



Government of Malawi

DEPARTMENT OF METEOROLOGICAL SERVICES

FIRST ROUND 2008/09 AGRICULTURAL ESTIMATES

## AGROMETEOROLOGICAL UPDATE

Released 5<sup>th</sup> February 2009

### SEASONAL HIGHLIGHTS

- The Department of Meteorological Services issued the 2008/09 Seasonal Forecast on 19 September 2008.
- At that time, Sea Surface Temperatures over the equatorial Pacific Ocean, which are highly correlated with rainfall over the SADC region including Malawi, were in a neutral state and model projections pointed towards the likelihood of neutral El Nino Southern Oscillation (ENSO) conditions during the 2008/09 rainfall season.
- Based on the models, during 2008/09 rainfall season a greater part of Malawi is expected to experience normal total rainfall amounts. However, just like in any ENSO-neutral season, extreme weather events like floods and prolonged dry spells are expected in prone areas.
- The start of the rainfall season slightly delayed over some parts especially Chikwawa and Nsanje where rains started mid December 2008. Some parts of the north experienced early onset
- Cumulative rainfall performance by 20 January 2009 indicted that less rainfall has been received this season than the same time last season
- Preliminary National Total Maize production estimates from Agrometeorological model is estimated at not more than 3.4 million MT

## 2008/09 GROWING SEASON PREPAREDNESS

The Department of Meteorological Services issued the 2008/09 Seasonal Forecast on 19 September 2008. At that time, Sea Surface Temperatures over the equatorial Pacific Ocean, which are highly correlated with rainfall over the SADC region, were in a neutral state and model projections pointed towards the likelihood of neutral El Niño Southern Oscillation (ENSO) conditions during the 2008/09 rainfall season. Neutral conditions are usually associated with normal rainfall over a greater part of Southern Africa including Malawi.

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The seasonal forecast was presented to Ministry of Agriculture and Food Security and other key stakeholders. Seasonal climate forecasts are issued for **planning and decision making**. For operational purposes users are encouraged to use short (up to 3 days) and medium range (5-10 days) forecasts that are issued by the department.

Seasonal climate forecast do not provide information on the start, cessation and seasonal distribution of the rains. It is therefore advised that all interested parties know the mean annual rainfall 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. Crop growing period and water requirement vary from crop to crop as shown in the table below.

### Growing period and crop water requirement estimates of some crops

Crop	Growing period (days)	CWR (mm)
Maize	90 – 140	500 -700
Sorghum	90 – 140	450 -650
Groundnuts	90 – 140	500 -700
Beans	60 – 120	300 -500
Sunflower	90 – 130	600 -1000

Even though a seasonal forecast is obtained after thorough analysis of most of the systems that affect the weather of the country or a region, it becomes more useful information if users of such information continue to update themselves with climate outlooks provided by the meteorological services over the season.

