Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

Farmers' Perception of Factors Hampering Maize Yield in Rain-fed Region of Pind Dadan Khan, Pakistan

http://dx.doi.org/10.4314/jae.v20i2.1

Muddassir, Muhammad
Department of Agricultural Extension and Rural Society, College of Food and Agricultural Sciences, King Saud University, Riyadh, Kingdom of Saudi Arabia. Email: ranamuddassir@gmail.com

Jalip, Muhammad Waqas
Institute of Agricultural Extension and Rural Development, University of Agriculture, Faisalabad-38040, Pakistan. Email: rajajalip3@gmail.com

Noor, Mehmood Ali*
Institute of Crop Science, Chinese Academy of Agricultural Sciences, Key Laboratory of Crop Physiology and Ecology, Ministry of Agriculture, Beijing 100081, China
*Principal contact for editorial correspondence.
Email: mnoor@ksu.edu.sa or mehmood2017@gmail.com. Phone: +86 131 2127 1099

Zia, Muhammad Abubakar
Department of Agricultural Extension and Rural Society, College of Food and Agricultural Sciences, King Saud University, Riyadh, Kingdom of Saudi Arabia. Email: thisabubakar121@gmail.com

Aldosri, Fahad Owis
Department of Agricultural Extension and Rural Society, College of Food and Agricultural Sciences, King Saud University, Riyadh, Kingdom of Saudi Arabia. Email: fadosri@ksu.edu.sa

Zuhaibe, Abu-ul-Hassan
Institute of Agricultural Extension and Rural Development, University of Agriculture, Faisalabad-38040, Pakistan
Email: abuulhassanzuhaibe@gmail.com

Fiaz, Sajid
China National Rice Research Institute, State Key Laboratory of Rice Biology, Hangzhou 310006, Zhejiang, China. Email: fiazsajid05@yahoo.com

Mubushar, Muhammad
Department of Agricultural Extension and Rural Society, College of Food and Agricultural Sciences, King Saud University, Riyadh, Kingdom of Saudi Arabia. Email: mubusharuaf@gmail.com

Zafar, Muhammad Mubashar
Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad-38040 Pakistan
Email: m.mubasharzafar@gmail.com.

Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

Abstract

The study assessed farmers' perceptions of factors impairing maize yield in Pind Daden Khan region of Pakistan. Data were collected from randomly selected 125 maize growers from five villages of the region. Investigations revealed that the majority of farmers (59.5%) were aware of recommended maize production, cultural and protection practices, but with a small proportion (33%) of adoptees. The majority of the farmers (80%) perceived that marketing uncertainty was affecting maize yield dramatically. The respondents disclosed that the gap between input application and output profit was creating frustration among the farmers. Temperature was considered as the leading climatic factor causing maize yield decrease in the region. A majority of respondents were aware of time of irrigation at sowing (96%) and post-germination (71.2%); and 91.2% and 55.2% had adopted them, respectively. Almost 50% of respondents adopted the recommended plant protection measures. Land should be given to small farmers on lease with cheaper rates so they can earn good profit *and* improve their livelihoods. Extension services should be made more effective to provide the information at proper time to the farmers. *There is need for a strong policy implementation regarding better marketing and inputs supply by introducing micro–credit loan schemes to maize farmers.*

.

Keywords: *Maize production practices, Adoption of maize,*

Introduction

Agriculture plays an important role in the growth and development of Pakistan contributing about 21% to the GDP of the country. Maize plays important role in the economic development of Pakistan. In the year 2015–16, maize had contributed about 0.4 % to GDP and 2.2 % to the value added in agriculture. An increase of 0.2% was also observed in production area compared to previous year 2015 (Govt. of Pakistan., 2016). Pakistan has an ideal soil and climatic conditions for maize production. However, despite suitable production environment and high yielding varieties, the yield of maize in Pakistan is very low (Bakhtavar et al., 2015). Major yield suppressing factors include poor agronomic practices, pest infestation, unavailability and high cost of inputs, low quality seed, exploitation by middlemen, mismanagement and low adoption of modern technologies by farmers (Ammani et al., 2012; Lawlor, 2002; Noor et al., 2016b).

Maize crop holds 39% of the total growing area in Punjab province contributing 30% annually to the total yields. Due to its rain-fed nature, favourable soils and climatic conditions, maize production in this region has gained significant importance among farming community.

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

Again, the farmers depend on grain market's middle-men to high interest loan to purchase seeds, fertilizers, pesticides and mechanized operations. Consequently, farmers are constrained to sell their produce to these middle men at very low market prices.

The present study assessed farmers' perception of factors impairing maize yield in Pind Daden Khan region of Pakistain. Specifically, it aimed at determining (i) the existing maize farmers' knowledge of site specific production, cultural and protection measures in Pind Daden Khan; (ii) the extent to which the maize farmers were adopting these site specific production, cultural and protection measures for optimum yields; and (iii) farmers' perceptions regarding the climatic adversaries affecting maize yields and prevailing socioeconomic factors including marketing and extension facilities.

