

# **The use of rainfall forecasts to assist in small-scale farming decisions: case study of Limpopo and Mpumalanga Provinces, South Africa**

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**COST 734 Conference  
3-6 May, 2011  
Topoľčianky, Slovakia**



# Presentation layout

- Introduction
- Methodology
- Results
- Achievements and challenges
- Acknowledgements

# Introduction

- Previous studies (Landman&Mason, 1999; Reason & Mulenga, 1999; Reason et al. 2005) has shown that northern and eastern parts of South Africa are influenced by ENSO phenomenon

In El niño

- seasonal rainfall is severely reduced impacting negatively on maize productivity
- *Onsets of rainfall becomes late*
- *Extremely low rainfall*
- *Water requirements of maize mostly not met*

In Laniña years

- *Seasonal rainfall above normal*
- *Onsets setting early resulting to long rainy season*
- *Floods impacting negatively on maize productivity*
- *Water requirements of maize not fully met*

- *Main observation*

- *The extreme weather events like seasonal dry spells has intensified recently even in above normal rains*



# Introduction

- Drought is the most limiting factor to productivity in most parts of South Africa
- Food insecurity in southern Africa is attributed to this agroclimatic hazard
- The most vulnerable group is the poor-resourced farmers residing in rural areas.
- These farmers have the following characteristics
  - They practice subsistence farming
  - They farm on marginal lands(poor soils, shallow etc)
  - They don't have access to insurance
  - Mostly extended families
  - No access to any credit facility



# Introduction

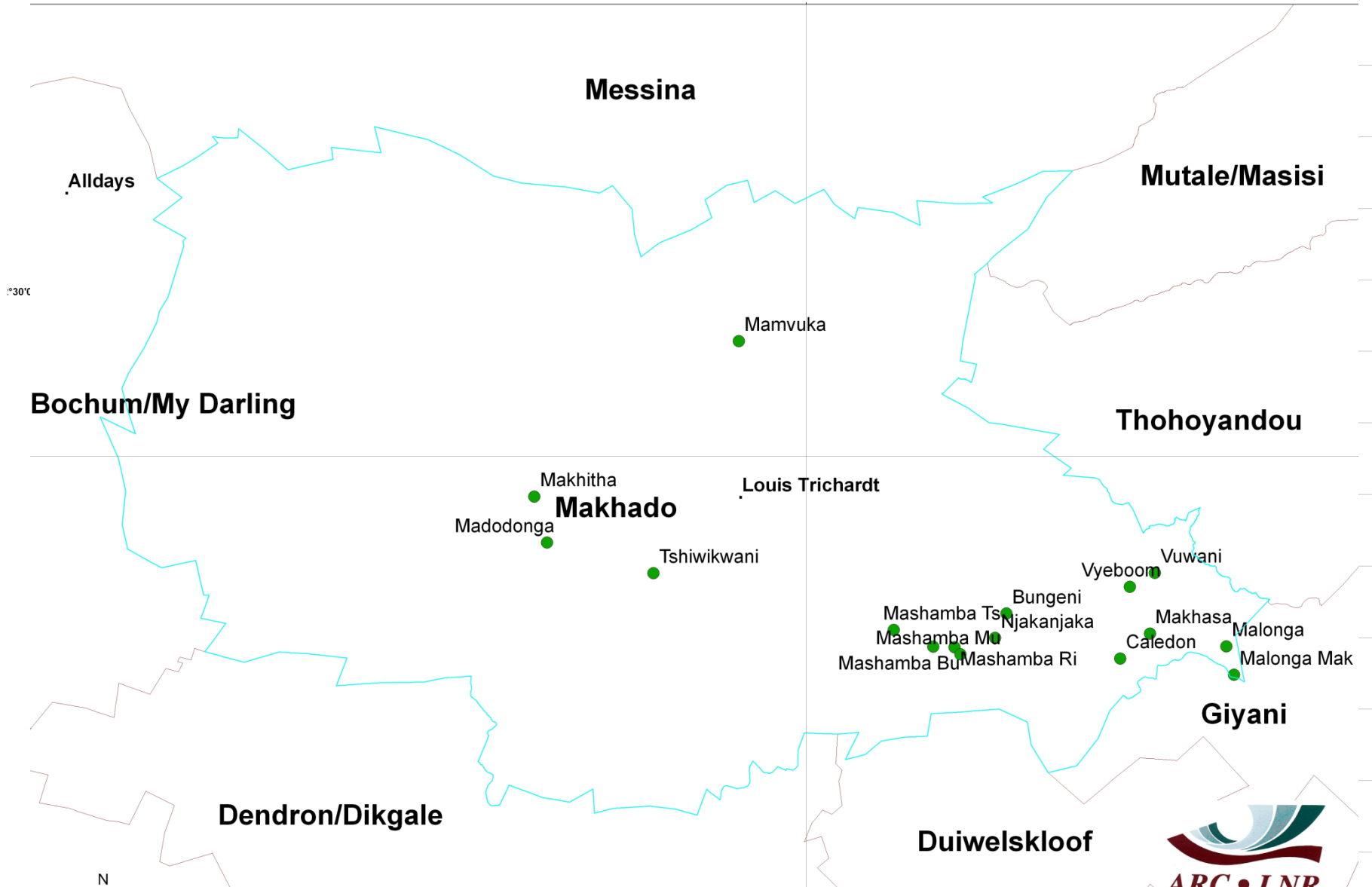
- **Project proposed in 2003**  
***Adapting day-to-day management of subsistence and small scale farming to weather and climate forecast to reduce drought risk***
- **Aim**
  - To enhance agricultural productivity in the subsistence farmer sector through use of climate forecasts and climate information
- ***The main goal of the response farming project is:***
  - To help improve food security in poor rural communities by helping farmers to better manage agroclimatological risks associated with dryland farming.



