Government of Malawi

DEPARTMENT OF CLIMATE CHANGE AND METEOROLOGICAL SERVICES

FIRST ROUND 2013/14 AGRICULTURAL ESTIMATES

AGROMETEOROLOGICAL UPDATE

In support of national early warning systems

Released 21 February 2014

SEASONAL SUMMARY

- **The Department of Climate Change and Meteorological Services released the 2013/14 Seasonal Forecast on 13th September 2013. Based on the models, there was a high chance for good rains than there was for drought as climate models had predicted average to above average rainfall amounts to be received over Malawi during the 2013/14 farming season...**
- **The start of effective planting rains had delayed in most areas particularly in some parts of southern Malawi where the delay was more than one month and will negatively impact on the farming season quality and crop harvests….**
- **After erratic start of the season improvement in rainfall distribution and amounts started from mid-December 2013 and continued into January and February 2014…**
- **However, localized dry spells and soil moisture stresses were experienced between December and January particularly in Karonga district…**
- **Cumulative rainfall situation by 10 February 2014 showed that most parts of Malawi have received their long term expected rainfall amounts with pockets of below average in Karonga, Kasungu north, Mzimba south, Balaka Chikwawa and Nsanje districts…**
- **However, less rainfall amounts have been received this season compared to same time last season and climatology and large rainfall deficits are in southern Malawi…**
- **Climate models predict that ENSO neutral conditions are likely to persist into winter 2014 and over Malawi there are high chances of receiving good rainfall amounts between January to March 2014…**
- **The preliminary national rain-fed maize production forecast from the maize yield estimation model is projected at 3,993,980 Metric Tonnes…**

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2013/14 SEASONAL FORECAST

The Department of Climate Change and Meteorological Services (DCCMS) issued the 2013/14 Seasonal Forecast on 13th September 2013. The forecast is based on dynamic and statistical models that use scientifically established relationships between rainfall over Southern Africa and Sea Surface Temperatures over tropical oceans. At that time most climate models had predicted neutral El Niño Southern Oscillation (ENSO) conditions to persist over the tropical Pacific and were likely to continue up to March 2014. This implies that there was a low likelihood of either El Niño or La Niña developing during the 2013/14 farming season.

For Malawi the climate models predicted that during the period October to December 2013, Malawi had 35% chance of rainfall total being above normal, 40% chance of normal and 25% chance below normal.

During the period January to March 2014, the Northern half of Malawi had 40% chance of rainfall total being above normal, 35% chance of normal and 25% chance below normal. While the southern half of the country had 35% chance of rainfall total being above normal, 40% chance of normal and 25% chance below normal.

In summary, the models suggested that during 2013/2014 farming season, Malawi was likely to receive normal total rainfall amounts. However, extreme weather events were likely to occur that could result in floods and dry spells particularly in prone areas.

The forecast covered the rainfall season from October 2013 to March 2014 and is relevant only to seasonal time-scales and relatively large areas. It does not fully account for local and day to day variations in distribution of rainfall. Seasonal climate forecast do not provide information on date of onset, cessation and seasonal distribution of the rains. It is therefore advised that all interested stakeholders know the mean annual rainfall for their area, the main crops to be grown and their crop water requirement (CWR), for good planning a head of the start of the season.

This seasonal forecast is issued to users as a planning tool. For day to day operations, users are advised to make use of the short and medium range forecasts and the 10-day weather and Agrometeorological bulletins that are regularly produced by the Department.

The forecast was planned to be presented to Ministry of Agriculture and Food Security and other key stakeholders However DCCMS has not been granted time to present the forecast to Ministry of Agriculture and Food Security.

