

Analysis of the Quality of Services Provided by the Public Sector to Enhance the Sugarcane Productivity in Punjab, Pakistan

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The study was undertaken to explore the awareness level of Sugarcane Growers (SGs) regarding the Quality of Services (QSs) provided by the government. For this purpose, district Rahim Yar Khan (RYK) was selected purposively as the universe of the study because it is major sugarcane growing area among all districts of Punjab. All the tehsils of the district RYK were selected for the study. The primary data were collected from 343 sugarcane farmers' personal interviews. Data were analyzed by using both descriptive and inferential statistics through the Statistical Package for Social Sciences (SPSS). Findings indicated a huge difference in awareness of the government interventions among SGs and the level of adoption. This implies that QSs provided by the government to support the SGs was not up to the mark. This study urges awareness campaigns among farmers to make them aware about QSs provided by Public Sectors (PS) to farmers. Integration of sugarcane production strategies and holistic efforts (from all stakeholders) are required to minimize the sugarcane production challenges and enhance the sugarcane productivity and income of the growers. Furthermore, cost-effective irrigation systems, bank loans, efficient extension systems, subsidies on inputs and mechanization are recommended to improve productivity and enhance the profitability of farmers.

Keywords: Sugarcane Potential, Yield, Constraints, Loans, Subsidy, PS

Introduction

Sugarcane has a substantial role in providing different by-products such as refined sugar, molasses, brown sugar, jaggery and various other valuable products like biogas production, pulp, biofertilizer, ethanol and paper-making, very helpful in sustaining the industry and strengthening socio-economic conditions of the farmers and creating employment opportunities (Rehman, 2015; Raza *et al.*, 2018; Raza *et al.*, 2020; Prasara and Gheewala, 2016). Fluctuations in the total production of sugarcane are due to different factors. These factors are poor quality seed, inadequate harvesting practices, improper production and protection technologies, pest susceptible varieties, lack of budget and lack of access to the latest plant protection technologies (Cheema *et al.*, 2002). So, the sugarcane farmers and the national economy face a significant loss in yield (Pakistan Sugar Mills Association, 2018). In addition to these factors' effectiveness of accessibility of the credit to smallholder SGs is another factor limiting the potential sugarcane yield (Namai, 2003). To achieve the potential yield loan schemes had a positive role to increase productivity (Mashatola and Darroch).

The potential further can be authenticated from the findings of Wanjawa *et al.* (2017) where they concluded that loan schemes had a positive impact on the productivity of sugarcane crops among smallholders' farmers in Kaka mega. The current study suggested that the government should design policies for small-scale farmers and give them financial support to cope with the different constraints faced by them in production. The income of Sugarcane Growers (SGs) can be increased by providing different financial assistance programs such as subsidies loans (Barros, 2008; Baillie, 2008). In addition, subsidies for agricultural inputs and equipment, subsidy for the installation of high-efficiency irrigation systems such as drip and sprinkler irrigation, lowering the input cost of cultivation by regular laws is also recommended to improve sugarcane productivity (Guo *et al.*, 2012). An economic survey of Pakistan (2017) revealed that bank loans and subsidies prove an effective strategy to sell their commodity to sugar mills. Incentives had a positive role to increase productivity (Sapkota *et al.*, 2017). Crop ratoon management, crop rotation, sugarcane-based entrepreneurship, cooperative farming, and the formation of farmers' union organizations are the most effective strategies to enhance the income and productivity of the sugarcane grower (Gangwar *et al.*, 2017). In addition, maintaining the soil fertility, adoption of integrated crop management, integrated pest management, crop rotation, balanced use of fertilizer, application of organic fertilizer, efficient ways of irrigation, and conservation of water, health seedling and intercropping are important strategies to enhance the sugarcane production with less input cost (Yadav *et al.*, 2018).

Although the provision and awareness of the QSs among farmers are important to achieve the potential yield. However, the QSs provided to SGs are meager. In Pakistan, lack of financial assistance and strategies provided to probe the sugarcane production constraints among farmers. Therefore, considering the assumption, this study was planned to investigate the provision and awareness regarding the QSs provided by the government in district RYK.

Methodology

Punjab

Punjab is the largest and most populous province of Pakistan. It is the major contributor with almost 62% share in sugarcane. In Punjab, the agricultural sector faces a significant yield gap problem between average and potential. This gap increases when the average yields of farmers are compared with those of other countries. Similarly, in Pakistan, the average yield of sugarcane (620 Mounds /acre) is very low as compared to other countries like Brazil, India, China and Thailand (PSMA, 2018). There are various factors responsible for reducing the average production. However, the Government of Punjab is focusing to increase the average sugarcane production in keeping abreast of the latest

agricultural technologies through launching different support programs and projects (GOP, 2017).