# Introduction

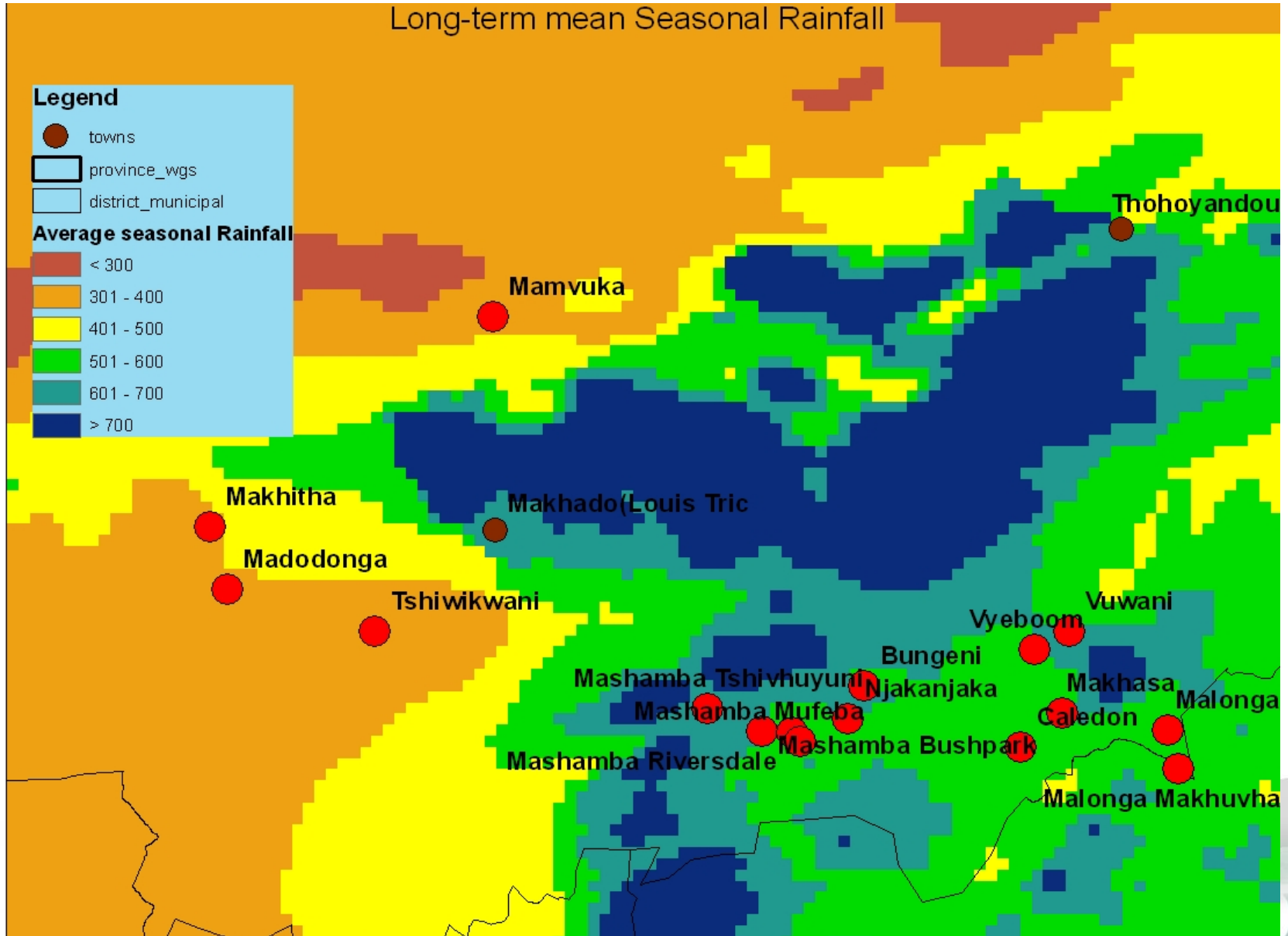
- **Main objectives of the project**
  - To help farmers reduce the impact of agroclimatological risks on their productivity through the use of agrometeorology information
  - To develop a mechanism of disseminate weather and climate forecasts to the farmers to support their daily activities
  - To advice the farmers on the day-to-day management of the fields based on the weather and climate information

# Study area



# Introduction

Long-term mean Seasonal Rainfall





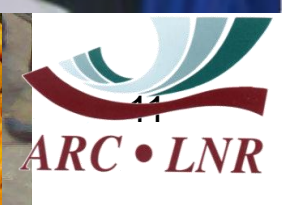
# Farmers-Limpopo

Village	Farmer/community farmers	Extension officer	Estimate no of farmers
Rathidili	Mr Mposhomali	Mr Netshifhere	1
Makhitha	Mr Ramovha	Mr Mudau	1
Njakanjaka	Mr Shirindza	Mrs Rose	1
Makhasa	Community garden	Mr Sibiya	15
Caledon	Community garden	Mr Mayimele	20
Mashamba	Mrs Madia	Mr Mashau	1
Mashamba Mufeba	Mrs Ramalumisi	Mr Mashau	1
Mashamba Tshivhuyuni	Community garden	Mr Mashau	4
Vuwani	Community garden	Mrs Mufamadi	6
Vyeboom	Community garden	Mrs Mufamadi	14
Malonga	Community garden	Mrs Mudau	9
Malonga Makhuvha	Mr Mulaudzi	Mrs Mudau	1
<b>Total</b>	<b>6 individual farms, 6 community farms</b>		<b>74</b>

# Farmers-Mpumalanga

Village	Farmer/community farmers	Extension officer	Estimate no of farmers
Hazyview	Andrew		1
Hazyview West	Alfred		1
Hazyview	Joyce		2
Lepongh	Maboza		1
Mpeneyatsatsi	Raephy		3
Numbi	Frank	Bob Hlongwane	1
Paola	Susan	Bob Hlongwane	1
Rooiboklaagte	Galina		2
<b>Total</b>	<b>8 sites</b>		<b>12</b>

