

# SUGAR BEET PRODUCTION IN IRAN, A STUDY ON PRODUCTION RESTRICTING FACTORS

I.ALIMORADI<sup>1</sup>

<sup>1</sup> Tahavol Design & Engineering Co. No 121.Hamsian Alley between Kargar&Jamalzadeh , Keshavarz Blvd,Tehran.

## ABSTRACT

Sugar beet production has a history of one century in our country. First sugar factory was established at south of Tehran in 1895, and there are 34 active beet factories with total capacity of more than 70000 ton/day now. According to the 2001 sugar syndicate record, the total sugar beet production has reached to 4.6 million tons, which is 65% of nominal sugar factories capacity. IRAN is located in semi-arid area with 250 mm annual precipitation, which is varied from 50 mm in desert to 1000 mm near Caspian sea. So all sugar beet cultivation should be irrigated. The source of water for irrigation are well, river, spring and Qanat. Also there are different climatic condition in country and varied from cold temperate in mountainous area of Zagros chain to semi-tropical climate near Persian Gulf, so by this reason the vegetation period are varied from 150 to 210 days. There are 103000 farmers for 171000 ha. Of sugar beet cultivation. It means that the average of beet field are less than 2 ha. In the other hand only a few farmers are graduated and most of them are uneducated. Sugar beet is growing in very light to very heavy soils, very salty to normal soils. Most of farm are clay soil with very low organic matter. 70% of total sugar beet cultivation are mechanized or semi-mechanized and 30% of the rest are still cultivated by traditional method, so low plant population in these fields produce low yield and low quality. This paper will explain you more details of these limitations.

## INTRODUCTION

Sugar is one of the most important food product in our food diet and sugar beet is one of the most important source. Our annual consumption is about two million tons, which we produce only half of them. According to sugar beet syndicate annual report (2002), we produced 832865 tons white sugar from beet and cane, which was 549711 tons from beet and the rest was from cane.

Much attempt has been done to produce all our needs in the country either by increasing beet factories or by growing more sugar cane field but the most effective way is to increase sugar beet yield per hectar, there are some problems that we could not achieve. This paper try to show these problems and method to achieve it.

## PRESENT SITUATION

According to 2001-2002 record total sugar beet acreage was 171641 ha , which 124542 ha was cultivated mechanized or semi – mechanized (69.8%) and the rest was cultivated by traditional method , which characterized by , multigerm seed supply , overall sowing , and flat irrigation .In mechanized and semi – mechanized farm they use monogerm and multigerm seed , mostly furrow cultivation and furrow irrigation.They produced 4640000 tons beet with average of 27.1 Ton/ha at all. Sugar beet yield is differ each in province and each sugar factory.The most productive area was khuzestan with 45.38 Ton/ha and the lowest one was Yasooj sugar factory with 14.45 Ton/ha .The average sugar content was 16.54, which the highest one produced in Yasooj with more than 18% and the lowest belonged to Moghan with 12.88 (Table 1) .

Tab. 1. Sugar beet Production in 2000 – 2001

Province	No.of S.F	Cultivation ha	Mech Farm ha	Yield Ton/ha	Sugar Content	Farmers Field Size/ha %
Khorasan	10	52269	25922	28.8	16.9	1.5
W.Azerbaijan	4	22054	23874	32.5	16.7	1.4
Fars	5	22485	21124	20.9	16.8	4.5
Khuzestan	2	7565	7400	45.4	13.6	14.2
Kermanshah	2	10500	3160	19.6	15.4	1.6
Ghazvin	1	8584	8400	31.3	16.4	2.8
Hamadan	1	4400	2944	22.5	17.3	1.7
Isfahan	2	19815	14283	21.2	17.4	3.5
Ardabil	1	3600	3600	42.2	12.8	28.3
Semnan	1	2950	2870	32.2	16.3	2.0
Lorestan	1	4200	1800	18.5	16.0	1.1
Kerman	1	2800	1200	18.8	17.7	1.2
Chahar-Mahal	1	4224	2665	25.7	17.9	2.6
Markazi	1	3295	2200	22.4	16.8	1.6
Kohkilooye	1	2900	2700	14.4	18.3	4.0
Total	34	171641	124242	27.10	16.54	1.65

## PRODUCERS

NUMBER OF FARMERS : 103000 farmers contracted with 34 sugar factories to cultivate sugar beet but finally they planted 171000 ha.The average of sugar beet cultivation per farmer is 1.65 ha, but because some farmers have their own land in different part so the average farm size is lower than .That the biggest farm are in Dezful and Moghan and belong to governmental agro-industrial farm and the smallest part are in Lorestan sugar factory with 1.1 ha/each farmer (Table 1).