Agricultural advisers need to regularly monitor seasonal climate outlook

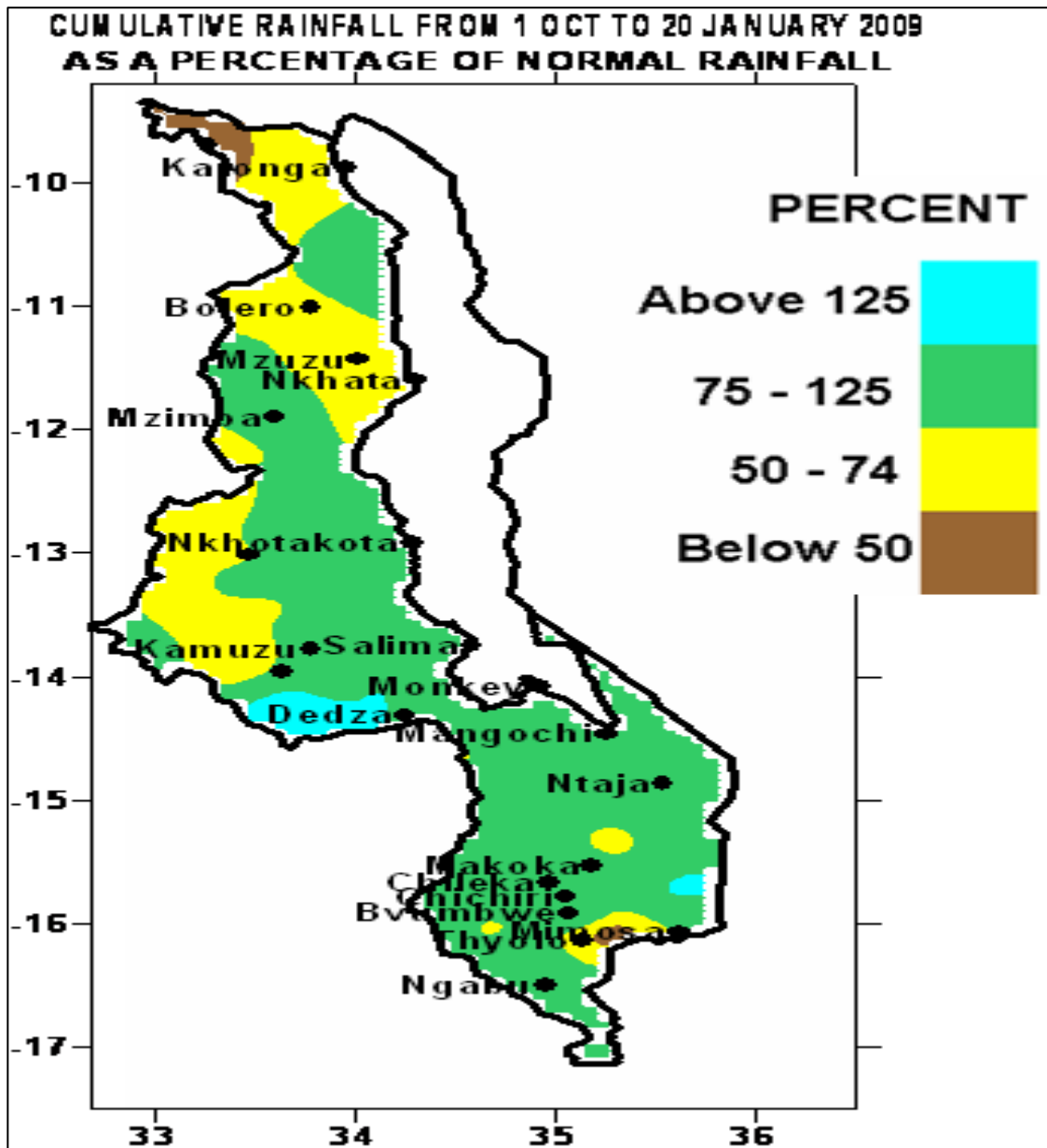
information. For example, if there is a high probability of below-average rainfall occurring, say 80% or 4 in 5 years, the appropriate response is to make management decisions anticipating low rainfall.

Subsequently the response to a changing situation should be in a number of steps; at each step the best decision is made on the basis of current information. Often the mistake people make is to make one decision based on the first seasonal climate outlook and then ignore keeping track of events. Weather patterns are notorious for changing at short notice.

### **PROGRESS OF 2008/09 RAINFALL SEASON**

The start of the rainfall season slightly delayed over some parts of the country especially over lower Shire districts of Chikwawa and Nsanje where rains started mid December 2008, about one month late. Some parts of the north however, experienced early onset. Otherwise, sufficient rains to support planting, germination and establishment of various crops started in most areas between end of November and mid December 2008. Significant rainfall continued to be experienced over most parts of the country mostly due to persistence of the Congo Air mass which is one of the main rain bearing system for Malawi. Some areas have experienced heavy rains with hail stones and strong winds causing damages to crops and infrastructure. Floods were experienced in lower Shire districts early January 2009.

Cumulative rainfall performance from October 2008 to 20 January 2009 (**map below**) indicated that the greater part of Malawi had received average rainfall amounts with few areas registering below and above average rainfall. The below average rainfall has been confined mostly to the northern half of the country due to late onset of the main rains.

