Government of Malawi

DEPARTMENT OF CLIMATE CHANGE & METEOROLOGICAL SERVICES

AGROMETEOROLOGICAL UPDATE

FOR THIRD ROUND 2010/11 AGRICULTURAL ESTIMATES

Released 13th JUNE 2011

SEASONAL HIGHLIGHTS

- **The DCCMS issued the Seasonal Rainfall Forecast for 2010/11 growing season on 1st September 2010**
- **The bottom line of the forecast was that during 2010/2011 rainfall season, a greater part of Malawi would experience normal to above normal total rainfall amounts that could result in floods especially in prone areas**
- **Generally effective rains started between end of November and mid December 2010 when most areas received adequate rains with better distribution**
- **However, from January localised areas started experiencing dry spells which intensified in February. The impact was most severe in sporadic localised areas in the south particularly for the late planted crop and local maize**
- **Between March and early April high rainfall intensities caused water logging soils conditions and flooding in low lying areas particularly in Karonga, Mzimba, Nkhotakota , Salima and Nsanje districts**
- **Cumulative rainfall situation at end of April 2011 indicated that a greater part of Malawi had received over seventy five percent of normal rainfall amounts**
- **Overall, seasonal rainfall performance has been better in the north and centre while localised areas in the south have experienced prolonged dry spells during critical months of January and February when most crops required ample moisture to develop**
- **Climate models indicate that a transition from La Niña conditions to ENSO-neutral conditions is underway across the equatorial Pacific and ENSO-neutral conditions are expected to develop during May-June 2011 and continue through the Northern Hemisphere summer 2011**
- **Despite localized dry spells in January and February and flooding between March and early April, 2010/11 national Maize production from the model is estimated at 3,725,224 Metric Tons.**

All inquiries should be addressed to: The Director of Department of Climate Change and Meteorological Services, P.O. Box 1808, Blantyre, MALAWI

2010/11 Growing Season Preparedness

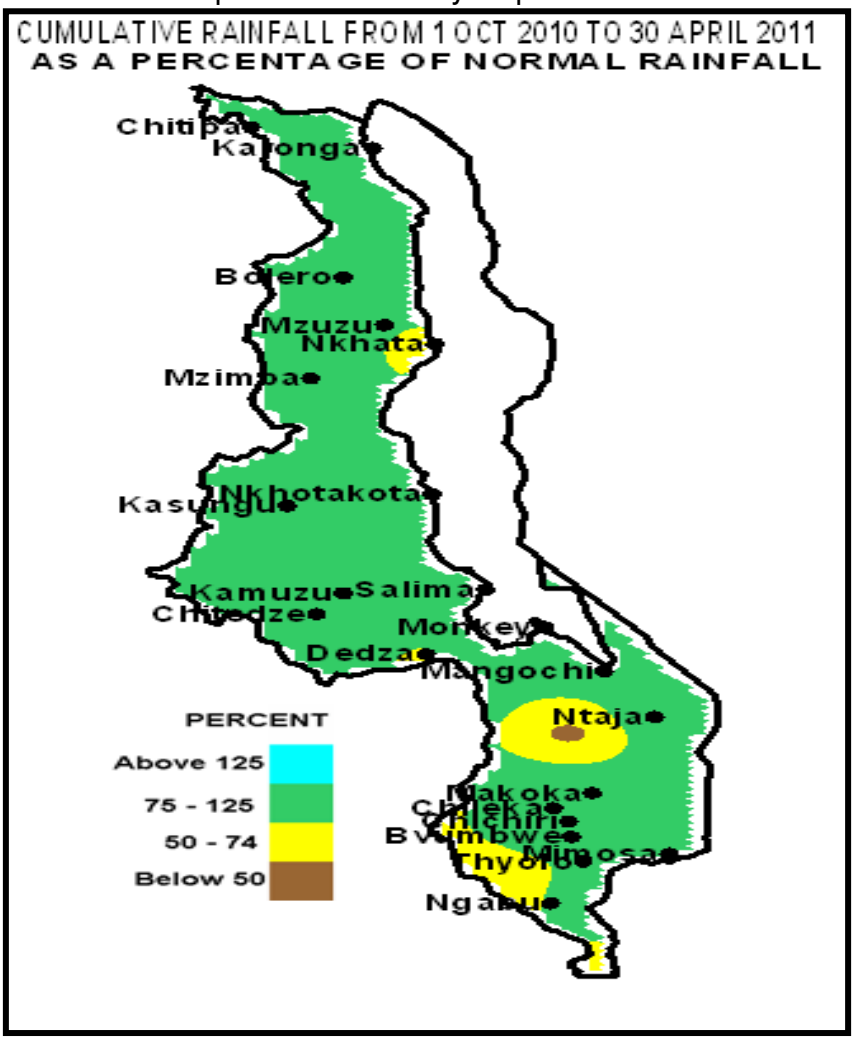
The Department of Climate Change and Meteorological Services issued the 2010/11 Seasonal Rainfall Forecast on 1st September 2010. At that time, moderate to strong La Nina conditions, which are the cooling of Sea Surface Temperatures over the eastern equatorial Pacific Ocean, had established and were predicted to persist into the first quarter of 2011.

