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Assessing Information Sources for Sugarcane Technology Adoption in Taluka Pano Akil, Sukkur

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Abstract
This study investigates the effectiveness of different information sources in promoting the adoption of recommended sugarcane cultivation technology in Taluka Pano Akil, District Sukkur. The results of the survey conducted among farmers revealed that the majority of respondents were in the age group of 31 to 45 years, were either illiterate or had received primary to intermediate education and owned small landholdings of up to 20 acres. While the majority of respondents were fully aware of and had adopted the CP-77-400 variety, there was limited awareness and low adoption rates of other recommended varieties. This highlights the importance of information dissemination in promoting the adoption of new technologies, and more efforts are required to raise awareness and promote the adoption of recommended sugarcane varieties. The study also sheds light on the sources of information that sugarcane growers rely on, with private extension being considered the most important source followed by experienced farmers and printed media. Interestingly, a small fraction of respondents ranked dealers as their source of information. Finally, the data suggests that private extension is the most important source of information for sugarcane growers and plays a crucial role in increasing the awareness and adoption of recommended practices and varieties. Overall, the study provides valuable insights that can guide policymakers and practitioners in developing effective strategies for promoting the adoption of recommended sugarcane cultivation technology in the region.
Keywords: Information sources, technology awareness & adoption

Introduction
The agriculture sector holds immense significance for the economies of developing countries, contributing to employment, foreign exchange earnings, and substantial GDP growth. Sugarcane, a pivotal crop in Pakistan, plays a vital role in the country's agro-based industry, ranking second only to textiles. Despite Pakistan being a leading sugarcane grower, challenges persist, including low yields

and production, primarily due to outdated farming practices. Farmers' lack of adoption of modern technologies has resulted in a decline in sugarcane cultivation, accentuated by factors such as water scarcity, delayed planting, inadequate plant protection, imbalanced fertilizer use, and poor land preparation. The importance of modernizing sugarcane farming practices is underscored by evidence from advanced countries, where the adoption of scientific technologies has significantly improved per-hectare yields.

In Sindh province, with its optimal climate for sugarcane, there is a pressing need to establish sound breeding facilities. Currently, reliance on sugarcane varieties developed in Punjab, coupled with the loss of potential in locally developed varieties due to climate changes, emphasizes the necessity for high-yielding and high-sucrose content varieties. However, the lack of basic laboratory facilities poses a challenge to effective variety development. Sugarcane's dual purpose as a cash crop and a valuable source of animal feed highlights its efficiency in photosynthesis. It has the potential to convert up to 1% of solar energy into biomass, with a remarkable yield potential of over 15 kilograms of cane per square meter of sunlight. However, to unlock this potential, a consistent water supply for 6-7 months per year is crucial, whether through natural rainfall or irrigation. Efforts are needed to rejuvenate the sugarcane sector, focusing on modernizing farming practices, improving breeding facilities, and ensuring a sustainable water supply. By addressing these challenges, the agriculture sector can harness the full potential of sugarcane, contributing to economic growth, food security, and the overall well-being of the farming community. This study was carried out with the following objectives to cover: to determine the awareness and adoption level of farmers about recommended technology, determine the importance of selected sources of information. And to determine the source of information and its effectives on adoption of recommended technology.

Materials and methods

This research aimed to investigate information sources and their effectiveness in influencing the adoption of recommended technology for sugarcane cultivation in Taluka Pano Akil, District Sukkur. The study focused on the agricultural landscape of Taluka Pano Akil, which comprises seven union councils (UCs), with a predominant rural setting and fertile land. The primary crops cultivated in this area include Wheat, Cotton, Sugarcane, as well as various vegetables, pulses, and maize crops.

To conduct the study, a Simple Random Sampling technique was employed, selecting a total of 100 respondents from five union councils within Taluka Pano Akil. Twenty growers were chosen from each union council to ensure a representative sample. The research utilized a questionnaire, collaboratively developed with the guidance of the research supervisor, to address the study's objectives. Personal interviews were conducted with farmers in their fields to collect relevant data. The collected data underwent analysis using the SPSS (Statistical Package for the Social Sciences) tool to derive mean and standard deviation values. This methodological approach provides a robust foundation for understanding the current state of information dissemination and technology adoption among sugarcane growers in the specified region. The findings of this research will contribute valuable insights to enhance the efficacy of agricultural extension services and promote the adoption of recommended technologies for sugarcane cultivation in Taluka Pano Akil.

