Impact of Sugarcane Production Technologies as Perceived by Sugarcane Farmers in Chittoor District of Andhra Pradesh

S. Ramalakshmi Devi P. V. Satya Gopal V. Sailaja S.V. Prasad
Department of Extension Education, S.V. Agricultural College, Tirupathi 517502, Andhra Pradesh
Corresponding author *e-mail : sauyagopal15@gmail.com*

ABSTRACT

The research study was conducted to know the impact of sugarcane production technologies as perceived by the sugarcane farmers in Chittoor district of Andhra Pradesh. The study revealed that 57.50 per cent of the sugarcane farmers perceived the impact of sugarcane production technologies as medium followed by low (27.50%) and high (15.00 %) impact of sugarcane production technologies. Based on impact percentage the technologies were ranked from 1 to 36. Among all the selected thirty six sugarcane production technologies optimum time of planting (90.93%) was ranked first in terms of highest impact percentage. Land preparation (90.00%) and Selection of planting material (86.20%) occupied second and third ranks. Varieties was ranked fourth (84.91%), followed by pre emergence weed management (82.78%), wrapping and propping (79.17%), chemical control for pests (78.52%), water management (77.50%), earthing up (74.91%), chemical control for diseases (72.22%), Zinc sulphate (72.04%), seed rate (67.69%), spacing (66.94%), fertilizer dosage (66.48%) occupied fifth, sixth, seventh, eighth, ninth, tenth, eleventh, twelfth, thirteenth and fourteenth ranks respectively. The other technologies occupied the next ranks as per the perception of sugarcane farmers. More than half (59.17%) of the respondents were with medium productivity followed by low (20.83%) and high (20.00%) productivity levels. In case of cost of cultivation majority (65.00%) of the sugarcane farmers incurring medium cost of cultivation followed by low (19.17%) and high (15.83%) cost of cultivation. Majority (68.33%) of the sugarcane farmers were getting medium net profit followed by high (19.17%) and low (12.50%) net profit. Actual net profit and Actual productivity were positive and significantly related with perceived impact of sugarcane production technologies of the respondents. Actual cost of cultivation was negative and significantly related with perceived impact of sugarcane production technologies of the respondents.

Keywords : *Impact of sugarcane production technologies; Sugarcane farmers; Impact indicators*

Sugarcane is the world's largest crop and is grown in over 110 countries. In 2009, an estimated 1,683 million metric tons were produced worldwide which amounts to 22.4% of the total world agricultural production by weight (FAO, 2009). India ranks second in cane area and sugar production after Brazil. The states of Uttar Pradesh, Maharashtra, Karnataka, Tamil Naidu and Andhra Pradesh together produce nearly 90 per cent of the cane and sugar in the country. Andhra Pradesh ranks fifth in sugar crop area of the country with a share of 4.83 per cent. The average production of Andhra Pradesh is about 20.30 million tons contributing to 5.83 per cent of the total production of the country (Rao, and Sunil, 2010). In Andhra Pradesh, the major sugarcane growing districts in Telangana, coastal Andhra and Rayalaseema regions are Nizamabad, Visakhapatnam and Chittoor districts respectively.

The significant contribution of researchers, extension functionaries and farming community plays pivotal role in achieving the success. On one side, the researchers developed sustainable technologies to meet the production requirements of the farmers followed by effective dissemination of technologies by the extension functionaries so as to bring the technologies to the farmers for adoption. On the other side, the farming community successfully adopting those technologies so as to increase the productivity levels of sugarcane. The technologies starting from land preparation to post harvest of sugarcane like ridges and furrows, time of sowing, method of sowing, seed rate, varieties, water management, weed management, nutrient management, pest and disease management, harvesting and so on were developed to increase the production and productivity levels of sugarcane. So the efforts in the direction of assessing the impact of sugarcane production technologies at the ground level from the point of farmer's perception towards the production technologies was not focused properly. Hence the present study was conducted to assess the impact of sugarcane production technologies as perceived by the sugarcane farmers by taking three impact indicators viz., increased productivity, reduced cost of cultivation and improvement in net income. Further, the actual values of impact indicators viz., increased productivity, reduced cost of cultivation and improvement in net income were also correlated with the perceived impact of sugarcane production technologies by the farmers.

