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A Study on Socio-Economic Conditions of Sugarcane Farmers in Aggichenupalli, Chittoor District, A.P

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INTRODUCTION

Sugarcane farming has been practiced the world over since the Persian farmers discovered the reeds that produced honey without bees between the 6th and 4th centuries in India. Since then, sugarcane farming has been practiced in various tropical regions in the world with the major driver of the industry being the world's increasing demand for sugar. This has led to the expansion of arable land under sugarcane cultivation, with a myriad of problems presenting themselves ecologically, socially and economically.

Sugarcane is tall perennial true grasses of the genus *Saccharum*, with originally soft, watery Culm sugarcane acquired through human selection a distinctive feature of partitioning carbon into sucrose in the stem.

Sugarcane is cultivated in more than 20 million hectares in tropical and sub tropical regions of the world, producing up to 1.3 billion metric tons of crushable stems. It has served as a source of sugar since hundreds of years, represents an important renewable bio fuel source, which could turn into a global commodity and important energy source.

Sugarcane cultivation requires a tropical or temperate climate, with a minimum of 60 cm (24 in) of annual moisture. It is one of the most efficient photo synthesizers in the plant kingdom. It is a C_4 plant, able to convert up to 2% of incident solar energy into biomass In prime growing regions, such as India, Indonesia, Pakistan, Peru, Brazil, Bolivia, Colombia, Australia, Ecuador, Cuba, the Philippines and Hawaii, sugarcane crops can produce over 20Ib (9kg) of cane for each square metre exposed to the sun.

Background to the study

The main driver behind the expansion of land under sugarcane farming and increasing sugarcane monoculture is the constant rise in the world's demand for sugar. Sugarcane accounts for 80% of the amount of sugar produced worldwide. However, industrialization has led to more investments in sugarcane farming for production of clean fuels, namely; ethanol and biogas.

In 2010, sugarcane was cultivated on about 23.8 million hectares in more than 90 countries with a worldwide harvest of 1.69 billion tonnes (FAO, 2010). This acreage under sugarcane agriculture is set to expand as sugarcane monoculture is being favoured at the expense of other food crops with resulting impacts on food prices, availability and variability of food commodities in the market and the livelihoods of those who had previously depended on the substituted crops as a source of income. The encroachment of pastoral land by sugarcane in the Afar region of Ethiopia has forced pastoralists to supplement their livelihoods with subsistence oriented cultivation of maize and sorghum and/or low paid wage labour like the picking of cotton (Altare *et al*., 2010).

Sugarcane cultivation in India

India is the largest producer and consumer of sugar in the World. About 45 million sugarcane farmers, their dependents and a large agricultural force, constituting 7.5 percent of the rural population, are involved in sugarcane cultivation, harvesting and ancillary activities. This enabled India to become the largest producer of sugarcane and sugar in the world leaving the other major producers Brazil and Cuba. The major sugarcane crop growing states in India are Uttar Pradesh, Bihar, Assam, Haryana, Gujarat, Maharashtra, Karnataka and Tamil Nadu.

Sugarcane is important cash crop grown in India. Sugarcane cultivation and development of sugar industry runs parallel to the growth of human civilization and is as old as agriculture. The importance and use of sugarcane and sugar in the country's socio-economic milieu is deep rooted and immense. In the current day rural economy set up sugarcane cultivation and sugar industry has been focal point for socioeconomic development in rural areas by mobilizing rural resources, generating employment and higher income, transport and communication facilities. About 7 million sugarcane farmers and large number of agricultural labourers are involved in sugar cane cultivation and ancillary activities. Apart from this, the sugar industry provides employment to 5 lakh skilled and semi skilled workers in rural areas.

India is one of largest sugarcane producers in the world, producing around 300million tonnes of cane per annum. Production of the sugar is the second largest agro processing industry in the country after cotton and textiles. India is the only country that produces plantation while sugar unlike other countries that produce raw or refined sugar or both.

In India, sugarcane the key raw material for production of Sugar and Gur, planted once a year during January to March. It is the major cost driver for the production of sugar. It being an agricultural crop is subject to the unpredictable vagaries of nature, yielding either a bumper crop or a massive shortfall in its cultivation from year to year.

The sugarcane growing may be broadly classified into two agro climatic regions – subtropical and tropical. The subtropical zone includes four States: 1) Uttar Pradesh (UP) 2) Bihar 3) Punjab 4) Haryana. The tropical zones include five States. These are: 1) Maharashtra 2) Andhra Pradesh 3) Tamil Nadu 4) Gujarat 5)

Karnataka (Pusappa, 2013).