District Rahim Yar Khan

Rahim Yar Khan is the district of Punjab Province selected for this research. It contributed 30% share in the total sugarcane production of Punjab (GOP, 2017). It is on the border between Sindh and Punjab. District Rahim Yar Khan consists of four tehsils namely Sadiqabad (SDK), Rahim Yar Khan (RYK), Liaquatpur (LP) and Khanpur (KPR). It is considered an agricultural district in southern Punjab where the majority of the population is associated with agriculture. It is a fertile area that produces sugarcane, wheat, cotton, maize and many other crops. It is also famous for producing and exporting Mangoes. Sugarcane is one of the important crops that plays a prominent role in the agriculture of this region. The main sugar mills in this area are Rahim Yar Khan Sugar Mills, Gulf Sugar Mills, JamlaldinWali Sugar Mills and Hamza Sugar Mills. Total population of District Rahim Yar Khan is 477,000 (United Nations, 2019) and the literacy rate is 33.1% (PBS, 2020).

Sampling Procedure

Sampling is a statistically representative portion of individuals in the research population that requires to be sufficient to provide answers to research questions (Majid, 2018). The sample size is the representative part of the total population (Kadam and Bhalerao, 2010). A multistage random sampling technique was used for this research due to the lack of time and money of the researcher as it was difficult to cover the entire province of Punjab. Therefore, district Rahim Yar Khan was selected for this research because in this district area under sugarcane cultivation is higher as compared to other districts of Punjab province. At the first stage, district Rahim Yar Khan was selected as this is one of the largest sugarcane growing districts of Punjab. It consists of four tehsils namely SDK, KPR, LP and RYK. At the second stage, all tehsils in District RYK were selected from the study area. At the third stage, the list of the registered growers was obtained from the office of the Deputy District Officer Agriculture, as the sampling frame, Department of Agriculture (Extension wing) of the respective tehsil.

According to these lists, 3193 were sugarcane registered growers of district RYK, 1406 of SDK, 855 of RYK, 461 of KPR and 471 of LP. In this regard, a sample size of 343 was collected by using an online website www.surveysystem.com by taking a confidence interval of 5% and a confidence level of 95 %.

At the fourth stage, a proportionate sampling technique was used to make a sample size of 343 as presented in figure 3.5. At the fifth stage, 151 of SDK, 92 of RYK, 49 of KPR 51 of LP respondents were selected by using a simple random sampling technique to make a total sample size of 343.

Quantitative data

Leedy and Ormrod (2010) reported that quantitative research is the collection of data in the form of numbers to be quantified and summarized to support alternative knowledge claims. Furthermore, it is also helped in generating research questions and hypotheses in the research. For the present research, quantitative data were collected through an interview schedule. An interview schedule was in English but the questions were asked in Urdu, Saraiki and Punjabi for the convenience of the respondents.

In quantitative methods, descriptive statistics were applied, including frequencies and percentages, to identify the situation of the demographic attributes, recommended production technology, information sources, to understand the QSs provided by the government and adoption strategies adopted by growers regarding the sugarcane production and protection practices.

Data Analysis

The quantitative data were analyzed using descriptive statistics, including frequency, percentage, mean value, and weighted score analysis through the SPSS (Bernard, 2010).