La Nina conditions are usually associated with average to above average rainfall over a greater part of Southern Africa and drought conditions over Eastern Africa region. As such Malawi lies in the transition zone between Eastern African and Southern African climate regions. The effects of La Nina are therefore mixed depending on strengths.

The bottom line of the forecast was that during 2010/2011 rainfall season, a greater part of Malawi would experience normal to above normal total rainfall amounts that could result in floods especially in prone areas.

The Timing and Intra-Seasonal Rainfall Pattern during 2010/2011 Rainfall Season

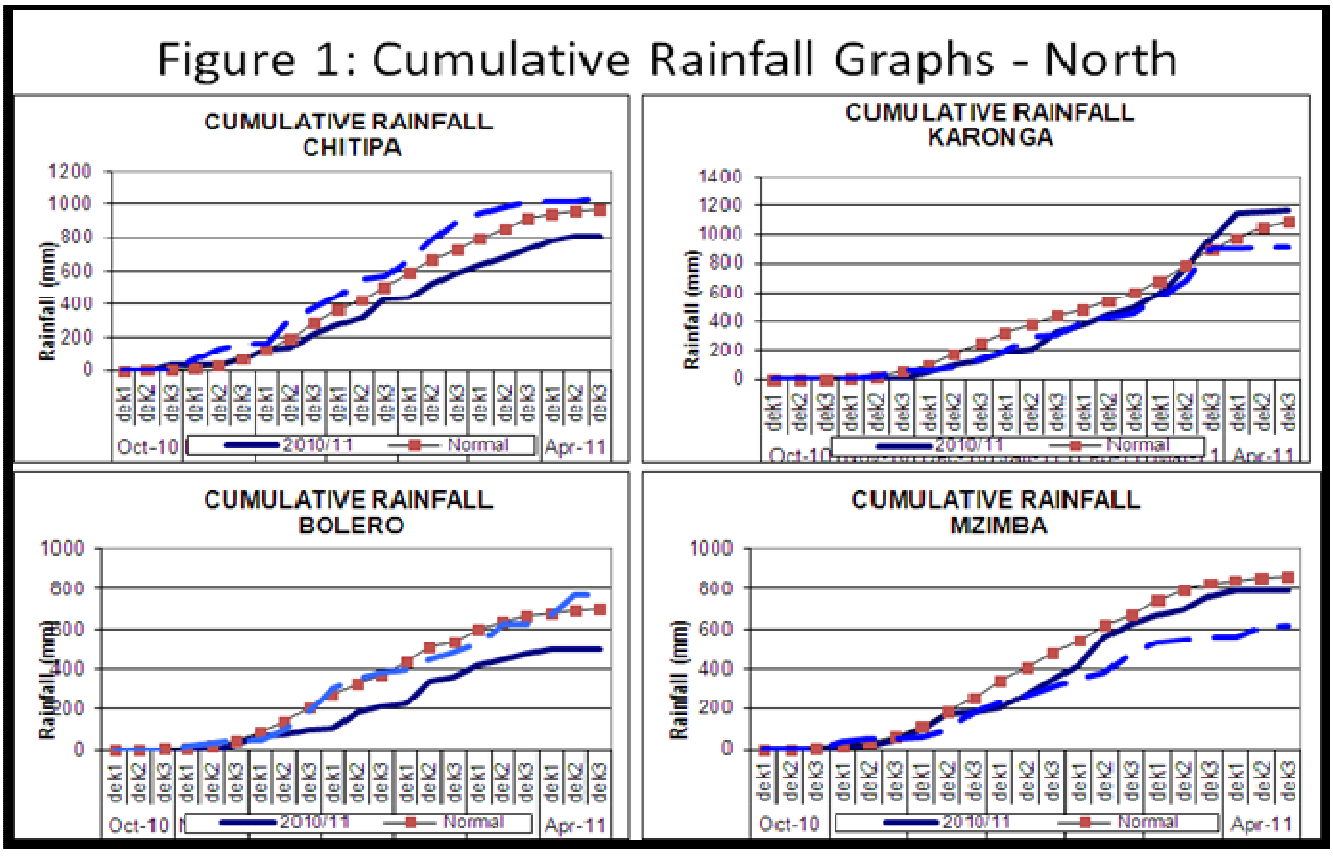
The timing of rains and intra-seasonal rainfall patterns are very important for smallholder farmers. Seasonality influences the farmers' decisions about when to finish land preparation, plant and harvest. It ultimately contributes the success or failure of their crops. The start of the main rains was generally between the middle of November and early December which represented average to late onset when compared to last season as well as the climatological start of rains in Malawi. A few areas received first effective rains in December and these included Karonga district in the north and some parts of Dedza and Mchinji districts in the Centre. The spatial and temporal distribution of rainfall in most areas has been good with no major breaks. At the end of December 2010, which is the end of the first half of the season, cumulative rainfall in Malawi had been generally normal to below normal. The