In India Uttar Pradesh is the major sugarcane growing state, contributing about 48% of the area and 40% of the production. Other important cane growing states are Karnataka, Maharashtra, Andhra Pradesh, and Tamil Nadu. In terms of productivity Tamil Nadu ranks first with average productivity of about 102.83 tonnes /ha followed by are Karnataka (90.25 tonnes/ha) and Maharashtra (80.10 tonnes/ha) and Uttar Pradesh (59.58 tonnes/ha) against a national average of 70.31 tonnes/ha. In India, Utter Pradesh ranks 1st in area and production of sugarcane and Maharashtra rank 1st in sugar production and sugar recovery (Balasaheb, 2013).

Sugarcane is in great demand for various other uses like fodder, paper production and most importantly bio-fuels. In a typical sugar mill, 100 tonnes of sugarcane on an average produces 10 tonnes of sugar, 4 tonnes of molasses from which ethanol is produced, 3 tonnes of press mud which is converted into bio fertilizer, 30 tonnes of bagasse used for cogeneration of power to yield 1,500 KW electricity and for manufacturing paper. Besides, about 30 tonnes of cane tops and leaves are generally left in the field, which through recycling further add to the economic value of the crop (Anonymous, 2009).

Sugarcane cultivation needs temperature of 15 degree to 40 degree and rainfall of 100 to 150 centimetres and fertile loamy soil or hard soil. Sugarcane is a long duration crop which produces huge amounts of biomass, requiring large quantities of water, which typically are supplied through 25-30 irrigation cycles per crop season sugarcane is cultivated from Kanyakumari (southern Part) to Punjab (north – west) but it is more cultivated in Uttar Pradesh, except these States, sugarcane is an important crop in Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka, Punjab, Haryana, and Bihar etc. (Nandhini and Padmavathy, 2017**).**

Sugarcane cultivation in Andhra Pradesh

In Andhra Pradesh during 2011-12, the area under sugarcane crop was 2.04 lakh hectares and production was 166.89 million tonnes with productivity of 81.8 tonnes/ha. In Costal Andhra region the area of sugarcane crop was 1.28 lakh hectares and production was 100.7 million tonnes, in Rayalaseema region the area of sugarcane was 0.31 million hectares and production was 27.76 million tonnes and in Telangana region the area of sugarcane was 0.45 lakh hectares and production was 37.43 million tonnes. Visakhapatnam, Chittoor, West Godavari, Medak, Vizianagaram, Krishna, East Godavari and Nizamabad districts are important producers and together accounted for 84.62 percent of the total area under the crop in the state.

Area under sugarcane cultivation in Andhra Pradesh as well as Telangana should be increased and all efforts should be made to improve the cane yields and recovery and also to modernise the mills.

Mills should focus on increasing the area under cane cultivation and also mill efficiency. Right from ploughing to sowing, intercultural operation, water and fertiliser use efficiency, the field staff of the sugar mills should ensure constant monitoring. Though the per acre yield in AP and Telangana is

better than in Uttar Pradesh, Bihar and Haryana, there is scope for considerable improvement. New technologies and farm-level mechanisation are necessary for achieving better productivity and quality.

There are 527 sugar plants in various parts of India, of which 24 are located in Andhra Pradesh and 10 in Telangana. Karnataka ranks third after Maharashtra and Uttar Pradesh AP is the sixth largest. Both AP and Telangana produce one million tonnes as against 24.5 mt in the country.

Review or Literature

Rao Rama (2012) in his study entitled that efficiency; yield gap and constraints analysis in irrigated vis-à-vis rainfed sugarcane in North Coastal Zone of Andhra Pradesh. The economics of yield gap in irrigated and rainfed sugarcane cultivation have been studied in North Coastal Zone of Andhra Pradesh for the period 2008-09 by collecting data on various aspects of costs and returns. Budgeting techniques, cost concepts, benefit cost ratio (BCR), yield gap analysis and response priority index have been used for the analysis. The study has shown that the value of BCR is higher for plant crop in irrigated (1.49) than in rainfed (1.43) regions. The yield gap between irrigated and rainfed regions has been found to be 67.8 per cent, in which input usage had a higher (41.86%) effect than cultural practices (25.93%).