Results

Demographic information

The farmer's age significantly impacts the decision-making process in agriculture and can shape their perspective towards accepting novel techniques. In the surveyed region, farmers were classified into three age groups: 18-30 years, 31-50 years, and 51 years and older. The analysis of demographic characteristics revealed significant insights into the surveyed farmers. A majority of respondents (60%) fell within the age group of 31 to 45 years, reflecting a diverse age distribution. Younger farmers in the age group of 1 to 30 years constituted 25%, while 15% of participants were aged 45 years and above. This demographic distribution provides a nuanced understanding of the age demographics within the surveyed agricultural community. Educational backgrounds varied among the surveyed

farmers, as depicted in the presented table. A notable 35% of respondents were found to be illiterate, emphasizing the need for targeted educational interventions. Additionally, 18% had received primary education, 13% had attained middle-level education, 9% had a matriculation level of education, 14% had completed an intermediate level of education, and 11% had achieved a university-level education. Education emerges as a crucial factor influencing various aspects of farmers' lives, including behavior, moral character, thinking patterns, and communication skills. It plays a pivotal role in facilitating informed decision-making. The data further revealed insights into the farmers' land tenure and ownership status. A majority of respondents (58%) were identified as tenants, highlighting the prevalence of this category within the surveyed population. Owner-operators constituted 30% of participants, while 12% were identified as landlords. This breakdown sheds light on the diverse roles and responsibilities assumed by farmers within the agricultural landscape. Landownership patterns were also examined, with the majority of respondents (70%) owning land up to 20 acres. A substantial 20% of farmers possessed land ranging from 21 to 40 acres, demonstrating a moderate-scale ownership category. The remaining 10% of respondents were landowners with holdings of 41 acres or more. This distribution provides valuable insights into the landownership structure within the surveyed population.

Table 1: Demographics

Age level (year)	***No. of respondents***	***Percentage***
1 -30 years	25	25.00
31-45 years	60	60.00
45-onwards	15	15.00
Total	100	100.00

Educational level (years)	*No. of respondents*	*Percentage*
Illiterate	35	35.00
Primary	18	18.00
Middle	13	13.00
Matric	9	9.00
Intermediate	14	14.00
Graduate	11	11.00
Total	100	100.00

Type of tenure	*No of respondents*	*Percentage*
Landlord	12	12.00
Tenant	58	58.00
Owner operator	30	30.00
Total	100	100.00

Size of land holding	*No. of respondents*	*Percentage*
1-20 acres	70	70.00
21-40 acres	20	20.00
41 acres to onward	10	10.00
Total	100	100.00

Table 2: Interviewee distribution according to understanding and implementation of the recommended technology for sugarcane crop variety CP-77-400.

Awareness	No of respondents	Percentage	Adoption	No of respondents	Percentage
Not aware	8	8.00	Not adopted	8	8.00
Little aware	10	10.00	Partially adopted	00.0	00.00
Moderately aware	5	5.00	Satisfactorily adopted	4	4.00
Satisfactorily aware	17	17.00	Mostly adopted	4	4.00
Complete aware	60	60.00	Fully adopted	84	84.00
Total	100	100.0	Total	100	100.00

Table 2 displays that 60% of the respondents were fully aware of the CP-77-400 sugarcane variety, 17% were satisfactorily aware, 10% had little awareness, 5% were moderately aware, and 8% were not aware of it. In terms of adoption, 84% of the respondents had fully adopted CP-77-400, 4% had satisfactorily adopted it, 4% had mostly adopted it, and 8% had not adopted it.

Table 3: The categorization of survey participants based on their familiarity and usage of the suggested technology related to US-133.

Awareness	No of respondents	Percentage	Adoption	No of respondents	Percentage
Not aware	74	74.00	Not adopted	88	88.00
Little aware	4	4.00	Partially adopted	0	0.00
Moderately aware	6	6.00	Satisfactorily adopted	0	0.00
Satisfactorily aware	0	0.00	Mostly adopted	0	0.00
Complete aware	16	16.00	Fully adopted	12	12.00
Total	100	100.00	Total	100	100.00

Table 4.6 shows that 74% of the respondents were not aware of the recommended sugarcane variety US-133, while 16% were fully aware, 6% were moderately aware, and 4% had little awareness. Among the respondents, 88% had not adopted the US-133 variety, while 12% had fully adopted it.

