

IMPROVEMENT OF SUGAR RECOVERY BY CULTIVATION OF NEW HIGH SUGAR RECENT VARIETIES / CLONES AND ITS IMPACT ON SUGAR PRODUCTION

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ABSTRACT

Sugarcane is a very important cash crop of Pakistan. It is equally important for the growers and sugar industry as well. It feeds more than 82 sugar mills. Though during this year (2011-2012) there is a great improvement in sugar recovery like Indus with sugar recovery of 10.96% and many others having sugar recovery more than 10% yet there has been always a scope for further improvement in sugar recovery. With the present varieties (CPF-246, CPF-247, CPF-237, SPF-213, SPF-234 (South), HSF-240, HSF-242, SPF-241, NSG-555, CSSG-668, CP77-400), further improvement in sugar recovery is not easy. Therefore, some new high sugar recent strains will have to be introduced. There are some new high sugar recent varieties / clones (US-633, US-694, US-247, US-127, US-133, US-165, CPSG-3481, CPSG-2923, US-704, US-114, US-778 etc.) which have the potential to enhance the sugar recovery as the varieties with sugar recovery ranging in between 12% to 16.82% are available and needs to be multiplied immediately.

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Their cane yield potential is also very high and ranges from 1000 mds to 1600 mds per acre. These varieties are unique in many characteristics and can adapt under diversified climatic and soil conditions of Pakistan. Some of the clones are tolerant against heat and frost. These have good ratoonability. Their all types of data on sugar recovery and other characteristics have been completed and are ready for approval. However, some points are very important to be considered seriously to promote these varieties / clones. These include provision of some incentives in the form of premium at least @ Rs. 10 per 40 Kg of cane on 1% extra sugar recovery and Rs. 20 per 40 Kg of cane on 2% extra sugar recovery against the benchmark sugar recovery of 10%. Moreover, separate channel may be provided for easy movement and quick unloading of the cane of these varieties. Similarly, cash payment facility within one week may be made possible for quick multiplication of the new high sugar recent varieties / clones.

INTRODUCTION

Sugarcane is the crop of tropical region but can successfully be grown in sub-tropical areas of Pakistan with artificial irrigation arrangement. Pakistan has unique canal irrigation system in the world. There are huge mountains of ice in the north of the country which permanently supply water almost throughout the year by melting

of ice except a few months in the winter season. Sugarcane is grown from north to south of the country mostly in three provinces. There are present very high sugar recovery varieties (12% to 16.82% (Table - 3) in the country but sugar mills are getting very low sugar recovery (7.17% Abdullah 11) with exception of some sugar mills which are getting reasonable sugar recovery (11.33% Ghotki, 11.25% united, 11.11% JDW and 10.96% indus) but not up to the level of major cane growing countries like Brazil, Australia etc. with sugar recovery of 14.50% and 13.50%, respectively.

It is not possible to achieve the desired results through normal procedure of multiplication of new recent high sugar varieties that too only by some mills and without any incentive in the form of premium on high sugar recovery and subsidy on high quality seed and provision of transport facility to the poor cane growers which are in majority and are dependent on poor quality cane in the neighbourhood. Thus in this way dream of high sugar recovery of the mills will remain dream. The pace of spreading of quality cane is very slow and unsatisfactory. There are many factors affecting the multiplication of high sugar varieties like shortage of quality seed, payment on weight basis without any incentive of premium, no development programme by most of the mills, unqualified staff working in the field for promotion of quality cane and lack of awareness among the growers about the high sugar varieties.

If the growers are not appreciated and do not get any favour in any form like quick disposal/unloading of their cane and are treated at par with those who bring poor recovery cane without any obstacle to dispose of poor recovery cane. Further improvement in sugar recovery of the mills with the present varieties (CPF-246, CPF-247, CPF-237, SPF-213, SPF-234 (South), HSF-240, HSF-242, SPF-241, NSG-555, CSSG-668, CP77-400) (Table - 2). mostly available in the field is not easy rather difficult. The average sugar recovery of the mills was more than 9% but less than 10%. At the prevailing cane and sugar prices of the market the sugar recovery should be at least 10% (Bench mark) to meet the expenses of sugar production. With the present status of sugar recovery, industry cannot survive without the enhancement of sugar recovery more than bench mark recovery of 10%.

