

Harvesting Capabilities: An Investigation in Context of Subject Matter Specialists

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Abstract: *The key role of agriculture extension services is to facilitate and uplift the socio-economic condition of the farming community. Keeping in view recent trends in the agriculture sector, Subject Matter Specialists (SMSs) would be enough capable to support and supervise their staff in the dissemination of the latest technology. Hence, this study was steered to investigate the harvesting proficiencies of SMSs working in Provincial Agriculture Extension Department Khyber Pakhtunkhwa, Pakistan. A total of 56, SMSs were selected from all districts of Khyber Pakhtunkhwa and were interviewed through a pre-tested interview plan. The outcomes are presented in the form of tables, percentages, and graphs. To achieve the desired objectives, the dummy variable regression model, Standard Deviation (SD), Mean, and Paired Sample T-test were also used. Outcomes disclosed that the majority (41.1%) of the SMSs were recorded in 41-50 years of age category following 37.5% in the age category of 31-40 years. The educational level of the respondents showed that majority (82.1%) were M. Sc (Hons) degree following 10.7% who were Bachelors and only (7.1%) were PhDs in their respective fields. Based on the mean difference, judging proper time was at 1st rank order with a mean possessed 3.42 against the mean required 4.48. Capabilities of the respondents regarding collecting and processing seed with a possessed mean of 3.33 against the mean required of 4.56 was reported at 2nd rank of the possessed and required level of harvesting capabilities. The topmost training need was reported in managing field heat followed by harvesting techniques and tools with a mean difference of -1.73 and -1.25 and t-values of -11.10 and -8.26 respectively. It is recommended that SMSs should be encouraged to pursue doctoral-level education to boost-up their analytical and managerial capabilities. More in-service training for SMSs should be arranged and conducted for effectively freight their services to the farming community.*

Keywords: Investigate, Capabilities, Processing Seed, Harvesting, Field Heat, Training Need

I. Introduction

Pakistan has experienced substantial obstacles since it was founded, but agriculture has contributed in a variety of ways to turn the country into a development and economic growth and the world's leading agricultural region (Khan, 2006 and Rehman *et al.*, 2011). Pakistan has an abundance of natural resources because of its well-irrigated plains, groundwater systems, weather extremes, and good soil (Sallam and Akram, 2005). As a nation that relies heavily on agriculture, it employs almost 37.4% of the workforce, generates 24% of the GDP, and accounts for a considerable portion of export revenue (GoP, 2024)

To promote the cutting-edge technology, the Pakistani government is concentrating on small and

underprivileged farmers. According to the 2017 Housing Census, the nation's population is increasing at a leap of 2.4% annually, demanding the production of an increasing number of crops. The present government has taken steps to develop this sector, including crop diversification, efficient water use, nutritious crops and vegetables, providing small farmers with credit facilities, promoting fertilizer availability at subsidized rates, and installing solar panels for agricultural tube wells. As a result, this sector's performance significantly improved following 13 years of sluggish and moderate development (GoP, 2023).

I.1 Role of Subject Matter Specialist in Agriculture Extension

In essence, agricultural extension is an educational service, which includes all possible efforts directed toward bringing desirable changes in people's behavior. It aims to teach rural people how to improve their living standards by their own efforts through efficient utilization of all available resources (Khan et al., 2022, Ahmad et. al., 2022). Extension is one of the main driving forces for information and transfer of technology for creating aspiration and attitudes helpful to change and for carrying farmer's problems back to researchers. However, extension services at present focus on learning, facilitating, forming farmers' groups, and helping farmers with marketing concerns. They also assist in addressing general rural issues such as health, food security, malnutrition, family education, youth empowerment, and resource conservation, among others. Subject-matter Specialists regarded as important pillars of the agricultural economy, must be able to carry out their duties effectively in this situation (Sallam and Akram, 2005). As a result, it is imperative to examine the Subject Matter Specialists' skills and how these affects their performance on the job as paid extension systems measure performance indicators, many countries place more emphasis on the methodology and assessment of extension workers' skills. Pakistan's growth and development are closely associated with increased agricultural production. The situation demand that only proficient and capable extension personnel can fulfill the gap between research, extension and farmers.