Table 4: The allocation of survey participants based on their knowledge and implementation of the suggested technology concerning the sugarcane type CPF-237.

Awareness	No of respondents	Percentage	Adoption	No of respondents	Percentage
Not aware	60	60.00	Not adopted	40	80.00
Little aware	12	12.00	Partially adopted	00	0.00
Moderately aware	00	00.00	Satisfactorily adopted	00	0.00
Satisfactorily aware	8	8.00	Mostly adopted	00	0.00
Complete aware	20	20.00	Fully adopted	20	20.00
Total	100	100.00	Total	100	10000

Table 4 shows that 60% of the respondents were not aware of the recommended sugarcane variety CPF-237, while 20% were fully aware, 12% had little awareness, and 8% were satisfactorily aware. Among the respondents, 80% had not adopted the CPF-237 variety, while 20% had fully adopted it.

Table 5: The categorization of survey respondents based on their familiarity and utilization of the suggested technology related to the sugarcane breed SPF-234.

Awareness	No of respondents	Percentage	Adoption	No of respondents	Percentage
Not aware	70	70.00	Not adopted	80	80.00
Little aware	12	12.00	Partially adopted	4	4.00
Moderately aware	2	2.00	Satisfactorily adopted	00	0.00
Satisfactorily aware	00	00.00	Mostly adopted	6	6.00
Complete aware	16	16.00	Fully adopted	10	10.00
Total	100	100.00	Total	100	100.00

Table 5 reveals that 70% of the respondents were not aware of the SPE-234 sugarcane variety, 12% had little awareness, 2% were moderately aware, and 16% were fully aware of it. As for adoption, 80% of the respondents had not adopted the SPE-234 variety, 4% had partially adopted it, 6% had mostly adopted it, and 10.5% had fully adopted it.

Table 6: The allocation of survey participants based on their knowledge and usage of the suggested amounts of fertilizers for cultivating sugarcane.

Awareness	No of respondents	Percentage	Adoption	No of respondents	Percentage
Not aware	0	0.00	Not adopted	0	0.00
Little aware	2	2.00	Partially adopted	2	2.00
Moderately aware	18	18.00	Satisfactorily adopted	20	20.00
Satisfactorily aware	22	22.00	Mostly adopted	28	28.00
Complete aware	58	58.00	Fully adopted	50	50.00
Total	100	100.00	Total	100	100.00

Table 6 shows that all respondents were aware of the recommended doses of fertilizer, but their degree of awareness varied. The majority of growers (58%) were fully aware, 22% were satisfactorily aware, 18% were moderately aware, while only 2% were slightly aware. The data also indicated that all respondents had applied fertilizer, but there was a heterogeneity in the adoption of recommended doses of fertilizer. Half of the respondents (50%) had fully adopted, 28% had mostly adopted, 20% had satisfactorily adopted, and the remaining 2% had partially adopted.

Table 7: Information sources regarding the recommended fertilizer doses of sugarcane crop and their effect on awareness and adoption.

Source of information	No of respondents	Percentage
Private Extension	48	48.00
Public Extension	5	5.00
Experienced farmers	15	15.00
Printed media	13	13.00
Radio	4	4.00
Extension worker	5	5.00
Television	5	5.00
Dealers	5	5.00
Total	100	100.00

Table 7 shows that respondents were asked to rank the sources according to their importance. The majority of growers (48%) considered private extension as the most important source, followed by experienced farmers (15%), printed media (13%), public extension (5%), extension workers (5%), and radio (4%). Furthermore, 5% of respondents ranked dealers as their source of information.

Table 8: Source of information by the respondents according to their importance.

Source of information	No of respondents	Percentage
Private Extension	50	50.00
Public Extension	5	5.00
Experienced farmers	14	14.00
Printed media	12	12.00
Radio	4	4.00
Extension worker	5	5.00
Television	2	2.00
Dealers	8	8.00
Total	100	100.00

Table 8 presents data on the selection of information sources by respondents. The majority of growers (50%) considered private extension as the most important source, followed by experienced farmers (14%), printed media (12%), public extension (5%), extension workers (4%), radio (4%), television (2%), and dealers (8%).

Table 9: Information sources regarding the recommended different sugarcane varieties and their effect on awareness and adoption.