Fortunately, cane varieties with very high sugar recovery are available and can raise the sugar recovery even up to 12% just with the initiation of development programme for multiplication of high sugar varieties by all sugar mills. Therefore, it is suggested that all sugar mills should establish their own high recovery cane varieties seed bank to distribute the seed to the growers for quick multiplication of recent high sugar varieties (US-633, US-694, US-247, US-127, US-133, US-165, CPSG-3481, CPSG-2923, US-704, US-114, US-778 etc.) (Table - 3). Their cane yield potential is also very high and ranges from 1000 mds to 1600 mds per acre. These varieties are unique in many characteristics and can adapt under diversified climatic and soil conditions of Pakistan. Some of the clones are tolerant against heat and frost. These have good ratoonability. Their all types of data on sugar recovery and other characteristics have been completed and are ready for approval.

However, some points are very important to be considered seriously to promote these varieties / clones. These include provision of some incentives in the form of

premium at least @ Rs. 10 per 40 Kg of cane on 1% extra sugar recovery and Rs. 20 per 40 Kg of cane on 2% extra sugar recovery after the benchmark recovery of 10%. Moreover, separate channel may be provided for easy movement and quick unloading of the cane of these varieties. Similarly, cash payment facility within one week may be made possible for quick multiplication of the new high sugar recent varieties / clones.

With 1% increase in sugar recovery from 8.84% to 9.84% at crushing of 1.223 million tons, the increase in sugar production will be 0.012 million tons worth Rs. 0.60 billion and with same crushing of 1.223 million tons with 2% increase in sugar recovery from 8.84 to 10.84% the sugar production will increase up to 0.025 million tons having value of Rs. 1.25 billion (SML, Jhang)(Table – 1).

Similarly, With 1% increase in sugar recovery from 10.96 to 11.96% at crushing of 1.120 million tons, the increase in sugar production will be 0.011 million tons worth Rs. 0.55 billion and with same crushing of 1.120 million tons with 2% increase in sugar recovery from 10.96 to 12.96%, the sugar production will increase up to 0.022 million tons having value of Rs. 1.10 billion (Indus) (Table – 1).

OBJECTIVES

A. Development of variety cane

For development of variety cane, seed of high sugar recent varieties may be provided to the growers by the industry at subsidized rate. For better cane and sugar yield, high cane and sugar yielding varieties having resistance against pests and diseases, tolerant to frost and drought with good ratoonability and adaptability should be multiplied. The premium/ incentive on varieties with high sugar should be declared before the sowing of the crop in both the seasons. The provision of green channel should be made with cash payment facility to encourage the farmers/ growers.

Keeping in view the prices of cane and sugar, varieties with sugar recovery of at least 12% should be promoted to get benefit in the next five years. Disease free and healthy tissue cultured seed of high sugar varieties should be provided to the growers to achieve the objective of development of variety cane immediately without further losing time.



B. Tissue culture labs

Tissue culture lab may be established by each mill to provide healthy and disease free seed to the growers.