METHODOLOGY

Ex-post-facto research design was followed for the study. The investigation was carried out in Chittoor district of Rayalaseema region of Andhra Pradesh during the year 2011. Four mandals were selected in Chittoor district and from each mandal three villages were selected purposively based on highest area under sugarcane for both mandals and villages. From each of the selected village, ten sugarcane

farmers were selected randomly thus making a total of one hundred and twenty respondents for the study. The data were collected with the help of personal interview method through structured interview schedule.

Impact of sugarcane production technologies was operationalized as the extent of influence of different sugarcane production technologies as perceived by the sugarcane farmers in terms of increased productivity, reduced cost of cultivation and improvement in net income. A structured schedule was developed with the help of review of literature, consulting the experts of Regional Agricultural Research Station (RARS) Tirupati and some of the progressive farmers to measure this dependent variable.

As a first step the sugarcane production technologies were screened by consulting the ARS scientists and a final list of 36 sugarcane production technologies were selected for the final schedule. All the selected 36 technologies were then assessed in terms of their effectiveness on the three impact indicators viz. productivity, reduced cost of cultivation and net income as perceived by the sugarcane farmers. The three impact indicators were measured on a three point continuum viz., Highly effective, Moderately effective and Less effective with the scores of 3, 2 and 1 respectively for each technology.

Before measuring the impact indicators, the adoption and non adoption of technologies was also obtained from the framers by asking their status of adoption or non adoption of sugarcane production technologies. If the farmer adopted the technology then he was asked for his perception about the effectiveness of their technologies in terms of impact indicators. If the farmer did not adopted the technology, then that technology was not considered for measuring the impact indicators. The impact score of that technology was given zero.

Then the scores obtained for each technology ranging from 'Zero' to 'Nine' was pooled for all the thirty six technologies to form the total impact score of sugarcane production technologies. Hence the total score ranges from 0-324. Based on scores obtained for each technology, the impact percentages were calculated by following the formula as given below and ranking was given to the sugarcane production technologies as the impact percentage.

Impact percentage

It is the perceived impact of sugarcane production technologies measured in terms of percentage. It was calculated as follows

Impact percentage of each technology =

$$\frac{\text{Sum of actual score obtained from 120 respondents}}{\text{Sum of maximum possible score for 120 respondents}} \times 100$$

Measurement of actual impact indicators

The actual values of impact indicators viz., productivity, cost of cultivation and net income obtained and during the past three years were collected from the farmers. The average of past three years were calculated and the same was considered as the actual years of productivity, cost of cultivation and net income of each of the respondents.

$$\text{Actual net income} = \frac{\text{Sum of the net income obtained for the past three years}}{3}$$

$$\text{Actual productivity} = \frac{\text{Sum of productivity obtained for the past three years}}{3}$$

$$\text{Actual cost of cultivation} = \frac{\text{Sum of cost of cultivation obtained for the past three years}}{3}$$

In order to study the nature of relationship between the impact of sugarcane production technologies as perceived by sugarcane farmers and their actual impact indicators (Actual net income, Actual productivity and Actual cost of cultivation), the data were subjected to correlation coefficient analysis. The values of correlation coefficients (r) were then tested for their statistical significance.

RESULTS AND DISCUSSION

a) Impact of sugarcane production technologies as perceived by sugarcane farmers

It is evident from the Table 1 that 57.50 per cent of the sugarcane farmers perceived the impact of sugarcane production technologies as medium followed by low (27.50%) and high (15.00%) impact of sugarcane production technologies.