Methodology

Pakistan comprises of four provinces viz. Punjab, Sindh, Balouchistan and Kyber Pakhtoonkhwa, and some Federally Administered Tribal Areas (FATA). Present study was conducted in Punjab province which has nine divisions, one division (Jehlum) which is designated as a rain-fed region in Pakistan was selected. More specifically, Pind Daden Khan Tehsil ('Tehsil' an administrative division within a district) was chosen for the study. This region is bounded by district Chakwal in the north, Khoshab in the west, Bhalwal in the south and Mandi Bahauddin in the east. Climatic zone of the selected division is arid to semi-arid with average annual rainfall of 900 millimeters. Tehsil Pind Dadan Khan consists of 16 union councils, out of which 13 union councils are rural and 3 union councils are urban (PMSIP, 2011). Maize is the major cereal crop of this area.

All maize growers in area were considered as population of study. Five villages were selected purposefully from Tehsil Pind Dadan Khan. From each selected village 25 respondents were selected randomly, thus making a sample size of 125 respondents. In order to collect the required information from respondents, an interview schedule was developed. To determine the validity and reliability of the interview schedule, it was pre-tested on 20% of the total respondents. As a result of pre-testing (with 0.6

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

reliability coefficient), necessary amendments were made on the instrument Questionnaire was comprised of close-ended questions to investigate the socioeconomic characteristics of the responding respondents, their awareness and adoption level regarding maize recommended production and protection practices. While, a five point Likert-type scale was used to record the perceptions of maize farmers regarding climatic factors as well as socioeconomic conditions influencing the maize production. Although the interview schedule was designed in the English Language, the questions were asked in local language for the convenience of interviewees to get the required information with maximum accuracy.

Data were analyzed through computer software Statistical Product and Service Solution (SPSS). Percentages, mean, and ranks were used in analyzing the data.

Results and Discussion

Demographic Characteristics of the Respondents

About half (52%) of the respondents were middle aged, (30-50 years), whereas the young (up to 30 years) were only 13.6% of the total population (Figure 1a). The majority (56%) of the respondents were illiterate. Among the literate respondents, only 9.6% and 6.4% were with secondary and higher secondary education, respectively. The majority (68%) of the respondents had small land holdings (up to 12.5 acres). Around 26.4% of the respondents were medium farmers having 12-25 acres (4.86–10.11 ha). Only 5.6% of the respondents were large farmers who had over 25 acres of land.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

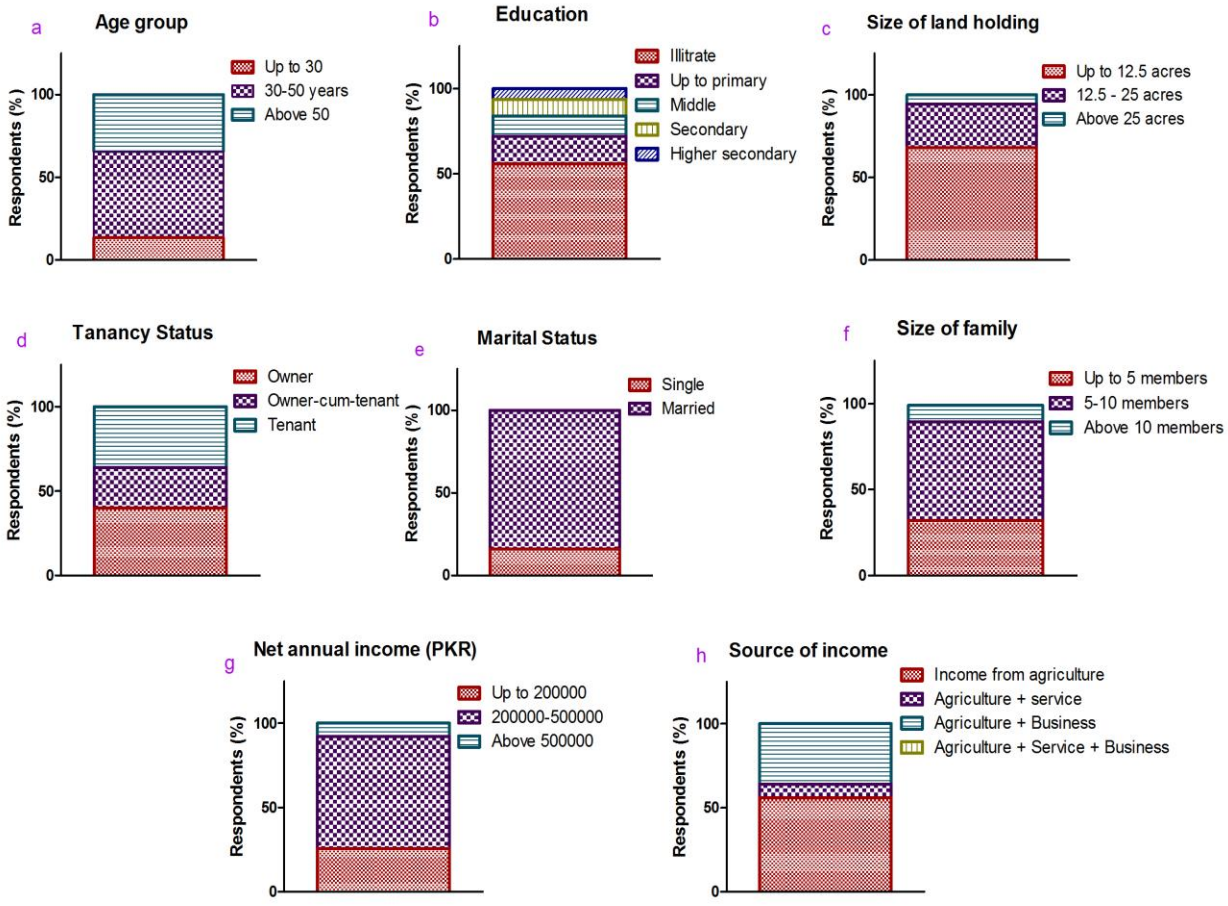

Figure 1: Demographic characteristics of the respondents from maize growing area of Pind Daden Khan.

