



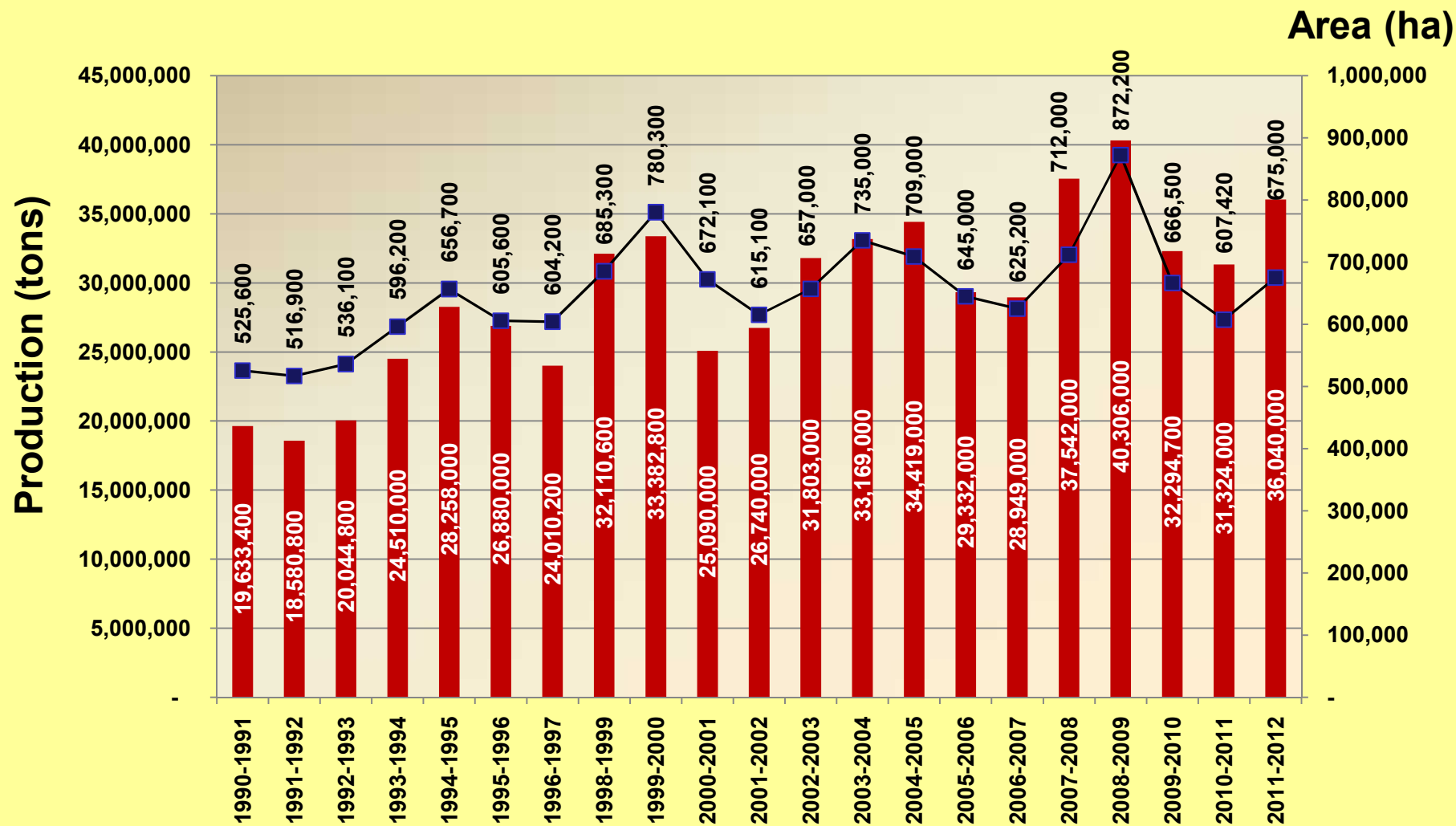
# **IMPROVING PRODUCTIVITY OF SUGARCANE GROWERS - THE WAY FORWARD**

**Mohammad Assenjee BHOLAH**  
Head of Farms, RSDF, Chiniot

**Malik Abdul SATTAR**  
GM Cane, RSML, Chiniot

*PSST, Karachi, 3 September 2012*

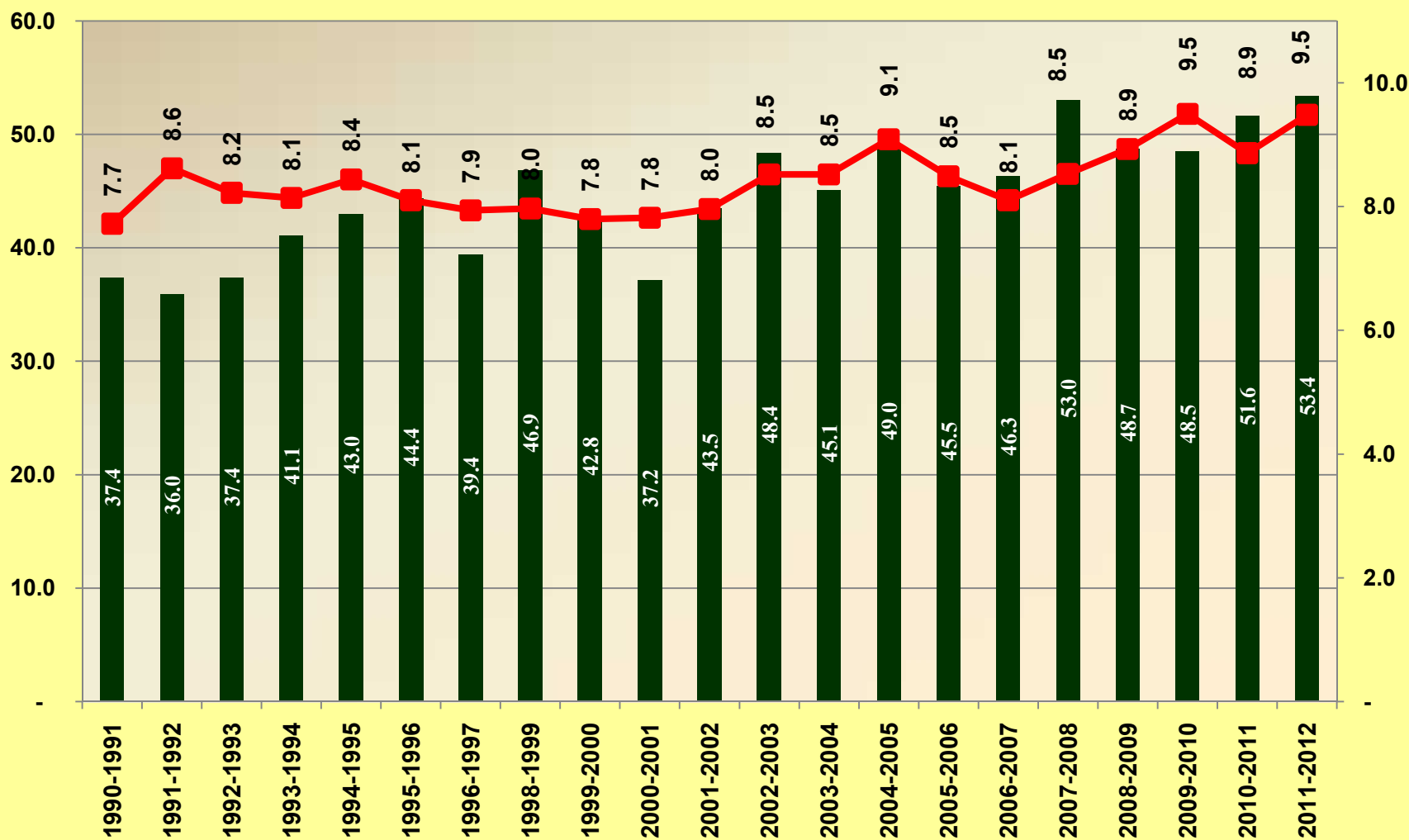
# SUGARCANE PRODUCTION AND AREA CULTIVATED IN PUNJAB



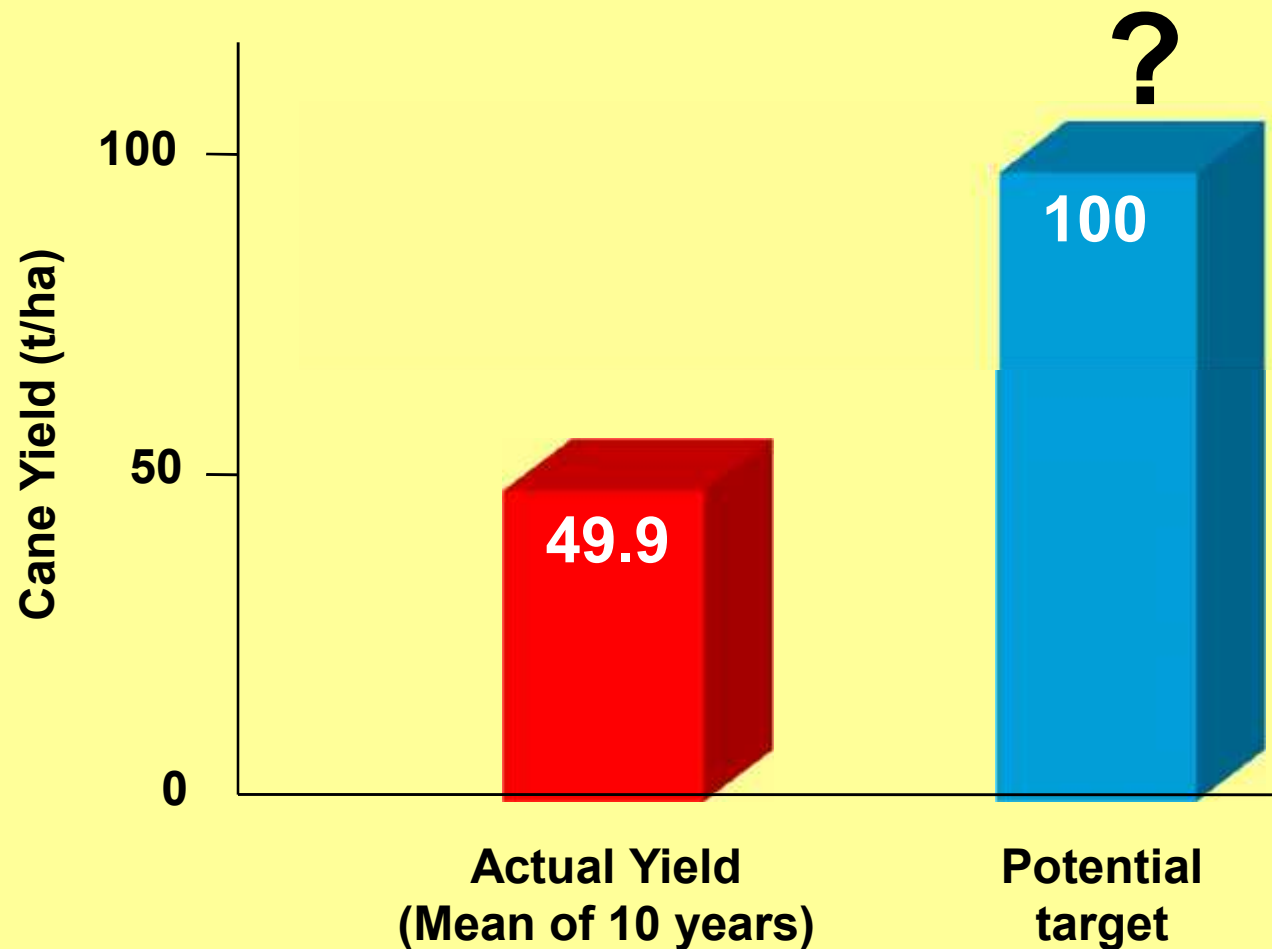
# EVOLUTION OF SUGARCANE YIELD AND SUGAR RECOVERY (Punjab)

CANE YIELD  
(T/Ha)

SUGAR  
RECOVERY (%)



# AVERAGE SUGARCANE YIELD IN PUNJAB AND POTENTIAL ACHIEVABLE TARGET ?



# ACHIEVEMENT OF POTENTIAL TARGET

**Focused and integrated approach on better management practices**

- ***Adequate land preparation***
- ***Choice of varieties and seed cane production***
- ***Crop protection – diseases and insect pests***
- ***Irrigation***
- ***Nutrient management***
- ***Cultural practices/weed management***