Table 1. Distribution of respondents according to their perceived impact of sugarcane production technologies

(N=120)

S. No.	Category	Frequency	Percentage
1.	Low	33	27.50
2.	Medium	69	57.50
3.	High	18	15.00
	Total	**120**	**100.00**

Mean : 155.83 S.D.:43.20

The farmers' perception about these technologies towards their influence on cost of cultivation, productivity and net profit was the symbol of the impact of sugarcane production technologies. In this context the farmers perceived that the sugarcane production technologies had significantly attributed to their net income and productivity. The technologies with less influence were been discontinued over a period of time. Sometimes the farmers may not have the awareness, knowledge and skills for successful adoption of technologies.

b) Ranking of sugarcane production technologies based on the impact as perceived by sugarcane farmers

From the Table 2 it could be seen that among all the 36 selected technologies optimum time of planting was ranked first (90.93%) in terms of its highest impact percentage.

The probable reason might be due to fact that farmers had experienced the delay in time of planting which resulted in the drastic decrease in the productivity due to unfavorable climatic conditions and also severe incidence of pests and diseases. On the other side, if the crop was timely planted, the farmers might be perceiving that they were getting higher yields with less cost of cultivation supplemented by the edge of high market rate.

Land preparation was ranked second (90.00%) in terms of its impact percentage. The probable reason might be due to the fact that farmers benefitted a lot with proper land preparation including deep ploughing, land leveling, forming ridges and furrows as per the recommended spacing and they escaped the unwanted calamities like lodging, incidence of pests and diseases so as to obtain higher yields from sugarcane.

Selection of planting material was ranked third (86.20%).This might be due to the fact that, quality and age of the planting material in sugarcane reflects the standing crop in terms of the growth, the incidence of pests and diseases and yield. In sugarcane the pests like white wooly aphid, scales, red rot and smut were more devastating the sugarcane crop primarily because of spread through the planting material. On the other side the optimum age of planting material also might be contributing for proper growth and productivity.

Table 2. Ranking of sugarcane production technologies based on the perceived impact by the sugarcane farmers

(N=120)

S. No	Sugarcane production technologies	Impact %	Rank
1	**Optimum time of planting** (Early varieties: December - January, Mid late varieties: Feb. - March)	90.93	I
2	**Land preparation** Deep ploughing, ridges & furrows (30cm wide, 20cm deep)	90.00	II
3	**Selection of planting material** (6-7 months seed nursery)	86.20	III
4	**Varieties** Early maturing (10 months):86V96, 2003V46, 87A298 Mid-late maturing(12-14 months):CoT8201,83V15,Co7805,Co87040,	84.91	IV
5	**Weed management pre emergence** (Atrazine @2kg ai/ha or Metribuzine @1.25kg ai/ha (400-500 l/acre) with the help of flood jet nozzle)	82.78	V
6	**Wrapping and propping of canes** (With bamboos or trash twist propping at about 5-6 months after planting)	79.17	VI
7	**Chemical control for pests** (Dimethoate, malathion, chlorpyriphos, methyl parathion, wettable sulphur, phorate)	78.52	VII
8	**Water management** (Once in six days during summer and once in 15-21 days from November to harvest) or drip irrigation	77.50	VIII

Table-2 Contd.

9	**Earthing up (**At about four months after planting)	74.91	IX
10	**Chemical control for diseases** (Propiconazole, mancozeb, carbendazim, tridemorph)	72.22	X
11	**Zinc sulphate** (Basal dose @ 20kg/acre or Foliar spray @ 2g/lit of water)	72.04	XI
12	**Seed rate** (16,000 three budded setts per acre) or 4t/acre	67.69	XII
13	**Spacing** (Early varieties: 80cm between rows, Mid late varieties:90cm between rows, paired row planting: 60/120cm, wide row planting:120 or 150cm)	66.94	XIII
14	**Fertilizer dosage** (Plant crop: 224 N:112 P_2O_5:112 K_2O Kg/ha Ratoon : 336 N:112 P_2O_5:112 K_2O Kg/ha)	66.48	XIV
15	**Ferrous sulphate** (Annabedhi 4Kg +200g Citric acid in 200 lit/acre)	66.11	XV
16	**Crop rotation** (With rice, black gram, green gram, groundnut)	65.19	XVI
17	**Gap filling (**If plant to plant gap is more than 50 cm fill gap with single budded setts within 2 weeks after ratooning)	64.81	XVII
18	**Weed management post emergence** (2,4-D @ 5 kg ai/ha or Metribuzine @1.25kg ai/ha (400-500 l/acre) with the help of flood jet nozzle)	62.22	XVIII
19	**Destruction of grasses on the bunds (**To control yellow mite)	61.85	XIX
20	**Harvesting** (Up to ground level and detopping, Mechanical/manual	50.19	XX
21	**Manures** (FYM@25ton/ha in the last ploughing)/press mud cake@12.5 ton/ha)	46.94	XXI
22	**Destruction of infested parts of cane**	45.74	XXII
23	**Intercropping** (With groundnut, green gram, black gram, bhendi, clusterbean, tomato)	33.70	XXIII
24	**Trash mulching** @3 t/ha at 3-5 days after ratooning	25.19	XXIV
25	**Bio fertilizers** Azospirillum 4kg+PSB 4kg/acre	19.35	XXV
26	**Post harvest technology** **(**Cane harvested should be free from trash, root material, soil etc.)	16.76	XXVI
27	**Sett treatment** **(**Hot water treatment of setts at 52^0c for 30 minutes or dipping of setts in chemical solution (150g Carbendazim+600 ml Malathion in 300 litres water/acre)	16.57	XXVII

