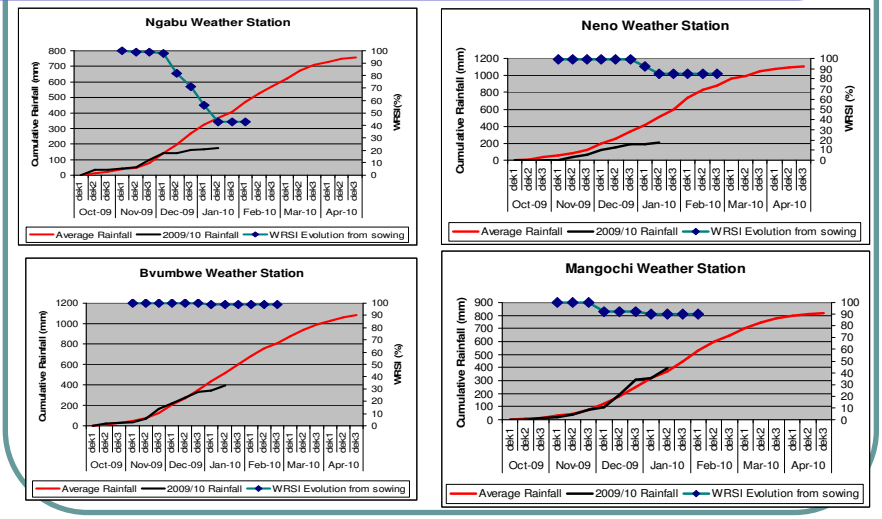


CUMULATIVE RAINFALL MAPS

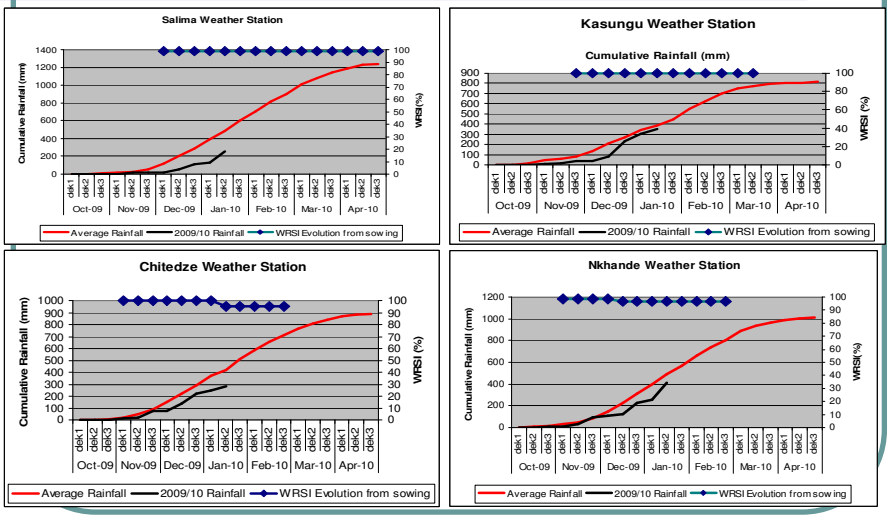


•**Significant rainfall deficits existed over some districts** (yellow and brown colours)

Weather station rainfall and WRSI evolution from sowing for maize - South



Weather station rainfall and WRSI evolution from sowing for maize - Centre



Weather station rainfall and WRSI evolution from sowing for maize - North