**Impact on cane growth and development and ultimate yield ?**

# Inadequate land preparation



# Poor levelling of field and water usage



## Infield loading



## Damage to cane stools



## Soil compaction



# Inadequate or untimely weed control



**Competition between weeds and sugarcane for nutrients and water**

# Inadequate control of pests and diseases



**Borer**

**Sugarcane Mosaic disease**



**Red rot**



**Commonly observed**  
**Considered to be of economic importance**

## **WAY FORWARD**

**Adopt new and improved management practices and minimize adverse impact on cane growth and development**

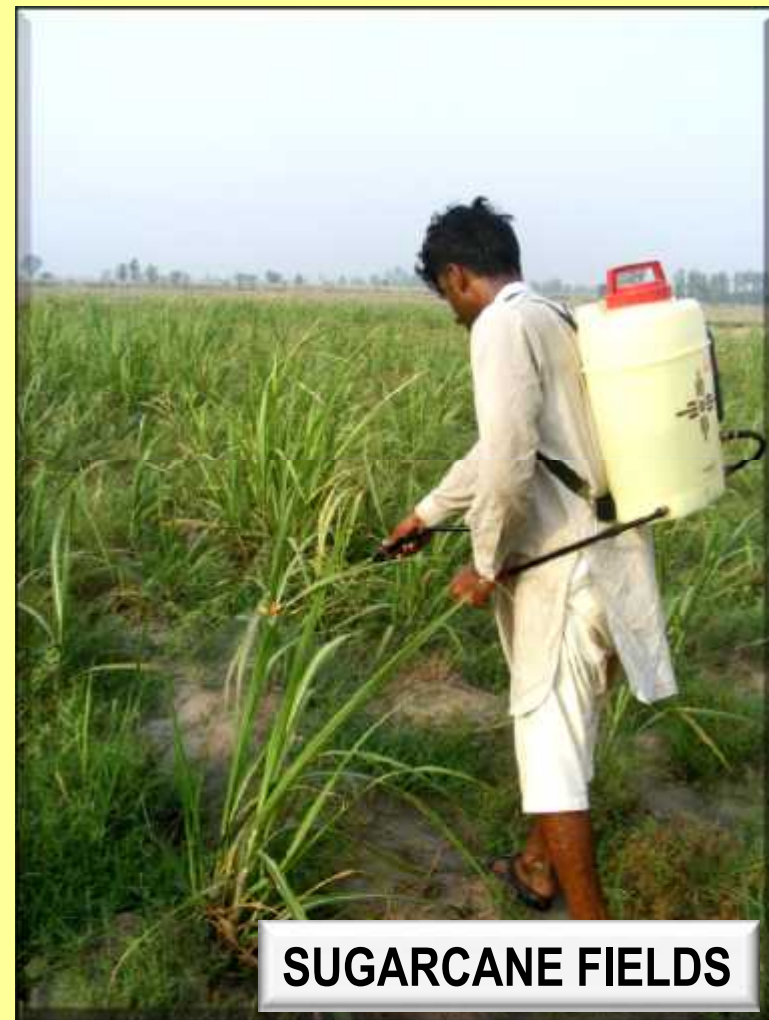
# ESTABLISH NEW CROPS ON LAND FREE FROM BERMUDA GRASS

**Effectiveness of glyphosate  
(490g/L ae, 2,5 L/acre)**

**Non selective weedicide**



**BARE LAND**



**SUGARCANE FIELDS**

# MODE OF ACTION OF GLYPHOSATE

Shikimic acid + Phosphoenol pyruvate

← + Glyphosate

**EPSP Synthase**

5-enolpyruvyl ~~shikimic~~ acid-3-phosphate

Without amino acids plants die



Aromatic amino ~~acids~~ (Phe, Tyr, Trp)  
(essential for synthesis of proteins)

