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Information sources and their perceived effectiveness on adoption of recommended technology for the rice crop in district Naushahro Feroze, Sindh, Pakistan

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Abstract

Present study was carried out in district Naushahro Feroze, Sindh Pakistan, In order to identify the rice farmers' awareness regarding modern technologies. Stratified Random Sampling method was applied for the selection of one hundred (100) rice growers from the district. The data revealed that a more than half (55%) of the rice growers were literate having average 9.3 years of farming experience. Vast majority (82%) of the rice growers were tenant's (7.5 acres per family), majority (80%) of them were using canal water. While, all the rice growers perceived that sowing method and weed control measures were completely diffused among them, where more than half (63%) of the rice growers perceived that new varieties for rice were completely diffused and almost among 90% of the farmers the insect control measures completely diffused. The top rank sources of information as perceived by the rice growers, was neighboring farmers, followed by radio, television, and contact farmers etc. Based on research findings, it is recommended that farmers do not care to use recommended land preparation technologies and fertilizer application. Therefore, it is recommended that an extension worker should stimulate farmers motives to use them properly. The study found that the performance of agriculture extension services was insignificant diffusion adoption process of recommended technologies. Therefore, it is recommended that agricultural extension services should come up to regulate the farm and home visits to the rice growers in this connection.

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Introduction

Rice (*Oryza sativa*) is one of the principal food grains and staple diets of majority people of Pakistan as well as Asia (FAO, 2016). Rice production in Pakistan holds an extremely important position in agriculture and the national economy (GoP, 2016). Pakistan is the world's fourth largest producer of rice, after China, India and Indonesia. Each year, it produces an average of 6 million tons and together with the rest of the Indian subcontinent; the country is responsible for supplying 30% of the world's paddy rice output. Most of these crops are grown in the fertile regions of Sindh and Punjab, with millions of farmers relying on rice cultivation as their major source of employment. Among the most famous varieties grown in Pakistan include the Basmati, Seela and IRRI known for its flavor and quality (FAO, 2016).

Rice is an important food and cash crop in Pakistan and it is the second staple food after wheat, which accounts for 3.1 percent in the value added in agriculture and 0.6 percent of GDP. During 2015-16, rice crop was cultivated on an area of 2748 thousand hectares showing a decrease of 4.9 percent over last year's area of 2891 thousand hectares. Rice production remained 6811 thousand tones, showing a decline of 2.7 percent over corresponding period of last year's record production of 7003 thousand tones. Rice area decreased due to less economic returns to the farmers on account of decline in rice prices both domestically and globally during last year's crop (GoP, 2016). Depressed prices and rising cost of production encouraged farmers to substitute rice with fodder and maize. The heavy downpours in July, 2015 also affected paddy cultivation. This sharp drop in prices mainly reflects pressure of large carryover stock from a record FY 2015 rice harvest. Specifically, abundant rice supply (owing to healthy crop in both FY 2014 and FY 2015), and sluggish exports particularly of Basmati, has led to a steep rise in rice stocks. In the case of Basmati rice, Pakistan's exports are already facing tough competition from India in the UAE market (Khan, 2004). As for the export of non-basmati varieties is concerned, severe drought in Thailand, the basmati varieties created opportunities for Pakistan to increase exports.

Rice exports particularly Basmati rice also remained subdued in 2015-16 compared to last year, whereas other varieties of rice exports improved in quantity by 9.9 percent (Tunio *et al.* 2016).

Many modern farming technologies related to the control of pests and productivity of soils has been identified as having effects on the long-term crop production of agro-ecosystems (Hossain *et. al*, 2010). Strategies aimed at dealing with these problems were increasingly addressed under the term of sustainable agriculture (Wasankar and Gohad, 2003). While there has been a great deal of research on related aspects like adoption of conservation technologies, less attention has been given to adoption of sustainable agricultural technologies as such. It was largely due to lack of success of the classic adoption diffusion model for explaining the adoption of sustainable technologies, which generally lacked the relative advantage in terms of profitability. It was in this context the present study was undertaken. It attempts to apply the adoption diffusion model to the case of sustainable agricultural technologies by employing a measure of farmer's attitude that shapes their perceptions of profitability and the current aspects of farming system theory (Hossain *et al.* 2010).

