

# Extent of Adoption behavior and Constraints of farmers towards improved Sugarcane cultivation practices in Dimapur district of Nagaland

## ABSTRACT

The present study entitled “Extent of knowledge Adoption behaviour of farmers and constraints towards improved Sugarcane cultivation practices in Dimapur district of Nagaland” was carried out during the session 2021-22. The investigation was conducted in Kuhuboto block of Dimapur district of Nagaland. A total number of 120 respondents from 4 villages were selected using proportionate random sampling procedure. The study revealed that majority (54.17%) of the sugarcane growers belonged to middle aged group, educated between primary (42.5%) and high school (30%) level, had medium level (68.33%) of annual income with medium size (45.84%) of land holding. Majority (63.33%) of the respondents were from families having upto five members, nuclear type of family and semi-cemented type of house. Majority of them had medium (10-20) years of farming experience, use of sources of information, mass media exposure and level of extension contact. Findings revealed that, majority of respondents i.e., (71.66%) of the total respondents were in the medium level of adoption group. In respect of correlation analysis between adoption level and the independent variables, it was revealed that variables like age, occupation, annual income, farming experience and source of information are significantly associated with adoption of sugarcane growers. Further, the variables education, marital status, type of family, family size, type of house, land holding, extension contact and mass media exposure was found to be non-significant. The major constraints faced by the respondents were lack of proper resources and capital, costly critical inputs, lack of proper market facilities, lack of credit facility at time, lack of technical knowledge, unavailability of seed at time, lack of knowledge about major insect- pest diseases & their control, lack of training program related with improved practices etc.

**Keywords:** adoption, constraint, sugarcane, Nagaland

**Comment [MPC1]:** Do not put in the keywords, words that already appear in the title.

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## 1. INTRODUCTION

Agriculture is one of the most significant sectors of the Indian economy. Agriculture is the only means of living for almost two thirds of the workers in India. The agriculture sector of India has occupied 43% of India's geographical area and is contributing 16.1% of India's GDP. Agriculture still contributes significantly to India's GDP despite the decline of its share in India's GDP. There are a number of crops grown by farmers. These include different food crops, commercial crops, oil seeds etc. Sugarcane is one of the important commercial crops grown in India [1].

**Comment [MPC2]:** Extensive paragraph to define the importance of agriculture for the country. Redo and make it clearer and more succinct.

Sugarcane (*Saccharum officinarum*) is an important agro-industrial crop in India, occupying 4.0-million-hectare area. Sugarcane belongs to the grass family (Poaceae). It is one of the most important cash crops of India and is cultivated in about seventy-five countries among leading countries such as Brazil, India, China, Thailand etc. It involves less risk and farmers are assured up to some extent about return even in adverse conditions. Nowadays sugarcane cultivation and industry become one of the decisive pillars of the Indian economy [2].

**Comment [MPC3]:** In this paragraph, it is again very repetitive... repeating the phrases to talk about the same subject, the sugarcane crop.

Sugarcane can be grown in a wide range of climate from warm tropical south to foothills of Himalayas. Under warm humid conditions it can continue its growth, unless terminated by following Winter. However, its height is strongly influenced by the age of the crop and the season. For good bud sprouting, moist soil and temperature range of 21-25°C are necessary, whereas emergence and tillering occur best at 30-35°C with relative humidity of about 50 percent and bright sunshine. Temperature above 50°C arrests its growth and that below 20°C slow, it and temperature lower than 10°C with severe frost proves fatal during its germination and establishment. The crop does its best in tropical regions, receiving rainfall of 750-1200mm. It can also be grown in subtropical areas but where the climate is surfeit to extremes with a lay dry season [3].

**Comment [MPC4]:** Too many unreferenced phrases. I suggest placing a larger number of authors.

Sugarcane cultivation is traditionally practiced by farmers in Nagaland and is an important cash crop in the state. Although the Sugar Mill in the state has been defuncted for many years now, the farmers still continue to cultivate sugarcane in all the districts mainly for making molasses (Gur) to generate income as well as for other purposes. The state agriculture department is implementing Sugarcane development in Nagaland under Rashtriya Krishi Vikas Yojana (RKVY) sub-scheme. In order to improve the economy and living standard of small and marginal farmers, the department through this programme proposed to take up various activities in order to increase the production and productivity of sugarcane in the state. During 2015-16, an area of about 1200 ha is targeted to be developed with an expected production of 48000 MT. This was stated in the Annual Administrative Report 2015-16 of the Agriculture Department [4].

