CPF 250: A NEW ENTRY TOWARDS THE ERA OF EARLY MATURING VARIETIES

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Introduction:

- Sugarcane (*Saccharum officinarum* L.*)* plays vital role in the economic uplift of the growers and financial stability of sugar industry
- Vast expansion of sugar industry necessitates to prolong the crushing season of sugar mills by introducing early maturing varieties
- Sugarcane Research Institute, Faisalabad has developed an early maturing variety CPF 250
- After adapting this new variety by the farming community, the sugar recovery pattern of mills will not only be improved but also CPF 250 will prove its worth than other commercial varieties.
- The CPF 250 is for general cultivation in the whole Punjab

Comparison with world (2013):

Item	World	Asia	Pakistan	Punjab	% share of Punjab in Pakistan
Area (000 ha)	26523	11036	1129	757	67
Production (m/t)	1877	745	64	44	69
Yield (t/ha)	71	67	56	63	--

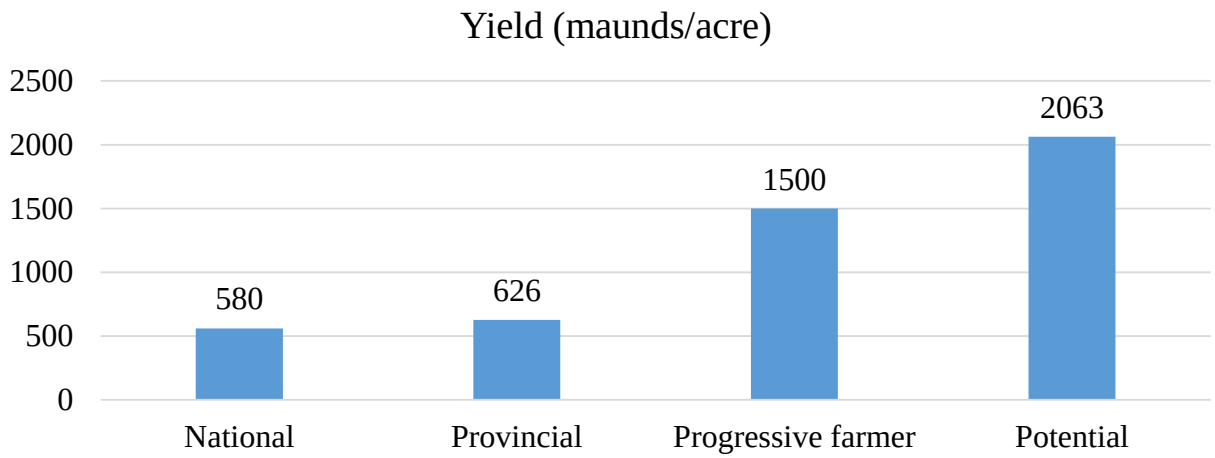
Source: FAO Statistics, 2013, Crop Reporting Service, GOP, 2013-14

Sugarcane producers in Asia:

Sr. No.	Country	Area (000 ha)	Production (000 t)	Yield (t ha^{-1})	Crop Duration (Months)	Stripped Cane Yield/Unit time
1	Philippine	433	30000	69.24	18	69.24
2	India	5090	347870	68.34	12-18	68.34
3	Sri-Lanka	13	800	63.49	18	63.49
4	Indonesia	458	26342	57.68	18	57.68
5	**Pakistan**	**1046**	**58038**	**55.49**	**10-15**	**79.91**
6	Lao DPR	21	1056	51.52	18	51.52
7	Nepal	65	2930	45.45	18	45.45
8	Bangladesh	118	4850	41.10	18	41.10
9	Cambodia	17	365	21.47	18	21.47
Ranking		**2**	**2**	**5**	**-**	**1**

Source: Ministry of Food & Agriculture, Pakistan

Yield gap:



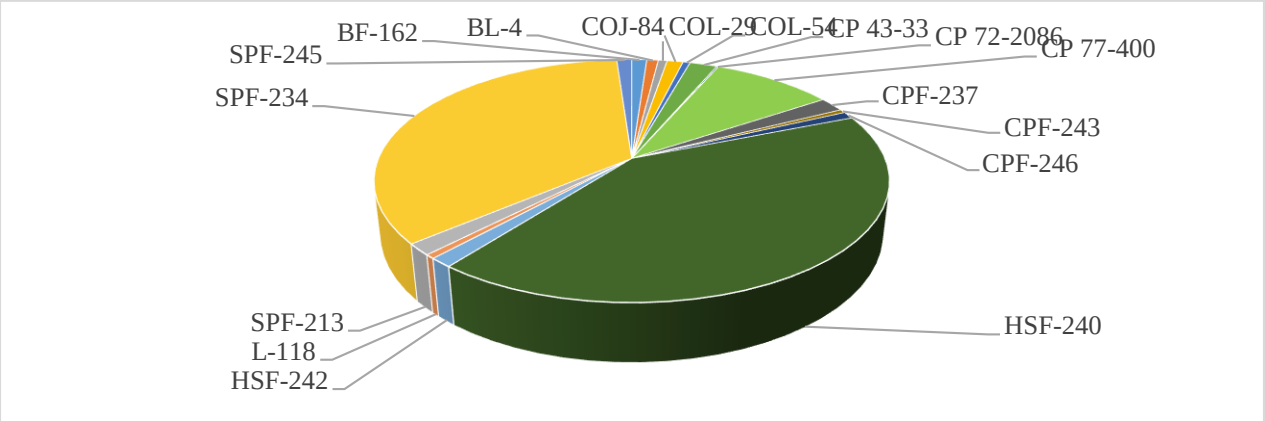
Source: Ministry of Food & Agriculture, Pakistan, Crop Reporting Service, GOP, 2014-15

Overall impact in Punjab:

Comparison	1999-00	2014-15	% increase
Area (000 ha)	672	711	06
Production (million tonnes)	25	41	64
Yield (tonnes/ha)	37	63	70
Recovery (%)	7.82	9.85	26
2.10° increase in sugar recovery has produced sugar of worth Rs. 39.14 billion			

Source: Ministry of Food & Agriculture, Pakistan, Crop Reporting Service, GOP, 2014-15

Varietal composition of SRI varieties in Punjab (2014-15):



Source: Ministry of Food & Agriculture, Pakistan, Crop Reporting Service, GOP, 2014-15

Morphological description:

Plant:

Height at maturity (m):	4.70
Growth Habit:	Erect
Tops:	Medium

Leaves:

Color:	Green
Length (cm):	160
Width (cm):	4.60
Attitude:	Erect
Surface:	Plain
Ligule:	Deltoid
Auricle:	Absent
Margins:	Non serrated

Leaf sheath:

Length (cm):	30
Spines:	Absent
Clasping	Medium
Trashing:	Loose

Cane:

Length (m):	2.52
Thickness (cm):	3.01
Shape:	Straight
Color Unexposed:	Pale Green
Pith:	Absent

Internode:

Length (cm):	16.5
Shape:	Bobbin
Splits:	Absent
Ivory Marking:	Absent
Bud Groove:	Present

Root zone:

Size (mm):	5
Rows:	2 (Staggered)
Color:	Brown
Wax Band:	Present
Aerial Roots:	Present at lower internode

Bud:

Size:	Medium
Type:	Round
Flanges:	Present
Germ Pore:	Apical
Position:	At leaf scar

Agricultural characteristics:

CPF 250 in comparison with HSF 240 & CPF 246

Variety	**Germ. (%)**	**Tillers per Plant**	**Cane count (000 ha^{-1})**	**Wt. per cane (kg)**
CPF 250	40.2	1.72	122.9	0.90
HSF 240	42.8	2.24	126.8	0.77
CPF 246	37.3	1.52	73.9	0.92

A) Sugarcane Research Institute, Faisalabad; CPF 250 compared with HSF 240

Year	Cane yield (t ha^{-1})		Difference (t ha^{-1})	Percent increase over HSF 240
	CPF 250	HSF 240		
2008-09	149.66	129.95	19.71	15.17
2009-10	98.06	90.74	7.32	8.07
2010-11	101.9	88.1	13.8	15.66
2011-12	92.7	82.6	10.1	12.23
Average	**110.58**	**97.85**	**12.73**	**13.00**

B) Sugarcane Research Station, Khanpur; CPF 250 compared with SPF 234/CPF 246

Year	Cane yield (t ha-1)		Difference (t ha-1)	Percent increase/decrease over SPF 234 / CPF 246
	CPF 250	SPF 234 /CPF 246		
2009-10	120.93	117.79	3.14	2.66
2010-11	102.32	101.48	0.84	0.83
2011-12	101.3	102.31	-1.01	-0.98
2012-13	106.39	103.15	3.24	3.14
Average	**107.73**	**106.18**	**1.55**	**1.46**