Perhaps the most significant innovation in the area of rice production is the development of high yielding varieties and hybrid seed (Aliou, 2006; Adedeji *et al.,* 2013). New varieties and hybrids provide the potential for many changes to the industry, including higher yields and the possibility of price impacts, due to increased supply (Chen Li-yun, *et al.,* 2007). Furthermore, modern seeds lead to increased production (Johnson and Vijayaragavan, 2011) on less land, which spares additional resources (i.e. water, labor, and land) needed to sustain the world's population. The primary reasons for such low rice productivity could be among others ignorance of farmers about latest improved technologies and their reluctance to change their traditional farming technologies, since the prospect of obtaining a marginal surplus depends largely on weather conditions in the state and the fear of possible crop failure certainly discourages the farmers to accept the advanced technologies (Shaikh *et al.* 2016).

Even with favorable climate, soil conditions, availability of water for irrigation, use of pesticides, and the production of rice are not up to the mark. For increasing the yield and to protect the crop from insect pests, it becomes necessary to transfer latest technologies to farmers and also motivate them to adopt those technologies. During the last few years, new varieties of rice were introduced; however, it is not known whether farmers are getting fruit of the new rice varieties (Binod *et al.,* 2012). Research and experiments of advanced countries have shown that key to increase per hectare yield lies in the adoption of modern scientific technologies by the farmers for which they do have contacts with a variety of information sources (Dibba, *et al.,* 2008). Therefore, a need exists to identify the information sources for the farmers and to assess their level of awareness and adoption of rice production technologies (Lidia, 2012). Thus, the purpose of this study was to investigate the information sources and their effectiveness on adoption of recommended technologies and level of technologies adoption for rice crop in district Naushahro Feroze, Sindh, Pakistan; as well as to develop recommendations based on achieved outcomes for policy makers.

Materials and methods

Every successful research starts with an appropriate planning before taking any further action. Research plan includes objectives and methods of study. The main purpose of present study was to find out the level of the diffusion and adoption process of recommended rice-growing technologies for the growers of Naushahro Feroze district, Sindh. Furthermore, the study was confined to only one district i.e. Naushahro Feroze, Sindh Pakistan which was further divided into five talukas (sub-districts) namely Moro, Naushahro Feroze, Kandiaro, Bhirya and Mehrabpur.

Sampling procedure

Stratified Random Sampling technique was used for random selection of 100 rice growers, where 20 respondents were selected from each taluka at random, while following Slavin (2007).

Data collection procedure and analytical measures

For primary data collection from the selected respondents, the questionnaire were prepared, consists of three sections (general information, level of diffusion/adoption of latest technologies, and opinion survey). Before finalization of the questionnaire it was pretested while interviewing five respondents, after all few questions were added in the questionnaire, to achieve the overall objectives of this study. Detailed interviews were conducted with respondents and specifically prepared questionnaires for the study were filled. Collected data were carefully arranged and organized for further treatments. Frequencies, mean, standard deviation and rank order were calculated with the help of Statistical Package for the Social Sciences.

Results and discussion

Outcomes of the present research regarding the knowledge about the recommended and adoption technologies as well as the effectiveness of various information sources in the diffusion of new agricultural technologies have been documented. The results are divided into three sections; respondent's socio-economic features; knowledge of recommended technologies and diffusion-adoption of recommended technologies.

Socioeconomics of the respondents

Socio-economic characteristics of the respondent play an imperative role with the term of adoption of technology (Mohamed and Temu, 2008, Toyobo *et al.,* 2011; Uwadiegwu, 2013, Magsi, *et al.,* 2015).

Results revealed that the average age of the respondents was 37 years. On average, literacy rate of the respondents including males, female, and children with 55 percent was recorded, which seems to be low than the national average that is 58 percent (GoP, 2016). While on average farming experience of farmers was about 9.3 years. With majority 82 percent of respondents were tenants with average land holding per family of 7.5 acres. Area under rice crop cultivation by each respondent on average was 4.6 acres.