Singh, Jaswant *et al*. (2011) in their paper entitled that Alternative Sweeteners Production from Sugarcane in India: Lump Sugar (Jaggary). Importance of sweeteners has long been recognized in Indian diets. Sweetness and flavour are very important as regards consumers' acceptability. The increasing trend of their production is of much significance to learn about peoples' liking towards jaggery in rural areas mainly due to its nutritional and medicinal values. About 25-30% of sugarcane produced in the India.

Murali and Balakrishnan, (2012) In the recent past, labour scarcity coupled with high labour wage rate greatly affected the irrigation and harvesting of the crop in time. It has reduced sugarcane area from 3.91 lakh ha 2006–2007 to 3.14 lakh ha in 2009–2010 at Tamil Nadu. Modern sugarcane machinery and labour saving devices were introduced at large scale to reduce the dependency of labour,

and complete the farm operation in time. This study has found Mechanical operations to be superior to manual operations in sugarcane cultivation.

Rao Rama and Babu, (2012) The present study was an attempt to work-out costs and returns in value added products of Sugarcane *viz.*, sugar, jaggary and sugarcane juice, in order to suggest the sugarcane growers the profitable and sustained way to deal with sugarcane. Multistage sampling technique was adopted in selecting the sampling units at various levels during 2010-11.

Shrivastava *et al*. (2011) in their study entitled that Sugarcane Cultivation and Sugar Industry in India. Sugarcane had been one of the most important and celebrated crops cultivated widely in India since time immemorial. Its cultivation and uses are mentioned in ancient Indian literature as well as in the descriptions in important books written during the reign of various kings as also in the descriptions given by various travellers who visited India during different periods. Sugarcane development has received due importance both at the national level as well as at the state levels.

Kshirsagar (2008) study entitled Organic sugarcane farming for enhancing farmer's income and reducing the degradation of land and water resources in Maharashtra. The stud The study point out that Maharashtra is the second largest sugarcane growing state in the country. It contributed 0.58 million hectares (13.53 per cent) to total area and 45.78 million tonnes (15.06 per cent) to total production of sugarcane in the country in TE 2002-03.

Yadav *et al*. (2003) the paper titled is Labour saving and cost reduction machinery for sugarcane cultivation cultural operations for sugarcane production are very arduous especially planting, interculture, plant protection and harvesting.

Modern sugarcane machinery and labour saving devices reduce the cost of sugarcane production, help in completion of operation timely reduce human drudgery and enable efficient utilization of resources with better quality work output. It helps in increasing overall production and productivity.

Maraddi *et al*. (2010) in their study on analysis of farmer's knowledge about selected sustainable cultivation practices (SCP) in sugarcane. The research study was conducted Belgaum and Bagalkot districts of Karnataka in the year 2005-06 with a sample of 180 respondents. The export factor research design was used for the research study. The study revealed that both knowledge and extent of adoption of respondents were at moderate level. Cent per cent of the respondents had knowledge about preparing land into ridges and furrows, selecting setts from main crop, FYM in soil helps to increase nutrient availability and water holding capacity, mulching reduces evaporation rate and weeds and chemical tool of IPM.

Poswal *et al.* (2005) conducted a questionnaire survey was among sugarcane farmers (n=220) in Muzaffarnagar district, western Uttar Pradesh, India, to determine farmers' knowledge level about recommended practices in sugarcane cultivation and the extent of adoption of improved sugarcane technology. The overall average knowledge level was 53.70%, while the overall extent of adoption was 46.45%.

Abbas *et al*. (2003) revealed that a majority of large farmers (52.50-84.80%) were aware of recommended sugarcane production technologies, which were adopted by majority of them. A significant proportion of small farmers gathered information about sugarcane production technologies through their follow farmers and progressive farmers. Large farmers (20% & above) got information about sugarcane production technologies through Agriculture Department (Extension

Wing) and Research Institutes, while (10 to 20 %) large farmers gathered information about sugarcane productions technologies through mass media (radio/television and printed material).

Kathiresan *et al.* (2003) the adoption level and the reasons for non-adoption of improved sugarcane technology were investigated in Perambalur district, Tamil Nadu, India. Data were obtained through questionnaire interviews with 30 farmers during September 2002. The study revealed that most farmers were aware of the technologies and that non-availability of labour was the reason for non-adoption in the case of detrashing and propping.