# Farmers



# Farmers

Mashamba



# Farmers

Mashamba Mufeba



# Farmers

Mashamba Tshivhuyuni



# Farmers

Vuwani



# Farmers

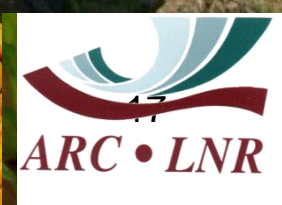
Vyeboom





# Farmers

Malonga Mukhuvha



# Farmers

Malonga





# Installation of rain gauges

- Rain gauges were installed at all the farmers plots



# Soil sampling and analysis

- Soil sample taken before the start of the season
- Samples were taken from the top soil to access the fertility
- Samples were also taken to determine the water holding capacity of the soil and profile characteristics



# Planting and other activities

- Most activities(Planting, weeding, harvesting etc) done by hand



Planting at Paola (Mpumalanga)

# Seasonal forecasts

- Seasonal forecast and its implications was conveyed to the farmers & extension officers before the start of the season
- Monthly updates were also communicated during meetings/workshops

## Expected Total Rainfall for the period October-November-December 2007

### AREA 1:

25% chance that the total rainfall for this period will be ABOVE-normal.

35% chance that the total rainfall for this period will be normal.

40% chance that the total rainfall for this period will be BELOW-normal.

### AREA 2:

40% chance that the total rainfall for this period will be ABOVE-normal.

35% chance that the total rainfall for this period will be normal.

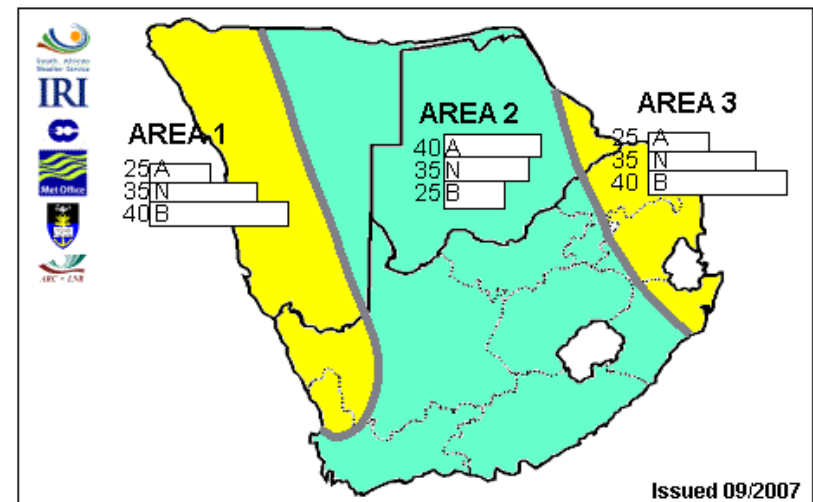
25% chance that the total rainfall for this period will be BELOW-normal.

### AREA 3 :

25% chance that the total rainfall for this period will be ABOVE-normal.

35% chance that the total rainfall for this period will be normal.

40% chance that the total rainfall for this period will be BELOW-normal.