In Pakistan, land tenure is categorized as tenant, owner, and owner-cum-tenants. In studied population, 40% of the respondents were owner cultivators. The majority (76%) of the respondents fell under the land tenancy system of owner-cum tenants (40%) and tenant (36%) (Figure 1d). The majority (84%) were married and it was assumed that married farmers are more oriented to the farming to get more income for their family (Figure 1e). More than half of the respondents (57.4%) had their family size of 5-10 members and very small proportion (9.6%) had above 10 family members (Figure 1f). Data from figure 1g showed that a majority (66.4%) belonged to medium category farmers, had their annual income ranging Rs. 200,000-500,000, followed by small farmer's category (25.6%) with annual income up to Rs. 200,000. Large farmer's category constituted 8% and had annual income above Rs.500,000. Regarding source of income, over half of the respondents (56%) had their source of

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

income mainly from agriculture, while 36% had agriculture along with business as their sources of income (Figure 1h).

Awareness and Adoption Level of Maize Production Technologies

The respondents' knowledge about different improved production practices for successful maize crop was assessed. The adoption level regarding these practices was also surveyed. One ploughing with chisel plough, 2-3 cultivation with cultivator and 2-3 plankings are recommended by agriculture department of Punjab for land preparation to ensure optimum yields. The findings suggested that 48% of the respondents were aware of one ploughing with chisel plough and 16% of them had adopted it, while 37.6% respondents were aware about 2-3 cultivations with cultivator, with only 18% of adoption level. The majority (72.8%) of the respondents were aware about 2-3 planking and 58% of them had adopted it. Which implies that almost half of respondents were neither aware of recommended number of cultivations and ploughings nor adopted them (Figure 2a). Even though, half of the respondents were aware of recommended tools, adoption was low. This could be attributed to the high prices of fuel and non-availability of resources to buy the necessary tools for seed-bed preparation practices.

Sowing at an appropriate time is an assurance to getting maximum germination stand resulting in high yields (Noor et al., 2016a). A majority of the respondents (80.8%) were aware of recommended sowing time for Spring crop (20 Jan-20 Feb) in rain-fed region and 73% were adopting it (Figure 2b). Similarly, most of the respondents (78.4%) were aware of the recommended sowing time for Kharif (autumn) crop (15 July-10 Aug) and 62.4% had adopted it.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