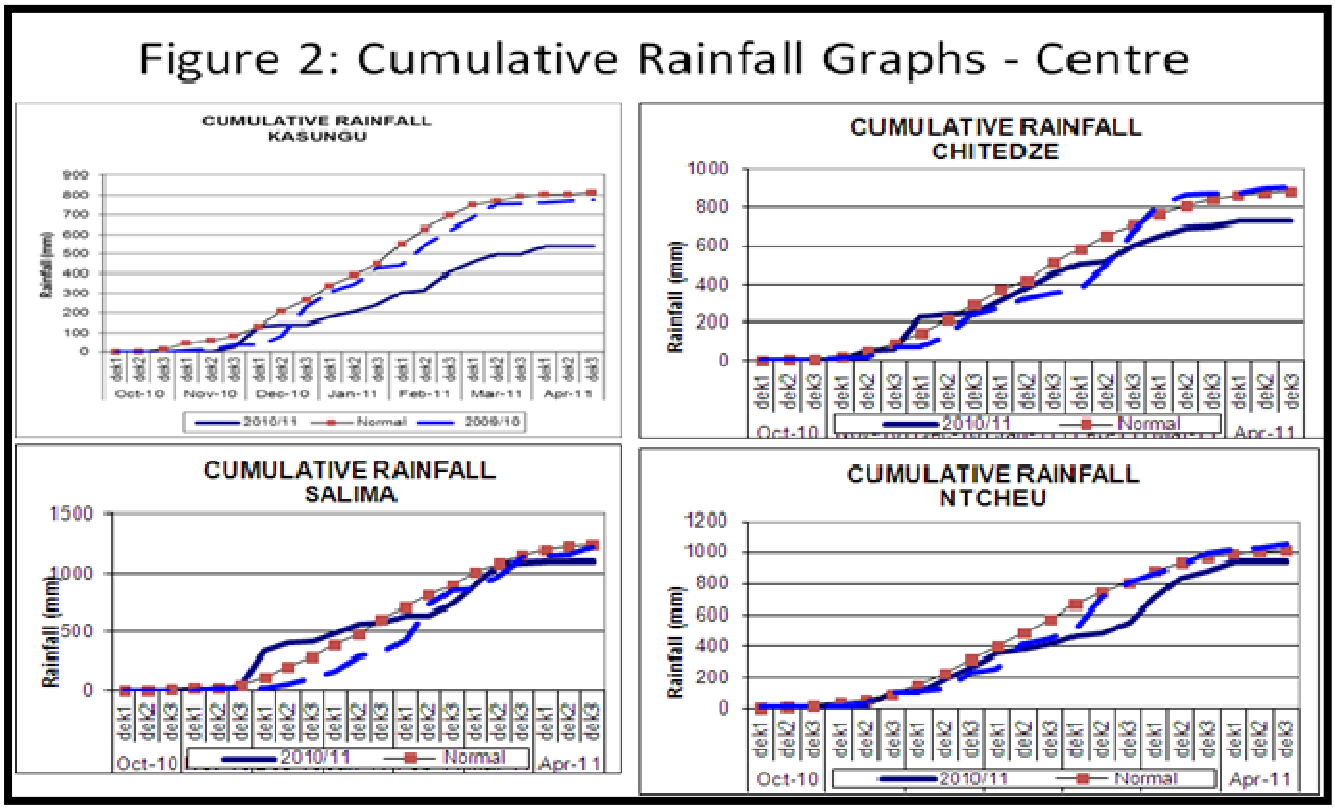


rainfall distribution and amounts had been generally good over northern and central parts of Malawi, while rainfall was poorly distributed in southern Malawi especially during critical months of January and February when most crops required ample moisture to develop.The impact of the dry spell was most severe on the late planted crop as well as local Maize crop. In contrast, crops were reported doing well in the northern and central parts of Malawi. Most parts of Malawi received high rainfall intensities between March and April 2011. These high intensities caused flooding particularly in low lying areas of Karonga, Mzimba, Nkhotakota , Salima and Nsanje districts. The cessation of the main rains was during early April 2010 which was normal for the