Majority of almost 80 percent farmers mainly depend upon canal water to irrigate the rice crop in study area. Most, 45% of the farmers were getting the yield of 55 mnds/acre, 31% were getting 45 mds/acre, and 24% of the farmers were getting 40 mds/acre yield of rice. During field surveys, it was observed that district government along with other CBOs had been tailoring new techniques in order to boosting the status of education, which were appreciable efforts towards increase in overall enrolment. A detail on the household characteristics has been shown through Table 1.

Level of diffusion of recommended technologies as perceived by farmers

The farmers were asked to rank and give their perceptions regarding the level of diffusion of recommended technologies based on a Likert type scale for instance (1= not diffused, 2= partially diffused, 3= moderately diffused and 4= completely diffused). All the information regarding to the level of diffusion of recommended technologies was presented in Table 2, in which 100 percent of the respondents were agreed that the sowing method and weed control measures were completely diffused among them as perceived by the farmers. While, majority (63%) of farmers perceived that new varieties for rice were completely diffused, while 90% of the farmers perceived that the insect control measures information was complete diffused among them. Whereas more than half (58%) of farmers perceived that irrigation technologies for rice were completely diffused among them.

Table 1. Descriptive statistics (n=100).

Descriptive	Statistics
Social	
Average age of the Respondents (year)	37
Literacy rate of the respondents (percent)	55
Farming Experience average (years)	9.3
Status as tenants (percent)	82
Economic	
Land Holding per family, average (acres)	7.5
Agriculture as major source of income (percent)	67
Area under Rice Crop (acres)	4.6
Sources of canal Irrigation (percent)	80
Average grain rice yield per acre (mds)	45.9
Average chuff (by product) yield per acre (mds)	20

Table 2. Level of diffusion of recommended technologies as perceived by farmers (n=100).

Recommended Technologies	1*		2		3		4		Total	Mean	S.D.	Rank
	F.	%age	F.	%age	F.	%age	F.	% age				
Sowing method	-	-	-	-	-	-	100	100.0	100	4.00	0.00	1st
Weed control measures	-	-	-	-	-	-	100	100.0	100	4.00	0.00	1st
Insect control measures	1	1.0	9	9.0	-	-	90	90.0	100	3.79	0.64	2nd
New varieties	8	8.0	29	29.0	-	-	63	63.0	100	3.18	1.10	4th
Irrigation	19	19.0	18	18.0	5	5.0	58	58.0	100	3.02	1.23	5th
Land prep. Technologies	32	32.0	25	25.0	2	2.0	41	41.0	100	2.52	1.31	6th
Fertilizer application	58	58.0	40	4.0	-	-	2	2.0	100	1.46	0.61	7th

*Scale: 1= Not diffused, 2= Partially diffused, 3= Moderate diffused 4= Complete diffused.

Use of information sources as perceived by farmers

The farmers were asked to give their perception on sources of information regarding recommended technologies. The responses were managed through rating using Likert type scale for example (1= not at all, 2= some times, 3= most of times, 4= almost always and 5= always). The information regarding use of information sources about recommended technologies.

Table 3 highlights the frequency of use of information sources regarding the use of recommended technologies as perceived by farmers, with majority of farmers agreed that their neighboring farmers are the main source of getting new information regarding recommended technologies and were ranked 1st with a mean score of (Mean = 4.49, S.D = 0.83).

Radio was ranked 2nd with a mean score of (Mean = 3.65, S.D = 1.08) and Television was ranked 3rd with a mean score of (Mean = 2.41, S.D = 0.97) respectively. The least perceived sources of information were newspapers ranked 6th with a mean score of (Mean = 1.31, S.D = 0.82). Magazines ranked 7th with a mean score of (Mean = 1.06, S.D = 0.23) and contact farmers ranked 8th with a mean score of (Mean = 1.00, S.D = 0.00).