28	**Pheromone traps (**5 no's per acre)	12.04	XXVIII
29	**Bio-control agent : Egg parasitoid** (*Trichogramma chilonis* @ 50,000/ha)	11.67	XXIX
30	**Release of predators (***Chrysoperla carnea*@5000-7500eggs/ha)	10.46	XXX
31	**Detrashing of the crop** (To control internode borer, cane fly and scale insect)	7.87	XXXI
32	**Planting of setts in 25 cm deep furrows (**to control early shoot borer)	7.13	XXXII
33	**Stubble shaving** (Immediately after harvest)	6.67	XXXIII
34	**Method of application of fertilizers (**Pocketing)	4.72	XXXIV
35	**Removal of water shoots** (To control internode borer and to improve quality)	3.15	XXXV
36	**Sterilization of harvesting knives (**With 5% formaldehyde or on direct flame)	2.78	XXXVI

Farmers perceived that varieties had more impact among the disseminated sugarcane production technologies ranked fourth (84.91%). It is known fact that over a period of 4-5 decades the varietal development in sugarcane is very substantial. The farmers were experiencing the enhanced performance of sugarcane varieties time to time not only in terms of productivity but also pest disease resistance, cane quality and other quality parameters. Because of these factors farmers might be achieving higher net profits with latest varieties released in sugarcane. In sugarcane, the selection of right variety of planting material suitable to the soil and environmental conditions is of paramount importance so as to obtain higher returns from sugarcane crop. The criteria of variety might be significantly differentiating the cost of cultivation and productivity leading to higher net returns. The farmers might have felt selection of right variety determines the net profit in sugarcane.