Objectives of the Study

1. To investigate the possessed and required level of Subject Matter Specialists in harvesting capabilities in the study area.
2. To identify the training need of the Subject Matter Specialists that restrain the required level of harvesting capabilities.

II. Material and Methods

2.1 Universe of the Study

The study was enfolded in Khyber Pakhtunkhwa and total of 56 Subject Matter Specialists of Provincial Agriculture Extension Department were selected as respondents for the enquiry. Khyber Pakhtunkhwa is one of the four provinces of Pakistan, located between 31 to 37° North and 70 to 74° East. The geographic area of Khyber Pakhtunkhwa is 10.17 million ha which is 12.8% of Pakistan's total geographic area (Farooq et al., 2007).

2.2 Research Design and interview Schedule Development

Cross-sectional descriptive survey design was employed as is concerned with the studies describing the characteristics of the particular individual or a group (Khatam et al., 2014). This design was also appropriate as it allowed for the use of both qualitative and quantitative data. in the light of study objectives, a well-planned interview schedule was prepared for data collection as it is one of the prominent method of data collection for those people are more willing to talk than to write.

2.3 List of Parameters Studied

S. No.	Parameters	Mean Difference	Possessed and Required Level	Training Need
1.	Judging proper time for harvest	✓	✓	✓
2	Harvesting techniques and tools	✓	✓	✓
3	Managing field heat	✓	✓	✓
4	Collecting and processing seed	✓	✓	✓
5	Forecasting maturity and yield	✓	✓	✓

2.4 Validity and Reliability of the Research Instrument

Validity ensures accuracy of the instrument judged on the part of experts by checking the instrument keeping in view the purpose for which it is developed (Wimmer and Dominick, 2003). As the accurate data collection is mainly the outcome of research instrument having both face and content validity. For this very reason the opinion and suggestion of the expert from the Department of Agriculture Extension Education and Communication, the University of Agriculture Peshawar was incorporated before finalizing the interview schedule. The reliability of a measure is an indication of the stability and consistency with which the instrument measures the concept and helps to assess the goodness of a measure. To measure the internal consistency of the instrument with respect to reliability, Cronbach's Alpha technique was used (Cronbach, 1951).

2.4 Analysis of Data

Statistical Package for Social Sciences (SPSS) V. 20 was used for the tabulation and analysis of the collected data. Descriptive statistics was utilized for presentation of the results. Also, the following statistics were applied:

- a. Dummy Regression Model equation of the form:

$$Y = a + bX \dots \dots \dots (3.1)$$

- b. Paired Sample T-Test

In the current study the data values are paired measurements i.e. possessed and required level of capabilities for a single group. To compare the mean of the two variables and to compute or check the significant difference between these variables paired sample t-test was applied. Mathematically denoted as;

$$t = \frac{\sum d}{\sqrt{\frac{n(\sum d^2) - (\sum d)^2}{n-1}}}$$

- c. Standard Deviation

Standard deviation refers to a number which measures the variation of a variable from the mean value. Standard deviation indicates the spreading of data about its mean, low standard deviation means the data are closed to the mean and the high standard deviation value indicates the data value is far away of its mean.

$$\text{Standard Deviation} = \sqrt{\frac{\sum_{i=1}^n n(x - \bar{x})^2}{n-1}}$$

Results and Discussions

3.1 Age of the Subject Matter Specialists

A person's age has an immense effect on how they respond to various situations in their life. Age has a positive association with innovation and adaptability, as revealed by demographic studies, physiological data, and other research findings. Age is important when it comes to accepting any progress. In addition, the adoption and spread of an idea are positively correlated with age (Saud et al., 2022). The following figure showed that the majority (41.1%) of the SMSs were recorded in 41-50 years of age category following 37.5% who were found in the age category of 31-40 years. Similarly, in both age categories, 21-30 and 50-60 years the percentages were recorded the same which was 10.7% of the total sampled respondents. The results highlighted that Subject Matter Specialists were energetic and can still reach the diverse nature of work.