# WEED CONTROL ON SUGARCANE LANDS

**Good control of  
bermuda grass**



# **WEED CONTROL ON SUGARCANE LANDS**

## **ADOPT AN INTEGRATED WEED MANAGEMENT APPROACH**

**Cost effective use of herbicides**

**Have no phytotoxic effects on target crop**

**Have no adverse effects on soils and  
broader environment**

# LAND LEVELING



Coarse



Laser levelling

# LAND PREPARATION



# USE OF PRESS MUD AT PLANTING



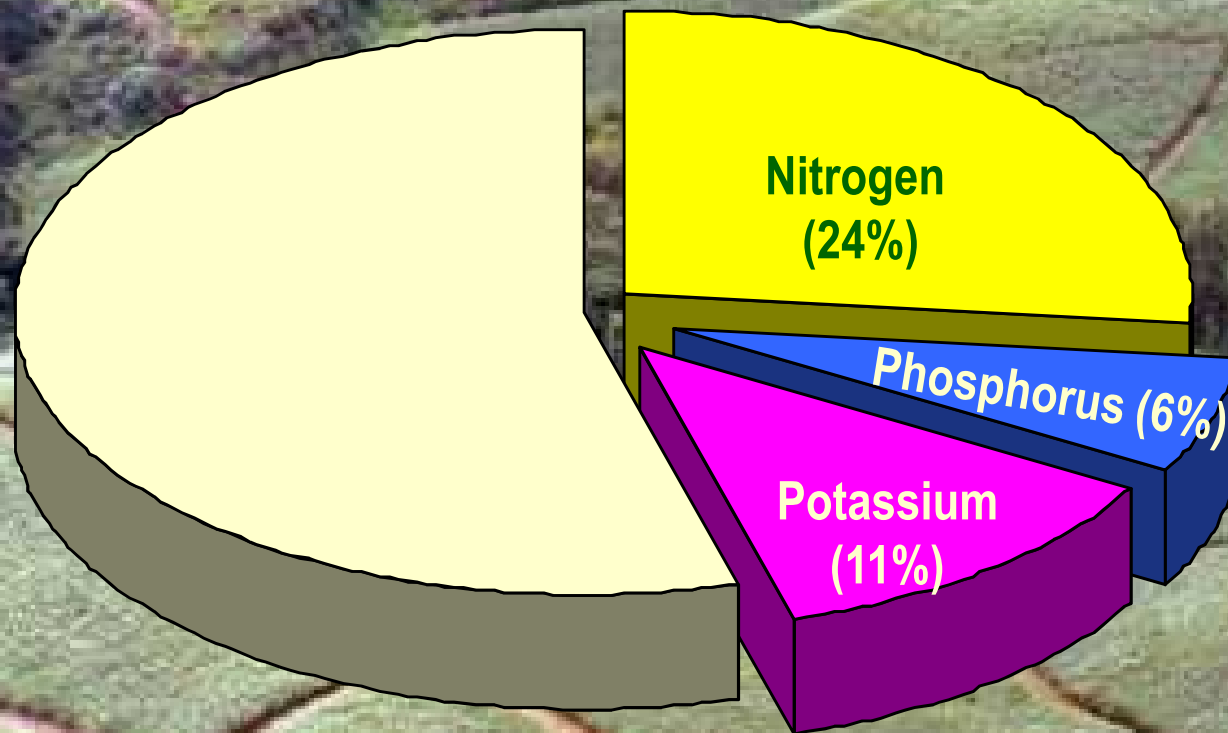
**0.1%N, 0.5 %  $P_2O_5$  & 0.15% of  $K_2O$**

**Contributes organic matter**

**Improves soil structure and texture**

**Improves CEC**

# NPK AND SUGAR PRODUCED



NEED FOR A GOOD NUTRIENT MANAGEMENT PLAN

# NUTRIENTS REMOVED BY SUGARCANE

For every 1000 mounds of cane harvested and sent to mills, the following amount of nutrients (kg) are exported from the field

N

50

(90 kg UREA)

$P_2O_5$

20

(50 kg DAP)

$K_2O$

125

(200 kg MOP)



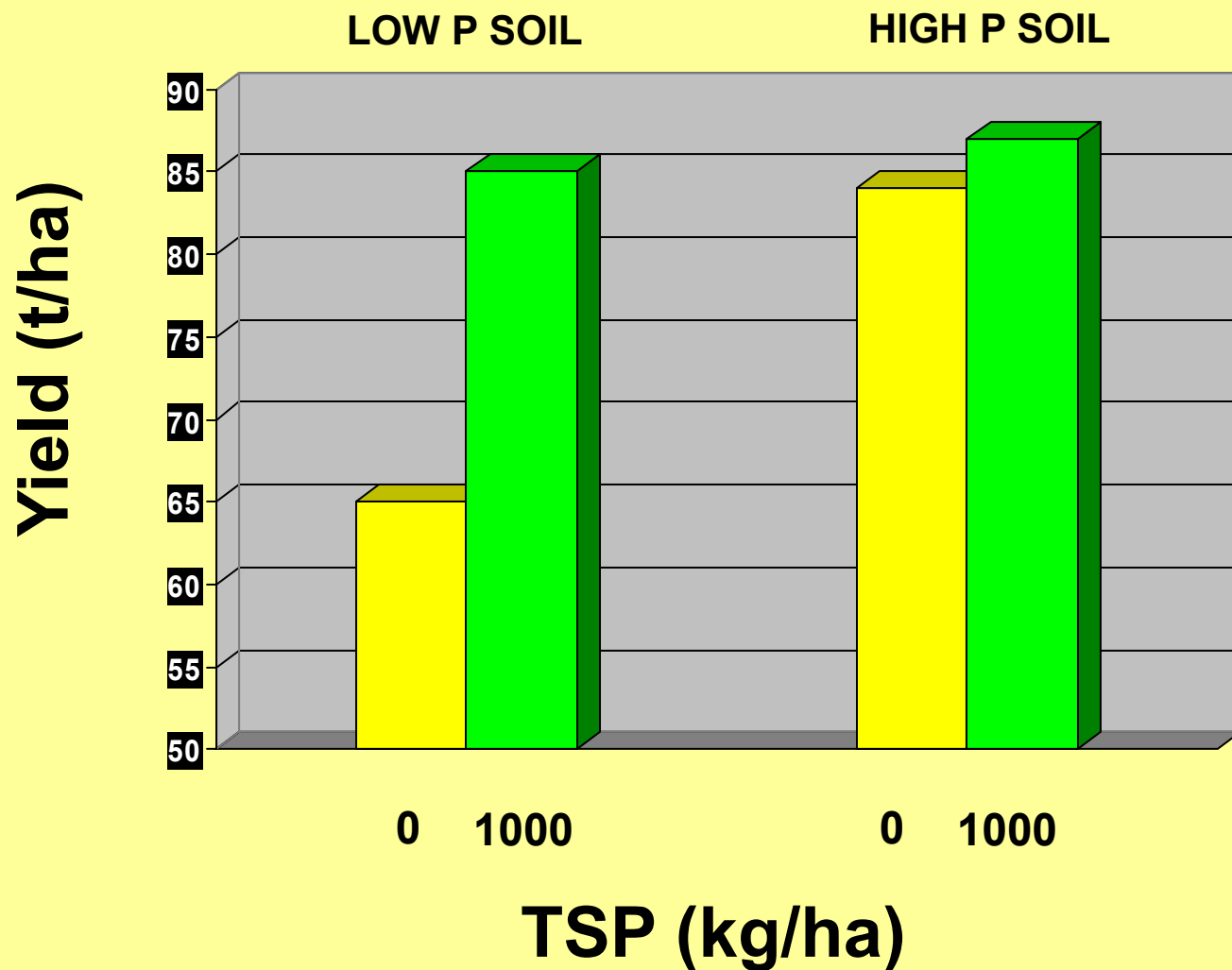
# **Soil testing for a balanced and optimum fertilization**