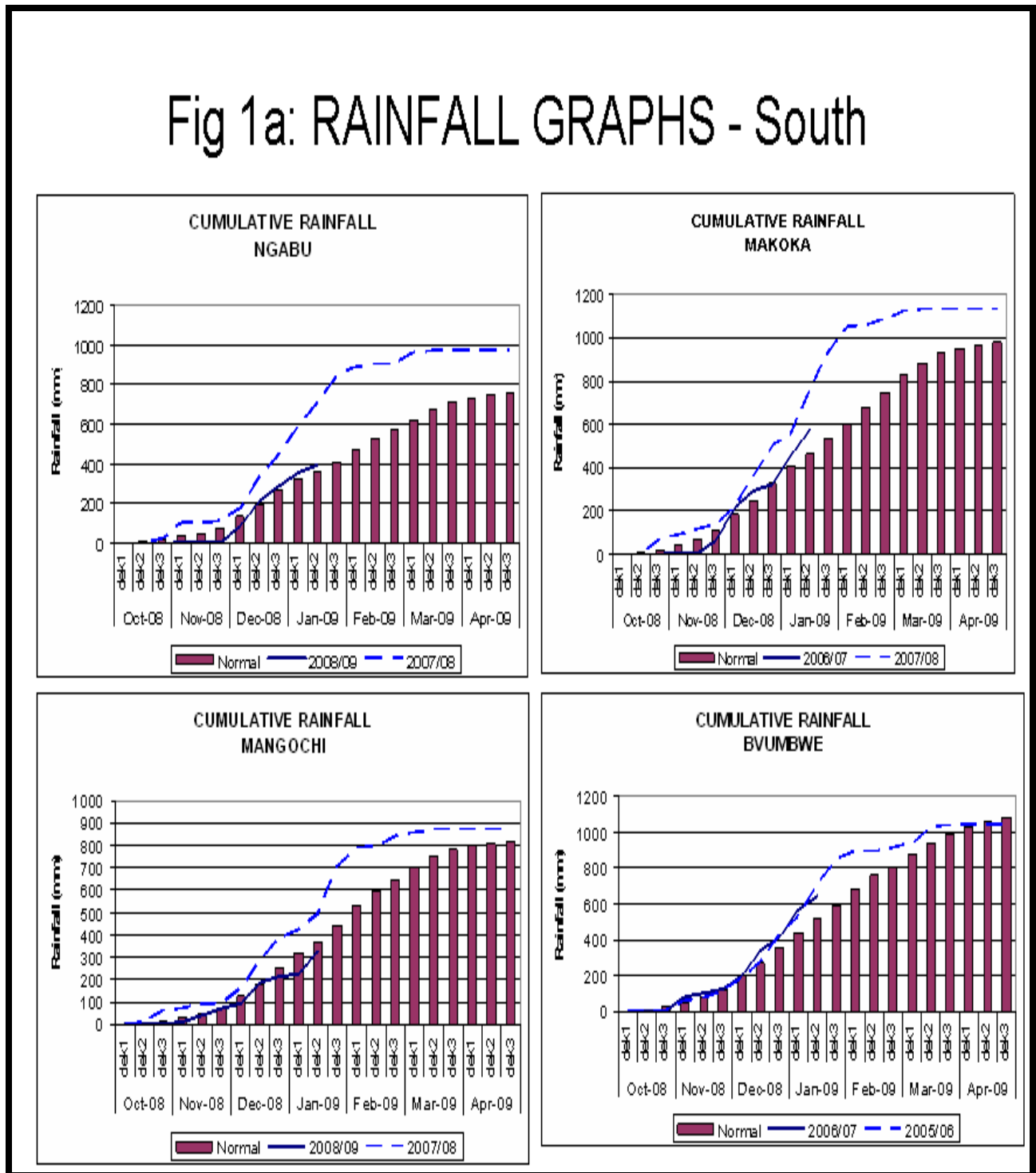


**OUTLOOK FOR FERUARY TO APRIL 2009**

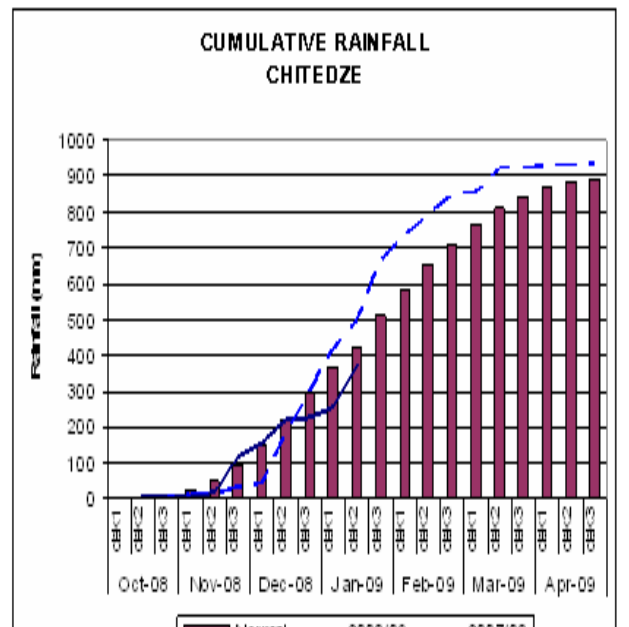
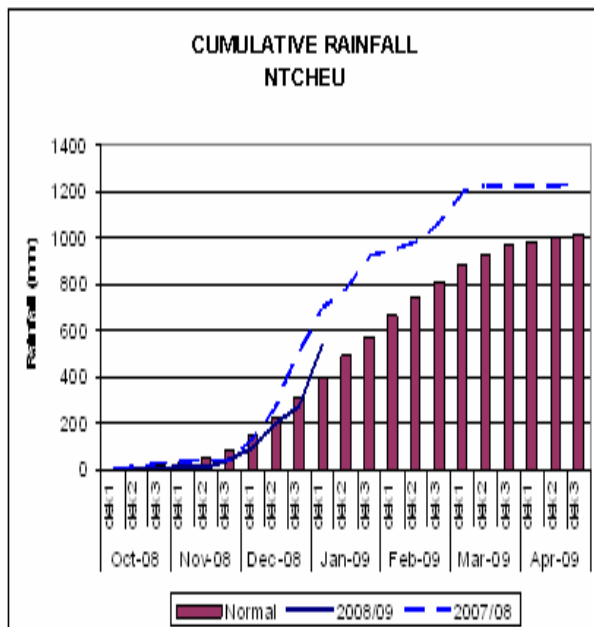
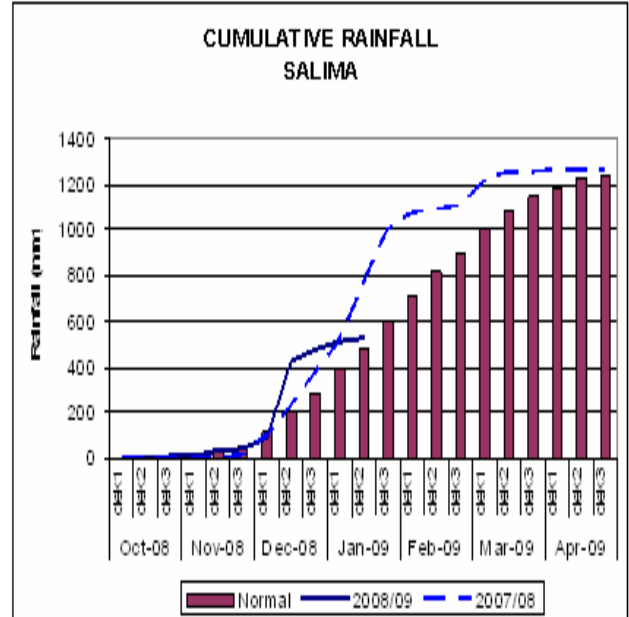
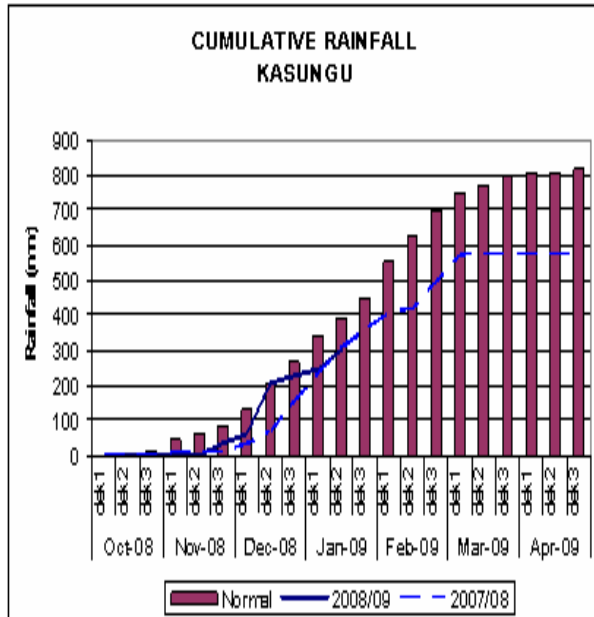
Climate prediction models continue to suggest that by end of April 2009 the greater part of Malawi should expect normal rainfall amounts with poor distribution in both space and time. Already there has been a delay in the onset of the wet season in some parts of the country. Externally, the influence of climate change cannot be ignored and one of the indicators is occurrence of extreme climatic events such as floods and drought. Low lying areas such as the Shire valley and lakeshore areas are more vulnerable to floods and droughts. Some floods have already been reported in Chikwawa.