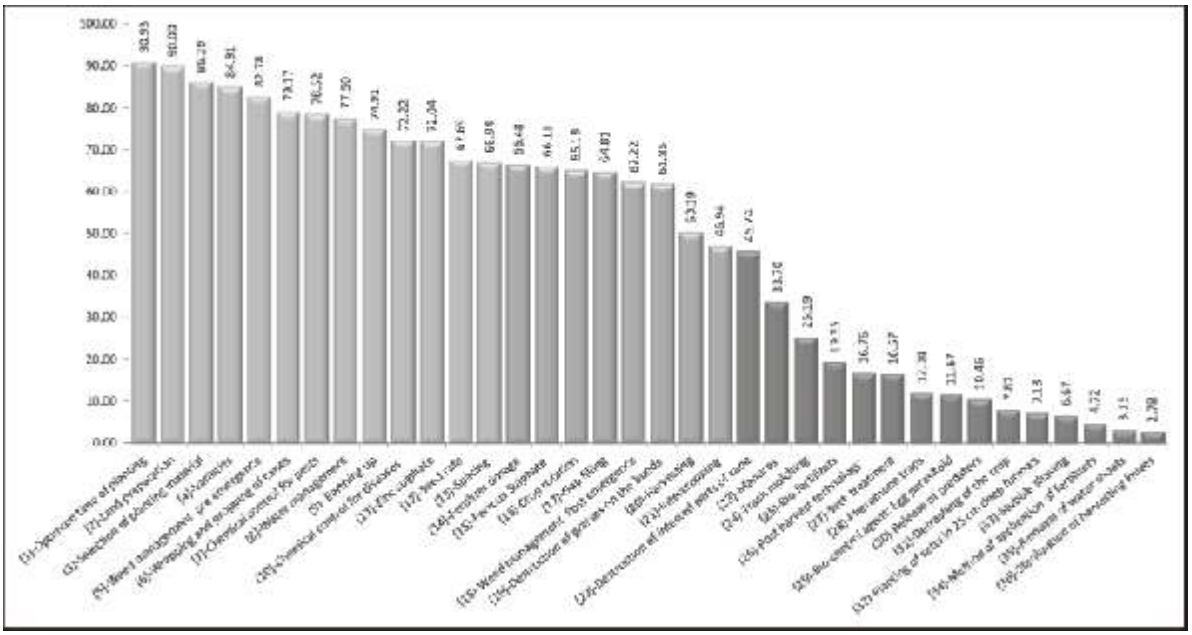

Fig. 1. Ranking of sugarcane production technologies based on the perceived impact by the sugarcane farmers

Pre emergence wed management was ranked fifth (82.78%) by the respondents. It was so because most of the farmers were applying weedicides for the control of weeds, which were relatively highly effective than manual weeding, different pre emergence weedicides were also abundantly available in the market so as to encourage the farmers to go for weedicides. On the other side non availability of human labour and higher wage rate making the farmers not to take up weeding operation properly. Hence farmers might be opting for weedicides in place of manual weeding.

Wrapping and propping was ranked sixth (79.17%) by the respondents. It might be due to, wrapping and propping protects the crop from heavy winds and rains so as to avoid lodging of crop which improves quality of cane and make harvesting easy. Hence the practice of wrapping and propping was felt as one of the most important technologies for better productivity.

Chemical control for pests and diseases were ranked seventh (78.52%) and tenth (72.22%). The probable reason for perceiving the above two technologies might be due to that farmers had experienced the necessity of chemicals to control the pests and diseases time to time, so as to obtain higher yields from sugarcane. They also might perceive that, it is inevitable to go for plant protection chemicals with the existing environmental and genotyp characteristics of the plants. Hence the plant protection chemicals might have been shown significant impact on sugarcane productivity. The farmers also perceived that higher the chemical use higher will be the control of pests and diseases.

Farmers perceived water management as an important technology which ranked eighth (77.50%). This is because, sugarcane is long duration crop which requires frequent irrigations starting from planting to final harvest specifically at tillering and grand growth phases. Irrigations at critical stages like tillering and grand growth phases were of importance and which had direct influence on productivity.

Earthing up was another important technology which was ranked ninth (74.91%). As the earthing up practice provides support to the plant as well as improves aeration at root zone which in turn leads to better growth of root system, efficient utilization of water and nutrients which has direct impact on yield of sugarcane.

Use of Zinc sulphate is another technology which the farmers perceived it as low ranking eleventh (72.04%). The probable reason might be because of that, the majority of soils in the region of study had no sufficient quantities of available zinc for sugarcane cultivation. Wherever there was no problem of zinc deficiency farmers might not be applying zinc sulphate. Hence majority of the farmers were applying zinc sulphate as per the recommendations and have observed significant difference in terms of vegetative growth of sugarcane plant. Hence the above trend might have occurred.

Farmers might have experienced the problem of stress with high seed rate and the problem of severe weed incidence with low seed rate and in turn both the situations might have resulted in low yields. Hence the farmers might have perceived that the optimum seed rate will give optimum plant population for higher productivity.

Spacing was another important technology which ranked thirteen (66.94%). Optimum plant population is mandatory which was scientifically obtained through proper spacing. The spacing was an integral part of crop production which will facilitate not only taking up intercultural operations but also obtaining uniform and higher yields from each plant. Hence the farmers perceived spacing as an important technology having direct impact on productivity and net income. On the other side, lack of awareness, lack of proper skill in the persons involved in sowing, this technology was not adopted properly by the farmers.