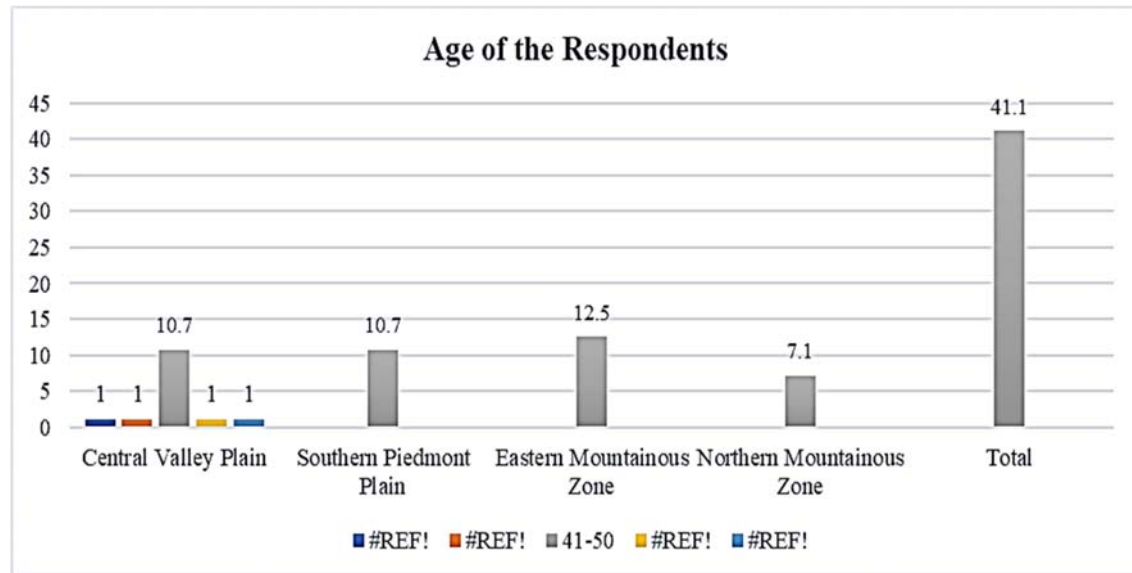


Figure 1. Represents the Age of the Respondents

3.2 Educational Level of the Respondents

The development of human resources is considered to be significantly affected by education. It usually happens as a result of any event that shapes a person's thoughts, beliefs, or behaviors. To the community's perspective, the respondents' education level assists in evaluating the standard of human resources and the various stages at which society is developing (Ullah and Nawab, 2019). In order to develop an image for educational level, it was therefore crucial to compile data regarding this attribute. The following Figure 2 depicts that, majority (82.1%) of the respondents holds M.Sc (Hons) degree following 10.7% who were Bachelors in their respective fields. Only (7.1%) of the total sampled respondents were observed that were PhDs in their respective fields. Although the below-mentioned qualification of the respondents is sufficient for the provision of services to the farming community, still there is a dire need for getting higher education to serve the community fruitfully.