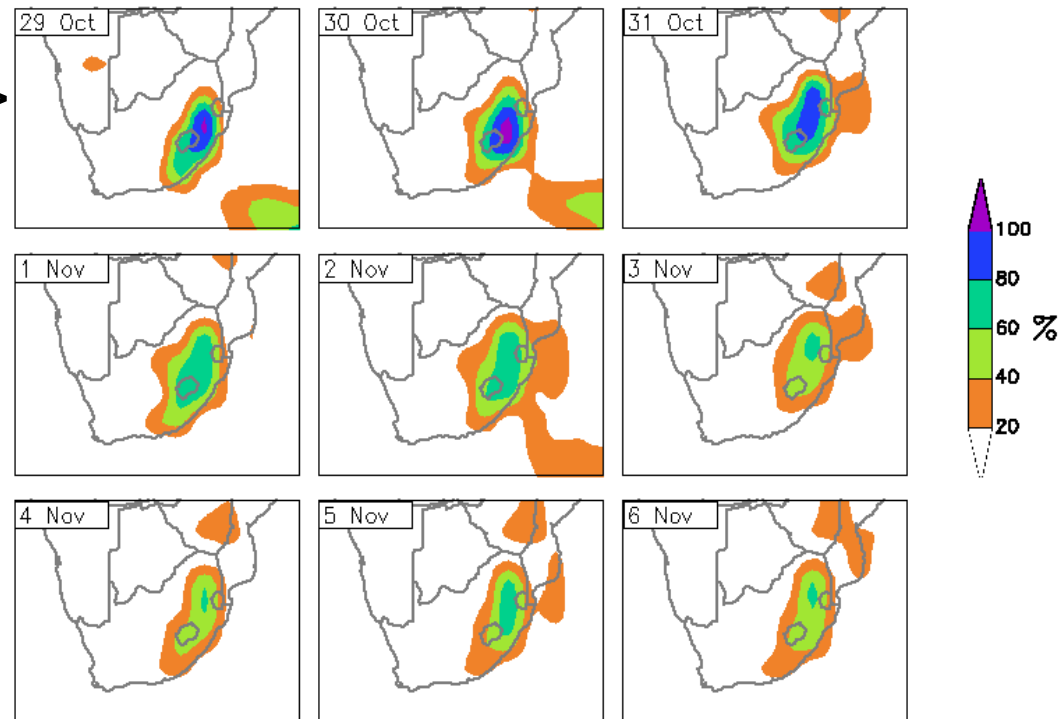


Issued 09/2007

# weather forecasts

- 2 weeks rainfall forecast is obtained daily in 3 categories probability > 1mm (light rainfall), > 5mm (medium rainfall) and > 20mm (heavy rainfall)