The total production of cane in India is 341.20 million tonnes while the sugar recovery is around 10.0 percent [5]. However, there is potential of increasing the average cane yield to 100 tons per hectare and sugar recovery to 11.0 percent, if new technologies are transferred to the farmers' fields. Sugarcane has a sucrose content of 10-18% and a fibre content of 10-15% at harvest. The stems or stalks develop from buds, and are ready for harvesting 10-24 months later. It is essentially a plant of the warm tropics and grown best when frequent heavy rainfall is interspersed with bright sunshine. It is very sensitive to temperature below 15°C growth is very slow, and growth ceases when the temperature exceeds 35°C. The optimum temperature range for sugarcane growth is 20-30°C. There are many factors affecting sugarcane production such as choice of cane variety, climatic and soil conditions and

**Comment [MPC5]:** Repeated information. Concentrate vegetative information and your needs in a single paragraph in just one paragraph

availability of water. Therefore, study was undertaken to determine the level of adoption of sugarcane production practices.

## 2. RESEARCH METHODOLOGY

The descriptive research design was used for the present research study. The study was conducted in Dimapur district of Nagaland. There are six blocks in Dimapur district namely; Dhansiripar, Kuhuboto, Medziphema, Chumukedima, Nihokhu and Niuland. Out of these, Kuhuboto block have been selected through purposive sampling method because maximum number of farmers were engaged in sugarcane cultivation. A list of farmers engaged in sugarcane cultivation from the selected villages shall be prepared and out of these 120 respondents shall be selected through random sampling.

The primary data was collected with the help of personal interview technique with the help of pre-tested & pre-structured interview schedule designed especially in the light of objectives, set up for the study. Secondary data was collected from library, journals, books, papers and their documents related with the topic. The entire data was transformed into normal score for tabulation. The independent variables as well as dependent variable were categorized as low, medium and high or the term applicable so far on the basis of score obtained. Keeping in view the objectives of the study and to draw logical conclusion the statistical tests i.e., frequency, percentage, mean, standard deviation and correlation coefficient were used for analyzing and interpretation of the data.

### 2.1 Objectives of the study

1. To determine the level of adoption of sugarcane production practices by the respondents
2. To identify the constraints faced by the respondents in adoption of sugarcane cultivation practices and seek their suggestions for better adoption.

## 3. RESULTS AND DISCUSSIONS

### ADOPTION

**Table 1:** -Distribution of adoption of the respondents about recommended sugarcane cultivation practices.

Sl. No.	Statements	Adoption level		
		Fully adopted	Partially adopted	Not adopted
1.	Varieties recommended	80 (66.67%)	28 (23.33%)	12 (10%)
2.	Planting/ sowing time	86 (71.67%)	24 (20%)	10 (8.33%)
3.	Field preparation	48 (40%)	65 (54.17%)	7 (5.83%)
4.	Method of sowing	89 (74.17%)	22 (18.33%)	9 (7.5%)
5.	Manures and fertilizers	22 (18.33%)	65 (54.17%)	33 (27.5%)
6.	Spacing	55 (45.83%)	60 (50%)	5 (4.17%)
7.	Seed rate	45 (37.5%)	62 (51.67%)	13 (10.83%)
8.	Seed treatment	12 (10%)	32 (26.67%)	76 (63.33%)
9.	Irrigation	11 (9.17%)	27 (22.5%)	82 (68.33%)

**Comment [MPC6]:** I suggest putting the objectives right after the introduction. I also suggest that at the end of the introduction bring the research hypothesis, implications, etc.

**Comment [MPC7]:** Put results and discussion separately. In this way, it is possible to bring a further discussion of the subject with more bibliographic references.

**Comment [MPC8]:** Number

**Comment [MPC9]:** Is this value the number of people? TO SPECIFY

10.	Weed management	37 (30.83%)	72 (60%)	11 (9.17%)
11.	Pest control	9 (7.5%)	30 (25%)	81 (67.5%)
12.	Disease control	12 (10%)	33 (27.5%)	75 (62.5%)
13.	Harvesting	96 (80%)	22 (18.33%)	2 (1.67%)
14.	Yield per hac	68 (56.67%)	46 (38.33%)	6 (5%)

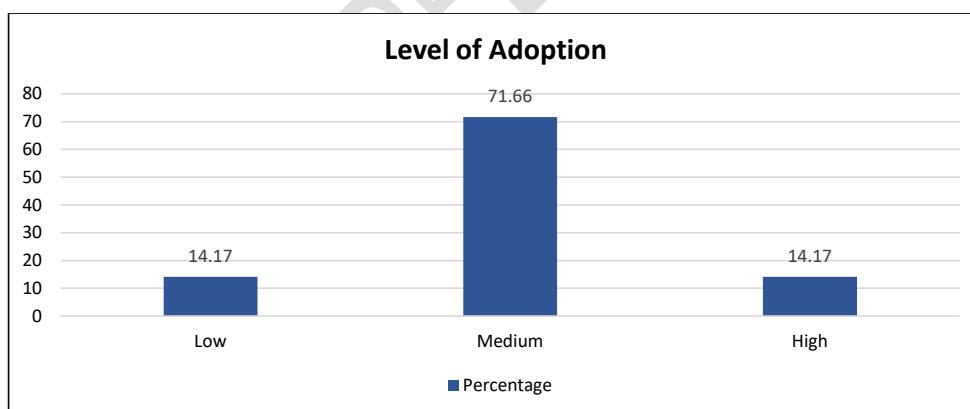
**Comment [MPC10]:** better format the table