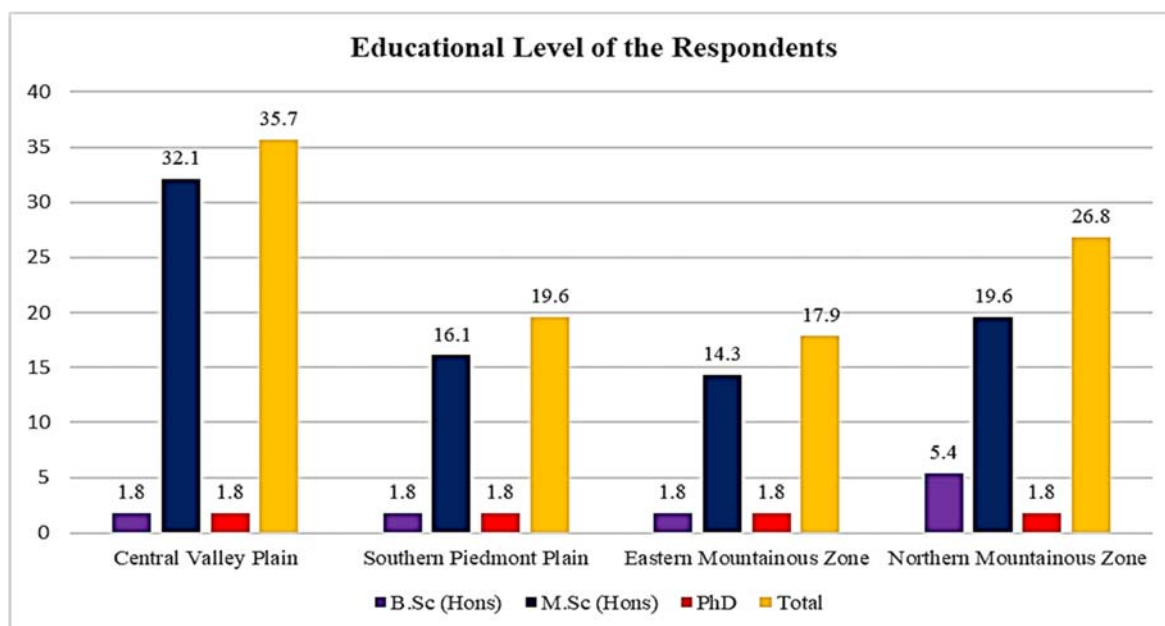


Figure 2. Represents the Educational Level of the Respondents

3.3 Required and Possessed Level regarding Harvesting Capabilities of the Respondents

Harvesting is the process of taking a crop out of its growing environment and transferring it to a safer area for storage, processing, or consumption. Most crops reach a point of maximum quality, meaning they ripen or develop and will deteriorate if left exposed to the weather (Khan et al., 2008). However, some tree fruit and root crops can be left in the field or orchard and harvested as needed. The crop's maturity is the primary determinant of harvest time, but other elements including weather, the availability of harvest tools, packing and storage facilities, and transportation are also crucial. The below mentioned Figure 3 depicts the possessed and required level of harvesting capabilities in which capability of the respondents in judging proper time for harvest was ranked at topmost with possessed mean of 3.42 against the required mean of 4.48. Capabilities of the respondents regarding collecting and processing seed with a possessed mean of 3.33 against the mean required of 4.56 was reported at 2nd rank followed by harvesting techniques and tools at 3rd ranked with a mean possessed 3.26 against the required value of 4.51. Similarly, forecasting maturity and yield was at 4th rank with a possessed mean of 3.17 against the mean required 4.39. Similarly, fifth-ranked proficiency of the respondents was reported managing field heat with a possessed mean of 2.73 against the required mean of 4.46.

During the informal discussion the respondents discussed that for the collection and processing of seeds different harvesting techniques and tools are used in order to minimize losses and increase production. It is apparent from the findings that respondents were more proficient to judge the exact time of harvesting of different crops.