Results and Discussion

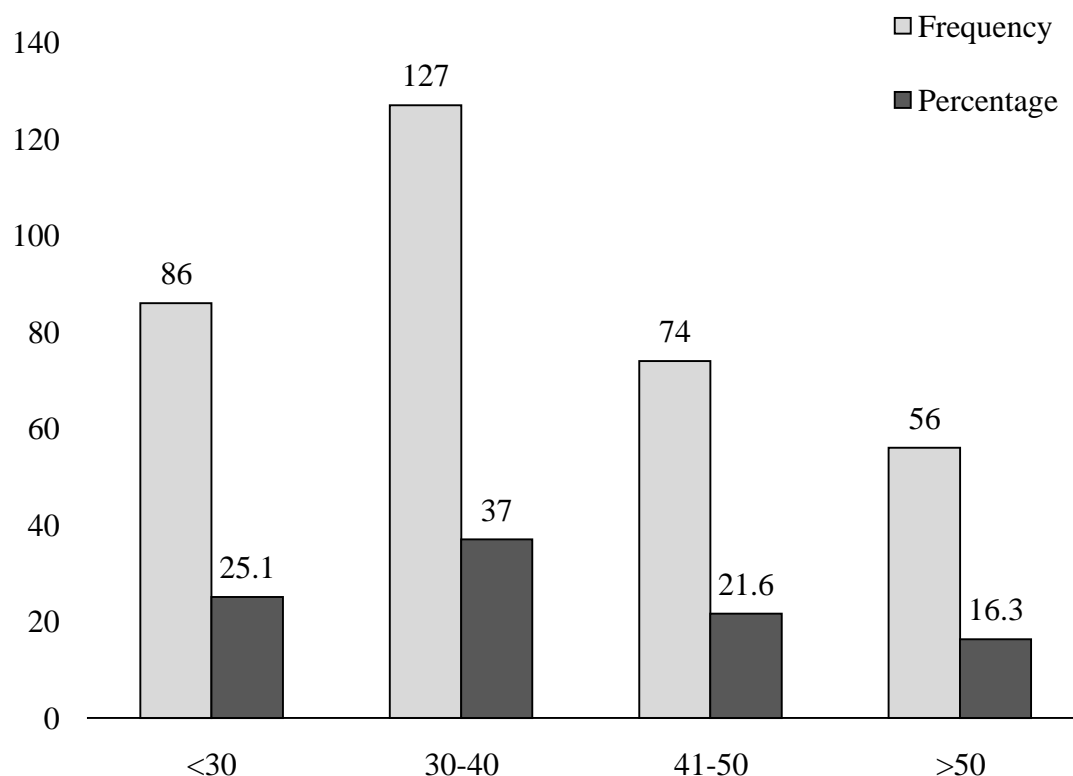


Figure 1: Age of the respondents in the study area

Data presented in figure 1 depict the range of the respondents' age that was between <30 to >50 years. Respondents were divided into the following groups as shown in the above figure. The data show that slightly more than one-fourth (25.1%) of the respondents were in the age of <30 years and 37% were under the age bracket of 30-40 years. On the other hand, 21.6% of respondents were under the age of 41-50 years and 16.3% were above 50 years. The findings inferred that majority of the respondents in the study area were under the age bracket of 31-40 years. The present study results are similar to Girei and Giroh (2012) findings, who reported that the majority (69%) of the respondents who belonged to the age of 31– 40 years were actively involved in sugarcane production. Likewise, the results to some extent, are similar to the previous findings of Khan and Khan (2017) who reported that most of the growers were under the age bracket of 26 to 35 years. They also reported that under the age of 26 to 35 years, growers got the maximum average yield, which could be considered productive towards adopting the production technology.

Moreover, Naeem *et al.* (2007) reported that the majority of farmers who had practiced sugarcane cultivation were an age group of almost over thirty years in Punjab. The current study's results are more or less similar to the findings of Muhammad *et al.* (2008) who indicated that most of the respondents belonged to an age of more than 30 years.