Babu *et al*. (2007) in this study effect of integrated use of organic and inorganic fertilizers on soil properties and yield of sugarcane. The results of a field experiment conducted on alluvial soils to study the effect of different organic manures along with inorganic fertilizers on physical, physico-chemical and chemical properties of alluvial soil and yield of sugarcane during 1994–96 in farmers' fields of Kovur Sugar Factory area of Nellore district, Andhra Pradesh revealed that sugarcane responded to organic manures when used in integration with inorganic fertilizers.

A study conducted by Lohar *et al.* (2000) estimated the per ton cost of production of sugarcane, per quintal production of jaggary, per quintal manufacturing of sugar and profitability of production of jiggery and sugar. The study was conducted with sample of 30 jaggery producers from six villages in Karveer, Tahsil, Kolhapur district, Maharasthra, India and it revealed that profitability is more in jaggery production.

Thangavelu and Subhadra, (2005) explained that footsteps of sugarcane right from 1923 to 2003. The data was compiled from various source and presented to

give conclusion. They said that sugarcane cultivation cannot be increased beyond a certain limit but the left out way before us was better variety and better cultivation practices.

Jain *et al*. (2006) examined the sugarcane germination. Germination in sugarcane refers to sprouting of buds and growth of young shoots from it. The productivity of sugarcane is higher in tropics than subtropics. Germination of setts or buds is usually less than 40 per cent in subtropical India against that of 60 percent to 80 percent in tropical zone. The germination of cane takes place from cane cuttings. The research consists of germination study made by the different scholars from 1947 to 1998 and concluded with a few details of factors that influencing with germination in sugarcane.

Nain *et al.* (2002) reported that the irregularity in the distribution of sugar cane purchase indent, delay in payment of sugar cane to the farmers, delay in unloading, lack of transportation facilities *etc.* were the major problems reported by the selected respondents in marketing of sugar cane to the sugar mills. The review revealed that jaggary production was major traditional enterprise in sugarcane producing areas. At times jaggary making was profitable to cane producers than supply to sugar factory. The cost of sugarcane was the major cost item in jaggary production. The investment in jaggary processing units was found to be profitable.

Shinde (2005) analysed the influence of sulphur application on sugarcane yield and quality. Field experiments were conducted during 2001 – 2004 to study the response of suru sugarcane to the graded levels and sources of sulphur. The present study indicated that the application of 60kg sulphur per hector was effective increasing the cane yield and for better quality.

Pawar *et al.* (2005) revealed that the factors affecting the adoption of sugarcane technology in sugarcane farms in western Maharashtra included: family composition and landholding; cropping pattern of sugarcane growers; and awareness of sugarcane technology. They approached 270 sugarcane farmers during 2002 – 03 to assess the degree of knowledge about improved production techniques of sugarcane farms. The average family size, land holding and cropping intensity of the sampled sugarcane farms was 6.00 members, 3.37 ha and 125.39, respectively and also 25% of farmers are not aware of sugarcane technology.

Sale and Yadav (2008) studied the sugarcane cultivation with an integrated approach in Kolhapur District of Maharashtra. This study was conducted to examine the per hectare resource use structure in organic and inorganic sugarcane farming, calculate the per hectare cost of cultivation in organic and inorganic sugarcane farming and compare the economics of the two farming systems. Results showed that the per hectare cost of sugarcane with inorganic and organic farming were Rs. 66,572.73 and Rs. 57,275.72, respectively and the per tonne cost of production of sugarcane were estimated as Rs. 660.83 and Rs.712.42 in inorganic and organic farming, respectively.

Naidu and Reddy (1981) examined jaggery marketing at Anakapalli regulated market. Immediately after manufacturing of jaggery, the cultivator brings it to the market due to need of money or lack of storage facilities. The commodity is entrusted to a commission agent. The jaggery brought to

each shop in the market is differentiated into three qualities and graded as one, two and three by the experienced Hamal based on colour, hardness and crystalline texture. The retailers or the commission agents of wholesalers gather at each shop where auction is being held under the supervision of a marketing committee official. The highest bidder purchases the stocks and the bidding is done in terms of 10 kgs of jaggery. The producers share in the consumer's rupee was 82.72 per cent. The wholesalers margin, brokerage and commission agents margin was 5.82, 2.74 and 2.64 per cent respectively.

