

# RESPECT OF NATURAL SUGARCANE DEVELOPMENT FOR JUICE AND JAGGERY(GUR): An EMPLOYMENT FOR RANCHERS OF INDIAN SUNDARBAN DELTA.

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**Abstract**— The Indian Sundarbans Delta (ISD) is a part of the delta of the Ganga- Brahmaputra-Meghna (GBM) basin and shared among Bangladesh (~60 %) and India (~forty %). The ISD unfold over about 9630 square kilometers between 21o30' to 22o 40' N, 88o 05' to 89o 55' E. The ISD covers 6 administrative blocks of the North 24 Parganas district (Haroa, Hansbad, Hingaljanj, Minakhan, Sandeshkhali-I, Sandeshkhali-II) and thirteen blocks in South 24 Parganas (Basanti, Canning-I, Canning-II, Gosaba, Joynagar-I, Joynagar-II, Kakdwip, Kultali, Mathurapur-I, Mathurapur-II, Namkhana, Patharpatima, Sagar) of West Bengal. The vicinity reviews a subtropical monsoonal climate with an annual rainfall of 1,600–1,800 mm. Sugarcane (*Saccharum* sp. hybrid complex) is a vegetatively propagated cash crop inside the world as well as in India and the juice extracted from sugarcane is used for making white sugar, brown sugar (Khandsari) and jaggery(gur). Sugarcane has a place of 17 thousand hectares with a median yield of 76.1 MT in keeping with hectare and general manufacturing of 12.94 lakh MT throughout 2017-18 in West Bengal. Sugarcane also can be eaten as is or ate up within the shape of juice, which has a big call for. a pitcher of sugarcane juice with the contact of lemon and ice makes a famous drink which honestly life both health and depleting tiers of energy. natural sugarcane juice has a robust defense in opposition to cancer, mainly breast and prostate cancer. Diabetic patients can also consume sugarcane juice because of the low glycemic index (GI). demands of sugarcane juice can easily be seen through the massive crowd rounding the roadside providers, waiting for a pitcher of Sugarcane juice. organic Jaggery (Gur) is a higher sweetener and having all of the elements of sugarcane juice in addition to sucrose and has an extra dietary fee and characteristic flavor because of natural compounds and can be prepared with the aid of sugarcane growers with the help of some skilled artisans in a small scale. installation of sugarcane juice bars/stores/stalls inside the Bus Stands, health center campuses, market places, academic institutes, one of a kind government office, Kishan Mandies, Parks, traveller Spots, spiritual locations, and so forth and organic jaggery(Gur) can considerably exchange the scenario and having possibilities of employment era as well as boom the earnings of the farmers in ISD.

**Keywords**— Sugarcane, Organic Cultivation, Livelihood, Indian Sundarban Delta.

## 1. Introduction

Sugarcane (*Saccharum* sp. hybrid complex) is a vegetatively propagated cash crop inside the world as well as in India and the juice extracted from sugarcane is used for making white sugar, brown sugar (Khandsari) and jaggery (Gur). it is able to additionally be eaten as is or fed on within the form of juice, which has a large demand in West Bengal. a pitcher of sugarcane juice with the contact of lemon and ice makes a popular drink which actually lifestyles each health and depleting levels of energy. it is a traditional crop and making jaggery (Gur) from its juice essential rural primarily based cottage industry in sugarcane developing regions inclusive of ISD. In widespread, a hybrid complicated of sugarcane varieties cultivated inorganically and massive synthetic chemical substances are used, which has an unfavorable impact on biodiversity and the ecosystem.

As ISD place is rich in biodiversity, organic cultivation of sugarcane is very lots critical for maintaining and enhancing the fitness of soil, plant, animals, people, communities, and ecosystems. Sugarcane has a place of 17 thousand hectares with a median yield of 76.1 MT per hectare and overall production of 12.94 lakh MT all through 2017-18 in West Bengal [8].

## 2. Nutritional fee of Sugarcane Juice

Sugarcane juice consists of excessive polyphenols, that are effective phytonutrients with the characteristics of antioxidants. it is also loaded with nutrients and minerals inclusive of calcium, potassium, magnesium, manganese, and iron; at the side of a whole profile of essential amino-acids that assist burn fat and build muscle. a number of those include pipercolic acid, methionine, tryptophan,  $\beta$ -alanine, and arginine; along with primary amino-acids like histidine, lysine, arginine, and tryptophan. Sugarcane juice is alkaline to the frame and most illnesses cannot stay in an alkaline environment. The juice Sugarcane according to serving (28.35 grams) comprise strength-111.thirteen kJ (26.56 kcal), Carbohydrates-27.51 g, Protein- 0.27 g, Calcium11.23 mg (1%), Iron zero.37 mg (three%), Potassium forty one.ninety six mg (1%), Sodium 17.01 mg (1%).