Table 1, Shows the distribution of the adoption level of the respondents about recommended sugarcane cultivation practices. The above table shows that a majority of 66.67%, 71.67%, 86.67% and 74.17% of the respondents had fully adopted the recommended varieties, the optimum time of sowing, field preparation and recommended method of sowing of sugarcane cultivation practices respectively. It is observed that 54.17%, 50% and 51.67% had partially adopted manure and fertilizer, spacing and seed rate of sugarcane practices respectively. Maximum of the parameters were still not adopted.

**Comment [MPC11]:** There is no discussion, just delivery of results. Place author references that explain the results

**Table 2:** Distribution of the respondents based on the adoption towards Sugarcane cultivation.

Sl.No.	Category	Frequency	Percentage	Mean	SD
1.	Low (<27.77)	17	14.17	30.0	2.9
2.	Medium (27.77-32.36)	86	71.66		
3.	High (>32.36)	17	14.17		
	Total	120	100.00%		



**Figure 1:** Distribution of the respondents based on the level of adoption towards sugarcane cultivation.

**Comment [MPC12]:** remove the gridlines from the graph and format

Table 2 revealed that 71.66% of respondents were having medium level of adoption followed by 14.17% of respondents having high level of adoption whereas 14.17% of respondents were having low level of sugarcane crop. Similar findings were also reported by **Kumar et al., (2018)**.

The major constraints in adoption of recommended sugarcane production technology were lack of credit in time, followed by non-availability of seeds in time, unavailability of improved varieties of seeds in time, lack of training programmes about improved cultivation, insufficient knowledge about plant protection, lack of information in right time, lack of fertilizer in time, non-availability of inputs in time. The findings are partially similar to **Rai et al.**

**Table 3:** Association between selected independent variables with adoption of respondents in sugarcane cultivation practices.

Sl.No.	Variables	Pearson's correlation coefficient
1.	Age	0.210 *
2.	Education	-0.201 NS
3.	Marital status	0.016 NS
4.	Type of family	-0.136 NS
5.	Family size	0.061 NS
6.	Type of house	0.107 NS
7.	Occupation	0.202 *
8.	Land holding	-0.096 NS
9.	Annual income	0.200 *
10.	Farming experience	0.203*
11.	Social participation	-0.052 NS
12.	Mass media exposure	0.119NS
13.	Source of information	0.241*

\* = Significant at p = 0.05%, NS= non-Significant

From Table 3, it may be inferred that respondent's age, their occupation, annual income, high farming experience and source of information were positive and significantly correlated and had relatively higher level of adoption of recommended sugarcane cultivation practices. Further, the variables education, marital status, type of family, family size, type of house, land holding, extension contact and mass media exposure was found to be negative and non-significant.

### **CONSTRAINT**

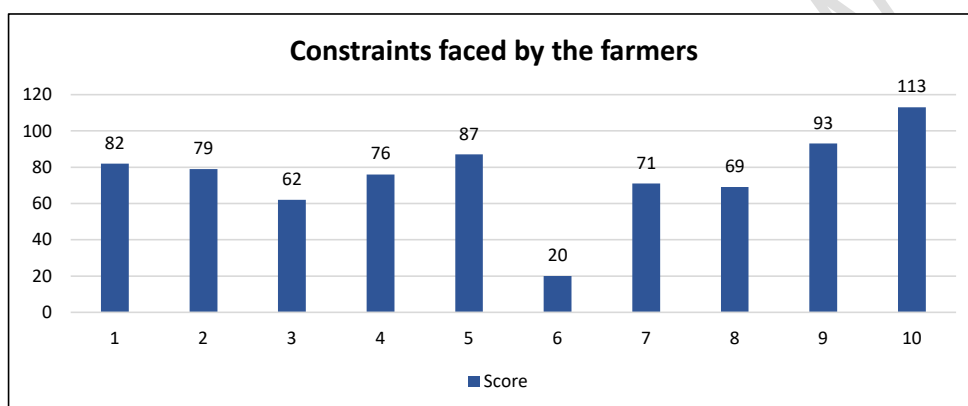
**Table 4:** - Constraints faced by the respondents in adoption of the recommended sugarcane cultivation practices.