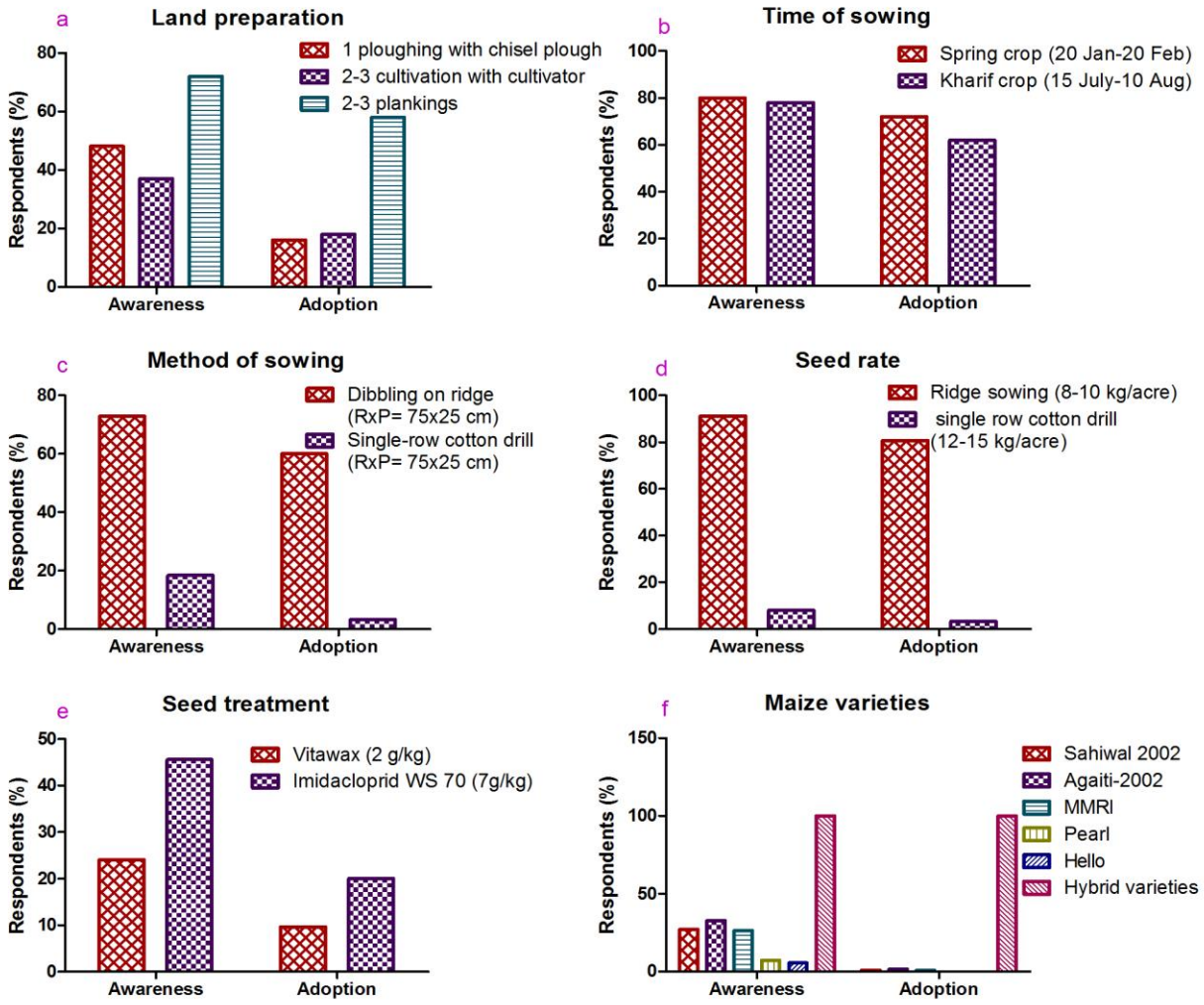

Figure 2: Awareness and adoption level of maize production technologies in Pind Daden Khan

The result indicated that significant percentage of respondents (72.8) were aware of dibbling method (row × plant distance= 75 × 25 cm) with 60% level of adoption. Whereas, a small number of respondents (18.4%) were aware of single row cotton drill (row × plant distance= 75 × 25 cm) with 3.2% adoption (Figure 2c). The large scale farmers having land holdings above 25 acres were adopting cotton drill or maize planter methods for maize sowing, but small land holders were adopting the traditional method (dibbling method) of sowing, which might be cheaper than single row cotton drill.

A Majority of the farmers (91.2%) were aware of recommended seed rate for ridge sowing and 80.8% of them had adopted. However, awareness about seed rate for sowing through single row cotton drill was almost negligible (8%) and adoption was only 3.2% (Figure 2d). The farmers mostly used the conventional method of sowing maize on ridges as it is considered cheaper than sowing through cotton drill or maize planter.

Only few (24%) of the respondents were aware of Vitawax (2g /kg) seed treatment and only 9.6% had adopted, while 45.6% of farmers were aware of Imidacloprid (WS 70, Confidor) for treating the seed before sowing and 20% had adopted it (Figure 2e). This had shown that farmers were becoming aware of imidacloprid for treating maize seed against fungal attack.

A good number of the respondents were aware of Sahiwal 2002 (27.2%), Agati 2002 (32.8%), and MMRI(26.4%) recommended maize varieties for the rain fed area (Figure 2f). However, there was very low adoption recorded for the varieties (Figure 2f). Very few of the farmers were aware of the Pearl and Hello varieties, hence these recorded zero adoption rates. All the respondents were aware of hybrid variety and had adopted it due to the higher yields it records as compared to local maize varieties. These results are more or less similar to those of Ahmad (2005) where he reported farmer preference of hybrid seed varieties over local seed breeds.

Inter-culture and harvesting operations

Data regarding cultural practices showed that 96% respondents were aware of time of irrigation at sowing time and 91.2% had adopted it. Similarly, 71.2% of respondents were aware of 2nd irrigation at germination time and 55.2% had adopted it. While, 56% of respondents were aware of three irrigations with 12 days' interval at vegetative stage, because it is a very sensitive stage of crop growth, only 37.6% had adopted it (Figure 3a). Reasonable responding proportion (36%) was aware of 2 irrigations at flowering stage with 12 days' interval and 23.2% adoption. Correspondingly, 43.2% of respondents were aware about one irrigation at maturity phase and 26.4% of adoption level. Most of farmers were dependent on rain as it was Barani area (rain-fed), therefore only half of the respondents were aware of

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

recommended irrigations at vegetative, flowering and maturity phase and lesser number of respondents had adopted that.