The farmers perceived fertilizer management as one of the important technology which ranked fourteenth (66.48%). Fertilizers were the prominent factors of production in sugarcane cultivation. Application of N, P and K in right doses at right time is important for getting higher yields. The farmers might have perceived its importance in terms of the vegetation, quality and quantity of sugarcane production. On the other side, the farmers with lack of proper knowledge and skills in nutrient management might be applying higher doses which in turn led to higher cost of cultivation.

Ferrous sulphate was ranked fifteenth (66.11%) by the sugarcane farmers. The probable reason might be that, in sugarcane iron was one of the major micronutrient deficiency been significantly observed in the early stages of crop growth. All the leaves would turn into yellow color which clearly indicates the deficiency of iron. By the application of ferrous sulphate farmers might had observed the early recovery of the plant and bring back the plant to healthy status quickly. Hence the farmers perceived the role of ferrous sulphate as an important practice in sugarcane.

Farmers perceived crop rotation as another important technology and they had experienced rotation of crops which resulted in the increase in productivity, which ranked sixteenth (65.19%). The farmers perceived the few incidences of pests and diseases leading to higher net profit. The other reason might be that farmers were cultivating rice-sugarcane

crop rotation system for their family consumption and also for further sales of rice. Gap filling was another technology which the farmers ranked seventeenth (64.81%) in terms of perceived impact. It was common in sugarcane cultivation that some of the planted setts could not survive after planting due to several reasons like, deep planting, lack of moisture, bud damage, pest and disease infestation etc. Hence there was a need to fill the gaps by planting other healthy setts. The farmers experienced higher productivity after filling those gaps. Post emergence weed management was another technology which the farmers ranked eighteenth (62.22%) in terms of perceived impact. Chemical control of weeds in the standing crop was one of the latest developments in sugarcane cultivation. The post emergence weed management in sugarcane was of high significant value because of huge labour involvement through manual weeding. This technology became the suitable alternative for the manual weeding in terms of its relative effectiveness and almost equal cost incurred as compared to manual weeding. The post emergence weed control may not replace manual weeding, because in sugarcane there was a need for at least one intercultural operation (earthing up) for better yields. Hence this trend might have occurred.

Destruction of grasses on the bunds was another technology which the farmers ranked nineteenth (62.22%) in terms of perceived impact. This is because, the grasses on the bunds act as alternative host for sugarcane pests (e.g. grasses like Cymbopogan act as alternative host for mealy bugs). The farmers observed reduced incidence of pests after destruction of grasses on the bunds.

Harvesting was ranked twentieth (50.19%) by the farmers. Cutting the cane at ground level was an important recommendation followed by farmers mainly for getting high recovery rate, reduced incidence of early shoot borer and for better germination of ratoon crop. The farmers might have perceived its impact in multifaceted dimensions and felt the significance of cutting to ground level as an important practice. But as this operation was in the hands of the labour the farmers could were not able to control the workers to cut the cane to the ground level perfectly.

Manures was ranked twenty first (33.70%) by the farmers. As the organic farming was gaining importance especially in sugarcane crop farmers might be applying FYM, vermi compost, press mud cake and other organic manures which would improve the soil fertility. The impact of organic manures might hare been clearly observed by the farmers in terms of soil fertility and crop growth. Hence the above trend was observed.

Destruction of infested parts of cane was ranked twenty second (45.74%) by the farmers. Majority of the farmers were well aware about the spread of pests and diseases through infected plant parts. It was a known fact that in sugarcane, the infested plant parts which were cut after the harvesting were simply been left out in field by taking the produce to the factory. The knowledgeable farmers might have adopted the technology of destroying the infected plant parts to avoid the further spread. Lack of awareness among the remaining farmers might have resulted in the above trend.