C. Establishment of bio control labs

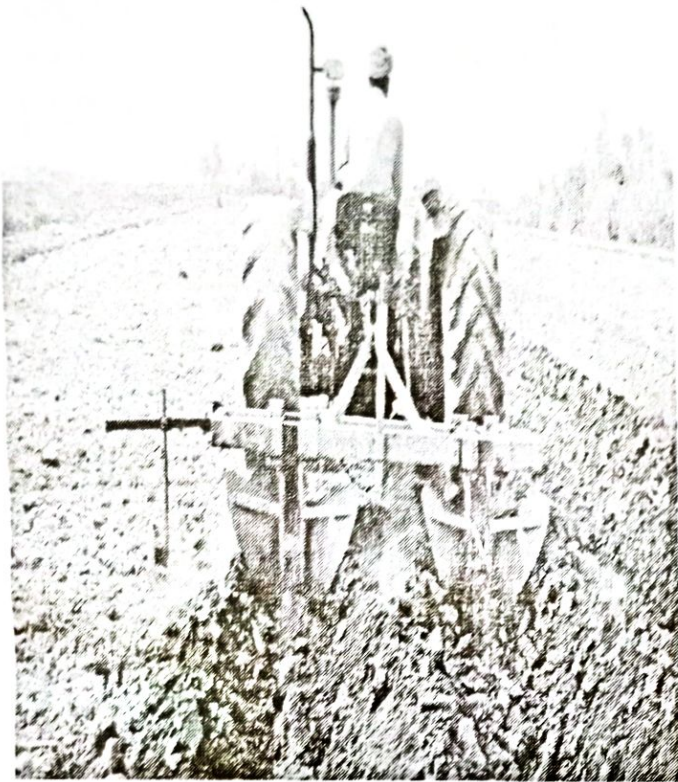
Bio control labs should be established by the mills to control the insect attack by providing trichogramma cards and chrysoperla sheets to the cane growers.



D. Provision of implements

Agriculture implements may be provided by the industry to the growers for planting of sugarcane with modern technique of deep trench planting at 4 ft apart and 1 ft deep trenches to save irrigation water and facilitate the intercropping of different crops like wheat, barseem, gram etc. and earthing up the crop to avoid lodging and checking of extra tiller formation to improve the sugar recovery and cane yield.

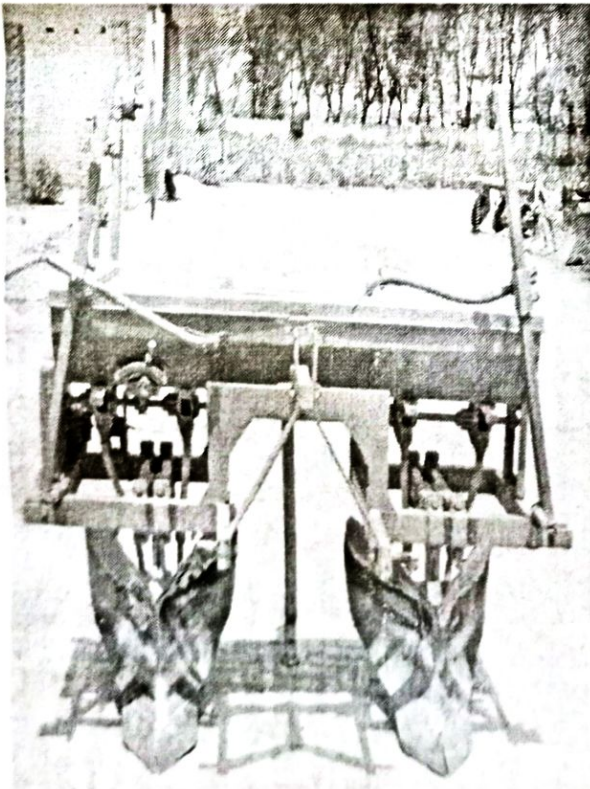
Deep Trenches are Being Made at 4ft. Apart