C) Sugarcane Research Station, Bahawalpur; CPF 250 compared with SPF 234

Year	Cane yield (t ha^{-1})		Difference (t ha^{-1})	Percent increase over SPF 234
	CPF 250	SPF 234		
2010-11	103.6	87.3	16.2	18.6
2011-12	130.0	90.1	40.2	44.4
Average	**116.8**	**88.7**	**28.1**	**31.7**

D) Trials at Farmers' Fields; CPF 250 compared with local check

Year	No. of sites	Cane yield (t ha^{-1})		Difference (t ha^{-1})	Percent increase over HSF 240 / CPF 247
		CPF 250	HSF 240 / CPF 247		
2011-12	10	105	104	1.00	0.96
2014-15	13	134.1	96.7	37.4	38.7
Average		**119.5**	**100.3**	**19.2**	**19.1**

E) Yield Performance of CPF 250 in NUVYT

Sr. No.	Year	Locations	CPF 250 (t ha^{-1})	Local Check (t ha^{-1})	% increase over local check
1	2009-10	NARC, Islamabad	61.7	54.0 (HSF 242)	14.2
2	2010-11	SRI, Faisalabad	128.9	124.9 (HSF 240)	3.2
Average			**95.3**	**89.4**	**6.5**

Quality Performance:

A) Sugarcane Research Institute, Faisalabad; CPF 250 compared with HSF 240

Year	Sugar recovery (%)		Difference	Percent increase over HSF 240
	CPF 250	HSF 240		
2008-09	12.89	12.42	0.47	3.78
2009-10	12.94	12.08	0.86	7.12
2010-11	13.39	12.80	0.59	4.61
2011-12	13.62	12.60	1.02	8.09
Average	**13.21**	**12.47**	**0.74**	**5.93**

B) Sugarcane Research Station, Khanpur; CPF 250 compared with SPF 234/CPF 246

Year	Sugar recovery (%)		Difference	Percent increase over SPF 234 / CPF 246
	CPF 250	SPF 234 / CPF 246		
2009-10	13.68	11.82	1.86	15.74
2010-11	12.73	12.21	0.52	4.26
2011-12	12.90	12.81	0.09	0.70
2012-13	12.90	12.39	0.51	4.12
Average	**13.05**	**12.31**	**0.74**	**6.00**

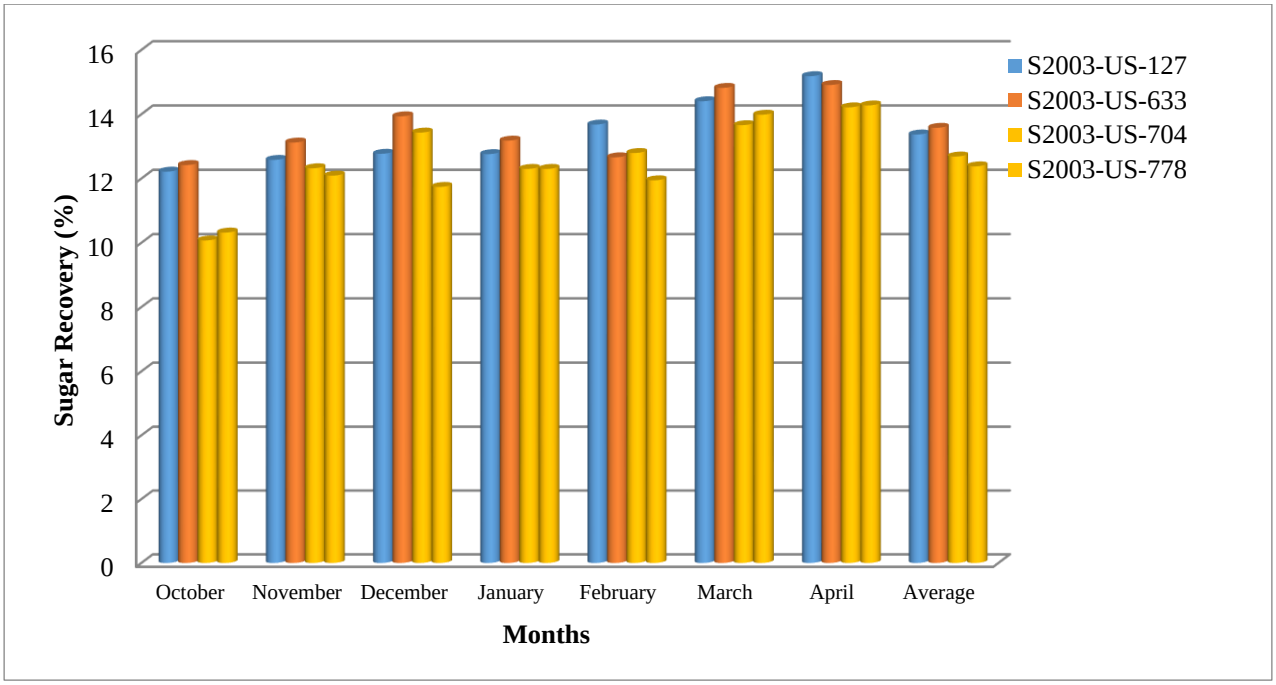
C) Trials at Farmers' Fields; CPF 250 compared with local check