Intercropping was ranked twenty third (46.94%) by the farmers which the farmers perceived as low impact technology. This was one of the most important technology which needs to be implemented by the farmers not only for sustainability but also for ecological balance improving soil fertility, efficient utilization of natural resources, integrated pest management and for higher productivity. But the farmers traditionally preoccupied with growing only sugarcane as a solo crop and not interested for intercropping because of their lack of awareness. The lack of knowledge might also be the reason for some of the farmers.

Trash mulching was ranked twenty fourth (25.19%) by the farmers which the farmers perceived as low impact technology. This might be because, even though this particular technology was having triple impact on soil moisture conservation, reduction in early shoot borer incidence and weed suppression activities, farmers thought it was important purely because of lack of awareness and knowledge on the importance of trash mulching in sugarcane.

Bio fertilizers technology was ranked twenty fifth (19.35%) by the farmers which they perceived had low impact. Non availability of bio fertilizers in the market and lack of credibility on bio fertilizers might be the major reasons for low impact.

Post harvest technology, which the farmers perceived as low imtrect technology and it ranked twenty sixth (16.76%). Farmers perceived low impact of Post harvest technology on the impact indicators. This might be due to, as the entire practice was in the hands of the labour working in post harvest operations, the farmers might not be realizing the significance of proper removal of trash, soil and root material which would reduce the recovery percentage. The farmers might be satisfying himself with quality of work whatever the labour were doing during post harvest.

Sett treatment had good impact among farmers ranking twenty seventh (16.57%). Sett treatment is one of the important IPM measure in sugarcane which prevent the incidence of diseases significantly. The farmers might have perceived its impact in sugarcane cultivation in terms of increased yield, reduced cost of

cultivation and increased net profit. But lack of practicability and feasibility in taking up sett treatment might have forced the farmer to go for direct planting without sett treatment. Hence they could not realize the impact of sett treatment in sugarcane.

Pheromone traps was another technology which the farmers perceived it as low impact which ranked twenty eighth (12.04%). This is the technology which hare been popularized by extension personnel State Department of Agriculture through conducting demonstrations. There was lot of awareness among the farmers about the technology but the practicability, feasibility and its economic importance were perceived relatively low in terms of cost of cultivation, net profit and productivity. On the other side the non availability of pheromone traps and lure also hinder the farmers not to adopt this technology.

Bio control agent and release of predators were other technologies which the farmers perceived as low which ranked twenty ninth (11.67%) and thirieth (10.46%). The probable reason might be that due to lack of awareness, non availability and lack of feasibility under farmers' conditions. On the other side farmers also habituated to use the latest and low volume protection chemicals of different brands. In this juncture the compatibility of these two also became a major problem to constraint these technologies.

De trashing of the crop, Planting of setts in 25 cm deep furrows, Stubble shaving, Method of application of fertilizers, removal of water shoots, sterilization of harvesting knives were other technologies which the farmers perceived as low which ranked thirty first (10.46%), thirty second (7.13%), thirty third (6.67%), thirty fourth (4.72%), thirth five (3.15%), thirty sixth (2.78%) respectively. Even though all these technologies recommended by scientists for better sugarcane production, none of the technologies has shown significant impact on the farmers purely because of lack of awareness, knowledge and feasibility and practicability on the part of technologies. Hence the above technologies had shown very low impact among the sugarcane farmers.

C) Distribution of respondents based on actual values of impact indicators

It is evident from the Table 3 and fig. 1 that more than half of the respondents (59.17%) were with medium productivity followed by low (20.83%) and high (20.00%) productivity levels. In case of cost of cultivation majority (65.00%) of the sugarcane farmers incurring medium cost of cultivation followed by low (19.17%) and high (15.83%) cost of cultivation. As net profit wise distribution of the respondents was concerned, majority (68.33%) of the sugarcane farmers were getting medium net profit followed by high (19.17%) and low (12.50%) net profit.

The above result clearly indicated that, the farmers were getting higher productivity and they could be able to get higher net profit, might be because of lower cost of cultivation. The existing land preparation, varieties, seed rate, fertilizer dosage, water management and some other practices lead to high net profit.