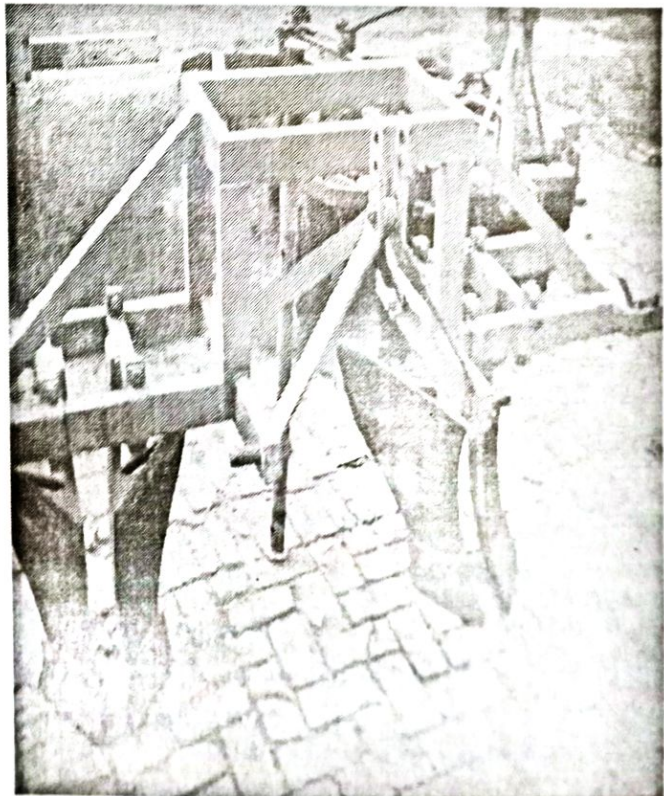
Sub Soiler (18 Inches Depth)



Ridger With Fertilizer Box



Ridger Without Fertilizer Box



Planting of Sugarcane at 4 ft apart trenches



Intercropping of wheat and gram with Sugarcane



OBJECTIVES

E. Establishment of variety cane seed farm

High sugar recovery varieties may be multiplied at the mill's farms to provide high quality seed to the farmers.

F. Provision of tankers and construction of tanks

The tanks may be constructed and tankers or tankies may be provided by the mills for storage and transport of spent wash.

G. Preparation of organic fertilizer

The industry should help the farmers to use cheaper organic fertilizer to improve the organic matter status of the soil and replace the costly inorganic fertilizers.

Impact of 1% and 2% increase in sugar recovery on sugar production of the industry

(Table 1)

Sr. No.	Mills	Crushing (m t)	Sugar Recovery %	Sugar Production (m t)	Rate of Sugar Rs./Kg	Value (Billion Rs.)
(1)	SML (Jhang)	1.223	8.84	0.108	50	5.40
1% increase		1.223	9.84	0.120	50	6.00
Difference			1.00	0.012	50	0.60
2% increase		1.223	10.84	0.133	50	6.65
Difference			2.00	0.025	50	1.25
(2)	SML (Bhone)	0.734	8.93	0.066	50	3.30
1% increase		0.734	9.93	0.073	50	3.65
Difference			1.00	0.007	50	0.35
2% increase		0.734	10.93	0.080	50	4.00
Difference			2.00	0.014	50	0.70

**Impact of 1% and 2% increase in sugar recovery on sugar production
of the industry**

(Table 1)

Sr. No.	Mills	Crushing (m t)	Sugar Recovery %	Sugar Production (m t)	Rate of Sugar Rs./Kg	Value (Billion Rs.)
(3)	Choudhry	0.730	9.30	0.068	50	3.40
1% increase		0.730	10.30	0.075	50	3.75
Difference			1.00	0.007	50	0.35
2% increase		0.730	11.30	0.082	50	4.10
Difference			2.00	0.014	50	0.70
(4)	Kashmir	0.800	9.50	0.076	50	3.80
1% increase		0.800	10.50	0.084	50	4.20
Difference			1.00	0.008	50	0.40
2% increase		0.800	11.50	0.092	50	4.60
Difference			2.00	0.016	50	0.80

**Impact of 1% and 2% increase in sugar recovery on sugar production
of the industry**

(Table 1)

Sr. No.	Mills	Crushing (m t)	Sugar Recovery %	Sugar Production (m t)	Rate of Sugar Rs./Kg	Value (Billion Rs.)
(5)	Fatima	1.080	9.53	0.103	50	5.15
1% increase		1.080	10.53	0.114	50	5.70
Difference			1.00	0.110	50	0.55
2% increase		1.080	11.53	0.125	50	6.25
Difference			2.00	0.022	50	1.10
(6)	Siraj	0.850	9.65	0.082	50	4.10
1% increase		0.850	10.65	0.091	50	4.55
Difference			1.00	0.009	50	0.45
2% increase		0.850	11.65	0.099	50	4.95
Difference			2.00	0.017	50	0.85