IMPORTANCE OF A SEASONAL FORECAST

A seasonal forecast is required for planning agricultural activities and decision making in both the pre-season and during the growing season. For instance;

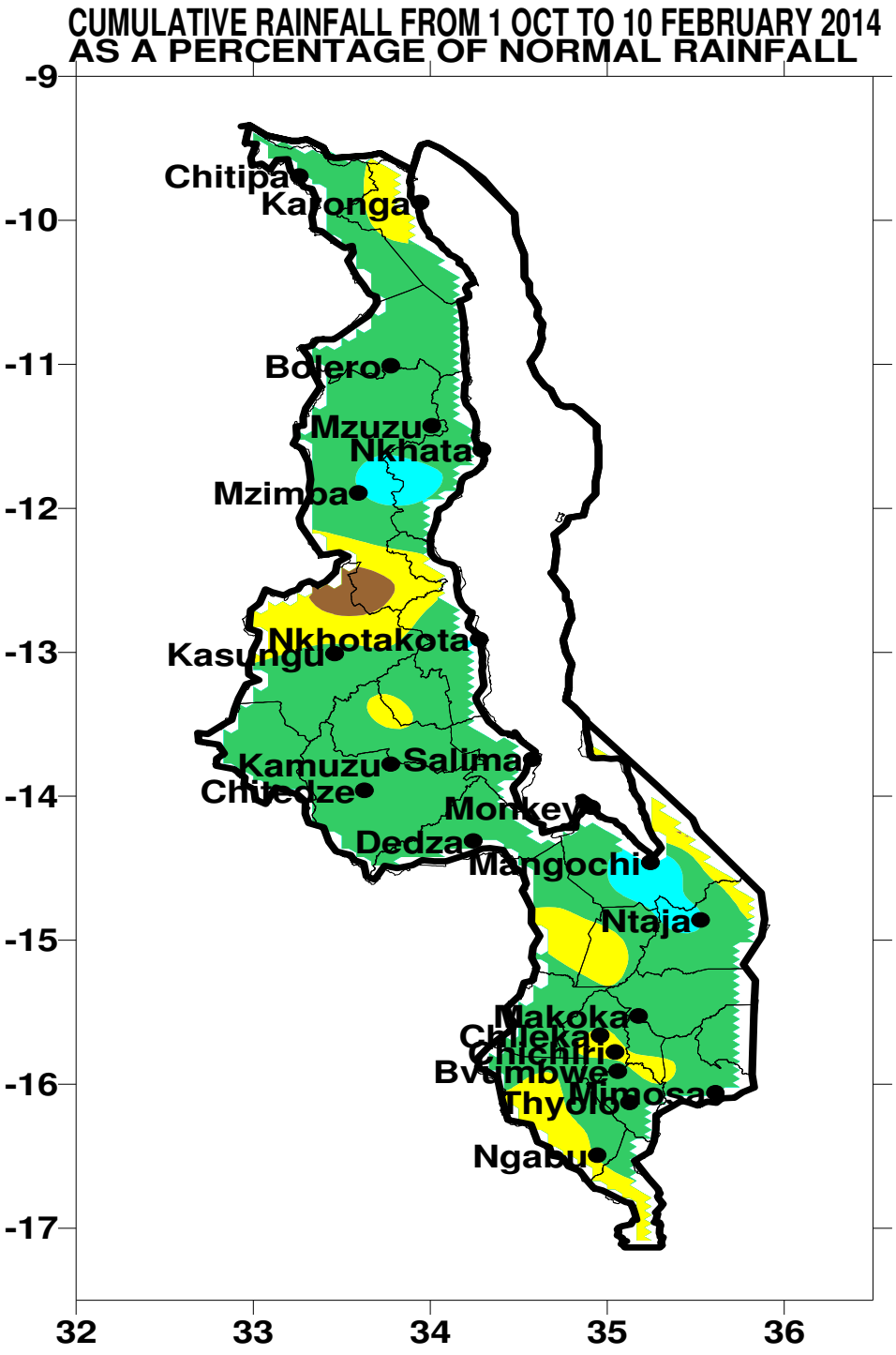
- timing delivery of farm inputs to various districts depends on knowledge of when the rains are likely to start,
- deciding area to plant depends on whether the season will be good or bad,

- choice of planting either early or late maturing crop varieties,
- Development of seasonal agricultural extension messages depends on the seasonal forecast.