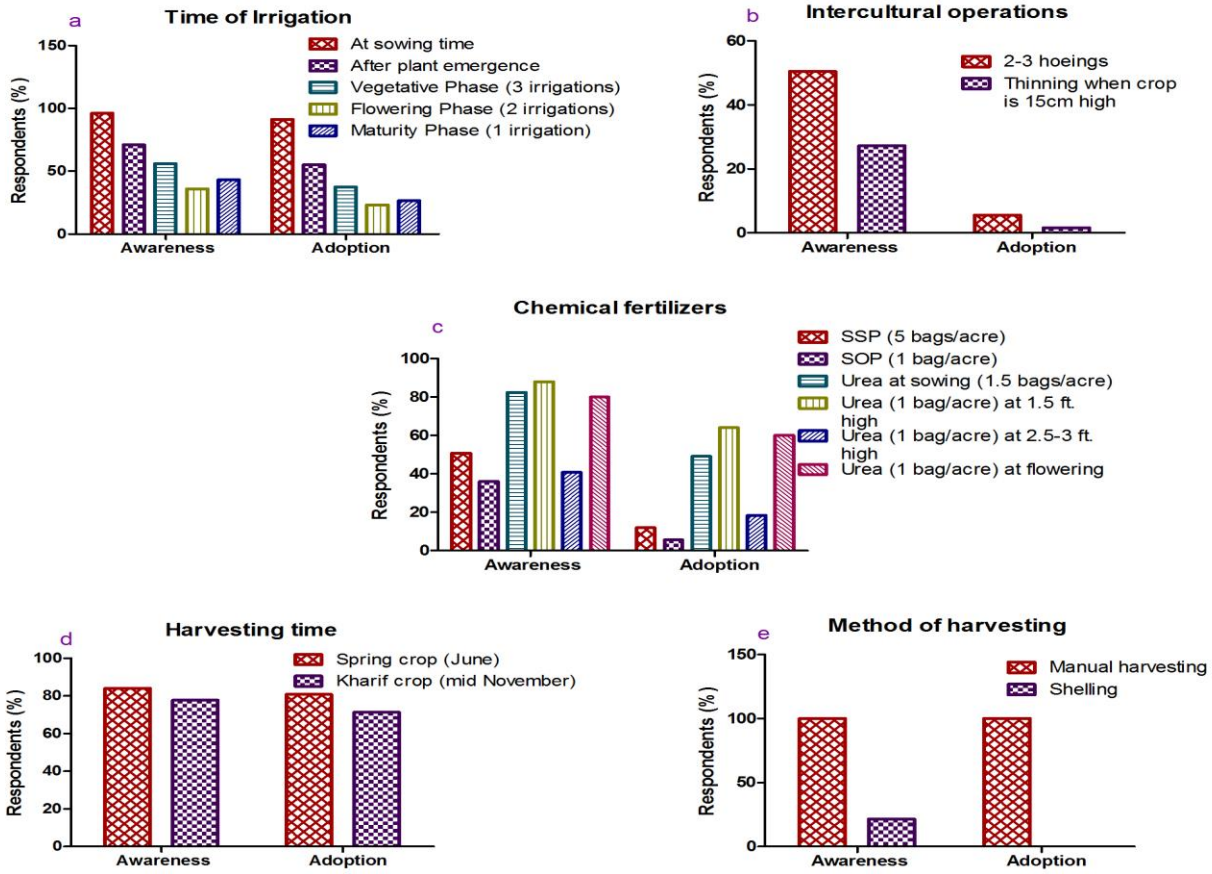

Figure 3: Level of awareness and adoption for inter culture and harvesting operations in maize crop for Pind Daden Khan region.

Intercultural operations are considered important for the removal of weeds which are a serious menace to the crop. Weeds compete with plants for sunlight, moisture, nutrients and space. They also serve hideout and serve as host for insects/pests and other agents causing diseases, thus adversely affecting crop yield. Intercultural operations such as hoeing, selective chemical weedicides also preserve soil moisture, improve soil aeration, and control weeds. Figure 3b shows that half (50.4%) of the respondents were aware of 2-3 hoeing and 27.2% were aware of thinning when the crop is 15cm in height. However, only 5.6 and 1.6% of the respondents had adopted these recommendations respectively.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

Fertility of the soil is one other major factor affecting plant growth and yield. Maize crop requires large quantities of plant nutrients for producing high yield over its short period of growth. Nitrogen, phosphorus and potassium are fundamental nutrients for plant growth and development which play a basic role in metabolism and energy production in plants and significantly enhance the grain yield and leaf area index (LAI), but photosynthetic rate reduces under nitrogen stress (Uhart and Andrade, 1995). The data given in Figure 3c indicated that 50.9, 36 and 82.4% of the respondents were aware of the recommended quantities of fertilizers SSP (single super phosphate), SOP (sulphate of potash) and Urea. However, 12, 5.6 and 49.2% of the respondents had adopted the same. A majority (88 and 80%) of the respondents were aware of the recommended quantity of urea at the time when the plant height becomes 1.5 feet and again at the flowering stage, and (64 and 60%) had adopted this recommended fertilizer application. About 41% were aware of urea application at plant height of 2.5 to 3 feet and only 18.4% had adopted it. Whereas, awareness and adoption status of the respondents with regard to SOP was extremely low. However, the awareness and adoption status with regard to SSP and urea were relatively better than that of SOP. The main reason for not adopting SSP and SOP according to recommendation was that maximum farmers grow potato or pea crops before sowing maize so they apply SSP and SOP at the preparation of fields for potatoes and peas and they feel that there is no need fertilizer application at the sowing time of maize.

Harvesting of maize crop at an appropriate time is an assurance for high yield and minimum harvest and post-harvest losses. The majority of respondents were aware of recommended harvesting time for spring (84%) and kharif (77.6%) crops respectively and, majority of respondents on both the Spring crops (80.8%) and khariff crops (71.2%) had harvested their crops as per recommendations (Figure 3d). The result is similar to the findings of Zafar (2005). that there exist a gap between research recommendations and adoption of maize production technologies by farmers of Tehsil Sahiwal. All of the respondents were aware and had adopted manual harvesting. Whereas only 21.6% of the respondents were aware of sheller harvesting and none of the respondents had adopted the practice (Figure 3e).

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

Control measures

The maize crop is seriously attacked by various insects and pests. Insects and pathogens outbreak may possibly reduce yields up to 75% and even total crop failure might happen in case of severe infestation (Kumar, 2002). Maize stem borer, shoot fly, aphid and army worm are the most important insect/pests of maize crop.