South and Centre and early in the North. Climatologically the main rainfall season in the north ends between end of April and early May 2011.

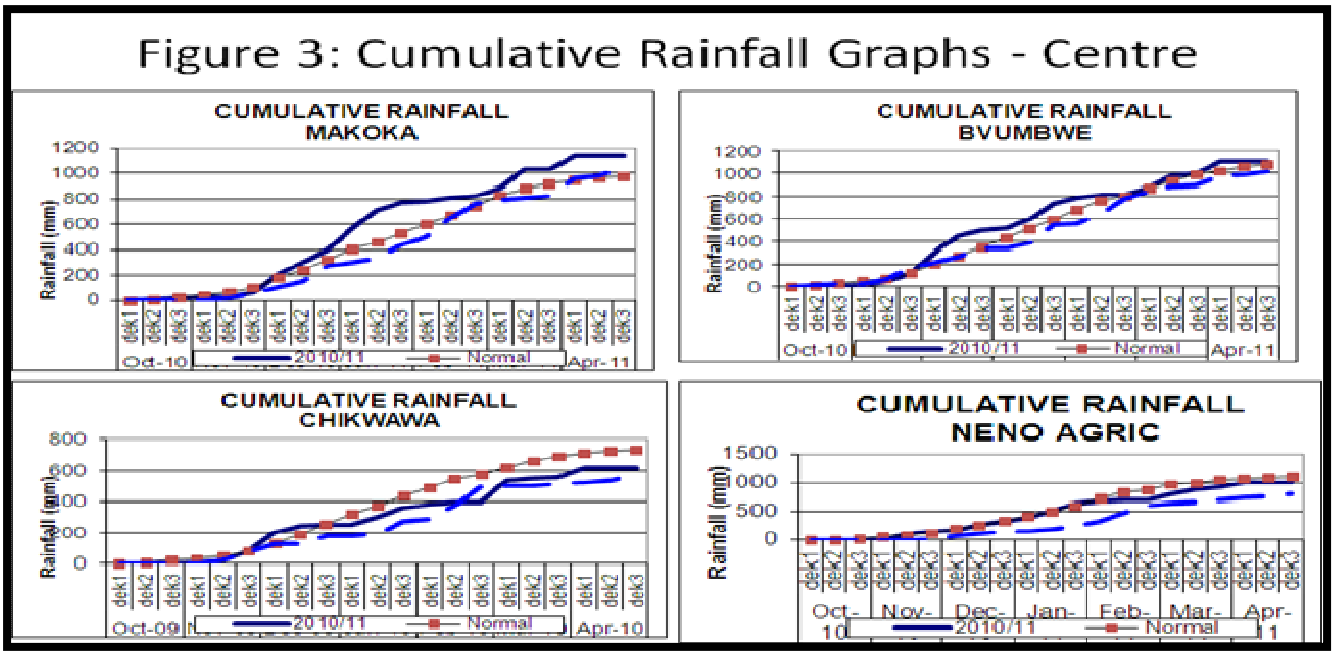
Cumulative rainfall performance from October 2010 up to 30 April, 2011 indicated that the 2010/11 rainfall season in Malawi has been generally good although localized rainfall deficits have been experienced. Notable areas with rainfall deficits were mostly confined along Shire River including Chikhwawa and Balaka districts. The rainfall deficits have been mainly due to prolonged dry spells in January and February 2011. At the same time ten day cumulative rainfall graphs indicated that generally less but well distributed rainfall has been received in the north and centre this season compared to last season.