Year	No. of sites	Cane yield (t ha^{-1})		Difference (t ha^{-1})	Percent increase over HSF 240 /CPF 247
		CPF 250	HSF 240 / CPF 247		
2011-12	10	105	104	1.00	0.96
2014-15	13	134.1	96.7	37.4	38.7
Average		**119.5**	**100.3**	**19.2**	**19.1**

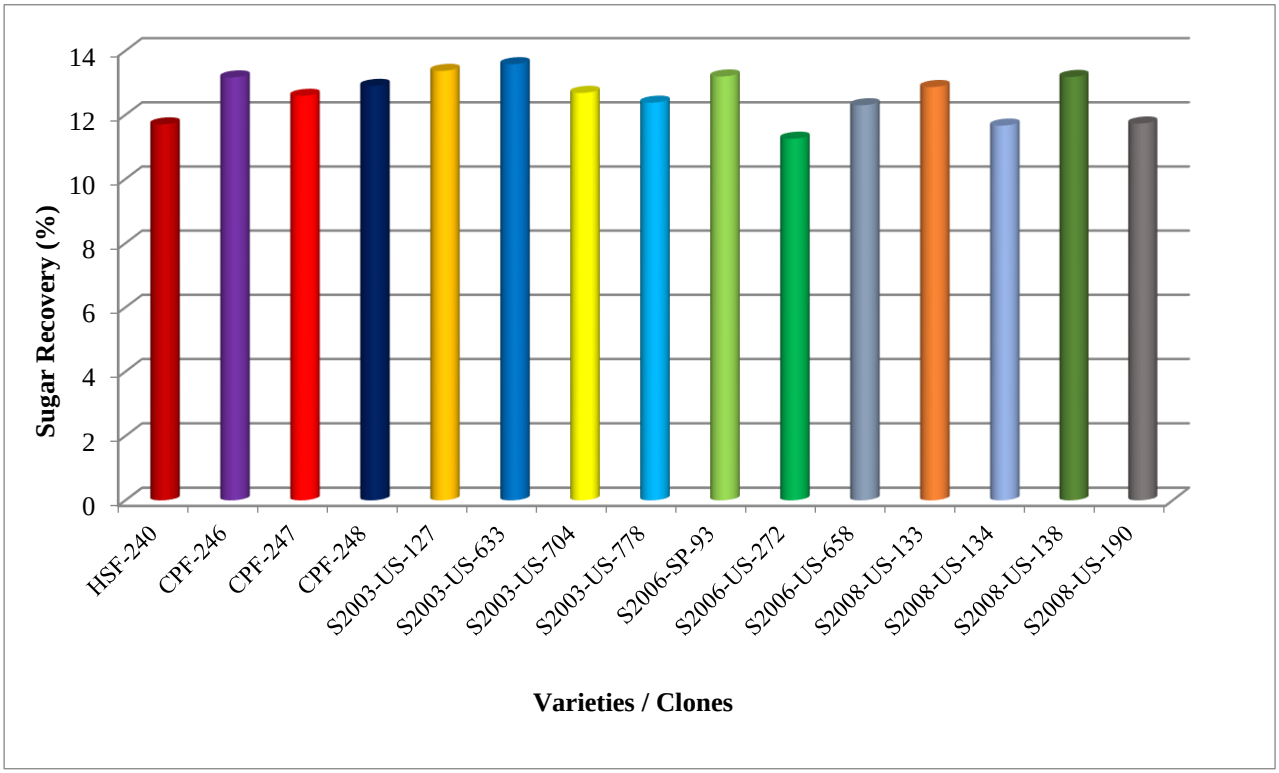
D) Quality Performance of CPF 250 in NUVYT