**Fine-tune P and K usage  
based on soil analysis data**

**Judicious use of fertilizers**

# EFFECT OF P ON CANE YIELD





**CPF 237**  
**(Sept 2011 crop)**

**High quality  
seeds**

**Physiologically vigorous**

**Healthy**

# SEED QUALITY IS A MUST



# **CANE SEED TREATMENT**

**HWT - CONTROL OF A NUMBER OF DISEASES  
(Chlorotic streak, Smut, RSD, Leaf scald, Red rot)**

- **SHORT HOT WATER TREATMENT  
@ 50 °C for 30 mins**
- **LONG HOT WATER TREATMENT  
@ 50 °C for 2 hours**
- **FUNGICIDE TREATMENT**

# HOT WATER TREATMENT OF CANE SEEDS



## SOWING

Seed rate (100 – 110 mounds)



## FUNGICIDE TREATMENT



## 1<sup>st</sup> IRRIGATION



# GOOD GERMINATION



**CPF 246**



**CPF 247**

**SPF 213**

**WELL DEVELOPED  
CANE AND GOOD  
TILLERING**



**CPF 246**

# CONTROLLED FURROW IRRIGATION

**Flexiflume gated pipes - Australia**



**Adopted at RSDF**



# PEST CONTROL (IPM)

## Biological control



Eggs parasitized  
by *Trichogramma  
chilonis*



Larva killed by *Cotesia flavipes*



Pyrilla nymph being  
attacked by *Epirope*

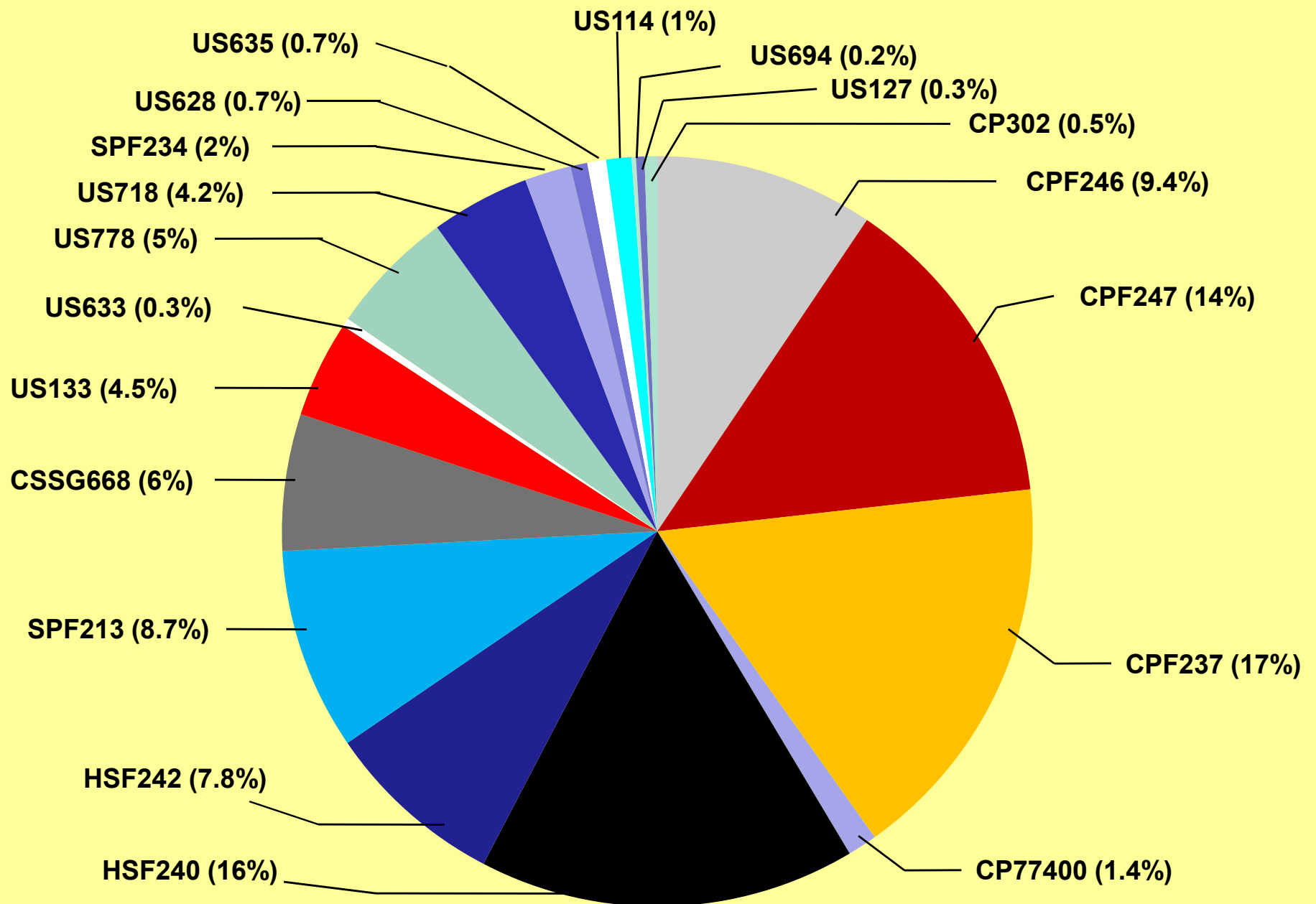
## Chemical control



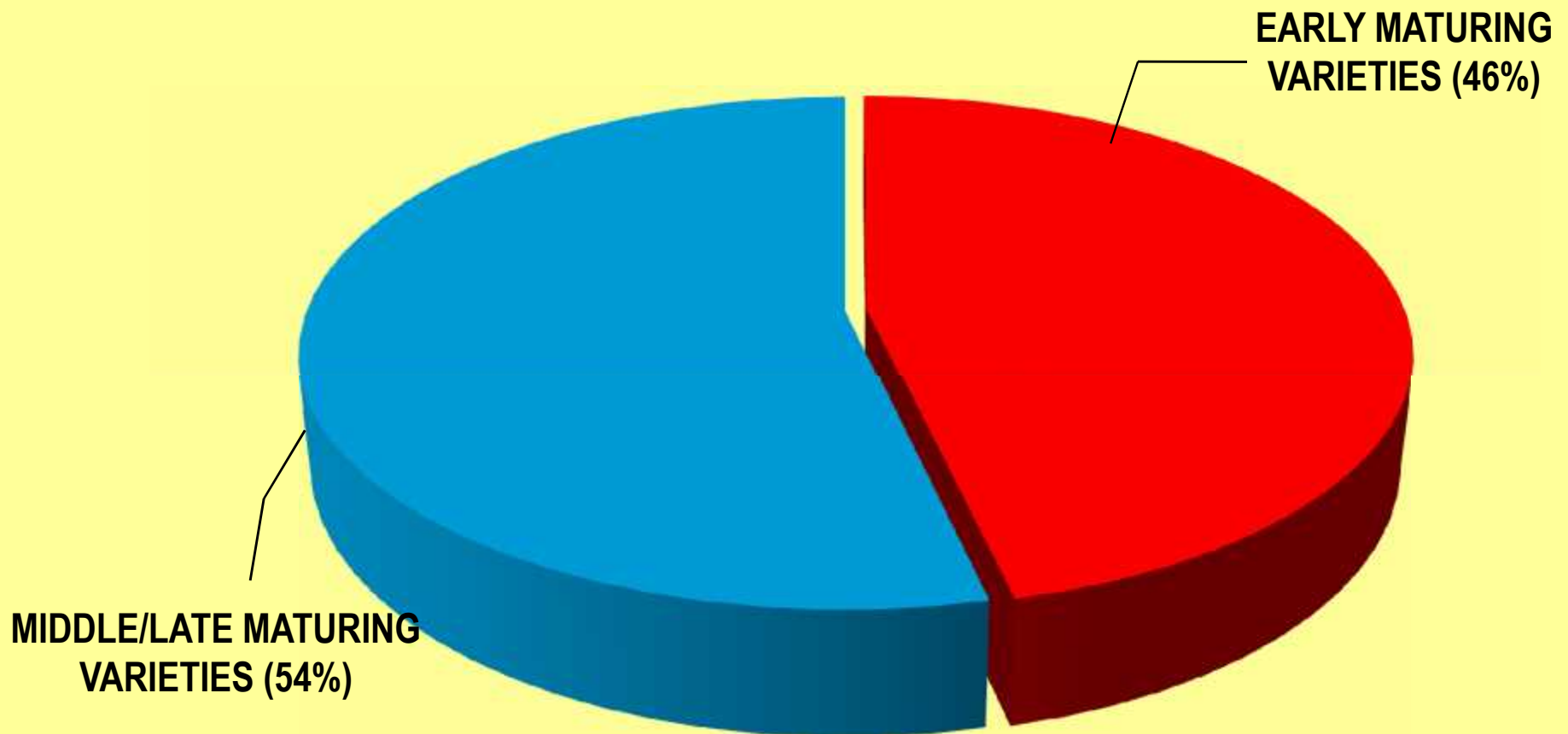
**Chlorpyrifos** (reduced residual  
activity in soils above pH6.5)

**Fipronil**

# VARIETY DISTRIBUTION AND % LAND OCCUPIED



## **PROPORTION OF EARLY v/s MIDDLE/LATE MATURING VARIETIES AT RSDF FARMS**



**GOOD BALANCE NECESSARY TO ENSURE CONTINUED SUPPLY OF  
GOOD QUALITY CANE TO MILLS THROUGHOUT CRUSHING SEASON**

# VARIETAL CHOICE & OPTIMUM HARVEST DATES

## SUGAR CANE - Variety Improvement

Table A. Planting and harvesting recommendations for the 22 sugar cane varieties currently under commercial cultivation

| Variety               | Soil type             | Harvest period*                   |
|-----------------------|-----------------------|-----------------------------------|
| M 3035/66 (G, r)      | B, F, H               | M, L                              |
| M 695/69 (L, S, Y)    | H, L, I               | E, M + (mid-June to end August)   |
| M 1176/77 (Y)         | L, P                  | E, M (August and September)       |
| M 52/78 + (S)         | H, F, H, L, I         | E (June to mid-August)            |
| M 261/78 (Y)          | L, P                  | M, L                              |
| M 96/82 (Y)           | L, P                  | E, M, L + (August to end October) |
| M 1246/84 (Y)         | H, L, P               | E, M, L + (August to end October) |
| M 387/85 (S)          | I                     | E, M (mid-July to mid-October)    |
| M 1186/86 (S, Y)      | H, L, P               | M, L                              |
| M 1394/86             | B, F, H               | M, L                              |
| M 1400/86 (Y)         | B, F, H, L, P         | E, M, L + (August to end October) |
| M 2024/88 (S) (I)     | L, P                  | E, M (mid-June to end August)     |
| M 2256/88 (L)         | B, F, H, L, P         | E, M (mid-June to mid-September)  |
| M 703/89 *** (p) (Y)  | B, F, H, L, irrigated | E, M (June to end July)           |
| M 186/88 (p)          | B, F, H               | M, L                              |
| M 2238/89 (p)         | H                     | M, L                              |
| M 1672/90 (p) (Y)     | L, P                  | M, L (mid-August to end October)  |
| M 2593/92 (p) (S) (Y) | L, P                  | E, M, L (mid-June to end October) |
| R 570 (Y)             | H, L, P               | M, L (mid-September to November)  |