Figure 1: Cumulative Rainfall Graphs - North





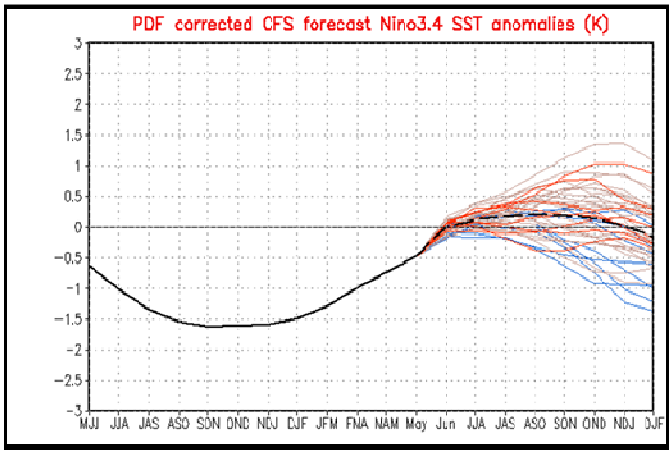
On the other hand the south has received more rains this season compared to last season but the distribution has been poor especially during the critical months of January and February when most crops required ample moisture to develop.



Rainfall Forecast for June to August 2011

A series of high pressure systems are likely to periodically induce cool and moist air from the Indian Ocean into Malawi. Therefore, occasional rains are expected particularly over highlands and along the lakeshore during the months of June, July and August 2011

El Nino / La Niña Update



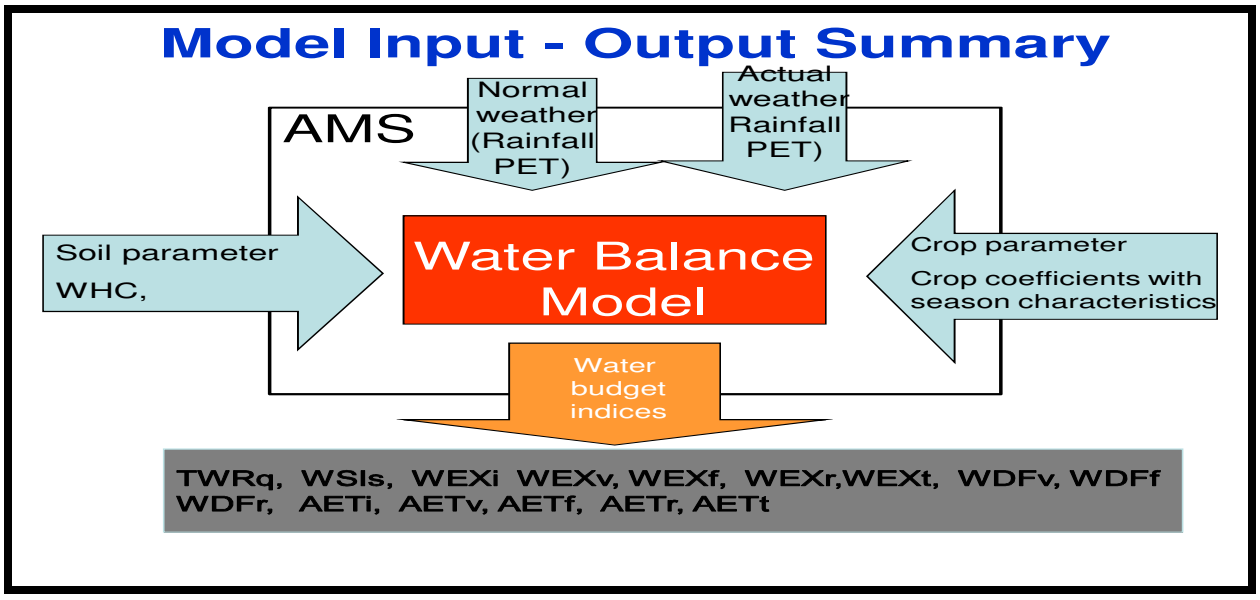
Meanwhile most climate models indicate that a transition from La Niña conditions to ENSO-neutral conditions is underway across the equatorial Pacific and ENSO-neutral conditions are expected to develop during May-June 2011 and continue through the Northern Hemisphere summer 2011. This means that the coming rainfall season in terms of predictors is likely to be a neutral season. However, the Department of Climate Change will release the 2011-12 seasonal rainfall forecast by September 2011.