Table 3. Distribution of respondents based on actual values of impact indicators

(N=120)

Impact Indicators	Productivity		Cost of cultivation		Net profit	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low	25	20.83	23	19.17	15	12.50
Medium	71	59.17	78	65.00	82	68.33
high	24	20.00	19	15.83	23	19.17
Total	**120**	**100**	**120**	**100**	**120**	**100**
	Mean:50.619 S.D.:35.685		Mean:36389.177 S.D.:28396.083		Mean:69908.506 S.D.:37914.226	

Table 4. Relationship between a perceived impact and impact indicators of sugarcane farmers (N=120)

S. No.	Impact indicator	Correlation coefficient ('r' value)
1.	Actual net profit	0.8337**
2.	Actual Productivity	0.8595**
3.	Actual Cost of cultivation	-0.1519**

** *Significant at 0.01 level of probability* * *Significant at 0.05 level of probability*

D) Relationship between impact of sugarcane production technologies and actual impact indicators

Table 4 presents the nature of relationship between the impact of sugarcane production technologies as perceived by sugarcane farmers and their actual impact indicators (Actual net income, productivity and cost of cultivation). In order to study the nature of relationship, the data related to the above aspects were subjected to correlation coefficient analysis. The values of correlation coefficients (r) were then tested for their statistical significance.

Actual net profit was positive and significantly related with perceived Impact of sugarcane production technologies of the respondents ('r' =0.8337). Actual Productivity was positive and significantly related with perceived impact of sugarcane production technologies of the respondents ('r'=0.8595). Actual cost of cultivation was negative and significantly related with perceived impact of sugarcane production technologies of the respondents ('r' =-0.1519). The possible reason for this trend might be that the farmers were giving priority for productivity,

cost of cultivation and also the net profit obtained to measure the impact of sugarcane production technologies. This kind of perception might be revealing the opinion of farmers towards the utilization of sugarcane production technologies and also their performance towards the impact indicators viz., productivity, cost of cultivation and net income.

CONCLUSION

More than half of the sugarcane farmers perceived the impact of sugarcane production technologies as medium followed by low and high impact of sugarcane production technologies.

Among all the selected thirty six sugarcane production technologies optimum time of planting was ranked first in terms of highest impact percentage. Land preparation and selection of planting material occupied second and third ranks. Varieties was ranked fourth followed by pre emergence weed management, wrapping and propping, chemical control for pests, water management, earthing up, chemical control for diseases, Zinc sulphate, seed rate, spacing, fertilizer dosage, occupied fifth, sixth, seventh, eighth, ninth, tenth, eleventh, twelfth, thirteenth and fourteenth ranks. Ferrous sulphate was ranked fifteenth followed by crop rotation, gap filling, post emergence weed management, destruction of grasses on the bunds, harvesting, intercropping, destruction of infested parts of cane, manures, trash mulching, bio fertilizers, post harvest technology, sett treatment, pheromone traps, bio control agent, release of predators ranked from sixteenth to thirtieth. Detrashing of the crop, planting of setts in 25 cm deep furrows, stubble shaving, method of application of fertilizers, removal of water shoots and sterilization of harvesting knives were perceived as very meager with lowest impact percentages and they were ranked from thirty first to thirty sixth.

More than half of the respondents were with medium productivity followed by low and high productivity levels. In case of cost of cultivation majority of the sugarcane farmers incurring medium cost of cultivation followed by low and high cost of cultivation. As the net profit wise distribution of the respondents was concerned, majority of the sugarcane farmers were getting medium net profit followed by high and low net profit. Actual net profit and Actual Productivity were positive and significantly related with perceived Impact of sugarcane production technologies of the respondents whereas Actual cost of cultivation was negative and significantly related with perceived impact of sugarcane production technologies of the respondents.

Paper received on : September 27, 2012
Accepted on : October 15, 2012

REFERENCES

1. : FAO, 2009. Food and Agriculture Organization. ***FAO production yearbook. 62*** (153) : 104-105.

2. : Rao, I.V.Y.R and Sunil, K.B.G., 2010. Sugarcane production and productivity trends in Andhra Pradesh during last three decades with special reference to North coastal districts of Andhra Pradesh. 24th meeting of sugarcane research and development workers of Andhra Pradesh. ***Souvenir.***