Prob of rainfall (Ave over 2.5x2.5° box) > 5 mm





# Farmers advisory

The main output for the project is Coded forecasts send via SMS

-Recommendations done in collaboration with extension officers

The forecasts contain 4 parts

1. Dates of the forecast
2. Weather types (e.g cloudy)
3. Rainfall probabilities
4. Recommendations

14-day Weather Forecast for Limpopo Province Lowveld

F= 21 SSMTWT

Lim ppppccp

>1 5343345

2w 8889889

>5 1111111

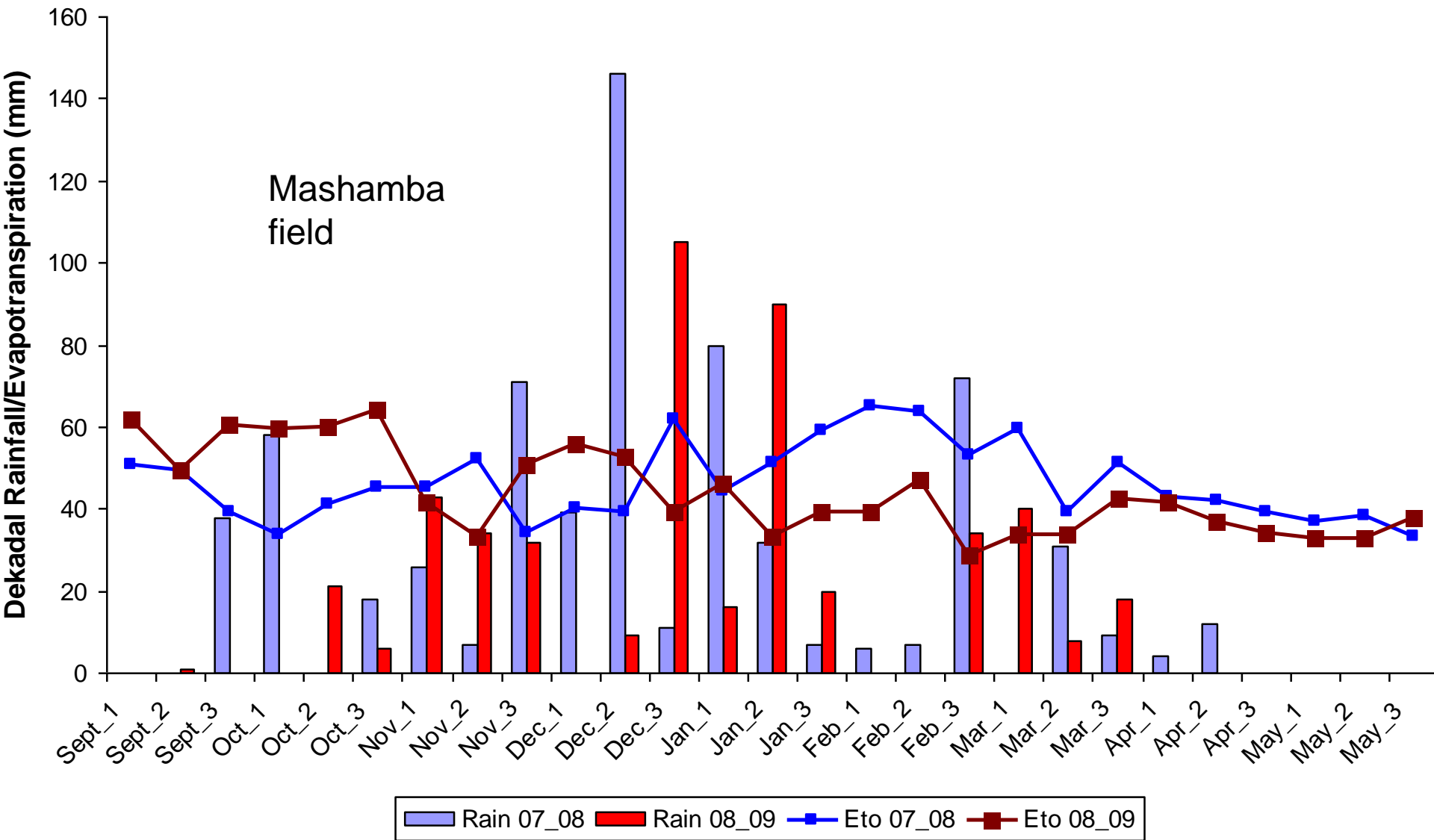
2w 77798878

>20 1111111

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Rec: prepare to plough next week