1. A strength Drink - Sugarcane juice is wealthy in an excellent type of carbohydrates, protein, iron, sodium, potassium and other vital nutrients that make it the appropriate power drinks. a tumbler of sugarcane juice with the touch of lemon, peppermint (*Mentha piperita*) and ice makes a famous drink which actual lifestyles both health and depleting ranges of strength. It builds up plasma and frame fluids and helps counter dryness and fatigue. Diabetic sufferers can also eat sugarcane juice due to the low glycemic index(G.I.)
2. Prevent cancer- maybe you have not heard this before; the efficacy of sugarcane juice turned into a robust defense in opposition to most cancers. Sugarcane juice is taken into consideration an alkaline forming food due to the high awareness of calcium, magnesium, potassium, iron, and manganese in it. sicknesses like most cancers cannot live to tell the tale in alkaline surroundings and that's why it's far effective in preventing cancer, especially prostate and breast most cancers. The content of flavonoids in sugarcane juice inhibits the growth of cancer cells inside the milk glands.
3. Treatment for Jaundice- according to Ayurveda, sugarcane juice facilitates give a boost to your liver and is consequently suggested as a treatment for jaundice. It also protects the liver against infections and helps in maintaining the bilirubin degrees in control. this is one of the reasons that docs' recommendation jaundice sufferers to drink sugarcane juice.

Similarly, it enables the increase of bones & teeth, solving constipation, keeps weight, uses as a digestive tonic and treats fever.

## 3. Nutritional Value of Jaggery(Gur)

Jaggery(Gur) contains Sucrose (65-85%), Glucose, Fructose(10-15%), Proteins(0.25%), Fats(0.05%), Calcium(0.4%), Phosphorous(0.045%), Iron(11mg/100gm), Copper(0.8mg/100gm), Total minerals(0.6-1), moisture(3-10%) & Energy(3.83 K.Cal). Organic Jaggery(gur) has more nutritional value and has a characteristic flavor of natural compounds. Compared to Sugar, it is a better sweetener by virtue of it having all the ingredients of sugarcane juice in addition to sucrose but white crystal sugar is only sucrose and all the ingredients go in the by-products in sugar industry [3].

## 4. Major Constraints in Sugarcane cultivation within ISD. Soil Salinity

Soil salinity threatens agricultural productivity in 77 mha of agricultural land including 45 mha(20% of

irrigated region) of irrigated and 32 mha(21% of dry land) of rainfed region (Munns,2002). The salts that largely make contributions to salinity include the chloride and sulphate of sodium, calcium, magnesium and potassium. In such soil the plant life is unable to absorb the water and nutrients in ok quantities because of high osmotic stress of the soil water. With heavy rainfall a transient alleviation of salt pressure may be located due to leaching of the salts from the root zone. Sugarcane is ranked moderately touchy to salinity with a threshold value of 1.4 dSm<sup>-1</sup> [4]. Soil root area EC underneath 2 dSm<sup>-1</sup> have no impact on boom and yield of sugarcane. 5-7.0, the yield decreased by means of 50% and at EC of 8.0 stools of some cultivars are killed and do no longer survive. A yield discount up to 60% has been recorded because of salinity [9]. faded green or yellow leaves, scorched tips and margins, decreased leaf vicinity & stunted cover are the signs of salt damages.

### **5. Impact of salinity on sett germination of sugarcane**

Usually germination of sett in sugarcane is not on time regularly with increasing salinity and discount in very last germination percent at excessive salinity level(EC> 5 dSm<sup>-1</sup>) Varietal reaction is a critical element in determining the final germination. in the course of germination and early increase of the crop, nitrogen requirements are more, as sink production is at its top. Nitrate reductase, a crucial enzyme in N-metabolism showed tremendous reduction in salinity remedy [2].

### **6. Effect of salinity on Yield and first-class characters of Sugarcane**

The discount of cane period, girth, a quantity of millabale cane, single cane weight is usually located due to salinity, which ultimately reduced the cane yield. Sucrose % juice, brix and purity are reduced with the aid of salinity [9].

### **7. Natural Calamity**

The ISD area is prone to extreme storm events which are frequent during the pre-monsoon period and from September through November. Historical records indicate a high frequency of extreme weather events, such as severe storms or cyclones.

### **8. Major parameters to be followed for organic Sugarcane Cultivation in ISD**

The following parameters need to be addressed before organic cultivation of sugarcane in ISD areas-

### **9. Improvement of Soil**

Application of gypsum as per soil testing report is allowed in organic cultivation system. Application of crop residue as mulch, organic or biofertilizers, adoption of crop rotation and multiple cropping, minimum tillage, keeping the soil covered with a green cover or biological mulch and abandoned use of synthetic chemicals are most important for the improvement of soil in an organic production system. Continuous incorporation of crop & weed biomass, Farm Yard manure (FYM), Vermicompost, special liquid formulations (Compost tea, vermiwash etc.), oil cakes, poultry manure, concentrate manures (a mixture of oil cakes, poultry manure, and rock phosphate) etc. are also equally important for improving the soil.