FARMER'S KNOWLEDGE: An observation in Ghazvin sugar factory shows that from 128 farmers only 2.3% was graduated 42% was uneducated and 55% was inbetween (table2).

Tab. 2 . Distribution of knowledge and age of 128 farmers in Ghazvin sugar factory .

Knowlwdge	Graduate	Diploma	Underdiploma	Uneducated	
	3(2.3%)	2(1.5%)	69(52.9%)	54(42.2%)	
Age	> 30 year	30 – 40	40 – 50	50 – 60	> 60 year
	16 (12.5%)	36(28.1%)	34(26.5%)	18(14%)	24(18.8%)

FARMER'S AGE: This observation also showed that 12.5% of farmers had below 30 years old and 18.8 % had more than 60 years old . The young people had no interest in sugar beet cultivation because of high labourous job and low income.

## CLIMATICAL CONDITION

Sugar beet is cultivated in all part of country from 38 °.33" latitude in north to 28 °.55" degree in south and 61° longitude in east to 42 ° in west. Altitude from 28 m in Ahwaz to 1900 m in Bardsir . The annual precipitation are differ from 140 mm in Isfahan to more than 700 mm in Piranshahr . Some sugar factory located in very warm area with 42-45 C in July and August which sugar beet defoliate , in country some of them are located at temperate climatic area with very low temperature at night. So the vegetation period are differ from 150 to 220 days.

## IRRIGATION

Sugar beet cultivation are completely related to irrigation in our country because of low rainfall which most of them precipitate during winter .The most source for water supply are spring , river , kanat and well . Low precipitation in recent years fell down the level of underground water . Lower surface of underground water not only causes higher cost for transferring water to soil surface but the quality of water also decreased and they became saline .The salinity of water in saline soil , raise many problem for sugar beet cultivation including seed emerge , low yield and low quality .

## SOIL

Sugar beet cultivation consecutively , low consumption of animal manure and forage crop create soil with very low organic matter . Most of soil are saline , alcalinity , very sandy or very heavy. Expert some part of north west which have higher organic matter ,in another part especially in central and eastern part the soil is very poor in organic matter . In some filed the o.m.is much below 0.5% . Soil hardness causes bad germination, low plant establishment and finally low yield and low quality (table 4) .

Tab. 4. Soil Character in two different sugar factories

Factory	Samples	O.C %	E.C ppm	P. ppm	K. ppm
Isfahan	524	0.59	7.0	25.8	338
Khoy	197	1.40	2.9	22.6	385

Different climatic characteristic , differences in soil texture, salinity, alkalinity and higher consumption of chemical manure such as Nitrogen causes big differences in chemical characteristic of soil, over – uses of Nitrogen especially in the end of growing season, decrease the quality of sugar beet. This problem will be more sever , in the field with low plant population .However the most of the field have enough quantity of Phosphorous but many farmers still supply high quantity of this element , in contrary they do not use to supply Potassium in most of the field .Nutrition management can solve most of these problem.

### RESTRICTNG FACTORS ;

1. The surface of sugar beet cultivated are not the same as contract and usually it is less .
2. The size of farm is small and it is very difficult to use suitable machinery in these fields .
3. Low knowledge of farmers do not allow them to use new technology and new machinery .
4. The surface of all crop cultivated are not coordinate with total water for irrigation, especially during spring which both beet and wheat need water . So both crop will damage by water stress. In the traditional cultivation , over-use of water in summer cause different root rot problem.
5. Late plating time and how vegetation period. Farmers are not well equipped to sow their farm in a short suitable time.
6. Seed emergence in saline soil is difficult, it is more difficult when, such farm irrigated by saline water. In these field plant population are low and finally they produce low yield and low quality beet .
7. In low o.m. soil it is very difficult to prepare see bed especially with low
8. Power horse machinery .Over- use of chemical manure especially Nitrogen in the end of vegetation period produce very low quality beet .

## METHODS OF IMPROVEMENT

1. Applied research and observation for each climatic locations
2. Farmer training by different methods
3. Use a suitable machinery according to their soil type and climatic Condition

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