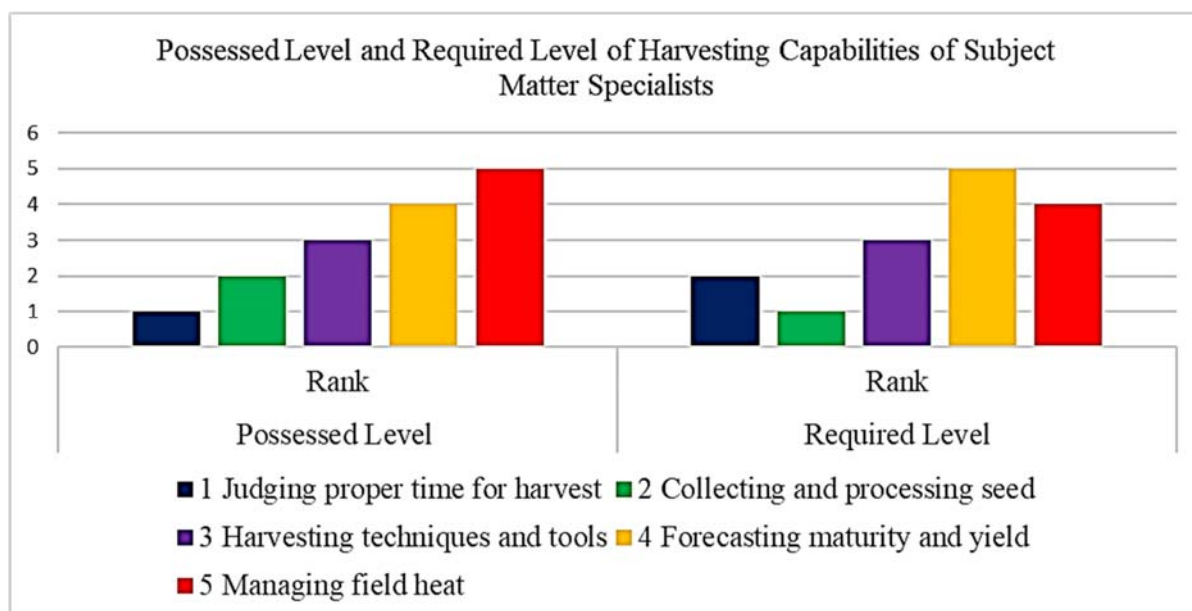


Figure 3. Represents the Possessed and Required Level of Harvesting Capabilities of Subject Matter Specialists

3.4 Training Needs in Harvesting Capabilities of Subject Matter Specialists

Table 1 indicates the training needs of SMSs regarding harvesting capabilities based on the difference between the possessed and required level of the respondents in harvesting. The topmost training need was reported in managing field heat followed by Harvesting techniques and tools with a mean difference of -1.73 and -1.25 and t-values of -11.10 and -8.26 respectively. Capabilities in forecasting maturity and yield & collecting and processing seed stood at 3rd rank on training needs with a mean difference of -1.21, and t-value of -9.99, -9.21 respectively. It was apparent from the above findings that SMSs need training in the aforementioned extents i.e. managing field heat, forecasting maturity and yield, collecting and processing seed to minimize problems related to the field of agriculture.

Table 1. Training Needs Based among Level Possessed and Required regarding Harvesting Capabilities of SMSs

S. No.	Capabilities Statement	Level Possessed	Level Required	Mean Difference	Rank	t-value
1.	Managing field heat	2.73	4.46	-1.73	1	-11.10**
2	Harvesting techniques and tools	3.26	4.51	-1.25	2	-8.26**
3	Forecasting maturity and yield	3.17	4.39	-1.22	3	-9.99**
4	Collecting and processing seed	3.33	4.55	-1.22	3	-9.22**
5	Judging proper time for harvest	3.42	4.53	-1.10	4	-7.71**

^{NS} Represents Non-Significant whereas ** represents significance at 5% level of probability