Sr. #.	Year	Locations	Sugar recovery (%)	Local Check	% increase/ decrease over local check
1	2009-10	NARC, Islamabad	14.29	10.91 (HSF 242)	30.98
2	2010-11	SRI, Faisalabad	12.99	12.66 (HSF 240)	2.61
Average			**13.64**	**11.78**	**15.78**

Sugar Recovery Trend of Cane Varieties / Clones (October to April)



Sugar Recovery Status of Varieties / Clones (Average: October to April)



Agronomic Studies

Ratooning ability

Cane yield (t ha^{-1})		Difference	Percent increase over HSF 240
CPF 250	68.4	33.9	98.26
HSF 240	34.5		

Economic Benefits

Location	Variety	Cane yield (t ha^{-1})	Sugar recovery (%)	Sugar Yield (t ha^{-1})	Difference (t ha^{-1})	Increased value Over HSF 240 (Rs. ha^{-1})	Increased value Over local check (Rs. ha^{-1})
SRI, Faisalabad	CPF 250 HSF 240	110.58 97.85	13.21 12.47	14.61 12.20	2.41	120500	
SRS, Khan Pur	CPF 250 SPF 234/ CPF 246	107.73 106.18	13.05 12.31	14.06 13.07	0.99		49500
Out field trials	CPF 250 CPF 247/ HSF 240	119.5 100.3	12.7 11.9	14.8 11.9	2.90		145000
Average	**CPF 250 HSF 240 Local Checks**	**112.60 97.85 103.24**	**12.99 12.47 12.10**	**14.63 12.20 12.49**	**2.43 2.14**	**121500**	**107000**

Local Checks: SPF 234, CPF 246,CPF 247, HSF 240
Sugar @ Rs. 50000/t

Sugarcane Plant Protection

A) Disease Reaction

Year	Varieties	Reaction to diseases					
		Red rot	Whip smut	Pokkah boeng	Red stripe	Rust	Mosaic virus
2009-10	CPF 250 HSF 240	R MR	MR MR	R MR	R R	R R	R R
2010-11	CPF 250 CPF 246	R R	MR R	MR MR	R R	R R	R R
2011-12	CPF 250 CPF 247	R R	R R	MR R	R R	R R	R R
2012-13	CPF 250 CPF 248	MR MR	R MR	R R	MR R	R R	R R

B) Borer infestation

Year	CPF 250		HSF 242/HSF 240	
	Dead heart (%)	Cumulative internode damage (%)	Dead heart (%)	Cumulative internode damage (%)
2008-2009	6.36	10.67	3.02	6.91
2009-2010	2.72	9.67	1.88	6.85
2010-2011	0.00	8.5	1.47	6.97
2011-2012	0.31	14.19	1.06	8.47
Average	2.39	10.76	1.86	7.30
Reaction	R	R	R	R

Brief Description of CPF 250

Proposed name of variety: CPF 250

Import of Fuzz (2002): Canal Point, U.S.A.

Clone name S2003-US-127

Parentage: CP 89-879 × CP 90-956

Maturity time: 240 – 270 days

Ratoonability: Very good

Planting time: 15th Feb.-15th March & whole month of September

Average cane yield (t ha^{-1}): 112.60

Average sugar recovery (%):	12.99
Average sugar yield (t ha^{-1}):	14.63

Summary

Red Rot	Moderately resistant
Whip Smut	Moderately resistant
Pokkah boeng	Resistant
Rust	Resistant
Red Stripe	Resistant
Mosaic virus	Resistant
Borers	Resistant
Maturity:	Early maturing with high sucrose contents.
Lodging:	Minor
Ratooning:	Very good
Adaptability	The variety is adaptable under average inputs throughout the Punjab Province

Conclusion

- The new variety CPF 250 is higher cane yielder than CPF 246, CPF 247, SPF 234 and HSF 240
- It is a early maturing variety and maintains good recovery throughout the crushing season
- Although this strain attains very good height, yet it lodge slightly on heavy soils
- Most of the tillers produced are matured into millable canes
- It does not produce off-shoots and sprouts during the season thus it attains more height and consumes inputs more efficiently
- It is tolerant to all insect pests and diseases
- CPF 250 will replace the old commercial varieties, like SPF 234, HSF 240 and SPF 245.