# Drought monitoring

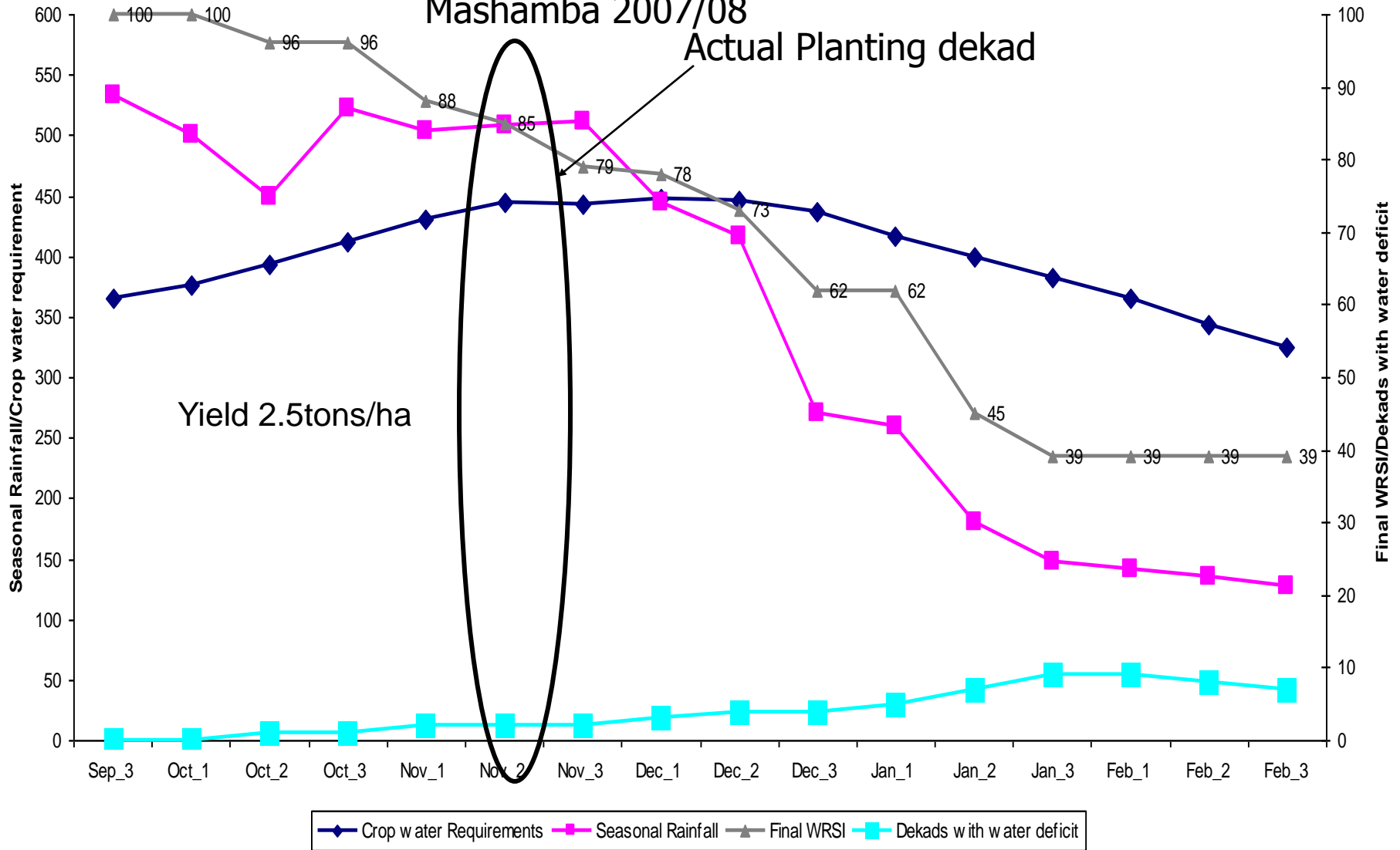


# Drought monitoring

Mashamba 2007/08

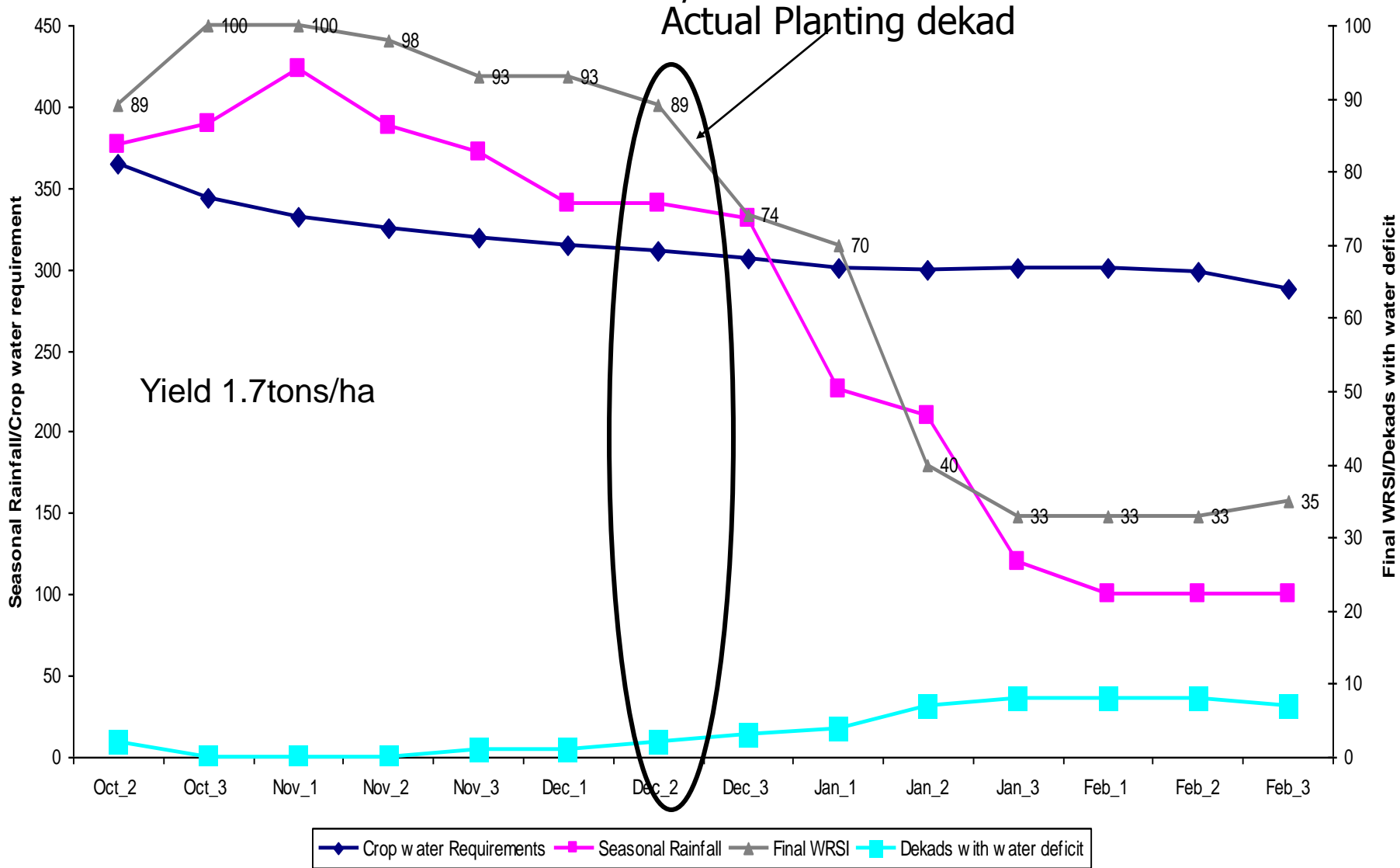
Actual Planting dekad

Yield 2.5tons/ha



# Drought monitoring

## Mashamba 2008/09



# Achievements of project

Survey conducted during the lifetime of the project and at the conclusion of the project showed farmers improved in the following areas

- Planning of agricultural activities
- Improvement in record keeping
- Increased understating of climate and environmental factors/issues
- Improvement in agronomic practices
- Good adoption of use of climate forecasts
- Improvement in yield in most places



# Challenges-technical

1. Accuracy of seasonal forecast issued
2. Resolution of the medium forecast maps very low
3. Verification processes show low forecast skill beyond 8 days except in cases of major synoptic systems

# Challenges-farmers

1. Literacy level variation
2. Language barrier
3. Tractor unavailability
4. Delayed response due to distance
5. Commitment and responsibility towards farming in community farms
6. Conflicting use of Indigenous knowledge
7. Labour problems
8. Communication problem

# Acknowledgements

- Government of France through FIRCOOP funding
- South African weather service for providing forecast information
- Provincial departments of Agriculture (Limpopo and Mpumalanga)
- Agricultural Extension officers
- All the farmers that are involved in the project



Thank you!