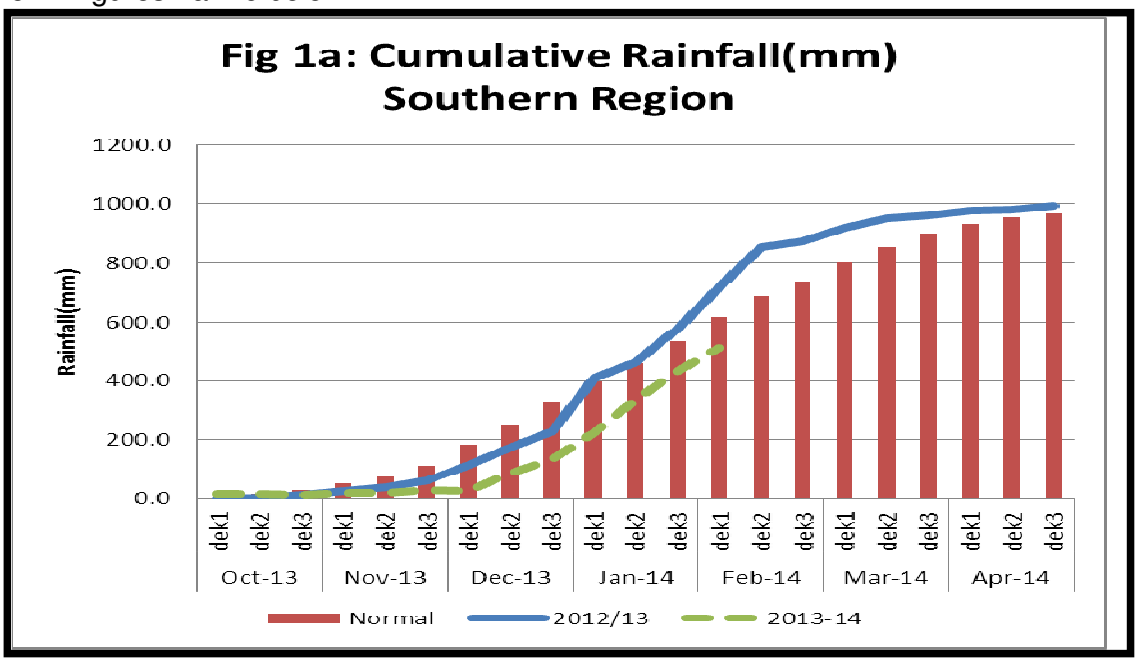
PROGRESS OF 2013/14 RAINFALL SEASON

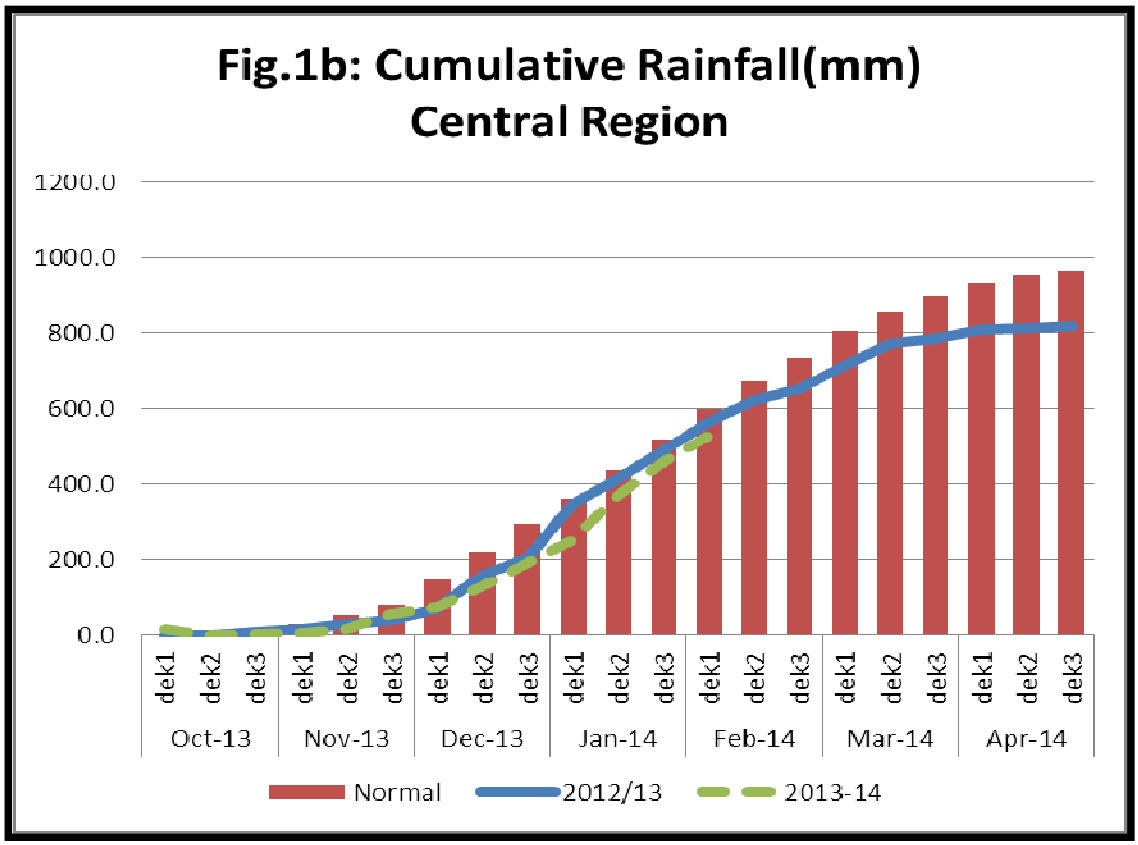
The start of effective planting rains in most areas of Malawi had delayed particularly in some parts of southern Malawi where the delay was more than one month. The delay in start of effective planting rains has negative implications on length of growing season and overall farming season quality and may result in farm level crop failure and poor harvests. Many areas had experienced poor and erratic rainfall performance between October and early December 2013. The erratic nature of rainfall performance had facilitated outbreaks of armyworms, overgrown seedlings of tobacco, poor germination and establishment. Improvement in rainfall performance started from mid December 2013 and had continued in most areas in January and February 2014. The improvement in rainfall performance had facilitated improvement