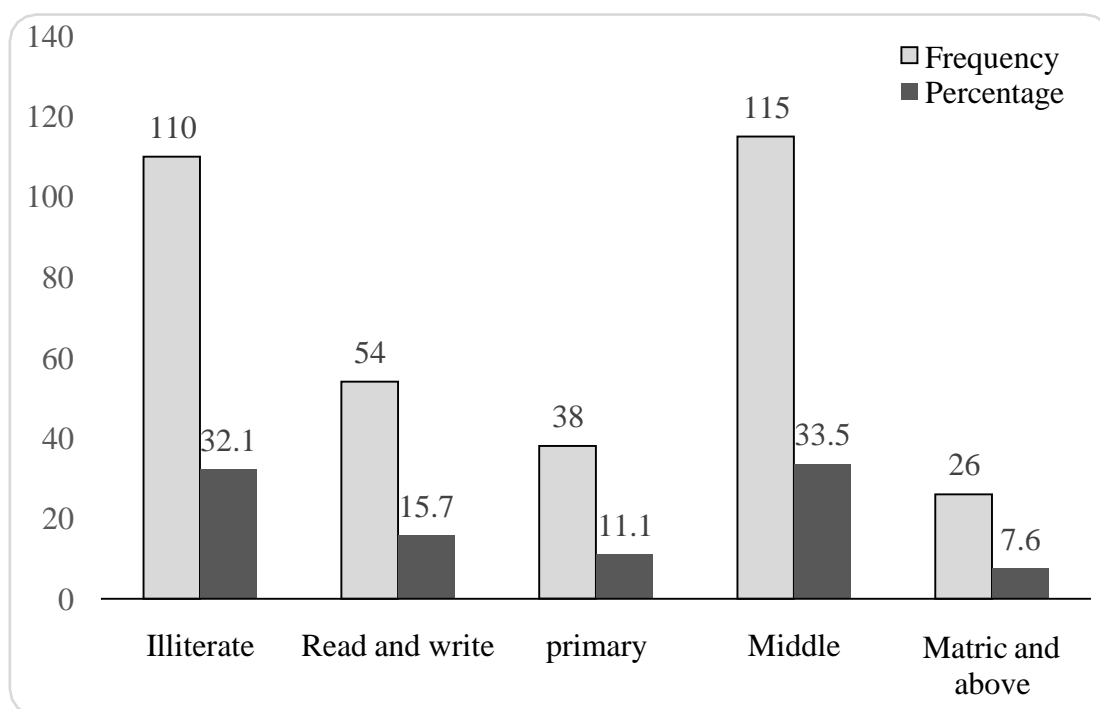


Figure 2: Education of the respondents in the study area

Figure 2 represents the SGs 'educational level in the study area. The respondent's education was categorized into the following groups, as shown in figure 2. The data described in figure 2 indicate that 32.1% of the respondents were illiterate and 15.7% could read and write in the study area. On the other hand, 11.1% of the respondents were educated up to primary and 33.5% had an education level of middle and 7.6% of respondents' education was matric and above. The results are more or less similar to Ali *et al.* findings (2013), who concluded that 30% of the respondents were illiterate in South Punjab. The findings of Raza *et al.* (2019) reported 39.3% of the respondents were illiterate, followed by 8.6 % who were educated up to secondary class. At the

same time, the results presented by Naz *et al.* (2021) reported 45% of the respondents were illiterate in South Punjab. Mochizuki and Bryan, (2015); Khan and Khan (2015); Agnihotri *et al.* (2018); Islam (2003), had indicated a significant and positive association between education and sugarcane yield. This indicates that with increasing education, the chances of sugarcane yield will escalate.

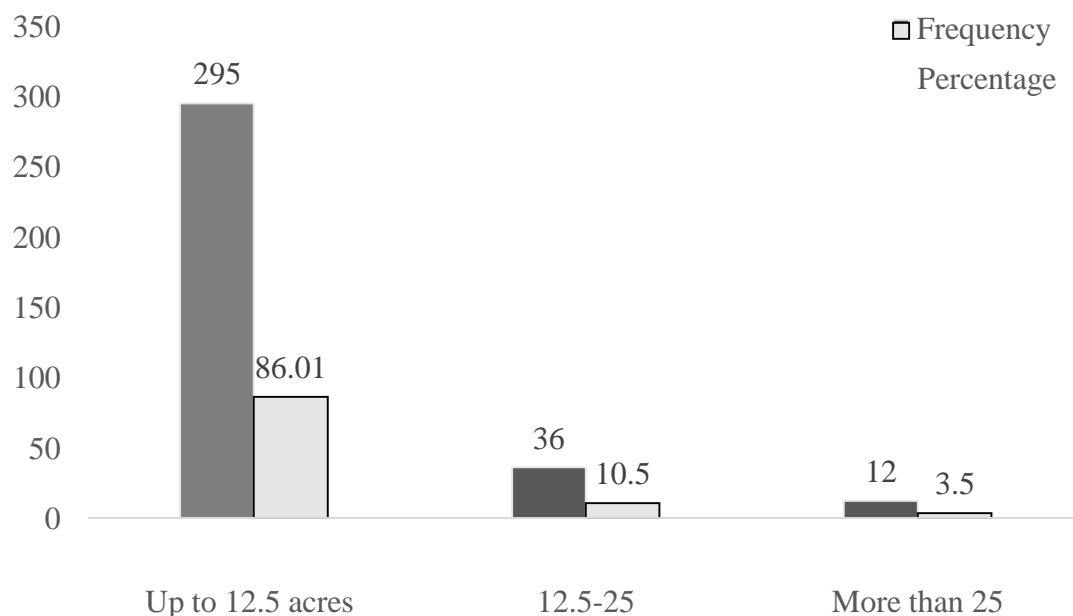


Figure 3: Distribution of the growers according to their sugarcane cultivated area