| R 573 (Y)             | H, L, P               | E, M (July to end September)      |
| R 575 ** (L)          | H, L, P               | E, M (mid-June to end August)     |
| R 579 + (G, Y)        | H, L, I               | M, L (October to November)        |

It is emphasized that long-season planting must be completed by the end of March and short-season planting before the end of August.

- + E - early (June to July); M - mid-season (mid-August to mid-October); L - late (end October to end November)
- \* M 52/78 and R 579 to be planted under irrigation in areas receiving  $\geq 2000$  mm rainfall
- \*\* R 575 to be planted under irrigation in areas receiving  $\leq 1500$  mm rainfall
- \*\*\* M 703/89 to be planted under irrigation in L soils
- M 695/69 to be harvested by end-August (or by end August if flowering rate does not exceed 25%)
- M 96/82 and M 1246/84 to be harvested by end September (or by end October if flowering rate does not exceed 25%)
- M 1400/86 to be harvested by end September (or by end October if flowering rate does not exceed 40%)
- G Susceptible to gumming and not recommended in areas where cane is prone to the disease
- L Susceptible to leaf scald. Planting material should originate from nurseries established from cuttings having undergone a cold soak, in running water for 48 hours, followed by a long hot water treatment at 50°C for 3 hours
- R Susceptible to rust and recommended only in low-lying regions
- S Susceptible to smut. Planting material for H, L and F soils should originate from nurseries established with cuttings having undergone a dual hot water treatment
- Y Susceptible to yellow spot and recommended only in low-lying regions
- i To be planted under irrigated conditions
- p Provisional recommendation
- r Recommended only in specific areas of the superhott and humid zones as given in Recommendation Sheet No 73 (April 1993)



## MAURITIUS SUGAR INDUSTRY RESEARCH INSTITUTE

## Recommendation Sheet

February 2004 No. 142\*

### RECOMMENDED HARVEST PERIODS OF COMMERCIAL SUGAR CANE VARIETIES

|               | JUNE | JULY | AUG | SEPT | OCT | NOV |
|---------------|------|------|-----|------|-----|-----|
| M 555/60      |      |      |     |      | ←→  |     |
| M 3035/66     |      |      | ←→  | ←→   | ←→  | ←→  |
| M 695/69 +    | ←→   | ←→   | ←→  | ←→   |     |     |
| M 292/70      | ←→   | ←→   |     |      |     |     |
| M 1551/70     |      | ←→   | ←→  | ←→   | ←→  |     |
| M 1176/77     |      |      | ←→  | ←→   | ←→  |     |
| M 52/78       | ←→   | ←→   |     |      |     |     |
| M 261/78      |      |      | ←→  | ←→   | ←→  |     |
| M 1658/78     |      | ←→   | ←→  | ←→   | ←→  |     |
| M 1551/80     |      | ←→   | ←→  | ←→   | ←→  |     |
| M 96/82 +     |      |      | ←→  | ←→   | ←→  |     |
| M 1300/83 (p) |      |      | ←→  | ←→   | ←→  |     |
| M 1246/84 +   |      |      | ←→  | ←→   | ←→  |     |
| M 387/85 (p)  |      | ←→   | ←→  | ←→   | ←→  |     |
| M 1186/86 (p) |      |      | ←→  | ←→   | ←→  | ←→  |
| M 1394/86 (p) |      |      | ←→  | ←→   | ←→  | ←→  |
| M 1400/86 (p) |      |      | ←→  | ←→   | ←→  | ←→  |
| M 2024/88 (p) | ←→   | ←→   | ←→  | ←→   |     |     |
| M 2256/88 (p) | ←→   | ←→   | ←→  | ←→   |     |     |
| M 703/89 (p)  | ←→   | ←→   | ←→  | ←→   |     |     |
| R 570         |      |      | ←→  | ←→   | ←→  | ←→  |
| R 573         |      |      | ←→  | ←→   | ←→  |     |
| R 575 (p)     | ←→   | ←→   | ←→  | ←→   | ←→  |     |
| R 579 (p)     |      |      | ←→  | ←→   | ←→  | ←→  |