of water resources and soil moisture reserves, pasture availability for communal grazing, planting of crops, replanting and germination of various crops as well as application of basal and top dressing fertilizer.

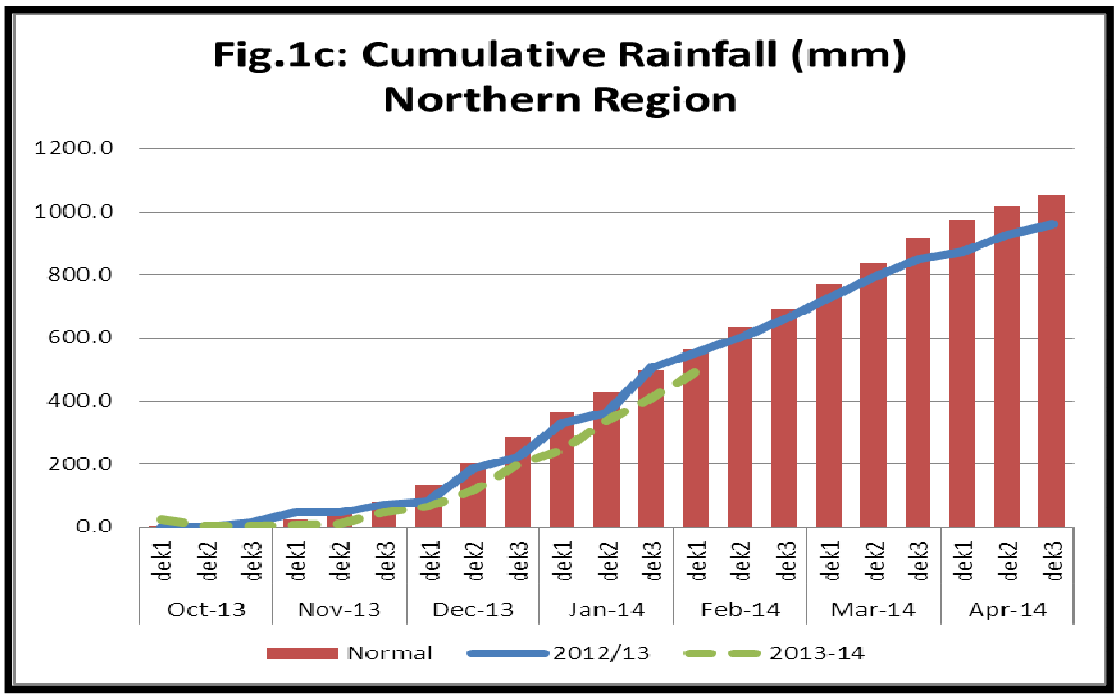
Cumulative rainfall performance from 1 October 2013 to 10th February 2014 shows that most parts of Malawi have achieved their normal rainfall amounts with a few pockets of below normal rainfall performance (less than 75% of the expected cumulative rainfall amounts) in Karonga, Kasungu north, Mzimba south, Balaka and Chikhwawa and Nsanje districts The cumulative rainfall picture also shows that generally Malawi has received less rainfall this season compared to last season and a normal season and large seasonal rainfall deficit are in southern Malawi largely because of the delay in the start of season and generally lighter rainfall amounts have been received.