The data in Figure 4a shows that there was low level of awareness and adoption of recommended plant protection measures. The result indicates that only 18.4%, 26.4%, 13.6% and 44.8% of the respondents were aware of the use of Refree (fipronal), Furdan, Sunfuran and Carbofuran 3G against the maize borer and only 5.6, 29.6%, 6.4% and 34.4% were adopting it respectively (Figure 4a). Similarly, low awareness was reported for different pesticides against shoot fly such as Imidacloprid (48.8%) and Thiodan (20%) and about 31.2% had adopted imidacloprid and only 8% adopted Thiodan. Respondents were similarly less well aware of Carbosulfan, Imidacloprid and Lambda (35.2%, 44% and 31.2% respectively), and only a few of them had adopted the Carbosulfan (20%), Imidacloprid (24%) and Lambda (6,4%) respectively. A few of the respondents were aware of different plant protection measures against armyworm such as Steward (32%), Lufenuron(24%) and Emamactin Benzoate (36%) hence only 17.6% were adopting Steward to control armyworm, 12% were using Lufenuron and 20% were adopting Emamactin.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

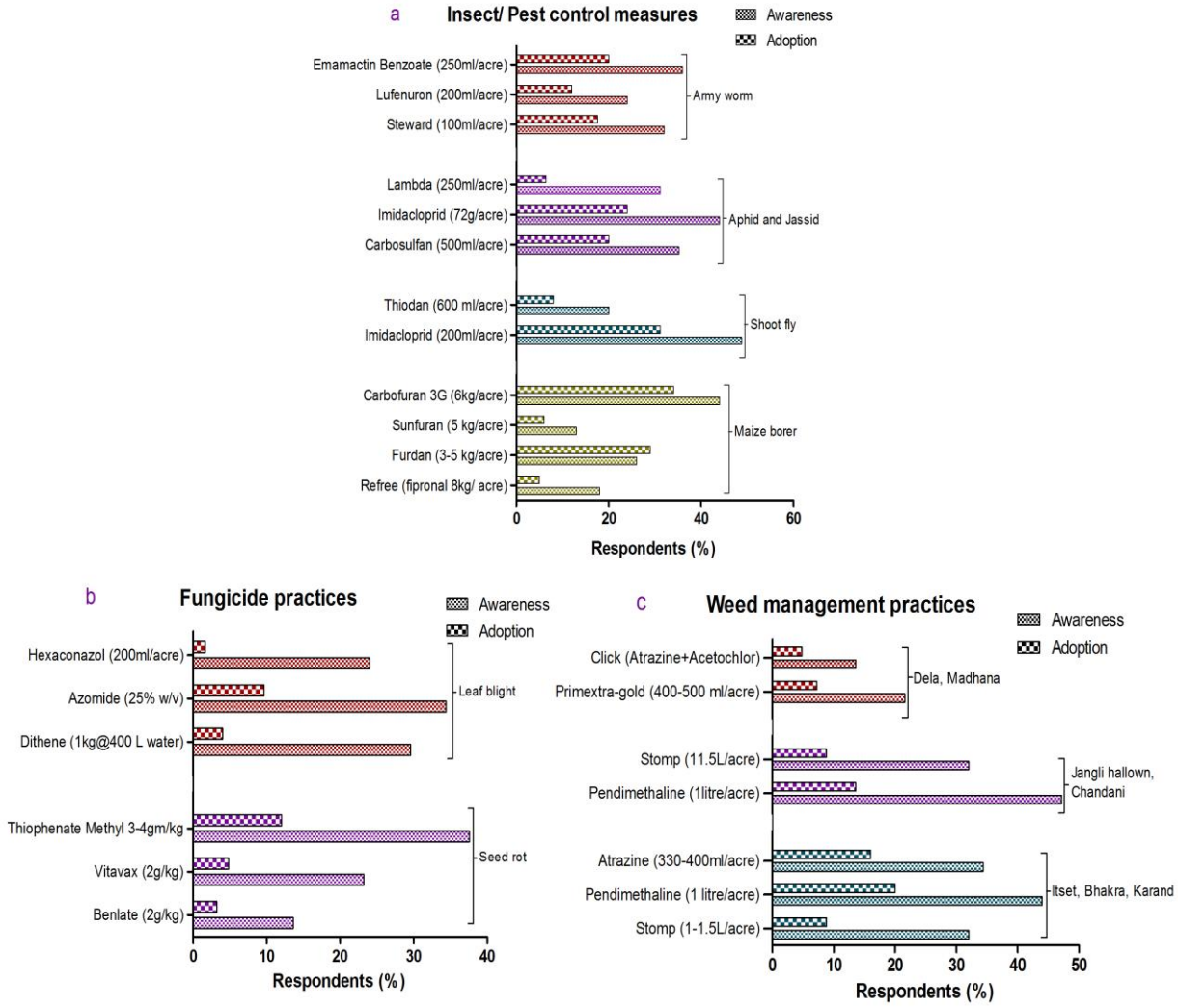

Figure 4. Awareness and adoption level of control measures taken by maize farmers in Pind Daden Khan.

Fungicide application

The findings further showed that 13.6%, 23.2% and 37.6% of the respondents were aware of Benlate, Vitawax and Thiophenate Methy recommended control measures against seed rot with 3.2%, 4.8% and 12% adoption level. Whereas 34.4% of the respondents were aware of Azoxytrbin 250sc recommended for protection against leaf blight. A few of the respondents (29.6% and 24%) were aware of the Dithene and Hexaconazol recommended against Leaf Blight. But a very small fraction (9.6%, 4% and 1.6%, respectively) had adopted it.