The graphs for cumulative rainfall indicated that generally less rainfall has been received this season compared to the same time last season and a normal season. See Figures 1a- 1c below.

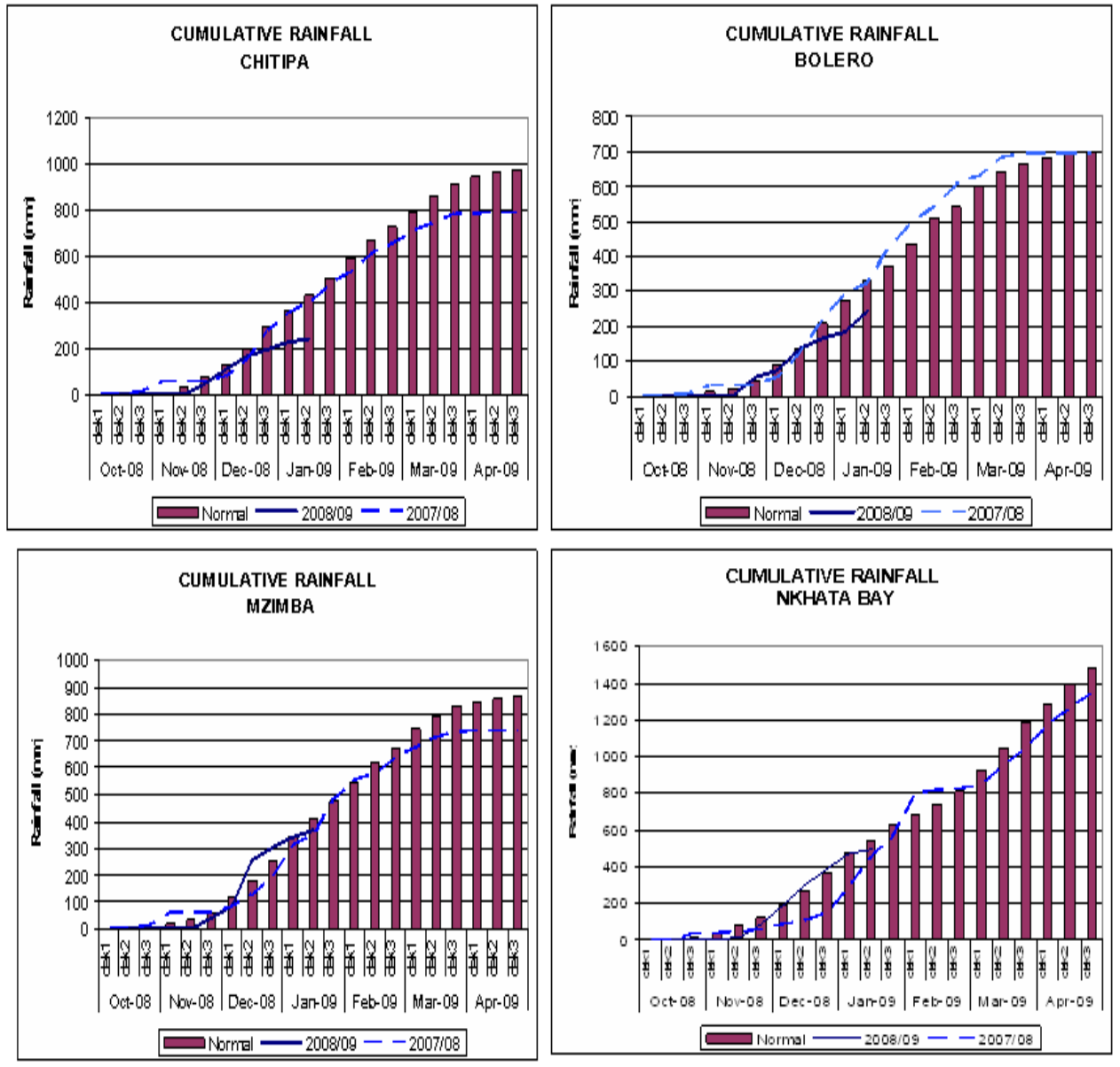
### Fig 1a: RAINFALL GRAPHS - South



# Fig.1b: Rainfall Graphs - Centre



# Fig.1c: Rainfall Graphs - North

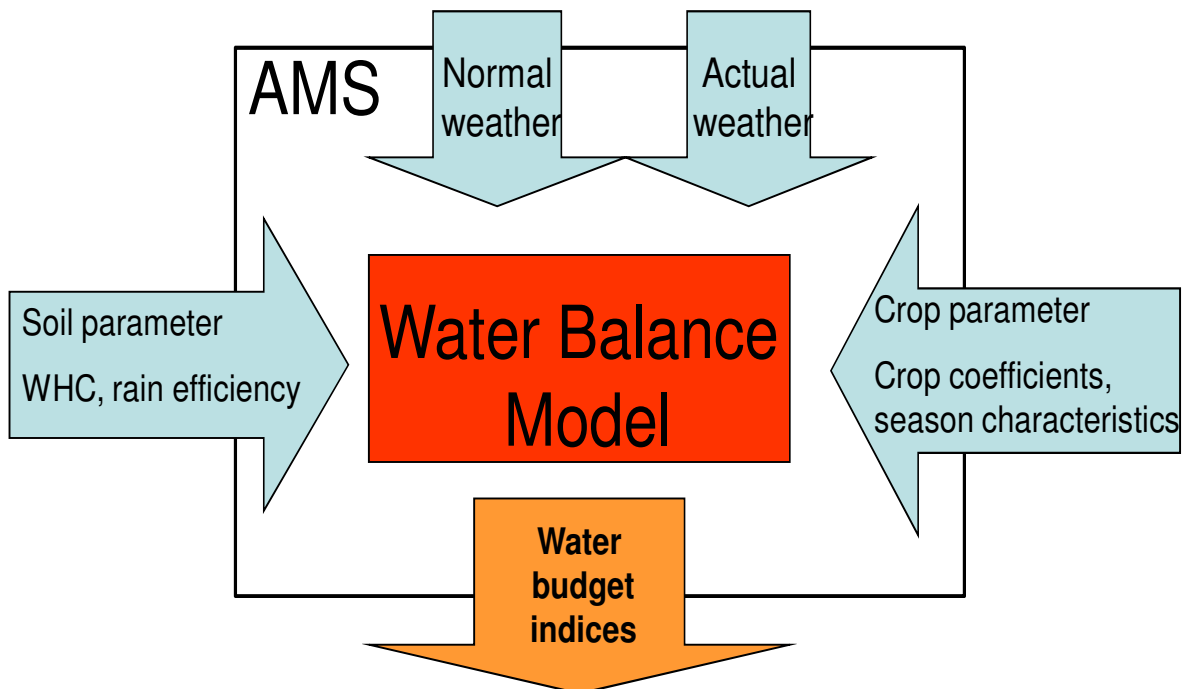


## PRELIMINARY RESULTS FROM MAIZE CROP MONITORING AND YIELD ASSESSMENT MODEL

### Model Main Objectives

- Monitoring Crop conditions with the aim of predicting yields (tons/ha) and production long before the harvesting actually takes place
- Support early warning systems for food security, management of Natural Resources, Disasters , weather and climate Risks