CUMULATIVE RAINFALL FROM 1 OCT TO 10 FEBRUARY 2014
AS A PERCENTAGE OF NORMAL RAINFALL
-9
-10
-11
-12
-13
-14
-15
-16
-17
32
33
34
35
36
Chitipa
Karonga
Rumphi
Mzuzu
Nkhata Bay
Mzimba
Nkhotakota
Kasungu
Kamuzu
Salima
Chitedze
Monkey Bay
Dedza
Mangochi
Ntaja
Makoka
Chileka
Chichiri
Bvumbwe
Mimosa
Thyolo
Ngabu

The graphs for regional cumulative rainfall indicated that generally less rainfall has been over Malawi this season compared to last season and a normal season. Details are in Figures 1a- 1c below.

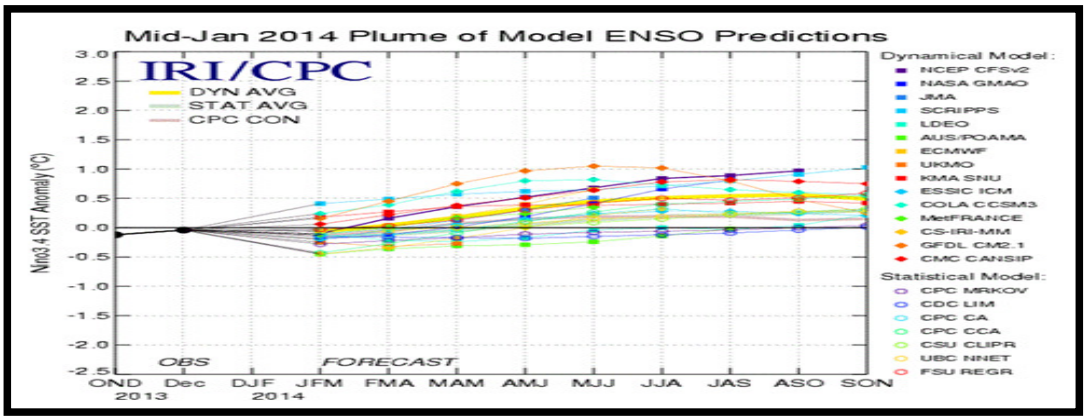






OUTLOOK FOR JANUARY TO MARCH 2014

Most of the dynamical and statistical models predict continuation of neutral ENSO conditions up to winter 2014 and there was a high chance for good rains than there was for drought. Thus planning for the period January and March 2014 should be based on expectations of wet conditions depending on the climate of the area. Malawi is expected to experience normal to above normal rainfall amounts with possibility of flooding particularly in prone areas.