Sl.No.	Constraints	Score (WEIGHTED MEAN)	Rank
1.	Lack of credit facility at time	82	IV
2.	Unavailability of seed at time	79	V
3.	Lack of proper information at time	62	IX
4.	Lack of technical knowledge	76	VI
5.	Lack of training program related with improved practice	87	III
6.	Irregular supply of electricity	20	X
7.	Non-performance of visit by agricultural personnel time to time	71	VII

8.	Costly critical inputs (seed and fertilizer)	69	VIII
9.	Lack of proper market facilities	93	II
10.	Lack of proper resources and capital	113	I

According to the table 4, Lack of proper resources and capital at number I for constraints faced by the respondents, Lack of proper market facilities (Rank II), fertilizer Lack of training program related with improved practices (Rank III), Lack of credit facility at time (Rank IV), Unavailability of seed at time (Rank V), Lack of technical knowledge (Rank VI), Non-performance of visit by agricultural personnel time to time (Rank VII), Costly critical inputs- seed and (Rank VIII), Lack of proper information at time (Rank IX) and Irregular supply of electricity (Rank X).

**Comment [MPC13]:** There is no discussion, just delivery of results. Place author references that explain the results



**Figure 2:** Constraints faced by the respondents in adoption of the recommended sugarcane cultivation practices.

#### 4. CONCLUSION

It is concluded from the present study that majority of the respondents were middle aged people, had education up to primary level, majority are married, had nuclear family, up to 5 family members and most of them lived in semi-cemented house. Majority of the respondents had agriculture as their occupation, had farming experiences of 10-20 years. A large number of the respondents had medium level of income. Most of the respondents also had social contacts with NSRLM. It was found that large number of respondents had medium level of knowledge and medium level of adoption. The main constraints faced by the respondents were lack of proper resources and capital, lack of proper market facilities, Lack of proper training program, Lack of credit facility at time and Unavailability of seed. They have suggested that seeds and other inputs should be made available at the village/block level, trainings should be given according to locally available resources and more training programs should be carried out by various extension workers which gives the farmers a wider range of knowledge regarding various types of cultivation practices as well as various schemes they are able to apply so as to assist them in balancing their earning and the subsidiaries provided by the government, which in turn it will lead to the sustainable livelihood and improved quality of life of the sugarcane growers.

## REFERENCES

1. Policepatil, G.A.K. (2014) Problems of sugarcane cultivators in Gulbarga District of Karnataka, *International Journal of Scientific Research* 3(11): 81-84.
2. Kumar, A., Jahanara and Bose, D.K. (2018). Knowledge and attitude of the respondents towards sugarcane cultivation practices in Khumbi Block of Lakhimpur Kheri District of Uttar Pradesh. *International Journal of Research Culture Society*.2 (1):399-402.
3. Anonymous (2013). Status paper on sugarcane. (Govt. of India).
4. The Morung Express (2016). Sugarcane Cultivation in Nagaland.
5. Department of Economics & Statistics (2020). Statistical Handbook of Nagaland. Directorate of Economics and Statistics, Government of Nagaland, Kohima.
6. Kumar, A., Jahanara and Bose, D.K. (2018). Knowledge and attitude of the respondents towards sugarcane cultivation practices in Khumbi Block of Lakhimpur Kheri District of Uttar Pradesh. *International Journal of Research Culture Society*.2 (1):399-402.
7. Rai, D.P., Singh, S.K. and Pandey, S.K. (2012). Socio-Personal analysis and constraints encountered by sugarcane growers of Burhanpur District (MP). *Agriculture Update* 7(3/4):401-404.
8. Alloh (2018). Smallholder Sugarcane Farming in Cameroon: Farmers' Preferred Traits, Constraints and Genetic Resources October, 52(8):47-54.
9. Itawdiya, K.K. (2011). A study on technological gap in sugarcane production of Sehore block of Sehore district (M.P.) M.Sc. (Ag.) Thesis, JNKVV, Jabalpur (M.P.).
10. Lahoti, S.R. and Chole, R.R. (2013). Adoption of sugarcane production technology by growers. *Journal of Agriculture Research and Technology* 38 (1):134-138.
11. Raza, H.A., Amir, R.M., Saghir, A. and Tahir, M. (2020). Sugarcane production and protection constrains faced by the growers of Punjab, Pakistan with special focus on the role of agricultural extension worker in related mitigation. *Pakistan journal of agricultural sciences* 57(6).
12. Singh, D.K. (2015). Knowledge Gap and Constraints Analysis of Sugarcane Production Technology in Western Uttar Pradesh. M.Sc. (Agri) thesis Sardar Vallabhbhai Patel University of Agriculture and Technology Meerut (U.P.).