**Impact of 1% and 2% increase in sugar recovery on sugar production
of the industry**

(Table 1)

Sr. No.	Mills	Crushing (m t)	Sugar Recovery %	Sugar Production (m t)	Rate of Sugar Rs./Kg	Value (Billion Rs.)
(7)	Rahman Hajra	1.540	9.77	0.150	50	7.50
1% increase		1.540	10.77	0.166	50	8.30
Difference			1.00	0.016	50	0.80
2% increase		1.540	11.77	0.181	50	9.05
Difference			2.00	0.031	50	1.55
(8)	Haq Bahoo	0.530	9.82	0.052	50	2.60
1% increase		0.530	10.82	0.057	50	2.85
Difference			1.00	0.050	50	0.25
2% increase		0.530	11.82	0.063	50	3.15
Difference			2.00	0.013	50	0.65

**Impact of 1% and 2% increase in sugar recovery on sugar production
of the industry**

(Table 1)

Sr. No.	Mills	Crushing (m t)	Sugar Recovery %	Sugar Production (m t)	Rate of Sugar Rs./Kg	Value (Billion Rs.)
(9)	Ramzan	0.80	10.01	0.080	50	4.00
1% increase		0.80	11.01	0.088	50	4.40
Difference			1.00	0.008	50	0.40
2% increase		0.80	12.01	0.096	50	4.80
Difference			2.00	0.016	50	0.80
(10)	Madina	0.250	10.03	0.025	50	1.25
1% increase		0.250	11.03	0.028	50	1.40
Difference			1.00	0.003	50	0.15
2% increase		0.250	12.03	0.030	50	1.50
Difference			2.00	0.005	50	0.25

Impact of 1% and 2% increase in sugar recovery on sugar production of the industry

(Table 1)

Sr. No.	Mills	Crushing (m t)	Sugar Recovery %	Sugar Production (m t)	Rate of Sugar Rs./Kg	Value (Billion Rs.)
(11)	Brother	0.80	10.27	0.082	50	4.10
1% increase		0.80	11.27	0.090	50	4.50
Difference			1.00	0.008	50	0.40
2% increase		0.80	12.27	0.098	50	4.90
Difference			2.00	0.016	50	0.80
(12)	Indus	1.120	10.96	0.123	50	6.15
1% increase		1.120	11.96	0.134	50	6.70
Difference			1.00	0.011	50	0.55
2% increase		1.120	12.96	0.145	50	7.25
Difference			2.00	0.022	50	1.10

Commercial Sugarcane Varieties For General Cultivation (2012-15)

(Table 2)

Sr. No.	Varieties	Max. Sugar Rec. %	Date of analysis	Laboratory	Ratoonability	Resistance against different stresses	Farmer's feedback
1	CPF-246	13.25 12.20	03.03.2009 11.03.2012	SRI (Fsd) SSRI Jhang	Very Good	Moderately Resistant	Acceptable
2	CPF-247	11.98 11.67	03.03.2009 22.02.2012	SRI (Fsd) SSRI Jhang	Good	Resistant	Acceptable
3	CPF-237	12.50 11.18	02.01.2002 13.02.2010	SRI (Fsd) SSRI Jhang	Good	Resistant	Acceptable
4	SPF-213	12.34 12.02	11.03.2012 18.02.2012	SSRI Jhang SSRI Jhang	Very Good	Moderately Resistant	Acceptable
5	SPF-234 (South)	12.59	22.02.2012	SSRI Jhang	Very Good	Moderately Susceptible	Highly Acceptable
6	HSF-240	12.25	07.03.2012	SSRI Jhang	Excellent	Moderately Resistant	Highly Acceptable