Harvest period is indicated by arrows

(p) provisional recommendations for recently released varieties

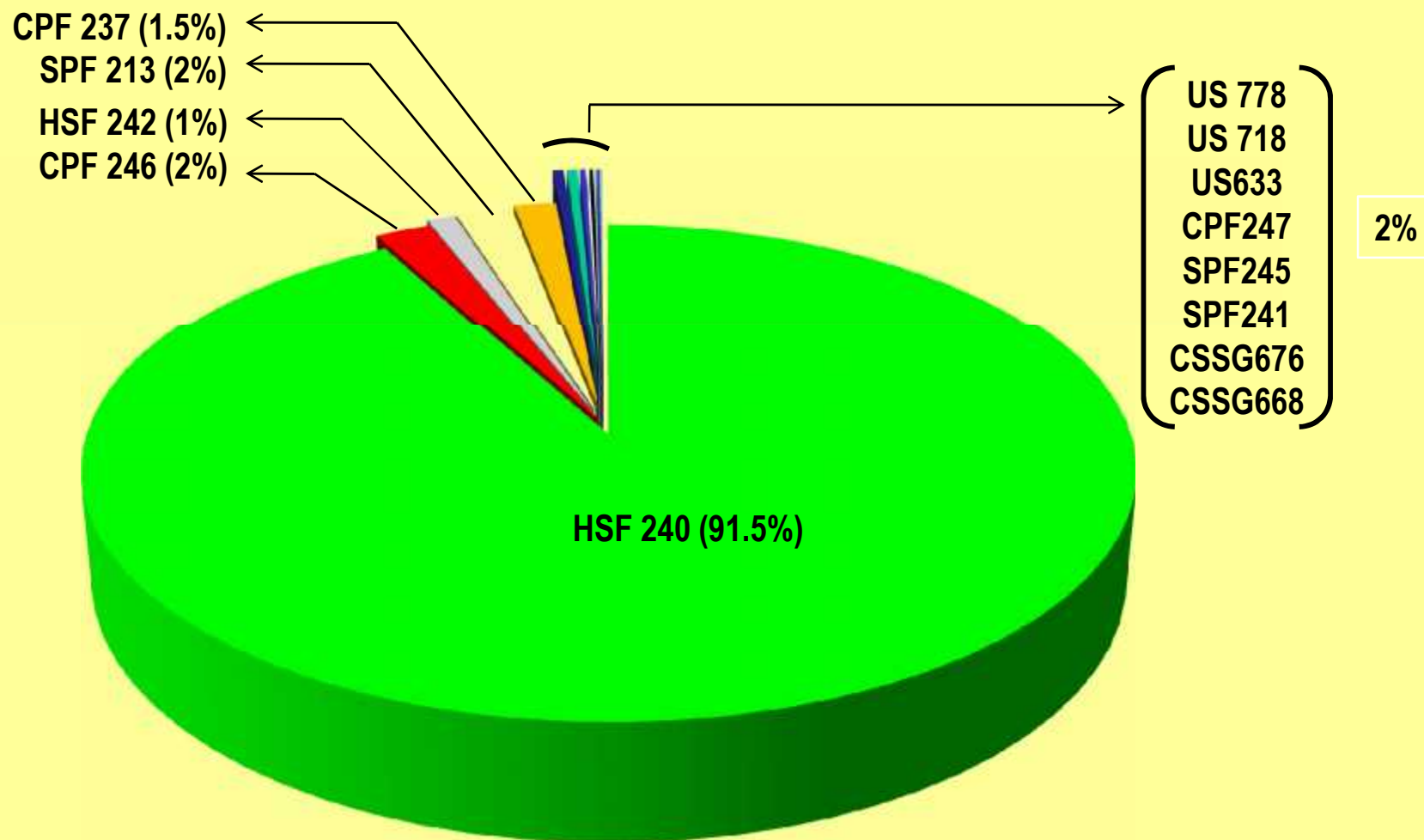
\* When flowering rate does not exceed 25%, harvest of M 555/60, M 96/82 and M 1246/84 could be extended as indicated

\* This Recommendation Sheet cancels No. 134 of February 2003

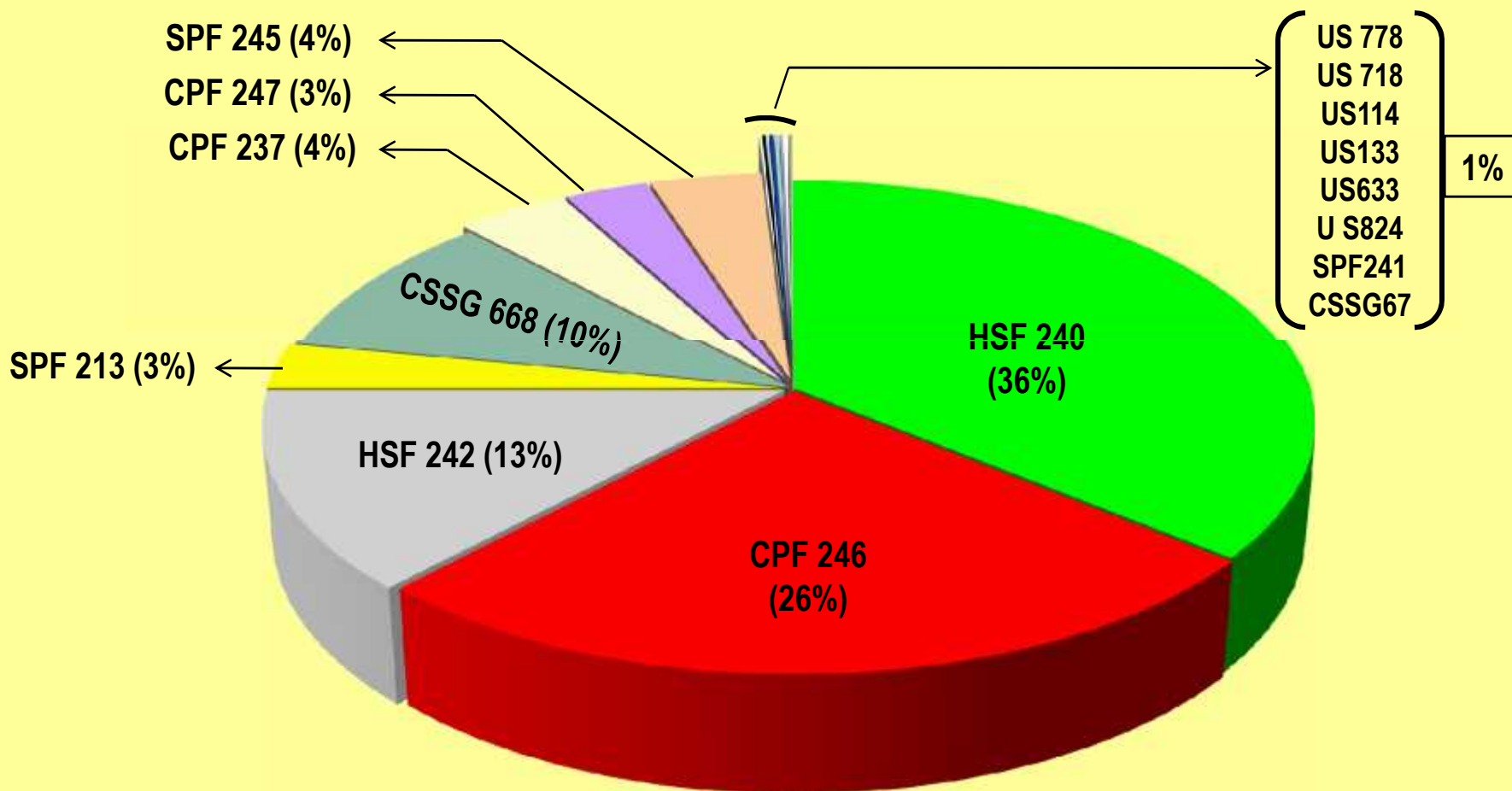
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454 1061, 466 6800, 250 1245 - Web Site: <http://webmsiri.intnet.mu>