Source: Field Survey, 2020-2021

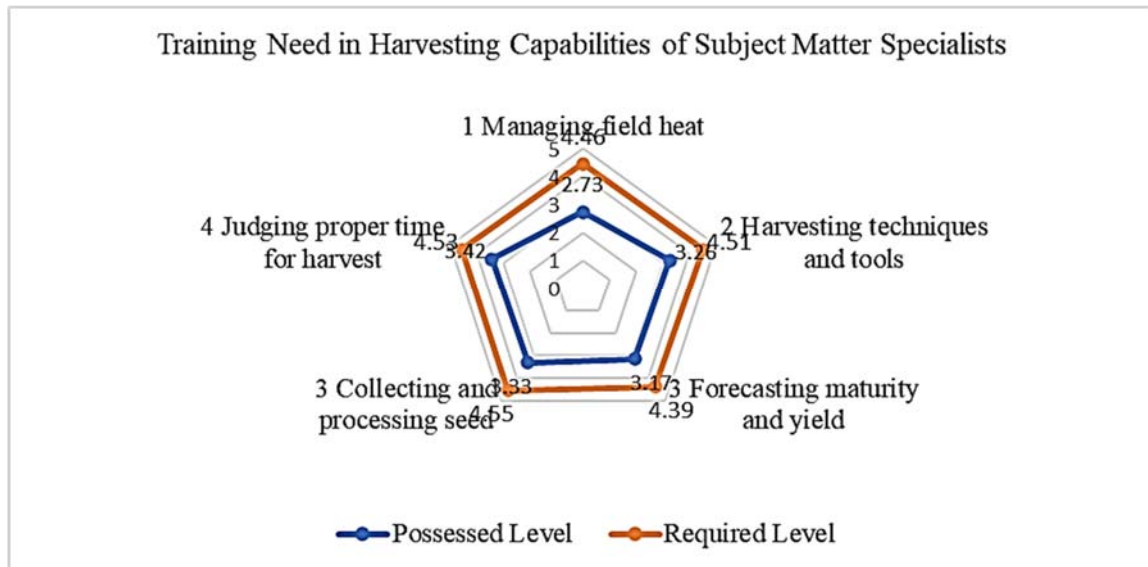


Figure. 4 Represents the training need regarding Harvesting Capabilities of Subject Matter Specialist

3.5 Upshots of Demographic Features Regarding Harvesting Capabilities of Subject Matter Specialists (Regression Analysis)

The analyzed data presented in Table 2 showed that age had a positive and statistically significant effect on the harvesting capabilities of Subject Matter Specialists. So, overall, all age dummies had a positive significant effect on the harvesting of Subject Matter Specialist. It means that older SMS were more efficient as compared to younger ones and they managed crop harvesting and monitored proper care of crops after harvesting. Similarly, education and higher qualification had a positive and significant effect on the harvesting skills of Subject Matter Specialists. It is due to the reason that harvesting management skills could be boosted through higher qualification and more education as well as through field activities and personal interest on part of SMSs. The R-Square value (0.784) demonstrated that 78.4% of the disparity in harvesting capabilities was enlightened by demographic characteristics measured in this model.

Table. 2 Upshots of Demographic Features Regarding Harvesting Capabilities of Subject Matter Specialists (Regression Analysis)

Independent Variables	Co-efficient	St. Error	t-ratio
Constant	3.126	.678	4.613
Age_D1	.403	.916	1.753*
Age_D2	.717	.211	2.962**
Age_D3	.803	.515	5.553**
Age_D4	.315	.412	7.765***
Education_D1	.830	.459	1.282*
Education_D2	.530	.353	2.823**
Education_D3	.641	.281	5.494***

D1_Age=If the respondent is within 23 and 30 years of age; else, 0
D2_Age=1 if the respondent falls between the age of 31 and 40; else, 0
D3_Age=1 if the respondent falls between the age of 41 and 50; else, 0
D4_Age=1 if the respondent is older than 50; else, 0
D1_Education = 1 If the respondent possesses a B.Sc. (hons.) degree, then 0
D2_Education = 1 in cases when the responder holds an M.Sc. (hons.), 0 in other cases
D3_Education = 1 in cases where the respondent holds a Ph.D.; else, 0

Probability indicators * at 1%, ** at 2% and *** at 3%. Values; R-square (.784), Adj. R-square (.632), F-stat. (.708**)

Source: Field Survey 2021-2022

Conclusion

It was concluded from the research study that the majority of the SMSs were recorded above in 40 years of age category whereas, majority of the respondents recorded that holds M.Sc (Hons) degree and minimum percentage recorded that were PhDs in their respective fields. Similarly, the topmost capability at level possessed of the respondents was recorded judging proper time for harvest following collecting and processing seed ranked at 2nd order of the harvesting capabilities of the respondents. Moreover, the topmost training need reported was managing field heat followed by harvesting techniques by the respondents at level required by respondents. Lastly, both the dummies including age and educational variables had a positive and significant effect on the harvesting capabilities of Subject Matter Specialist.

Conflict of Interest: No conflict of interest exists

Author's Contribution Statement: Shah, S. comprehended the inkling and managed the work while Khan, M. Z, executed the field research and data analysis.

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