Source: http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

SUMMARY OF 2013/14 MAIZE YIELD FORECAT BASED ON THE FAO CROP SPECIFIC WATER BALANCE MODEL CONCEPT

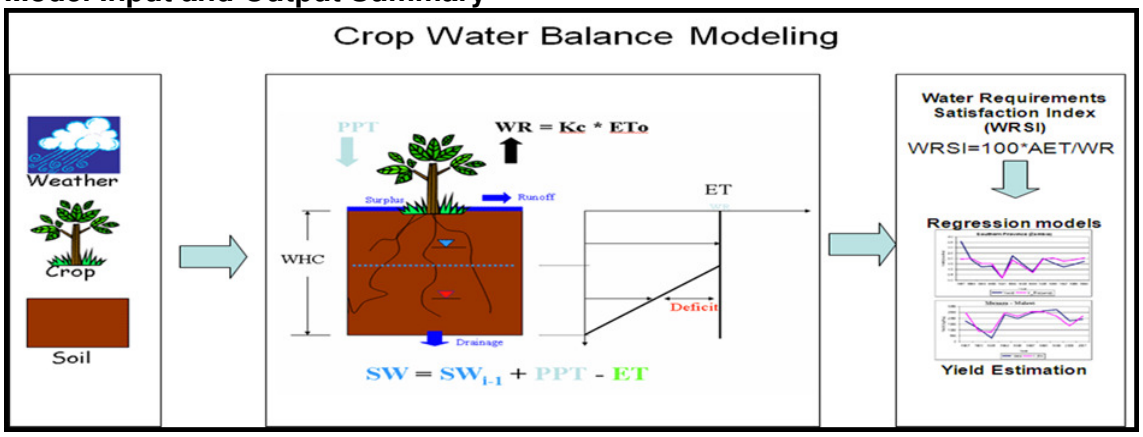
A brief Overview of Yield Estimation Techniques

Crop yield estimation is a process that is important and useful for food security analysis. There are many ways of estimating these yields including statistical sampling in the field, estimation by eye, crop-cutting techniques, remote-sensing, and agrometeorological modelling. Each of these methods has various advantages and disadvantages, varying from expense, timeliness, accuracy.

Model Main Objectives include:

- informing decision makers in advance of the magnitude of any impending food production deficit or surplus;
- improving the planning of food trade, marketing and distribution;
- establishing co-ordination mechanisms between relevant government ministries;
- reducing the risks and suffering associated with the poverty spiral**.**

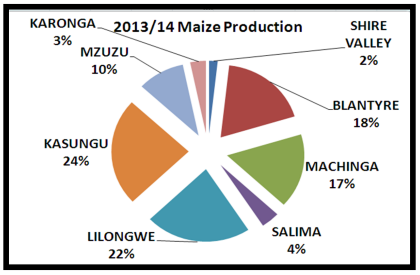
Model Input and Output Summary



Results for 2013/14 farming season

The Water Requirement Satisfaction Index (WRSI) is an indicator of crop performance based on the availability of water during a growing season. The outputs from the model show that by 10th February 2014 rainfall has satisfied the maize crop water needs in most parts of Malawi and if the good rainfall performance persists up to March 2014, then average to good yields are expected this season Preliminary results from the FAO Crop Specific Soil Water Balance model indicate that the 2013/14 national rain-fed maize production from the model is estimated at **3,993,980 Metric Tonnes** which is made up of **2,295,897** Metric Tonnes of local and OPV maize and **1,698,083** Metric Tonnes of hybrid maize. Considering that the start of the rainfall season had delayed by over a month particularly in the south and some parts of central region, this is very preliminary forecast as some of the maize is at vegetative stage and there is still a long

way to maturity stage.



So where is this Maize? At Agricultural Development Division (ADD) level 24% the maize is likely to be produced in Kasungu while Lilongwe ADD is expected to produce 22% of the maize followed by 18% in Blantyre and 17% in Machinga ADD. The remaining percentage is share by Mzuzu, Salima, Karonga and Shire Valley ADDs.More details are on 2013/14 maixe production graph.

In terms of cessation, usually rains start tailing from southern Malawi by end of March and progress northwards reaching the north between April and early May. If this happens then this season the south will have a shorter growing season which will most likely not support late maturing crop varieties and may result in poor harvests.