Commercial Sugarcane Varieties For General Cultivation (2012-15)

(Table 2)

Sr. No.	Varieties	Max. Sugar Rec. %	Date of analysis	Laboratory	Ratoonability	Resistance against different stresses	Farmer's feedback
7	HSF-242	12.41	15.01.2010	SSRI Jhang	Very Good	Moderately Resistant	Acceptable
8	SPF-241	12.35	07.03.2012	SSRI Jhang	Very Good	Tolerant	Acceptable
9	NSG-555	12.37	07.03.2012	SSRI Jhang	Very Good	Resistant	Acceptable
10	CSSG-668	11.36	25.02.2012	SSRI Jhang	Good	Resistant	Acceptable
11	CP77-400	11.90 11.30	31.01.1996 12.12.2011	SRI(Fsd) SSRI Jhang	Good	Resistant	Acceptable

Recent Sugarcane Promising Clones Selected For Development (2012-15)

(Table 3)

Sr. No.	Promising Clones	Max. Sugar Rec. %	Date of analysis	Laboratory	Ratoonability	Resistance against different stresses	Farmer's feedback
1	S2003 US-633	16.82 15.98 15.71 12.65	15.04.2012 15.03.2012 02.02.2012 06.11.2008	SRI (Fsd) SRI (Fsd) SRI (Fsd) Al-Moiz (D.I. Khan)	Very Good	Resistant	Highly Acceptable
2	S2003 US-694	12.96 12.55	16.11.2012 06.11.2008	SSRI Jhang Al-Moiz (D.I. Khan)	Very Good	Resistant	Acceptable
3	S2003 US-247	14.52 12.90	03.03.2009 16.02.2012	SSRI Jhang SSRI Jhang	Very Good	Resistant	Acceptable
4	S2003 US-127	14.96 12.52	02.02.2012 22.02.2012	SRI (Fsd) SSRI Jhang	Very Good	Resistant	Acceptable
5	S2002 US-133	12.56	31.12.2011	SSRI Jhang	Good	Resistant	Acceptable
6	S2003 US-778	14.27 14.15	02.02.2012 03.03.2009	SRI (Fsd) SSRI Jhang	Excellent	Moderately Resistant	Highly Acceptable
7	S2003 US-114	14.27	02.02.2012	SRI (Fsd)	Very Good	Moderately Resistant	Highly Acceptable
8	S2003 US-704	14.90 12.56	02.02.2012 16.02.2012	SRI (Fsd) SSRI Jhang	Very Good	Resistant	Acceptable
9	2001CPSG-3481	12.84	16.02.2012	SSRI Jhang	Excellent	Tolerant	Highly Acceptable

Recent Sugarcane Promising Clones Selected For Development (2012-15)

(Table 3)

Sr. No.	Promising Clones	Max. Sugar Rec. %	Date of analysis	Laboratory	Ratoonability	Resistance against different stresses	Farmer's feedback
10	2004CPSG-2923	12.87	09.03.2012	SSRI Jhang	Excellent	Tolerant	Highly Acceptable
11	2004CPSG-437	12.15	16.02.2012	SSRI Jhang	Excellent	Tolerant	Highly Acceptable
12	S2003US-165	13.45	16.02.2012	SSRI Jhang	Good	Moderately Resistant	Acceptable
13	S2002US-160	12.50	06.03.2009	SSRI Jhang	Good	Moderately Resistant	Acceptable
14	S2000US-50	12.00	06.03.2009	SSRI (Fsd)	Good	Resistant	Acceptable
15	S2006US-658	11.48	12.02.2012	SSRI Jhang	Good	Resistant	Acceptable
16	2001HoSG-315	12.67	16.02.2012	SSRI Jhang	Very Good	Resistant	Highly Acceptable
17	2001CSSG-2402	12.67	16.02.2012	SSRI Jhang	Good	Moderately Resistant	Acceptable
18	2001CSSG-2453	12.07	11.03.2012	SSRI Jhang	Good	Resistant	Acceptable

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