### How does the Crop Yield forecast work?



**Finally link Water Budget Indices with Crop Yields through regression models**

## Yield Prediction & Production

### Yield Prediction

$$\square Y = a + b (\text{WRSI})$$

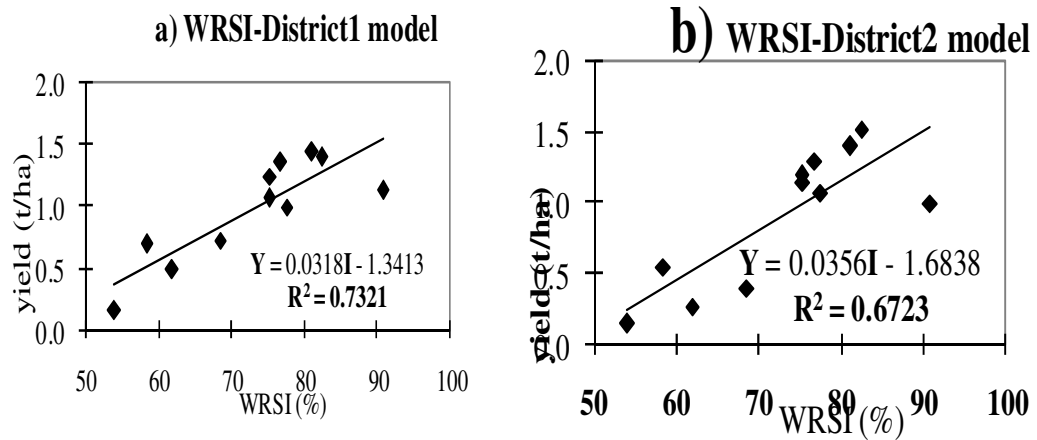
Where; a = intercept constant

b = coefficient of the relationship  
btwn hist. yields and WRSI

WRSI = Water Requirement  
Satisfaction Index

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## DISTRICT REGRESSION MODELS



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## Production

### Production Forecasting

$$\square P = Y \times A,$$

where;

Y = predicted yield

A = Area planted to that  
specific crop (maize)

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**TABLE 1: 2008/09 FIRST ROUND LOCAL & COMPOSITE MAIZE PRODUCTION ESTIMATES**

<b>CROP: Local &amp; Composite Maize</b>						
<b>YIELD: kg/ha WRSI: % AREA: Hectares PRODUCTION: Tonnes</b>						
<b>AREA BASED ON 2008/09 FIRST ROUND CROP ESTIMATES</b>						
<b>ADD</b>	<b>08/09 WRSI</b>	<b>08/09 YIELD</b>	<b>YIELD LOW</b>	<b>YIELD HIGH</b>	<b>08/09 AREA</b>	<b>08/09 PRODUCTION</b>
SHIRE VALLEY	98	1388	1036	1740	33950	47117
BLANTYRE	97	1555	1162	1947	157754	245247
MACHINGA	98	1659	1257	2061	234571	389145
SALIMA	96	1943	1510	2376	37086	72054
LILONGWE	98	1925	1612	2239	236633	455634
KASUNGU	95	2098	1688	2507	208270	436891
MZUZU	98	2260	1865	2655	94062	212577
KARONGA	99	2075	1649	2501	14692	30485
<b>NATIONAL</b>	<b>97</b>	<b>1858</b>	<b>1477</b>	<b>2238</b>	<b>1017018</b>	<b>1,889,150</b>

**TABLE 2: 2008/09 FIRST ROUND HYBRID MAIZE PRODUCTION ESTIMATES**

<b>ADD</b>	<b>08/09 WRSI</b>	<b>08/09 YIELD</b>	<b>YIELD LOW</b>	<b>YIELD HIGH</b>	<b>08/09 AREA</b>	<b>08/09 PRODUCTION</b>
SHIRE VALLEY	98	2413	1393	3433	7773	18758
BLANTYRE	98	2903	2273	3533	91502	265629
MACHINGA	98	3839	2638	5040	58570	224859
SALIMA	97	3477	2753	4201	21374	74322
LILONGWE	98	3010	2581	3439	100064	301193
KASUNGU	98	3361	2462	4260	118684	398886
MZUZU	99	3836	3364	4308	54506	209092
KARONGA	99	2519	966	4071	16610	41837
<b>NATIONAL</b>	<b>98</b>	<b>3271</b>	<b>2520</b>	<b>4023</b>	<b>469083</b>	<b>1,534,577</b>

Making a total Maize production of around 3.4 million MT

Major Assumptions made are:

- Weather will be the major factor affecting crop yields
- Normal seasonal rainfall performance between in February and March
- Normal cessation of the main rainfall season
- No outbreaks of pests and diseases