The range area under sugarcane cultivation was between 1 acre to more than 25 acres, as shown in the above figure. The majority (86.01%) of the respondents were small farmers. The present study results are more or less similar to the findings of Raza *et al.* (2019), who revealed that 92.9% of respondents had up to 12.5 acres of land. Data presented in the above figure indicated that 10.5% of respondents were medium farmers (12.5-25 acres). On the other hand, 3.5% of respondents had more than 25 acres under sugarcane cultivation. It implies that a few respondents in the study area had total land of more than 35 acres. The size of the household is expected to have a mixed (positive or negative) influence on sugarcane yield. Previous studies such as Uriarte *et al.* (2009) had revealed a positive association between farm size and sugarcane productivity. Santos *et al.* (2018) had revealed a positive association between farm size and adoption of the latest technology. This implies that large landholding farmers were equipped with the latest technology compared to small landholdings.

Table 1: Awareness level of the respondents regarding the QSs provided by the government to enhance the sugarcane productivity

QSs provided by the government	Yes		No	
	<i>f</i>	%	<i>f</i>	%
Disaster loans	244	71.1	99	28.9
Subsidized loans (intercropping and ratoon cropping)	303	88.3	40	11.7
Banks loans	287	83.7	56	16.3
Crop insurance	199	58.0	144	42.0
Interest-free loans to small farmers	215	62.7	128	37.3
Subsidies on mechanized farming	199	58.02	144	41.98
Subsidy on irrigation techniques	170	49.56	173	50.44
Extension program	120	35.0	223	65.0
Equipment's on 50% cost-sharing base (Chisel plough, ridger and planter)	148	43.1	195	56.9
Bio-agent cards	123	35.9	220	64.1
Training/workshop	282	82.2	61	17.8
Farm home visits	165	48.1	178	51.9
Agriculture exhibition	135	39.4	208	60.6

The awareness level of the respondents regarding the QSs provided by the government to enhance sugarcane productivity is presented in Table 1. Almost 71.1% of the respondents had information about the disaster loans in case of floods and other natural damage and about 88.3% of the respondents reported that they had information about subsidized loans for intercropping and ratoon cropping by the government. The respondents' awareness level about the bank loans was more than eighty (83.7%) and the knowledge level of respondents related to crop insurance was 58%. Similarly, respondents reported that the awareness level for direct payments, interest-free loans to small farmers and extension programs launched by the government to support the farmers were 53.4%, 62.7% and 35%, respectively. Whereas the awareness level of the respondents related to the equipment's on 50% cost-sharing base (Chisel plough, ridger and planter), bio-agent cards, training/workshop, farm home visits and agriculture exhibition were 43.1%, 35.9% and 82.2%, 48.1% and 39.4%, respectively.

Table 2: Perceived response of the respondents regarding the provision of QSs provided by the government mainly to enhance the sugarcane productivity

QSs provided by the government	W.S.	R. O	Mean	S. D
Subsidies on mechanized farming	762	1	2.22	1.45
Subsidy on irrigation techniques	530	2	1.55	1.16

Bank loans	500	3	1.46	1.22
Subsidized loans (intercropping and ratooning)	420	4	1.23	0.95
Arranging training/workshop	384	5	1.12	1.15
Interest free loans to small farmers	382	6	1.12	1.27
Crop insurance	268	7	0.78	1.05
Disaster loans	260	8	0.76	0.69
Extension program	221	9	0.64	1.28
Provision of Equipment's on 50% cost sharing base (chisel plough, ridger and planter)	211	12	0.62	0.95
Provision of bio-agent cards	200	13	0.58	1.11
Paying farm home visits	165	14	0.48	0.50

Scale; 0 =No, 1=V. Low, 2=Low, 3=Medium, 4=High, 5=V. High

The data regarding different QSs provided by the Government to enhance sugarcane productivity were observed (Table 2). The data exhibited that among the quality services, subsidies on mechanized farming ($\bar{x} = 2.22$) were ranked 1st with a weighted score of 762. The mean value fell between low to medium but inclined towards the medium.