THE MALAWI MAIZE YIELD ASSESSMENT MODEL

Background Information

The Malawi maize yield assessment model is an FAO Crop Specific Water Balance Model that was originally developed for the Food and Agriculture Organization (FAO) by Frere & Popov. The Water Balance model is a simple calculation technique which compares available water (rainfall) and water requirements of a given crop for each 10-day period of the growing season. In Malawi this model is used as a maize crop monitoring and yield assessment tool but can also be adapted for other crops. It is also used as an early warning tool for food security. It has been in use in Malawi since late 1980's. Currently efforts are underway to improve the water balance based models by incorporating crop productivity models like the FAO AquaCrop Model. The Department of Climate Change and Meteorological services have started calibration and testing of Aquacrop model as a step toward improving its estimations of the contributions of rainfall to maize yields and production. The relevant trials have started implemented during in 2010/11 season. The DCCMS is also updating the coefficients underlying the Malawi Maize Index water balance model.

The main objectives of this model Include monitoring Crop conditions with the aim of objectively predicting yields (tons/ha) and production long before the harvesting actually takes place and also to support early warning systems for food security, drought risk management instruments at national and household levels as an adaptation to climate change in agriculture.

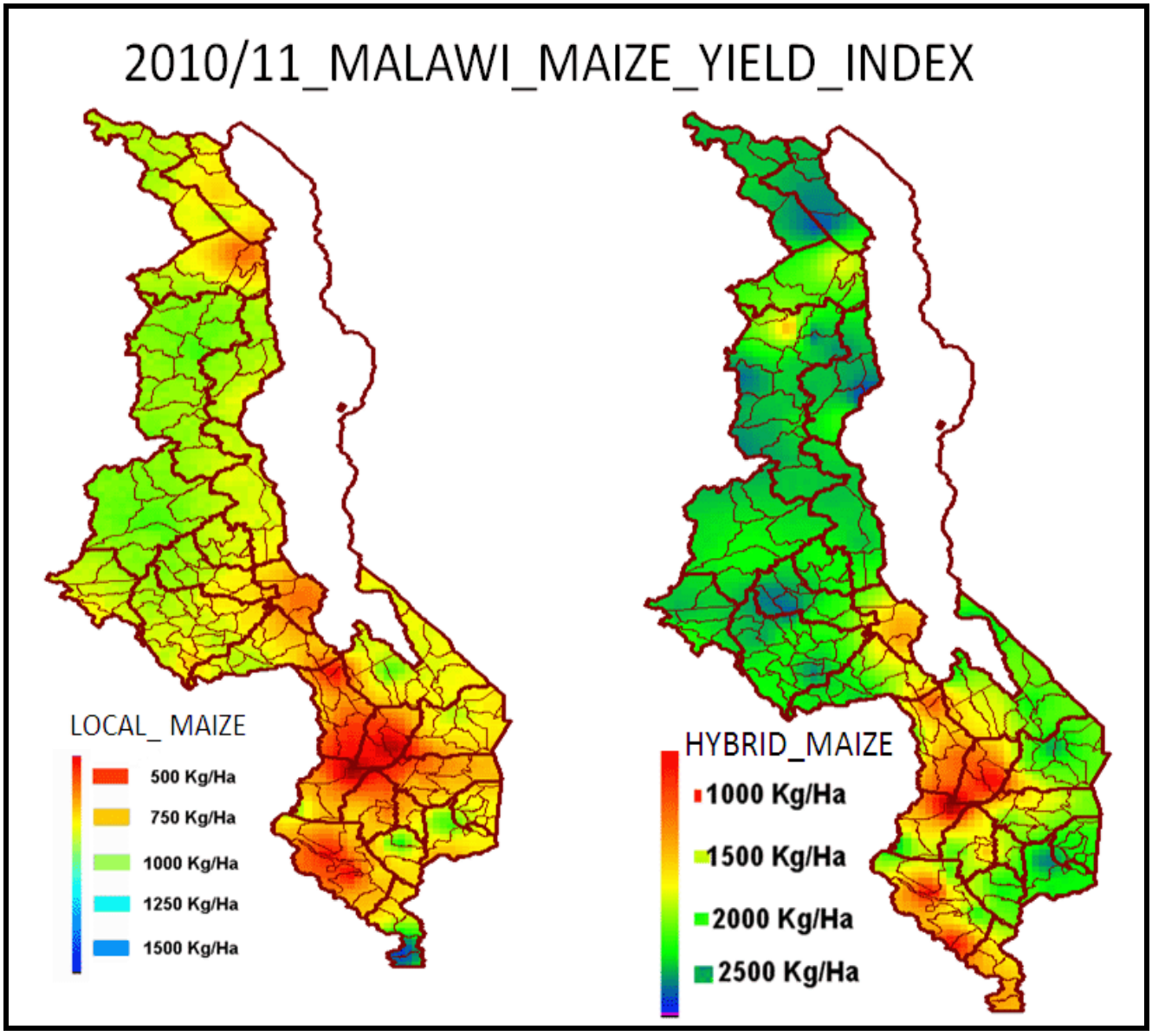


In this model Crop yield indices have been calculated for past years for various locations in Malawi. Using simple linear regression analysis, the data was analysed against historical crop yields data for each location.