# STATUS OF VARIETIES CULTIVATED BY GROWERS PRIOR TO 2009

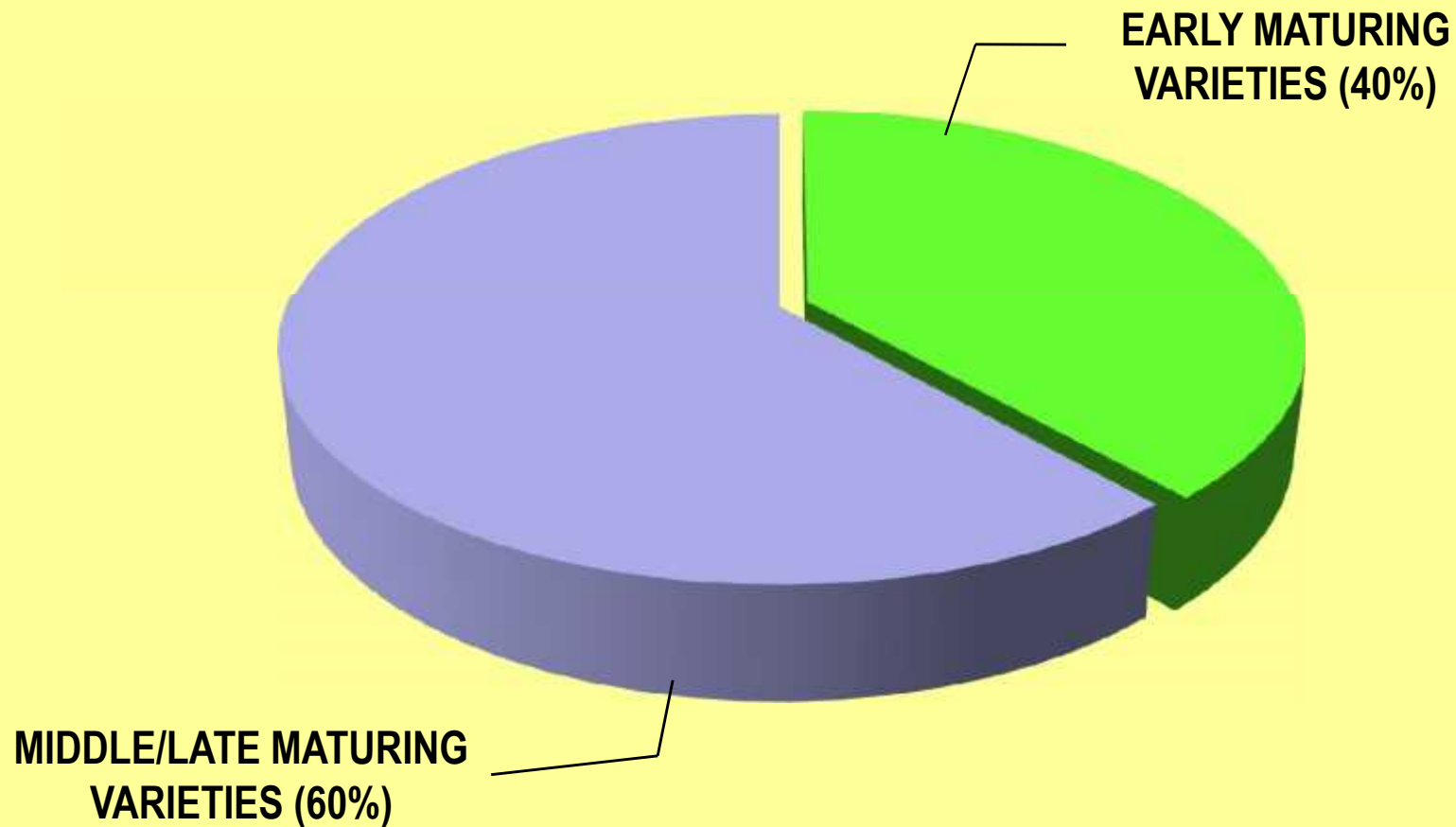


# ADOPTION OF NEW VARIETIES BY GROWERS FOR SEPTEMBER 2011 CROP

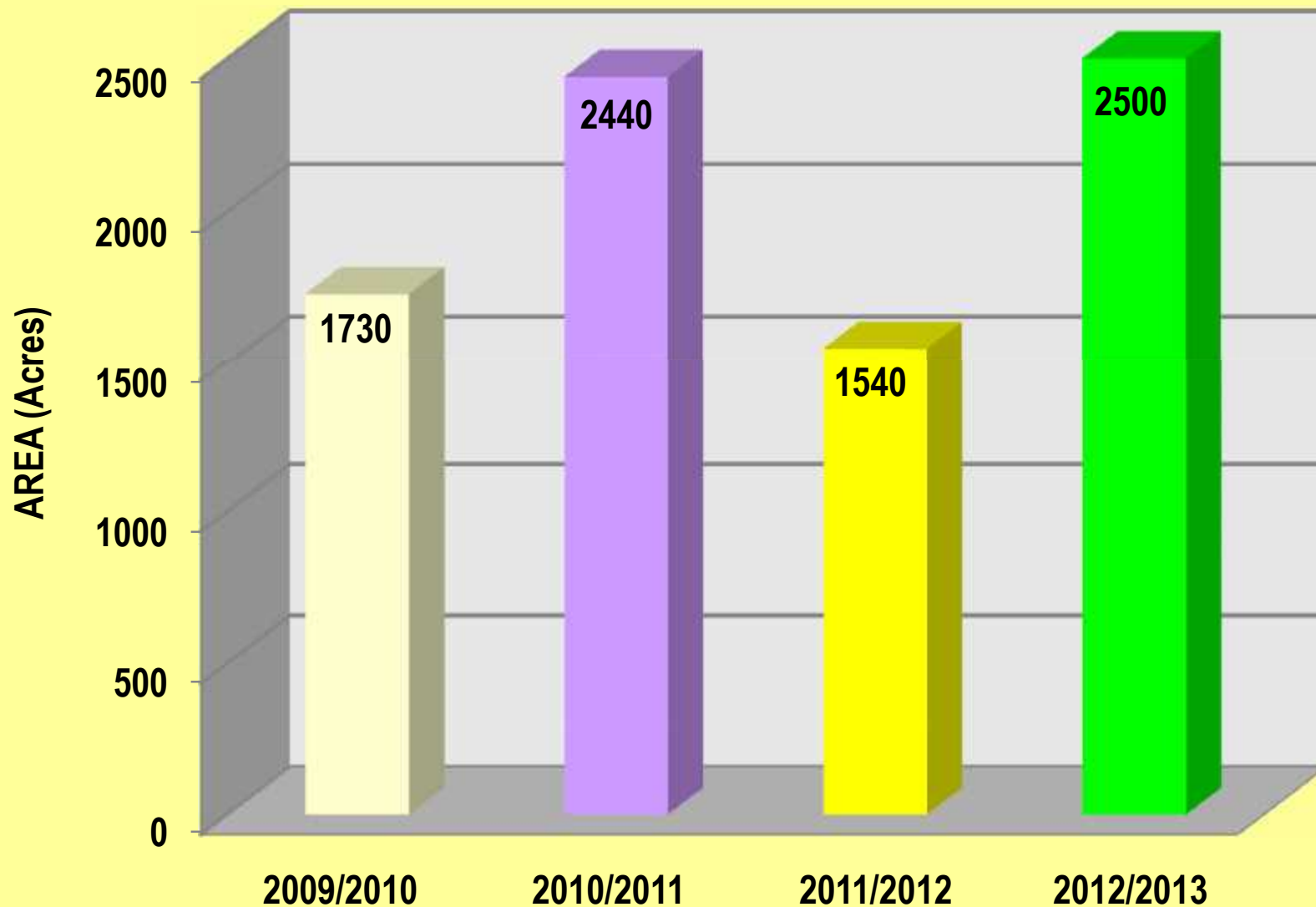


**VARIETY MIX SHOULD BE OPTIMISED TO MINIMISE NEGATIVE IMPACTS OF DISEASE  
FROM A HIGH PROPORTION OF SINGLE HIGHLY PRODUCTIVE VARIETY**

# EARLY v/s MIDDLE/LATE MATURING VARIETIES (February 2012 Crop - Growers Fields)



# AREA PLANTED BY GROWERS (RSML seeds)



# **SUPPORT BY FARMS AND MILLS**

**Provision of seeds of new and better performing varieties**

**Provision of incentive scheme**

**Loan for purchase of seeds, fertilizers and pesticides**

**Promotion of BMP to improve cane productivity with enhanced recoveries**

# TECHNOLOGY TRANSFER



# PROVISION OF INFORMATION AND ADVICE TO GROWERS

Assessment of newly sown crop



Photo taken on  
31 January 2012

25 January 2012



# Field visits



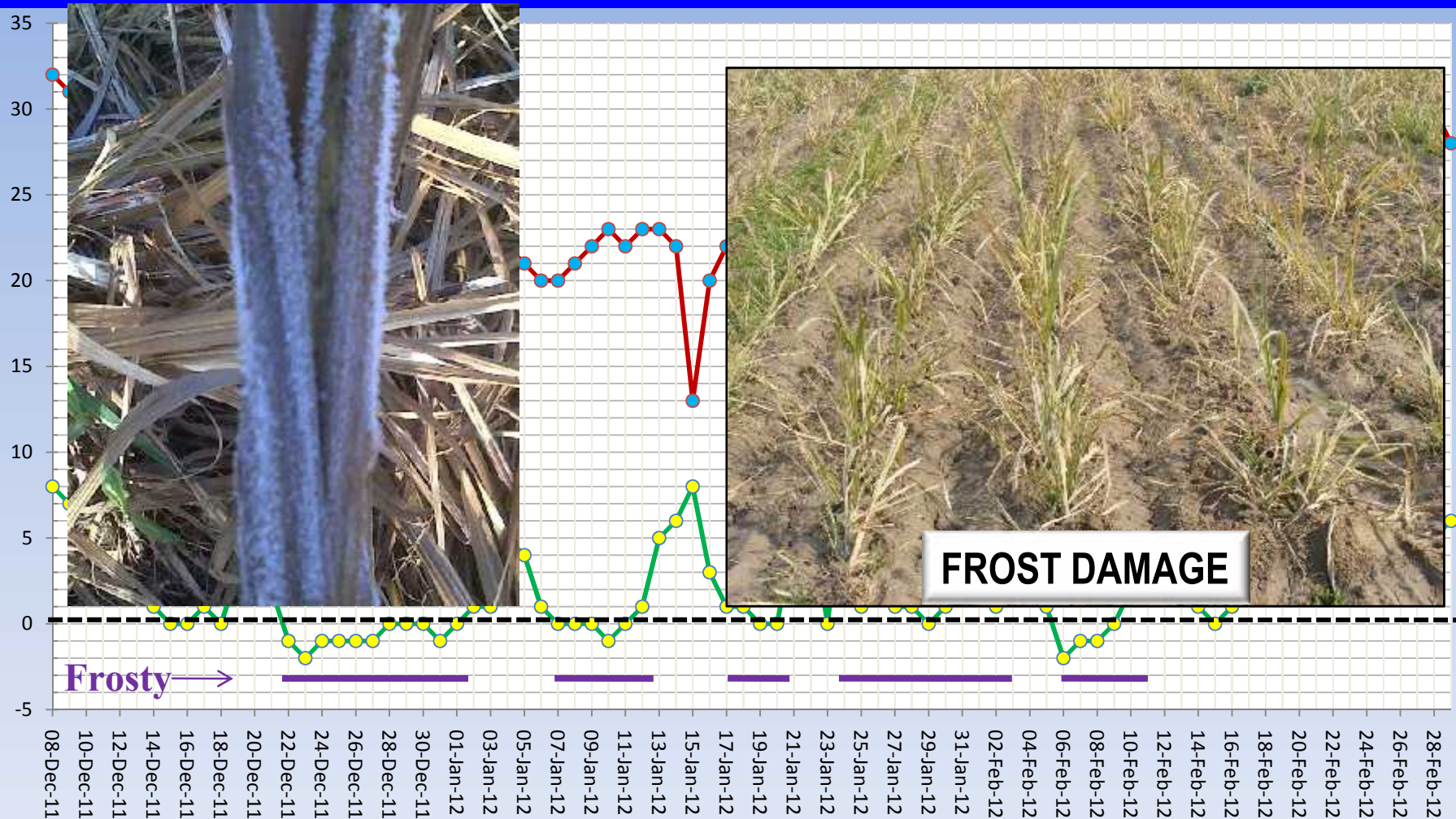
2 July 2012



20 July 2012

# ADVERSE EFFECTS OF CLIMATE

## MINIMUM and MAXIMUM TEMPERATURES RECORDED AT FARMS





# **PROTECTION AGAINST FROST BY COVER CROP**

Photo taken on 31 January 2012

# POTENTIAL YIELD EXPECTATIONS - ACHIEVABLE FROM ADOPTION OF BMP



20 July 2012