Methodology

chose for my study purpose random sampling techniques. There is a wide range of sampling techniques including; convenience, typical case and representative and reputational samples. Rationale for selecting cases to addresses specific purposes related to the research questions. Each case is selected to address a particular set of questions so that each case has high information content value. Sample size is usually small, often 60 cases. Determinants of sample size, size is determined judgemental and where time and resources permit selection method judgement based on advice from experts combined with researchers judgement and possibly checked through rapid exploratory studies. Chittoor district is the largest Andhra Pradesh.

Area of the study:

Aggichenupalli village in Chittoor district, fully selected for this purpose of study

1. Aggichenupalli is one of my interesting area of Rayalaseema region.
2. It is one of the areas in the districts not only in Andhra Pradesh but also country sugarcane farmers facing number of problems economically, socially and environmentally. Hence the present study is carried out to know

Objectives:

1. To know the socio- educational background of sugarcane farmers
2. To know the economic conditions of sugarcane farmers
3. To know health conditions of sugarcane farmers

4. To know the awareness of benefit policies and programmes of the sugarcane farmers

Methodology:

Research Design and Samples:

For the present study the investigator used purposive random sampling method to collect data from Aggichenupalli village.

Tools and techniques of data collection:

Collection of primary data:

For primary data a structured interview scheduled is propagated among respondent relating to the socio economic aspects and also data was collected from sugarcane farmers in Aggichenupalli village.

Collection of secondary data:

The data was collected from libraries and source of internet was collected of statistical data regarding differently

Analysis of data:

The data was coded, tabulated and analysed with the help of statistical package for social service.

Scope of the study:

The study covers the approximately 60 responds who are differently sugarcane farmers from Aggichenupalli village in Chittoor district.

Analysis

Table 1: Age of Respondents

Age	Number of respondents	Percentage (%)
20-35	12	20
35-55	33	55
55-75	15	25
Total	**60**	**100**

This table indicates the age group of the sugarcane farmers in the Aggichenupalli village. This table represents 12 members of the respondents that is about 20% of the respondents are related to age group up to 35 years, 33 members of the respondents that is about 55% of the respondents are related

to age group of

35 to 55 years and 15 members of the respondents that is about 25% of the respondents are related to age group of 55 to 75 years among the sugarcane farmers in the Aggichenupalli village. According to the above survey the percentage of youngsters in the sugarcane farming is less.

Table 2: Type of Family

Type of family	Number of respondents	Percentage (%)
Nuclear	42	70
Joint	18	30
Single parent	-	-
Total	**60**	**100**

This table indicates the type of family in sugarcane farmers in the Aggichenupalli village. This table represents 42 members of the respondents that is about 70% of the respondents are related to type of family is nuclear family, 18 members of the respondents that is about 30% of the respondents are related to type of family is Joint family and no respondents are related to type of family Single parent family. According to the above survey the percentage of Joint family in the sugarcane farming is less. It is because of financial problems and no respondents are Single parent family.

Table 3: Educational Status

Educational status	Number of respondents	Percentage (%)
Illiterates	21	35
0-5 class	17	28.33
5-10 class	15	25
Inter – degree	7	11.66
Total	**60**	**99.99**

This table indicates the educational status of the sugarcane farmers in the Aggichenupalli village. This table represents 21 members of the respondents that is about 35% of the respondents are related to the educational status of illiterates, 17 members of the respondents that is about 28.33% of the respondents are related to the educational status of up to 5^{th} class, 15 members of the respondents that is about 25% of the respondents are related to the educational status of 5^{th} to 10^{th} class and 7 members of the respondents that is about 11.66% of the respondents are related to the educational status of Inter –

degree.

Table 4: Acres of Land

Acres of Land (acres)	Number of respondents	Percentage (%)
Below 2	10	16.66
2 – 3	39	65
3 – 6	11	18.33
Above 6	-	-
Total	**60**	**99.99**

This table indicates the acres of land of the sugarcane farmers in the Aggichenupalli village. This table represents 10 members of the respondents that is about 16.66% of the respondents are related to the acres of land is below 2 acres, 39 members of the respondents that is about 65% of the respondents are related to the acres of land is 2 - 3 acres, 11 members of the respondents that is about 18.33% of the respondents are related to the acres of land is 3 - 6 acres and no respondents are related to the acres of land is above 6 acres.