Source of information	CP-77-400		US-133		CPF-237		SPF-234.	
	N	Percentage	N	Percentage	N	Percentage	N	Percentage
Private Extension	50	50.00	47	47.00	45	45.00	54	54.00
Public Extension	5	5.00	00	00.00	4	4.00	0	0.00
Experienced farmers	14	14.00	13	13.00	19	19.00	16	16.00
Printed media	12	12.00	10	10.00	10	10.00	10	10.00
Radio	4	4.00	4	4.00	0	0.00	2	2.00
Extension worker	5	5.00	4	4.00	7	7.00	0	0.00
Television	5	5.00	3	3.00	0	0.00	0	0.00
Dealers	5	5.00	20	20.00	15	1500	18	18.00
Total	100	100.00	100	100.00	100	100.00	100	100.00

The data

presented in table 9 indicate that the information regarding recommended sugarcane varieties had effect on respondents .Private extension was the effective source of information for 50% respondents who were aware of CP-77-400 variety, 14% of the respondents were advised by experienced farmers, 12% of the respondents read printed media, 5% of the respondents were informed by public Extension, 4% of the respondents were listen from radio, 5% Extension worker was the source of information ,5% of respondents were received information from Television ,whereas 5% respondents were informed from dealers, (47%) respondents got information about US-133 variety of sugarcane from private extension, 20% respondents were able to know about the variety from dealers , 13% respondents were advised about the variety from experienced formers 10% respondents read about the variety through the printed media , 4% respondents were listened about the variety from radio, 4% respondents were received information from extension worker about variety, remaining 3% respondents were watched television , It was observed that the responses regarding the of source of information on adoption of CPF-237 sugarcane variety was that the 45% respondents were received information from private extension 19% respondents were received information about the variety from experienced formers ,15% respondents were informed about the CPF-237 variety from dealers ,10% were informed through printed media 7% respondents were got information from the extension worker about variety , remaining 4% respondents were informed about the variety through public extension. The responses regarding the source of information about the SPF-234 variety as well as the data also indicated that private extension was the source of information for 54% respondents were got information from private extension, 18% respondents were informed by dealers 16% respondents were advised by experienced farmers 10% of the respondents had read about SPE-234 variety of sugarcane from printed media remaining, 2% respondents were listened about the variety from radio.

Conclusion and Recommendations

The present study sheds light on various aspects of sugarcane cultivation technology adoption in Taluka Pano Akil, District Sukkur. The findings suggest that awareness and adoption of recommended sugarcane varieties are crucial factors in promoting the adoption of new technologies. The study also identified that private extension is the most important source of information for sugarcane growers, followed by experienced farmers and printed media. The adoption rate for recommended sugarcane varieties other than CP-77-400 was low, highlighting the need for more efforts to raise awareness and promote the adoption of these varieties. The results of the study are expected to help policymakers and agricultural extension workers design and implement more effective programs to promote the adoption of recommended practices and varieties among sugarcane growers in the study area and beyond. Further research is recommended to investigate the factors influencing the adoption of recommended sugarcane varieties and practices in other regions to develop a more comprehensive understanding of the challenges and opportunities in this area.

Based on the findings of the present study, the following recommendations are suggested:

1. Awareness campaigns: More efforts are needed to raise awareness among sugarcane growers regarding the recommended varieties, doses of fertilizers, and other recommended practices. Awareness campaigns should be conducted to inform growers about the benefits of recommended varieties and practices.
2. Strengthening private extension: Private extension services should be strengthened to disseminate information on recommended practices and varieties to a larger number of growers. Training programs should be conducted for private extension workers to equip them with the necessary knowledge and skills to effectively communicate with growers.
3. Collaboration between public and private extension: Public and private extension services should work together to disseminate information on recommended practices and varieties. The government should provide financial and technical support to private extension services to improve their capacity to reach out to more growers.

4. Research and development: Research should be conducted to identify the factors that affect the adoption of recommended practices and varieties. Additionally, new varieties and practices should be developed through research to meet the changing needs of growers.
5. Incentives: Incentives should be provided to encourage growers to adopt recommended practices and varieties. For example, subsidies can be provided on the purchase of recommended fertilizers, and credit facilities can be made available to growers for the adoption of new technologies.

Overall, the findings of the present study emphasize the importance of information dissemination in promoting the adoption of recommended sugarcane cultivation practices and varieties. Efforts should be made to strengthen the extension services and collaborations between the public and private sectors to effectively disseminate information and promote the adoption of recommended practices and varieties.

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