# Status of variety CPF 246 sown in September 2011

A photograph showing a dense cornfield on the left side of a dirt road. A silver SUV is parked on the road in the distance, with a person standing next to it. Another person is walking away from the camera on the road. The corn plants are tall and green. The sky is overcast. A concrete block is visible in the foreground on the left.

**1600  
mounds/acre**

26 August 2012

# QUALITY CANE SENT TO MILLS

**HARVEST**



**MINIMIZE TIME  
BETWEEN CUT AND  
CRUSH**

**AVOID CANE  
DETERIORATION AND  
MAINTAIN GOOD  
RECOVERY**



**TRANSPORT TO MILLS**

# CONCLUSION

Change in mindset is imperative and growers must adopt new and improved management practices

Potential for increased cane productivity on a commercial scale is indeed achievable

Emphasis must be on effective technology transfer

Technology transfer must be science based and must encompass socio-cultural background and language of farmers

# **ACKNOWLEDGEMENT**

Appreciation to higher management of Sharifgroup and in particular to Mian Suleman Shahbaz Sharif (MD), Mr Ikram Ul Haq (Group Director) and Mr Javed Iqbal (Project Director) for their support and for giving me the opportunity to make this presentation

Mr Malik Abdul Sattar, GM cane and his collaborators for their assistance in the preparation of this presentation



**THANK YOU FOR  
YOUR ATTENTION**