Table 5: Awareness about different types of pollution

Types of pollution	Number of respondents	Percentage (%)
Air pollution	5	8.33
Water pollution	-	-
Soil pollution	18	30
Above all	37	61.66
Total	**60**	**99.99**

This table indicates awareness about different types of pollution in sugarcane farmers in the Aggichenupalli village. This table represents 5 members of the respondents that is about 8.33% of the respondents have awareness about air pollution, no respondents have awareness about water pollution separately, 18 members of the respondents that is about 30% of the respondents have awareness about soil pollution and more members (37) of the respondents that is about 61.66% of the respondents have awareness about all pollutions.

Table 6: Investment invested in sugarcane farming

Investment (Rs)	Number of respondents	Percentage (%)
Up to 5000	5	8.33
5000 - 10000	27	45
Above 10000	28	46.66
Total	**60**	**99.99**

This table indicates the investment invested in sugarcane farming by farmers in the Aggichenupalli village. This table represents 5 members of the respondents that is about 8.33% of the respondents are related to the investment invested in sugarcane farming up to Rs 5000, 27 members of the respondents that is about 8.33% of the respondents are related to the investment invested in sugarcane farming of Rs 5000 to Rs 10000 and more of members of the respondents that is about 8.33% of the respondents are related to the investment invested in sugarcane farming of above Rs 10000.

Table 7: Sources of borrowings

Sources of borrowings	Number of respondents	Percentage (%)
Relatives	11	18.33
Money lenders	41	68.33
Mini finance	8	13.33
Total	**60**	**99.99**

This table indicates the sources of borrowings of sugarcane farming by farmers in the Aggichenupalli village. This table represents 11 respondents that is about 18.33% of the respondents are borrowings money from relatives, 41 respondents that is about 68.33% of the respondents are borrowings money from money lenders and 8 respondents that is about 13.33% of the respondents are borrowings money from mini finance. According to the above survey more farmers are depending up on money lenders.

Table 8: Money of borrowings

Money of borrowings (Rs)	Number of respondents	Percentage (%)
30000	19	31.66
50000	29	48.33
70000	12	20
Above 70000	-	-
Total	**60**	**99.99**

This table indicates the money of borrowings of the sugarcane farmers in the Aggichenupalli village. This table represents 19 members of the respondents that is about 31.66% of the respondents are borrowing money of up to Rs 30000, 29 members of the respondents that is about 48.33% of the respondents are borrowing money of up to Rs 50000, 12 members of the respondents that is about 28.33% of the respondents are borrowing money of up to Rs 70000 and no respondents are borrowings money of above Rs 70000.

Table 9: Money of bank loans

Money of bank loans (Rs)	Number of respondents	Percentage (%)
30000	26	43.33
50000	19	31.66
70000	15	25
Above 70000	-	-
Total	**60**	**99.99**

This table indicates the money of bank loans by sugarcane farmers in the Aggichenupalli village. This table represents 26 members of the respondents that is about 43.33% of the respondents are taken money from bank loans up to Rs 30000, 19 members of the respondents that is about 31.66%.of the respondents are taken money from bank loans up to Rs 50000, 15 members of the respondents that is about 25% of the respondents are taken money from bank loans up to Rs 70000 and no respondents are taken money from bank loans above Rs 70000.

Table 10: Total labour cost in a year for one acre

Labour cost (Rs)	Number of respondents	Percentage (%)
Up to 10000	45	75
10000-20000	15	25
Above 20000	-	-
Total	60	100

This table indicates the total labour cost in a year for one acre in sugarcane farming in the Aggichenupalli village. This table represents 45 members of the respondents that is about 75% of the respondents are related to total labour cost in a year for one acre is up to Rs 10000, 15 members of the respondents that is about 25% of the respondents are related to the total labour cost in a year for one acre is Rs 10000 Rs 20000 and no respondents are related to total labour cost in a year for one acre above Rs 20000.

Table 11: Mode of disposal of sugarcane

Disposal of sugarcane	Number of respondents	Percentage (%)
Sent to factory	15	25
Direct sale to juice vendors	-	-
Direct sale to jaggery units	45	75
Total	**60**	**100**

This table indicates the mode of disposal of sugarcane by sugarcane farming in the Aggichenupalli village. This table represents that 15 members of the respondents that is about 25% of the respondents are related to mode of disposal of sugarcane was sent to factory, no respondents are related to mode of disposal of sugarcane was direct sale to juice vendors and 45 members of the respondents that is about 75% of the respondents are related to mode of disposal of sugarcane was direct sale to jaggery units. According to survey more number of sugarcane farmers prefers to direct sale to jaggery units.