Table 3. Use of information sources as perceived by farmers (n=100).

Sources of information	1*		2		3		4		5		Total	Mean	S.D.	Rank
	F.	% age	F.	% age	F.	% age	F.	% age	F.	% age				
Neighboring Farmer	1	1.0	3	3.0	7	7.0	24	24.0	65	65.0	100	4.49	0.83	1st
Radio	4	4.0	11	11.0	25	25.0	36	36.0	24	24.0	100	3.65	1.08	2nd
T. V	17	17.0	40	40.0	31	31.0	9	9.0	3	3.0	100	2.41	0.97	3rd
Extension worker	75	75.0	3	3.0	14	14.0	8	8.0	-	-	100	1.55	1.00	4th
Demonstration Plots	78	78.0	1	1.0	15	15.0	5	5.0	1	1.0	100	1.50	0.98	5th
News papers	86	86.0	2	2.0	8	8.0	3	3.0	1	1.0	100	1.31	0.82	6th
Magazines	94	94.0	6	6.0	-	-	-	-	-	-	100	1.06	0.23	7th
Research worker	100	100.0	-	-	-	-	-	-	-	-	100	1.00	0.00	8th
Contact Farmer	100	100.0	-	-	-	-	-	-	-	-	100	1.00	0.00	8th

*Scale: 1= not at all, 2= some time, 3= most of time, 4= almost always, 5= always.

Effectiveness of information sources as perceived by farmers

The farmers were asked to judge the effectiveness of information sources regarding diffusion of recommended technologies (Lakho, 2004) on a Liker type scale (1= not effective, 2= somewhat effective, 3= effective, 4= very effective and 5= extremely effective). All the information regarding the effectiveness of sources of information about recommended technologies are presented in Table 4.

Table 4 indicates the effectiveness of information sources regarding diffusion of recommended technologies as perceived by farmers and shows that majority of farmers perceived neighboring farmers as "effective" source of information regarding diffusion of recommended technologies and were ranked 1st with a mean score of (Mean = 4.18, S.D = 0.84). Radio was ranked 2nd with a mean score of (Mean = 3.48, S.D = 1.07) and Television was ranked 3rd with a mean score of (Mean = 2.24, S.D = 0.75). The least perceived sources of information were newspapers ranked 6th with a mean score of (Mean = 1.26, S.D = 0.67). Magazines ranked 7th with a mean score of (Mean = 1.06, S.D = 0.31) and contact farmers ranked 8th with a mean score of (Mean = 1.00, S.D = 0.00). These finding are in line with the findings of (Sadaf *et al.*, 2006, Farooq *et al.* 2007, Adinya *et al.*, 2008, Mengal *et al.* 2016, and Sheikh *et al.* 2016,) who described that the neighboring farmers obliged as foremost sources of information.

Problems faced by farmers in adoption of recommended technologies

Farmers were asked to provide information regarding the problems that they faced in adoption of recommended technologies through Likert type scale, whereas 1 is stand for (1= not at all, 2= to some extent and 3= to a greater extent). These finding somewhat are in line with the findings of (Fatima *et al.,* 2014, Mirani *et al.,* 2014, and Shaikh *et al.,* 2016) have reported that the neighboring farmers served as main sources of agricultural information. This might be due to the fact that neighboring farmers are easily in contact with each other due to short distance between their houses, same background, origin, tradition and culture.

Table 4. Effectiveness of information sources as perceived by the farmers (n=100).