The relationship between the index and yields is tentatively as follows:

Index	Comments	Expected Yields
100	Excellent	100% or more
97 – 99	Good	90 – 99%
80 – 96	Average	50 – 89%
60 – 79	Mediocre	20 – 49%
50 – 59	Poor	10 – 19%
<50	Complete failure	<10%

It is important to note that the model must have reliable historic yield data in order to forecast yields. In other words, the model is not a substitute for a well-functioning system that gives statistically sound estimates of crop yields as well as area and production. However, the model can be used in conjunction with such a system, particularly to serve as a check.



2010/11 RESULTS FROM MAIZE YIELD ASSESSMENT MODEL

TABLE 1: 2010/11 LOCAL & COMPOSITE MAIZE PRODUCTION ESTIMATES

LOCAL MAIZE – SEASON 2010–2011

ADD	Area Pl.	WRSI	a	b	S.E.	t stud.
SHIRE VALLEY	30206	82	−65.01	1.679	14.289	1.761
BLANTYRE	136548	85	−68.00	1.663	13.821	1.714
MACHINGA	207481	84	−86.13	1.978	15.190	1.714
SALIMA	35416	96	−128.30	2.444	13.652	1.721
LILONGWE	217566	91	−114.41	2.275	10.452	1.692
KASUNGU	208119	95	−80.44	1.909	11.668	1.693
MZUZU	89708	96	−85.82	1.980	10.945	1.717
KARONGA	27103	93	−140.85	2.583	13.004	1.812
NATIONAL	952147	90	−86.17	1.954	12.980	1.645

RDP	EST. YIELD (% Max.)	EST. YIELD (kg/ha)	EST. PROD. (Tonnes)	YIELD LOW	YIELD HIGH	PRODUCTION LOW	PRODUCTION HIGH
Balaka	80	1483	60223	1002	1963	40709	79736
Blantyre	73	2249	53740	1521	2977	36352	71129
Chikwawa	72	1133	27215	738	1527	17736	36694
Chiradzulu	73	1811	28912	1225	2398	19557	38267
Chitipa	100	2816	45550	2151	3480	34803	56297
Dedza	94	1822	108947	1478	2166	88385	129510
Dowa	101	2456	142095	1975	2938	114251	169940
Karonga	100	2340	25565	1788	2892	19533	31597
Kasungu	101	3060	195641	2460	3660	157303	233978
Likoma	104	2072	12	1696	2448	10	15
Lilongwe	94	2220	213453	1801	2639	173166	253740
Machinga	80	2036	76938	1376	2695	52009	101867
Mangochi	80	1785	144564	1206	2363	97723	191405
Mchinji	101	2446	148153	1966	2925	119121	177185
Mulanje	73	2007	58660	1358	2656	39680	77641
Mwanza	73	1433	12978	969	1896	8779	17177
Mzimba	104	3128	235497	2561	3696	192779	278215
Neno	73	1522	23250	1030	2015	15727	30773
NkhataBay	104	2624	18210	2148	3100	14907	21513
Nkhotakota	106	2608	38047	2029	3187	29606	46489
Nsanje	72	1307	8078	852	1763	5265	10892
Ntcheu	94	1995	122932	1618	2372	99730	146134
Ntchisi	101	3254	83808	2616	3891	67385	100230
Phalombe	73	2031	53223	1374	2689	36002	70443
Rumphi	104	3242	24246	2654	3830	19848	28644
Salima	106	2437	50767	1897	2978	39503	62031
Thyolo	73	2218	37566	1501	2936	25411	49721
Zomba	80	1652	79411	1117	2188	53680	105141

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 SECOND ROUND 2010/11 CROP ESTIMATES FIGURES