Table 12: Mode of transport

Mode of transport	Number of respondents	Percentage (%)
Own	22	36.66
Hired	38	63.33
Total	**60**	**99.99**

This table indicates the mode of transport of sugarcane by sugarcane farming in the Aggichenupalli village. This table represents that 22 members of the respondents that is about 36.66% of the respondents are related to mode of transport of sugarcane on own tractors and 38 members of the respondents that is about 63.33% of the respondents are related to mode of transport of sugarcane on hired vehicles. According to above survey the percentage of hired transport in sugarcane farming more in the Aggichenupalli village.

Table 13: Trend of sugarcane cultivation

Cultivation	Number of respondents	Percentage (%)
Increasing	42	70
Stable	16	26.66
Decreasing	2	3.33
Total	**60**	**99.99**

This table indicates the trend of sugarcane cultivation by sugarcane farmers in the Aggichenupalli village. This table represents 42 members of the respondents that is about 70% of the respondents are related to the trend of sugarcane cultivation was increasing, 16 members of the respondents that is about 26.66% of the respondents are related to the trend of sugarcane cultivation was staple and 2 members of the respondents that is about 3.33% of the respondents are related to the trend of sugarcane cultivation was decreasing. According to above survey the sugarcane cultivation was increasing in the Aggichenupalli village.

Table 14: Time for receipt of cash on sale of produce

Time of cash	Number of respondents	Percentage (%)
Immediately	-	-
Within a month	43	71.66
Within a 4 months	15	25
Within a 6 months	2	3.33
Total	**60**	**99.99**

This table indicates the time for receipt of cash on sale of produce by sugarcane farmers in the Aggichenupalli village. This table represents no respondents are receipt of cash on sale of produce Immediately, 43 members of the respondents that is about 71.66% of the respondents are related to the receipt of cash on sale of produce in within a month, 15 members of the respondents that is about 25% of the respondents are related to the receipt of cash on sale of produce in within 4 months and 2 members of the respondents that is about 3.33% of the respondents are related to the receipt of cash on sale of produce in within 6 months.

Table 15: Government programmes

Programmes/ Schemes	Number of respondents	Percentage (%)
Tractor loans	7	11.66
Crop loans	24	40
Spray subsidy loans	12	20
Input subsidy	17	28.33
Total	**60**	**99.99**

This table indicates the government programmes of sugarcane farmings in the Aggichenupalli village. This table represents 7 members of the respondents that is about 11.66% of the respondents are related to the government programmes of tractor loans, 24 members of the respondents that is about 40% of the respondents are related to the government programmes of crop loans, 12 members of the respondents that is about 20% of the respondents are related to the government programmes of spray subsidy loans and 17 members of the respondents that is about 28.33% of the respondents are related to the government programmes of input subsidy.

Case studies

His name is Sambasivam, age 52 years old and cultivating sugarcane since 20 years. I have two brothers and four sisters. I was depending on agriculture before his marriage. We has 3 acres of cultivating land out of this 1 ½ acres cultivating sugarcane. It has good income in sugarcane with this income my brothers are well in education. I did marriages to my sisters. I have to give good future to my children. My wife giving so much of support to me. I have girl child and one boy child. Both are completed P.G. my son doing job. I have constructed own house. We have good position in village in economically. We also utilized government policies and programmes.

His name is Varamuni age 46 years old I have 2 acres of land. I got marriage before 20years sugarcane crop came from hereditary my elder also during this crop cultivation in my family. I have two daughters and one son. I did marriage to my brother I have good income in this crop. I buy one bike. My elder daughter studying in college. We developed economically well. The support from government also good for this crop. Sugarcane is an economic crop for us.

His name is Munaswami age 62 years old am cultivating sugarcane by our hereditary and it was yearly crop. We cultivating sugarcane and we made jaggary. I have two sons and one daughter. We have profit in this crop we constructed own house and also repaying bank loans and also borrowings. If we loosed in sugarcane the government are giving input subsides and insurance to us. I did marriage to my elder son and younger son studding well. We purchased gold for our daughter and also done marriage to her. My wife has illness and we are taking treatment in hospital. For all this purpose we got income from sugarcane crop. I cannot leave this crop.