Sources of information	1*		2		3		4		5		Total	Mean	S.D	Rank
	F.	%	F.	%	F.	%	F.	%	F.	%				
Neighboring Farmer	1	1.0	1	1.0	19	19.0	37	37.0	42	42.0	100	4.18	0.84	1st
Radio	5	5.0	13	13.0	28	28.0	37	37.	17	17.0	100	3.48	1.07	2nd
T.V	15	15.0	50	50.0	31	31.0	4	4.0	-	-	100	2.24	0.75	3rd
Demonstration Plots	78	78.0	-	-	3	3.0	12	12.0	7	7.0	100	1.70	1.35	4th
Extension worker	77	77.0	1	1.0	6	6.0	8	8.0	8	8.0	100	1.69	1.33	5th
News papers	86	86.0	3	3.0	10	10.0	1	1.0	-	-	100	1.26	0.67	6th
Magazines	96	96.0	2	2.0	2	2.0	-	-	-	-	100	1.06	0.31	7th
Research worker	100	100.0	-	-	-	-	-	-	-	-	100	1.00	0.00	8th
Contact Farmer	100	100.0	-	-	-	-	-	-	-	-	100	1.00	0.00	8th

*Scale: 1= not effective, 2= somewhat effective, 3= effective, 4= very effective, 5= extremely effective.

Table 5. Problems faced by farmers about adoption of recommended technologies (n=100).

Problems	1*		2		3		Total	Mean	S.D.	Rank
	F.	% age	F.	% age	F.	% age				
Lack of knowledge	32	32.0	26	26.0	42	42.0	100.0	2.10	0.85	1st
Shortage of irrigation	35	35.0	26	26.0	39	39.0	100.0	2.04	0.86	2nd
Lack of money	44	44.0	17	17.0	39	39.0	100.0	1.95	0.91	3rd
Afraid of loss	72	72.0	9	9.0	19	19.0	100.0	1.47	0.79	4th
Non-availability of inputs	84	84.0	5	5.0	11	11.0	100.0	1.27	0.64	5th
Adulterated inputs	92	92.0	2	2.0	6	6.0	100.0	1.14	0.49	6th

*Scale: 1= not at all, 2= to some extent, 3= to a greater extent.

Table 5 shows that most (42%) of the farmers faced problems of lack of knowledge to a greater extent, 39% of farmers faced problems of lack of money and shortage of irrigation water to a greater extent, 19% of farmers faced problems of afraid of loss to a greater extent, 11% of farmers faced problems of non-availability of inputs and 6% of farmers faced problems of adulterated inputs to a greater extent.

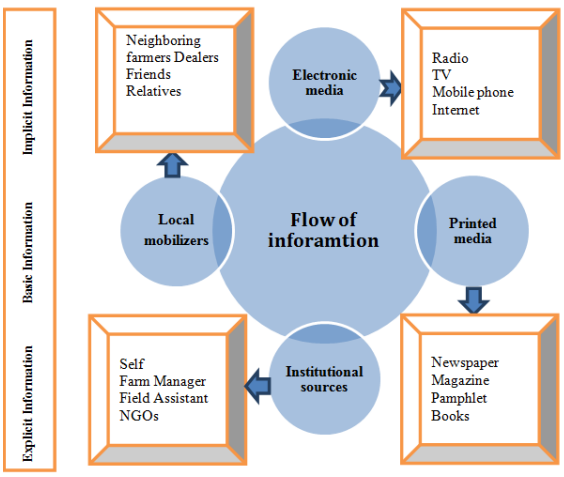

Fig. 1. Author computation.

Information System Model

Sources of information are a significant instrument for awareness (Chaudhary, 1997) and assistance tool of the farmers for adoption state-of-the-art expertise as knowledge dimension. Amalgamations sources of information's and communication channels can be operationally demarcated as broadly or as closely as appropriate. Information system flow was measured between each and every node/corner and categorized as [(electronic media (radio, television, mobile phones, internet); printed media (newspaper, magazine, pamphlet); institutional sources; (self, farm manager, field assistant, NGOs) and others local mobilizers (neighboring farmers, dealers, friends)] aiming at to classify configurations of communication, individuals, systems and institutions (Rogers, 1983). However, in this regard, it has excessive effectiveness for comprehend the information system and flows among the electronic media, printed media, institutional sources and others local mobilizers as shown in Fig. 1.

The information system model entails all nodes/corners are the factual sources either are explicit information or basic information and implicit information (Khan, 1997). Present Information System Model not only increases the credibility, knowhow and proximity with the term of qualitative quantum, but also ascertains the roadmap in quantitative aspect for the future prospect.