ADD	10/11 WRSI	10/11 YIELD	YIELD LOW	YIELD HIGH	10/11 AREA	10/11 PROD	PROD LOW	PROD HIGH
SHIRE VALLEY	82	1168	761	1575	30206	35293	23001	47585
BLANTYRE	85	1965	1329	2601	136548	268330	181509	355151
MACHINGA	84	1741	1177	2305	207481	361135	244122	478149
SALIMA	96	2508	1951	3064	35416	88814	69109	108520
LILONGWE	91	2047	1661	2433	217566	445332	361281	529383
KASUNGU	95	2737	2201	3274	208119	569696	458060	681333
MZUZU	96	3099	2536	3661	89708	277965	227543	328387
KARONGA	93	2624	2005	3243	27103	71115	54336	87894
NATIONAL	90	2224	1700	2748	952147	2117681	1618960	2616402

TABLE 2: 2010/11 HYBRID MAIZE PRODUCTION ESTIMATES

HYBRID MAIZE – SEASON 2010–2011

ADD	Area Pl.	WRSI	a	b	S.E.	t stud.
SHIRE VALLEY	13902	87	−108.484	1.991	12.513	1.734
BLANTYRE	120900	91	−108.072	1.982	10.000	1.740
MACHINGA	85229	84	−72.913	1.448	7.893	1.833
SALIMA	29015	96	−57.574	1.334	18.938	1.729
LILONGWE	130338	93	−52.891	1.350	6.276	1.833
KASUNGU	192230	96	−31.645	1.063	11.382	1.729
MZUZU	61786	97	−24.802	0.853	13.925	1.782
KARONGA	22443	95	−194.014	2.779	18.037	1.771
NATIONAL	655843	92	−76.262	1.763	14.768	1.645

RDP	EST. YIELD (% Max.)	EST. YIELD (kg/ha)	EST. PROD. (Tonnes)	YIELD LOW	YIELD HIGH	PRODUCTION LOW	PRODUCTION HIGH
Balaka	48	1597	28917	1118	2076	20242	37591
Blantyre	72	2774	55423	2107	3440	42107	68739
Chikwawa	64	1540	13361	1022	2059	8862	17859
Chiradzulu	72	2622	34942	1992	3253	26546	43337
Chitipa	71	2794	26475	1540	4049	14590	38360
Dedza	73	2389	69057	2013	2766	58167	79948
Dowa	70	2508	98781	1803	3214	71011	126552
Karonga	71	2420	31382	1334	3506	17295	45470
Kasungu	70	2438	181678	1752	3123	130602	232753
Likoma	58	2029	300	1160	2898	172	429
Lilongwe	73	3131	226973	2637	3624	191179	262766
Machinga	48	2247	26801	1573	2921	18761	34840
Mangochi	48	1510	32221	1057	1963	22555	41887
Mchinji	70	2490	152616	1790	3190	109711	195522
Mulanje	72	2789	78412	2119	3459	59573	97252
Mwanza	72	2272	15981	1726	2818	12142	19821
Mzimba	58	2158	102146	1234	3082	58416	145877
Neno	72	2204	17195	1674	2733	13064	21327
NkhataBay	58	2029	15219	1160	2898	8704	21735
Nkhotakota	71	2517	27893	1357	3677	15036	40750
Nsanje	64	1491	7793	989	1993	5169	10417
Ntcheu	73	2335	67553	1966	2703	56900	78206
Ntchisi	70	2681	45665	1927	3435	32827	58503
Phalombe	72	2643	39242	2008	3279	29814	48671
Rumphi	58	2519	17152	1441	3598	9809	24495
Salima	71	2684	48130	1447	3921	25944	70316
Thyolo	72	2727	81253	2072	3382	61731	100776
Zomba	48	1920	64980	1344	2496	45487	84474

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 SECOND ROUND 2010/11 CROP ESTIMATES FIGURES

ADD	10/11 WRSI	10/11 YIELD	YIELD LOW	YIELD HIGH	10/11 AREA	10/11 PROD	PROD LOW	PROD HIGH
SHIRE VALLEY	87	1522	1009	2034	13902	21154	14032	28276
BLANTYRE	91	2667	2026	3308	120900	322449	244976	399922
MACHINGA	84	1794	1256	2332	85229	152919	107045	198793
SALIMA	96	2620	1412	3828	29015	76023	40980	111066
LILONGWE	93	2790	2350	3229	130338	363583	306246	420920
KASUNGU	96	2490	1790	3191	192230	478740	344150	613330
MZUZU	97	2182	1248	3116	61786	134818	77100	192536
KARONGA	95	2578	1421	3735	22443	57858	31885	83830
NATIONAL	92	2451	1778	3124	655843	1607543	1166413	2048673

Despite dry spells in January and February and localised flooding in March and early April the 2010/11 national maize production from the model is estimated at 3,725,224 Metric Tons