His name is Subramanyam age 42 years old. I am cultivating sugarcane crop since five years. Before that is not a position to provide studies for my children's and even not requiring my basic needs also not fulfilled. My father gave one acre land to me. 1st year got losses but remaining years I learned about cultivating process and got good income. Present am in good position economically. I constructed own house and I purchase TV and bite. We purchased gold for my daughter with the help of the crop. We are in good position in the society. His name is Nakshatram age 54 years old I have 2 daughters and one son. I am cultivating sugarcane since 30 years and making jaggery with this sugarcane crop. We sold at market did marriage for my son and also for my daughters. I constructed own house with the help of government loan we buy tractor and also bike. If one year we got losses and another year come profits and we adjusted by these and am paying bank loans present.iam not taking borrowings from anyone because we are good income in sugarcane.

Average size of land holdings of Indian farmers is decreasing day by day owing to constant increase in human population. Presently, the proportion of marginal, small and big farmers in the country is 58.0, 18.0 and 24.0 per cent, respectively. Therefore, to meet the demand of food viz; cereals, pulses, oilseeds, vegetables, sugar, etc. for the ever increasing population, raising production of these crops is of utmost importance. Since increasing the area under these crops is not possible due to limited availability of agricultural land, the only option is to increase the crop productivity on the available land. The productivity of land could be enhanced substantially by growing intercrops in the space left between sugarcane rows. Sugarcane crop remains in the field for a year or more and the space between

sugarcane rows range from 70 to 90 cm providing ample chance for profuse weed growth which draws huge amount of nutrients and moisture from the soil. Hence, besides suppressing weeds in the inter-row spaces, additional production could be taken by growing suitable intercrops in between the cane rows. Some of the Intercrops have been found to have no/negligible adverse effect on sugarcane yield.

It has been proved by the results obtained at the research stations and demonstrations conducted on farmers' fields that the intercropping with sugarcane is beneficial over the growing of sugarcane alone. Keeping the idea in view, a team of scientists under Institution-Village Linkage Programme (IVLP) thoroughly discussed the prospects of intercropping in sugarcane with the farmers. During the discussion, it came to our notice that the farmers of the area have never taken intercrop with sugarcane. They were apprehensive of yield reduction in both sugarcane and intercrop due to less time available for intercultural operations. Generally, the farmers had been growing sugarcane during spring season or after the harvest of rabi crops i.e. March to May. Farmers felt surprised to know about the benefits of growing sugarcane in autumn season. Scientists explained in detail that 20-25 per cent yield and 0.5 unit sugar recovery are increased by growing sugarcane in autumn in comparison to spring planting sugarcane. Normally, there is no yield reduction in intercrops. The farmers thus, got motivated towards intercropping in autumn planted sugarcane.

Conclusion

Sugarcane production, farmers' perceived production constraints and preferred traits of small-scale sugarcane growers of the southern Ethiopia were assessed using a PRA approach. Further, 90 genetically diverse sugarcane germplasm grown by smallholder farmers were collected for breeding and conservation. Sugarcane production under the smallholder systems is challenged by a number of constraints across the value chain that limits the productivity and income of growers. Main sugarcane production constraints included drought stress, declining soil fertility, limited access to market, land shortage, lack of inorganic fertilizers, and other production inputs, and limited extension service.

Participant farmers prioritized drought tolerance (21%), increased cane yield (20%), early maturity (18%), marketability (17%), and high biomass (14%) as the top preferred traits of sugarcane.

Sugarcane farming has had a great impact on community livelihoods in village. More income attributed to proceeds from the sugar industry has been pumped into the local economy. This has seen gradual urbanisation of the sugar belt especially in terms of better roads and building infrastructure. There is stability in the industry, mainly attributed to the fact that farmers engage in alternative income generating activities as their sugarcane matures. Resultant threats to food security associated with sugarcane farming has not manifested in sub-sector in village as 77% of farmers lease land for sugarcane while growing food crops on their farms. Further, 94% of the population interviewed have enough food from their farms to feed their families all year-round with 6% having to buy from the market once their farms run out of produce.

The natives are traditional pastoralists thus ensuring agricultural diversification. Majority of the farmers are unaware of the potential health effects of sugarcane farming as well as threats to the biophysical environment, save for

deforestation, decried upon by 43% of the population. Tree cover has reduced by 12% within the last eighteen years and this is bound to worsen given the continued expansion of sugarcane farming. Famers are quickly shifting to zero grazing of dairy cattle due to it being less labour intensive and also as a result of diminishing pasturelands cited by 22% of the population.

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