TABLE 1a: 2013/14 FIRST ROUND LOCAL & OPV MAIZE PRODUCTION ESTIMATES

CROP YIELD ASSESSMENT BASED ON THE WATER SATISFACTION INDEX (WRSI)
CROP: Local Maize FARMING SECTOR: Small Holder
YIELD: kg/ha WRSI: % AREA: Hectares PRODUCTION: Tonnes
90% CONFIDENCE INTERVAL: Y(est)+/-t(0,10)*Std. Err. of Y(est)
AREA BASED ON 5-YEAR AVERAGE HECTARAGE

ADD	13/14 WRSI	13/14 YIELD	YIELD LOW	YIELD HIGH	13/14 AREA	13/14 PRODUCTION
SHIRE VALLEY	96	1560	1153	1966	27513	42907
BLANTYRE	95	2426	1792	3059	143297	347568
MACHINGA	95	2196	1632	2760	203708	447344
SALIMA	94	2411	1856	2967	33527	80850
LILONGWE	95	2210	1826	2595	223662	494365
KASUNGU	94	2696	2160	3233	207474	559442
MZUZU	92	2874	2312	3435	89224	256412
KARONGA	96	2827	2211	3442	23707	67007
NATIONAL	**95**	**2411**	**1889**	**2934**	**952113**	**2,295,897**

Table 1b: Local Maize Yield Functions at ADD level

LOCAL MAIZE - SEASON 2013-2014

ADD	Area Pl.	WRSI	a	b	S.E.	t stud.
SHIRE VALLEY	27513	96	-65.01	1.679	14.289	1.761
BLANTYRE	143297	95	-68.00	1.663	13.821	1.714
MACHINGA	203708	95	-86.13	1.978	15.190	1.714
SALIMA	33527	94	-128.30	2.444	13.652	1.721
LILONGWE	223662	95	-114.41	2.275	10.452	1.692
KASUNGU	207474	94	-80.44	1.909	11.668	1.693
MZUZU	89224	92	-85.82	1.980	10.945	1.717
KARONGA	23707	96	-140.85	2.583	13.004	1.812
NATIONAL	952112.6	95	-86.17	1.954	12.980	1.645

District	EST. YIELD (% Max.)	EST. YIELD (kg/ha)	EST. PROD. (Tonnes)	YIELD LOW	YIELD HIGH	PRODUCTION LOW	PRODUCTION HIGH
Balaka	101	1871	73558	1391	2351	54673	92443
Blantyre	91	2786	68278	2059	3514	50445	86112
Chikwawa	97	1513	33334	1119	1908	24643	42026
Chiradzulu	91	2244	36104	1658	2830	26674	45534
Chitipa	108	3052	40736	2388	3716	31868	49603
Dedza	102	1978	130442	1634	2322	107762	153121
Dowa	99	2418	136190	1937	2900	109083	163297
Karonga	108	2536	26271	1984	3088	20553	31990
Kasungu	99	3013	198655	2413	3612	159115	238195
Likoma	96	1923	14	1547	2299	11	17
Lilongwe	102	2410	220755	1991	2829	182373	259136
Machinga	101	2569	97280	1910	3229	72306	122255
Mangochi	101	2252	170491	1674	2831	126721	214262
Mchinji	99	2408	146454	1929	2887	117304	175604
Mulanje	91	2486	77233	1837	3136	57060	97405
Mwanza	91	1775	17224	1311	2238	12725	21722
Mzimba	96	2903	214647	2336	3471	172696	256598
Neno	91	1886	34087	1393	2378	25184	42990
NkhataBay	96	2435	18009	1959	2911	14489	21528
Nkhotakota	102	2511	33138	1932	3090	25501	40774
Nsanje	97	1746	9573	1291	2202	7077	12069
Ntcheu	102	2166	143168	1789	2542	118276	168061
Ntchisi	99	3203	78142	2566	3841	62589	93696
Phalombe	91	2516	63969	1859	3174	47261	80677
Rumphi	96	3009	23742	2421	3597	19102	28382
Salima	102	2347	47713	1806	2888	36717	58708
Thyolo	91	2748	50673	2030	3466	37437	63908
Zomba	101	2086	106014	1550	2621	78797	133231