### **10. Self-reliance of inputs**

On-farm production of seedcane, composts, vermicomposts, vermiwash, liquid manure & botanical extracts should be ensured.

### **11. Integration of animals**

Back yard poultry, cattle, piggery, gottary, etc. should be maintained.

## **12. Steps in developing organic farm for sugarcane cultivation**

Organic cultivation of sugarcane crop requires integrated management of essential components in a systematic manner for optimum productivity.

## **13. Habitat Development**

The area of ISD is storm-prone, thus various trees and bushes [Neem, Custard Apple, Wood Apple, Guava, Mulberry, Ber, etc.] should be planted surrounding the organic farm. Those trees and bushes do not only protect the sugarcane field from storms but also attract the birds and other beneficial animals and provide food & shelter for them. Different biopesticides may be extracted from different parts of the trees and bushes. In border rows of each plot within the farm, Glyricidia/Sesbania, will not only act as a biological fence but also provide biologically fixed nitrogen to the soil.

## **14. Conversion of soil to natural**

software of synthetic chemicals must be banned. Intercropping of different legumes, green manuring, green leaf manuring, trash mulching, natural farm waste recycling, software of different forms of bio fertilizers [Rhizobium, Azotobacter, Azospirillum, Phosphate Solubilizing microorganism, and so forth], natural liquid fertilizers [vermiwash, panchaygavya] enables for the conversion of soil to natural.

## **15. Organic Pest management**

As artificial chemical substances are prohibited, pest management should be performed through-

## **16. Cultural/Agronomic**

Use of sugarcane setts unfastened from pest affected plots and cultivate resistant varieties, manipulating the date of planting, detrashing, earthing up, and so on

## **17. Mechanical/physical**

elimination of affected cane and plant elements, collection and destruction of egg masses, use of mild traps

## **18. Organic**

Inundative launch of *Trichogramma chilonis* 2cc/acre at fortnightly c language is usually recommended to manipulate Gurdaspur borer (*Acigona steniellum*) and Plassey borer (*Chilotumi dicostalis*). In case of internode borer, detrashing (at five th & 7 th month), launch *Trichogramma/Cotesia* parasitoids and use of pheromone @ 25 traps/ha are encouraged [10].

Natural sugarcane cultivation, by the way, conserves herbal enemy complicated of pests and keep them underneath test.

## **19. Natural ailment management**

Vegetative propagation, the exercise of rationing and high sugar accumulation makes sugarcane crop without difficulty vulnerable to diverse sicknesses within the discipline. inflamed seed canes are accountable for the primary spread of various diseases like red rot, smut, wilt, grassy shoot, yellow leaf ailment, etc. For organic cultivation, emphasis should accept on using ailment-loose sugarcane setts from disorder loose seed manufacturing plots of resistant varieties.

## **20. Special management practices of sugarcane for natural cultivation in ISD regions:**

1. A better seed rate of 25% over everyday seed price has to be observed to compensate germination losses and to make sure proper germination and crop stand.
2. Irrigation with suitable first-rate water at the least all through essential boom levels as much as 150 days of the crop.
3. Following a changed trench device of planting with more natural manure advanced yield in saline soil.
4. Crop rotation with a tolerant crop like cotton, mustard, etc.
5. Proper wrapping & propping must be practiced and erected the clumps fallen after storms.
6. Growing salt tolerant varieties like Co 94012, Co 99004, Co 85019, Co 0403, Co 0218, BO 91, CoB 99161, and so forth.

## 21. Organic Certification

After growing the sugarcane crop for two-3 years as in step with the natural fashionable, one emerges as eligible for making use of for natural certification. In India, there's two accreditation device for authorizing certification and inspection companies for organic certification. country wide Programme on organic manufacturing(NPOP) promoted by way of the Ministry of trade is the middle software which governs and defines the standards and implementing strategies. country wide Accreditation body(NAB) is the apex decession making body. Certification and inspection corporations approved by means of NAB are legal to undertake the certification method. The NPOP notified underneath FTDR act and managed with the aid of Agricultural Processed Meals Export Improvement Authority(APEDA) appears after the requirement of export whilst NPOP notified below APGMC act and controlled by way of Agriculture advertising and marketing guide, Directorate of marketing and inspection looks after home certification [7].

## 22. Precis

The importance of sugarcane for chewing, juice, and jaggery(Gur) and the demand for them, especially on festive events like Durga Puja, Lakshmi Puja, Kali puja, Makar Sankranti in West Bengal including ISD, offers superb scope for organic sugarcane cultivation. set up of natural sugarcane juice bars/stores/stalls within the Bus Stands, health center campuses, market places, instructional institutes, specific authorities places of work, Kishan Mandies, Parks, traveller Spots, non-secular places, etc and organic jaggery(Gur) making devices can considerably exchange the scenario and having big opportunities of employment generation as well as increase the income of the sugarcane growers in ISD.

## 23. References

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