The data shows that mechanized sugarcane planting and harvesting was considered economically efficient compared to the traditional method. It is one of the cost-efficient, labor-saving and mass cultivation within less time had an impact on overall sugarcane farmer's income. Yadav *et al.* (2018) determined that mechanized farming was an effective strategy for improving sugarcane productivity. Table 2 revealed that subsidy on irrigation techniques ($\bar{x} = 2.68$) was ranked 3rd with a weighted score of 530. The mean value fell between the low extent to medium but inclined towards the medium. The results are in line with the results of Muzammil *et al.* (2020); Pandey *et al.* (2020) who indicated that subsidies on efficient irrigation systems such as sprinkler and drip irrigation proved effective in terms of water-saving strategies and improving sugarcane production. Bank loans ($\bar{x} = 1.46$) and subsidies for growers through mills (mean = 1.30) were ranked 3rd and 4th with weighted scores 500 and 446, respectively. The average mean values for both above categories were very low to low but more inclined towards low. Namai (2003) reported that financial assistance of the growers in the form of direct payment and bank loans through different schemes have been identified a positive impact on sugarcane production. The government had provided almost Rs70 billion in subsidy to sugar mills more than the support price to improve their economic situation and overall development of the SGs (Faruqe, 2020). The results are in line with the results of Khan *et al.* (2020) who indicated that agriculture credit interest-free loans had a positive and significant effect on crop production. Free loans were considered important to control the price fluctuation and it helps SGs to increase crop productivity and yield including in rural development. Subsidized loans provided for the intercropping and ratooning crop ($\bar{x} = 1.23$), arranging training/workshop ($\bar{x} = 1.12$) and interest-free loans to small farmers ($\bar{x} = 1.12$) appeared at 5th to 7th position with weighted scores 420, 384 and 382, respectively. The mean values for the above categories were between very low to low but more inclined towards low. Ahmad *et al.* (2007) and Khan and Khan (2015) revealed that different extension programs and agriculture exhibitions had a significant role in the dissemination of knowledge regarding the awareness of subsidy offered by the PSs persuaded SGs to adopt the latest technology.

The data showed that among the quality services, crop insurance ($\bar{x}=0.78$) appeared at 8th rank with a weighted score of 268. It implies that the Qs in the form of crop insurance provided by the government mainly to enhance the sugarcane productivity was perceived by the growers as very low in the study area. Crop insurance had a positive and significant effect on crop production and it was helped the farmers cope with different agriculture risks (Aditya *et al.*, 2018; Ghazanfar *et al.*, 2014). The findings of this study have similar to the results of Galt (2008) who reported that extension programs and extension teaching were not effectively informed to sugarcane farmers about biological control methods to reduce the excessive use of pesticides to a safe environment and human health. Disaster loans ($\bar{x}=0.76$), extension program ($\bar{x}=1.66\pm 1.28$) and provision of equipment are on 50% cost-sharing base ($\bar{x}=0.62$) were ranked 9th, 10th and 11th with weighted scores 260, 220, and 211, respectively. The mean values for the above categories were between very low to low but more inclined towards very low. This implies that the majority of the farmers perceived these services at a very low level in the study area. In the context of Qs provided by the government regarding bio-agent cards (mean=0.58) and paying farm home visits ($\bar{x}=0.48$) was ranked 12th and 12th position with weighted scores 200 and 165, respectively. It means the government did not provide the above services to sugarcane farmers. Ingel *et al.* (2018) revealed that bioagent cards were an ecological friendly strategy to eliminate pest attacks for ensuring good quality and high production of crops by minimizing related pest losses.

Conclusion

This study investigates the provision and awareness regarding Qs provided by the government among SGs in district RYK. The findings indicated that farmers are challenged by several different constraints that limit the sugarcane productivity and income of growers. Major constraints faced by the growers in the study area were lack of services provided by the government in terms of financial assistance to enhance the productivity of sugarcane and to support the SGs were unsatisfactory and ineffective in terms of provision of disaster loans, subsidized loans for intercropping and ratoon cropping, bank loans, crop insurance, direct payments, interest-free loans to small farmers, an extension program, provision of the equipment's on fifty percent cost-sharing base, provision of bio-agent cards and provision of micronutrients. Similarly, the attack of pests arises mainly due to the poor management of sugarcane farmers. The public and private sectors work together and have to play a positive role in providing the Qs among SGs to persuade the adoption of the latest technology. In addition, the government should provide support in terms of providing financial assistance for mechanized farming, which requires cooperation among the SGs, sugar mill and PS. The government would provide subsidies directly to farmers instead of giving to sugar mills. The public and private sector shall provide timely and up-to-date information on input prices especially on the availability of improved sugarcane varieties, market prices, agriculture, and macroeconomic policies for improving the competitiveness and comparative advantage of SGs.

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