TABLE 2a: 2013/14 FIRST ROUND HYBRID MAIZE PRODUCTION ESTIMATES

CROP: Hybrid Maize
AREA BASED ON 5-YEAR AVERAGE HECTARAGE

ADD	13/14 WRSI	13/14 YIELD	YIELD LOW	YIELD HIGH	13/14 AREA	13/14 PRODUCTION
SHIRE VALLEY	98	2319	1738	2900	11915	27633
BLANTYRE	97	3116	2473	3759	126097	392962
MACHINGA	97	2548	2005	3091	84574	215500
SALIMA	98	2681	1473	3889	27429	73549
LILONGWE	98	3027	2587	3468	128599	389303
KASUNGU	99	2620	1918	3322	151632	397275
MZUZU	97	2190	1251	3130	62734	137406
KARONGA	99	2937	1761	4112	21948	64455
NATIONAL	**98**	**2761**	**2087**	**3436**	**614929**	**1,698,083**

Table 2b: Hybrid Maize Yield Functions at ADD level

HYBRID MAIZE - SEASON 2013-2014

ADD	Area Pl.	WRSI	a	b	S.E.	t stud.
SHIRE VALLEY	11915	98	-108.484	1.991	12.513	1.734
BLANTYRE	126097	97	-108.072	1.982	10.000	1.740
MACHINGA	84574	97	-72.913	1.448	7.893	1.833
SALIMA	27429	98	-57.574	1.334	18.938	1.729
LILONGWE	128599	98	-52.891	1.350	6.276	1.833
KASUNGU	151632	99	-31.645	1.063	11.382	1.729
MZUZU	62734	97	-24.802	0.853	13.925	1.782
KARONGA	21948	99	-194.014	2.779	18.037	1.771
NATIONAL	614929.2	98	-76.262	1.763	14.768	1.645

DISTRICT	EST. YIELD (% Max.)	EST. YIELD (kg/ha)	EST. PROD. (Tonnes)	YIELD LOW	YIELD HIGH	PRODUCTIOI LOW	PRODUCTION HIGH
Balaka	68	2249	36803	1770	2728	28963	44642
Blantyre	84	3230	65377	2563	3896	51887	78867
Chikwawa	87	2070	15949	1552	2589	11954	19944
Chiradzulu	84	3054	43978	2424	3684	34904	53053
Chitipa	80	3192	32635	1914	4470	19573	45698
Dedza	79	2591	75255	2214	2968	64310	86199
Dowa	73	2633	89750	1927	3338	65708	113791
Karonga	80	2714	31819	1628	3800	19083	44555
Kasungu	73	2558	142603	1873	3244	104403	180802
Likoma	58	2025	277	1157	2894	158	396
Lilongwe	79	3395	243941	2901	3888	208464	279418
Machinga	68	3164	43882	2490	3838	34534	53229
Mangochi	68	2126	44535	1673	2579	35049	54022
Mchinji	73	2613	117004	1913	3313	85662	148346
Mulanje	84	3248	89152	2577	3918	70756	107547
Mwanza	84	2646	19119	2100	3191	15174	23064
Mzimba	58	2154	104781	1230	3078	59844	149718
Neno	84	2566	14612	2037	3096	11597	17627
NkhataBay	58	2141	15862	1223	3059	9059	22665
Nkhotakota	73	2575	26844	1415	3736	14752	38937
Nsanje	87	2774	11684	2079	3469	8757	14611
Ntcheu	79	2532	70107	2163	2900	59911	80303
Ntchisi	73	2814	47919	2060	3568	35082	60755
Phalombe	84	3078	46275	2443	3713	36727	55823
Rumphi	58	2515	16485	1436	3594	9415	23555
Salima	73	2746	46705	1509	3983	25665	67744
Thyolo	84	3175	114449	2520	3830	90834	138065
Zomba	68	2703	90280	2128	3279	71049	109511