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

Weed control practices

Figure 4c reveals that 32%, 44% and 34.4% of the respondents were aware of recommended weedicides (Stomp 330 EC), (Pendimethaline, 1 litre/acre) and (Atrazine Sc, 330-400 ml/acre) used against Itset (*Trianthema portulacastrum* L.), Bhakra (*Tribulus terrestris*) and Karand (*Chenopodium murale* L.) respectively. Only 8.8%, 20% and 16% had adopted the recommendations. It implied that a small fraction did use weedicides. Whereas, the awareness against Jangli Hallown and Chandni weedicide was 47.2% and 32% respectively, only 13.6 and 8.8% had adopted it. About 22.6% were aware of use of Primextra-gold against Madhana (*Dactyloctenium aegyptium*L. Wild) and Dela (*Cyperus rotundus* L.), only 7.2% of them had adopted it. About 14. % of the respondents were aware of (Click 72.4SE (Atrazine + Acetochlor) against Madhana (*Dactyloctenium aegyptium* L. Wild), only 4.8% had adopted it. These results are similar to those of Jabar (2014).

Climatic Factors Affecting Yield of Maize Crop

The Table 1 shows the climatic factors affecting yield of maize crop, as ranked by the respondents. Temperature was ranked 1st followed by light (2nd) and rainfall (3rd). The wind was ranked as 4th followed by precipitation (5th) and humidity (6th). Hailstorm was perceived in the least (11th rank) amongst the factors affecting maize crop yield.

Table 1: Ranking of climatic factors which affect the yield of maize crop

Climatic factors	Rank	Mean	SD
Temperature	1	2.74	0.804
Light	2	2.73	0.608
Rainfall	3	2.56	0.858
Wind	4	2.05	0.743
Precipitation	5	1.88	0.724
Humidity	6	1.60	0.640
Dew	7	1.58	0.544
Fog	8	1.45	0.532
Frost	9	.00	0.000
Snow	10	.00	0.000
Hailstorm	11	.00	0.000

***SD = Standard deviation**

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

Severity of Climatic Factors Affecting Yield of Maize Crop

The Table 2 shows respondents' rating on the severity of climatic factors affecting maize yield. Amongst the climatic factors, temperature was the only variable perceived to have very high negative effects on maize growth by a few (2.5%) of the respondents. However, the majority (51.6) rated temperature as having medium effects on maize yield. Light and rainfall were the other variables highly rated by the respondents (62.5 and 54.1 respectively) to have medium impacts on maize yields.

Table 2: Rating of the climatic factors which affect the yield of maize crop

Sr. #	Climatic factors	Very Low (%)	Low (%)	Medium (%)	High (%)	Very High (%)
1	Temperature	5	30.8	51.6	10	2.5
2	Light	1.7	30	62.5	5.8	0.0
3	Rainfall	1.7	35.8	54.1	8.3	0.0
4	Wind	24.1	47.5	27.5	0.8	0.0
5	Precipitation	32.5	46.6	20.8	0.0	0.0
6	Humidity	48.3	43.3	8.3	0.0	0.0
7	Dew	44.1	53.3	2.5	0.0	0.0
8	Fog	56.6	41.6	1.7	0.0	0.0
9	Frost	0.0	0.0	0.0	0.0	0.0
10	Snow	0.0	0.0	0.0	0.0	0.0
11	Hailstorm	0.0	0.0	0.0	0.0	0.0

Rating: 1= Very low, 2= Low, 3= Medium, 4= High, 5= Very High

Non-Climatic Factors Affect Yield of Maize

The respondents ranked some non-climatic factors constraining the achievement of high maize yields in the study area. Market uncertainty ($\bar{x}$=3.81) was ranked first indicating that farmers perceived their low yields were as a result of uncertainty of markets in the area. Shortage of irrigation water ($\bar{x}$=3.79) ranked second, followed by poor extension services ($\bar{x}$=3.78). High land rent ($\bar{x}$=2.48) and availability of labor ($\bar{x}$=2.17) were in the least considered as constraining maize yield (Table 3).

Creative commons User License: CC BY-NC-ND
Abstracted by: EBSCOhost, Electronic Journals Service (EJS), Google Scholar, Directory of Open Access Journals (DOAJ), Journal Seek, Scientific Commons, Food and Agricultural Organization (FAO), CABI and Scopus

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

Table 3: Ranking of marketing and other factors which affect the yield of maize

Marketing & other factors	Rank	Mean	SD
Market uncertainty	1	3.81	0.702
Shortage of irrigation water	2	3.79	0.634
Poor extension services	3	3.78	0.624
Non-availability of fertilizers	4	3.78	0.586
Seed quality	5	3.73	0.579
Non-availability of seed	6	3.63	0.595
Adulteration in fertilizers	7	3.54	0.578
Limited credit facilities	8	3.52	0.722
High cost inputs	9	3.41	0.587
Soil and soil related factors	10	3.35	0.763
Adulteration in pesticides	11	3.20	0.512
Non-availability of pesticides	12	3.13	0.607
Non-availability of farm machinery	13	2.80	0.495
Small land holding	14	2.54	0.620
Costly labor	15	2.53	0.888
High land rent	16	2.48	0.594
Availability of labor	17	2.18	0.589

***SD = Standard deviation**

The respondents ranked uncertainty in market as 1st followed by the shortage of irrigation water and poor extension services as 2nd and 3rd. Non-availability of fertilizers was ranked as 4th constraining factor followed by seed quality and non-availability of seed as 5th and 6th. Non-availability of farm machinery was ranked as 13th followed by the small land holding and costly labor as 14th and 15th. High land rent and availability of labor was ranked as 16th and 17th (Table 3).