Conclusions

Major research findings regarding the demographic characteristics has been shown that most (49%) of the rice growers belonged to the age group of 21 to 35 years, while 36% were illiterate, (45%) of the rice growers had an experience of 10 to 20 years, most (39%) of the rice growers were owner cultivators, (64%) of the rice growers have up to 20 acres of land. Most (44%) of the rice growers were getting 20 mds per acre yield of rice whereas vast majority (96%) were using canal irrigation system. Whereas most (42%) of the rice growers perceived neighboring farmers as an extremely effective source of information regarding diffusion of recommended technologies of rice. In the opinion survey section, the study revealed that most (42%) of the rice growers faced "lack of knowledge" in the adoption of recommended technologies and (36%) of the rice growers preferred "demonstration" as a better information method for the diffusion of recommended agricultural technologies.

Recommendations

On the basis of research findings, it is recommended that farmers do not care to use recommended land preparation technologies and fertilizer application. Therefore, it is recommended that an extension worker should stimulate farmers to use them properly. The study found that the performance of agriculture extension services was insignificant as a whole diffusion-adoption process of recommended technologies. Therefore, it is recommended that agricultural extension services should come up with some positive attitude with the term of farm and home visits in this regard. The study further showed that extension authorities point blankly neglect the effectiveness of mass media as perceived by the farmers for diffusion of agriculture technologies. It is also recommended that availability government should ensure the pure inputs in market.

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References

Adedeji TO, Nosiru MO, Akinsulu AA, Ewebiyi IO, Abiona BG, Jimoh TS. 2013. Adoption of New Rice for Africa (NERICA) technology in Ogun State, Nigeria. Journal of Development and Agricultural Economics **5(9),** 365-371.

Adinya IB, Idio AD, Kuye OO. 2008. Farmer's awareness of sources of credit for improved farm practices in Cross River State, Nigeria. Global Journal of Social Sciences **7(1),** 5-8.

Alene A, Zeller D, Schwarze M, Nuryartono SN. 2005. The extent and determinants of production efficiency of farmers in the rainforest margins in Central Sulawesi, Indonesia: implications for land use and support services. Quarterly Journal of International Agriculture Germany **44(4)**, 335-353.

Aliou D. 2006. Diffusion and adoption of Nerica Rice Varieties in Côte D'ivoire: The Developing Economics **44(92),** 208-231.

Binod K, Paudel MN, Ghimire RC. 2012. Assessing current status of early rice varieties in river Basin area of Nepal: a concern to diffusion, International Journal of Agriculture: Research and Review **2(2),** 59-61.

Chaudhary SM. 1997. Individual contact Methods Rajab Ali Memon and E. Bashir (Eds.) Extension Methods, Islamabad. National Book Foundation pp. 155-176.

Chen Li-yun, Xiao Ying-hui, Tang Wen-bang, LEI Dong-Yang. 2007. Technologies and Prospects of Super Hybrid Rice Breeding. Advances in Agriculture & Botanicsopen access International Journal of the Bioflux Society Rice Science **14(2),** 71-77.

Dibba L, Diagne A, Fialor SC, Nimoh F. 2008. Diffusion and Adoption of New Rice Varieties for Africa (Nerica) in the Gambia. African Crop Science Journal **20,** 141 -153.

FAO. 2016. The den Bosch declaration and agenda for action on sustainable agricultural and rural development: Report of the Conference: Ministry of Agriculture, Natural Management and Fisheries of the Netherlands and FAO, Rome Italy.

Farooq S, Muhammad S, Choudhry KM, Ijaz A. 2007. Role of print media in the dissemination of agricultural information among farmers: Pakistan Journal of Agricultural Sciences **44(2),** 378-380.

Fatima I, Siddiqui BN, Ali M, Naseem K. 2014. Self-perceived role of rural youth in ensuring food security in tehsil Rawalpindi, Pakistan. A paper presented at the International Conference "Emerging Horizons of Agricultural Extension for Sustainable Rural Development". Faisalabad, Pakistan.