Conclusion and Recommendations

The majority of the respondents were aware of recommended maize production practices, but they did not adopt the same due to lack of finance, high cost of inputs, non-availability of information and good quality seed of maize. Farmers were worried about the marketing uncertainty and they feel that market uncertainty is affecting the yield of maize crop because the gap between input and output (profit) is creating

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

frustration among farmers and they are forced to start another business along with agriculture to fulfill their livelihood. The high cost of electricity and rented water made it difficult for farmers to earn good profit. There is need for site specific extension services to update the farmers existing knowledge about maize production. Government should allocate agriculture land to small farmers on lease with cheaper rates so they can earn good profits and improve their livelihoods. Market uncertainty is affecting the yield of maize crop. The gap between cost of input and output profits is creating frustration among farmers and they are forced to start another business along with agriculture to fulfill their livelihoods. One important factor hindering maize production is the cost of electricity for irrigation water. There is need for a policy to subsidize the electricity for tube wells. Extension services should be made more effective in the area to disseminate timely information.

References

Afzal, I., Noor, M. A., Bakhtavar, M. A., Ahmad, A., & Haq, Z. (2015). Improvement of spring maize performance through physical and physiological seed enhancements. *Seed Science and Technology*, 43(2), 238-249.

Ahmad, M. 2005. An investigation into the adoption gap of modern agricultural technologies of maize in District Jhang, Master's Thesis, Dept. of Agri. Ext., Univ. of Agri., Faisalabad.

Ali, M. 1999. A study into the adoption of recommended wheat growing practices' effect on grain yield in tehsil Faisalabad, Master's Thesis, Dept. of Agri. Ext., Univ. of Agri., Faisalabad.

Ammani, A. A., Ja'afaru, A. K., Aliyu, J. A., & Arab, A. I. (2012). Climate Change and Maize Production: Empirical Evidence from Kaduna State, Nigeria. *Journal of Agricultural Extension*, 16(1), 1-8.

Bakhtavar, M. A., Afzal, I., Basra, S. M. A., & Noor, M. A. (2015). Physiological Strategies to Improve the performance of Spring Maize (*Zea mays* L.) planted under early and optimum sowing conditions. *PloS one*, 10(4), e0124441.

Fiaz, S., Noor, M. A., & Aldosari, F. O. (2016b). Achieving food security in the Kingdom of Saudi Arabia through innovation: Potential role of agricultural extension. *Journal of the Saudi Society of Agricultural Sciences.* (in Press) http://dx.doi.org/10.1016/j.jssas.2016.09.001

Fiaz, S., N. Mobeen, M.A. Noor, M. Muddassir and M. Mubushar. (2016a). Implications of Irrigation Water Crisis on Socioeconomic Condition of Farmers

Journal of Agricultural Extension
Vol. 20 (2) December, 2016
ISSN(e): 24086851; ISSN(Print); 1119944X
http://journal.aesonnigeria.org
http://www.ajol.info/index.php/jae
Email: editorinchief@aesonnigeria.org

in Faisalabad District, Punjab, Pakistan. *Asian Journal of Agricultural Extension, Economics & Sociology*, 10(1): 1-7.

Government of Pakistan. 2016. Economic Survey of Pakistan 2015-16, Ministry of Finance, Islamabad-Pakistan.

Kumar, H. (2002). Resistance in maize to the larger grain borer, *Prostephanus truncatus* (Horn) (Coleoptera: Bostrichidae). *Journal of Stored Products Research*, 38(3), 267-280.

Lawlor, D. W. (2002). Limitation to Photosynthesis in Water-stressed Leaves: Stomata vs. Metabolism and the Role of ATP. *Annals of botany*, 89(7), 871-885.

Nachmias, C.F. and D. Nachmias. 1992. Research methods in social sciences. (4th ed.). martin press Inc. Kent, UK.

Noor, M. A., Ahmad, W., Afzal, I., Salamh, A., Afzal, M., Ahmad, A., ... & Wei, M. (2016a). Pea Seed Invigoration by Priming with Magnetized Water and Moringa Leaf Extract. *Philippine Agricultural Scientist*, 99(2), 171-175.

Noor, M. A., Fiaz, S., Nawaz, A., & Nawaz, M. M. (2016b). The effects of cutting interval on agro-qualitative traits of different millet (*Pennisetum americanum* L.) cultivars. *Journal of the Saudi Society of Agricultural Sciences*. (in Press) http://dx.doi.org/10.1016/j.jssas.2016.07.002

Punjab Municipal Services Improvement Project (PMSIP), 2011. Tehsil Pind Dadan Khan.

Uhart, S. A., & Andrade, F. H. (1995). Nitrogen deficiency in maize: I. Effects on crop growth, development, dry matter partitioning, and kernel set. *Crop Science*, 35(5), 1376-1383.

Zafar, I. 2005. A study into the gap between research recommendations and adoption of maize production technologies by farmers of Tehsil Sahiwal. Master's Thesis, Dept of Agri. Ext., Uni. of Agri., Faisalabad.