GoP. 2016. Economics Survey of Pakistan 2015-16. The Pakistan Rice's. MINFAL, Pakistan Central Rice Committee. Finance Division, Economic adviser's wing. Islamabad, Pakistan.

Hossain M, Jaim WMH, Paris TR, Hardy B. 2010. Adoption and diffusion of modern rice varieties in Bangladesh and eastern India.

Johnson B, Vijayaragavan K. 2011. Diffusion of System of Rice Intensification (SRI) Across Tamil Nadu and Andhra Pradesh in India. The Indian Research Journal of Extension Education **11(3),** 250-263.

Khan SA. 1997. Extension Models and case studies. Rajib Ali Memon and E. Bashir (Eds.). Extension Methods. Islamabad, National Book Foundation pp. 349-361.

Lakho MA. 2004. Role of Mass Media in adoption of recommended production technology of Rice crop in District Hyderabad. Sindh Agriculture University Tandojam, Pakistan.

Lidia D. 2012. Determinants of diffusion and adoption of improved technology for rice parboiling in Benin, Review of Agricultural and Environmental Studies **93 (2),** 171-191.

Magsi I, Memon AW, Magsi H Mirani Z. 2015. Socioeconomic Conditions of Sindh, Pakistan: Case of Kambershahdadkot District. International Journal of Rural Studies **22(1),** 27-32.

Memon FH. 2007. Farmers perception regarding the role of print media for transfer of technology of cotton crop in District Hyderabad Sindh. M.Sc. Agriculture Extension, Sindh Agriculture University, Tandojam Sindh, Pakistan.

Mengal AA, Dostain A, Anwar S, Mirani Z, Magsi H. Ahmad M. 2016. Farmer's Perception Paradigm: Public and Private Extension Services in Baluchistan, Pakistan. Public Policy and Administration Research **6(4),** 11-17.

Mirani Z, Kumbhar MI, Magsi H, Mughal S. 2014. Rural Women role in agriculture of Pakistan: contributions and constraints. Journal of Business Strategies **8(2),** 83-96.

Mohamed KS, Temu AE. 2008. Access to credit and its effect on the adoption of agricultural technologies: the case of Zanzibar. Journal of Savings & Development. 32 (Supplementary) pp. 45-89.

Mustapha SB, Undiandeye U, Sanusi C, Bakari AMS. 2012. Analysis of adoption of improved rice production technologies in Jeer local government area of Borno state, Nigeria. International Journal of Development and Sustainability **1(3),** 278-283.

Rogers EM. 1983. Diffusion of innovations. 3rd ed. Free Press, New York.

Sadaf S, Asif Muhammad L. 2006. Preferences of Rural Women for Agricultural Information Sources: A Case Study of District Faisalabad, Pakistan. Journal of Agricultural Social Sciences **2(3),** 145–149.

Sheikh MJ, Magsi H, Qureshi NA. 2016. An analysis of Extension Services in rural Sindh, Province of Pakistan. The Macrotheme Review **5(2),** 77-84.

Slavin R. 2007. Educational research in an age of accountability. Boston: Pearson Education.

SPSS, Inc. 2015. Statistical Package for the Social Sciences (Version 23) [computer software]. New York, USA: IBM Corporation.

Toyobo A, Muili EA, Ige JO. 2011. Correlates of socio-economic characteristics of housing quality in Ogbomosho township. Oyo State, Nigeria. Global Journal of Human Social Science U.S.A. 1(7).

Tunio A, Magsi H, Solangi MA. 2016. "Analyses of Growth Trends and Production Forecast of Cash Crops in Pakistan, "International Journal of Agronomy and Agricultural Research **9(1),** 158-164.

Uwadiegwu BO. 2013. The structural profile of the socio economic and housing problems of the slum area in Enugu City, Nigeria; An Insider's Perception. The International Journal of Engineering and Science **2(3),** 8-14.

Wasankar SR, Gohad VV. 2003. Constraints in adoption of Rice production technology. New Agriculturist **14(2),** 113-116.