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LINKAGES MECHANISM BETWEEN RESEARCH-EXTENSION-FARMER IN BALOCHISTAN: A POLICY PARADIGM

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ABSTRACT

Present study sought to explore the emergent linkages/communication mechanism between research, extension and farmers responsible for diffusion of innovations in the Balochistan province, Pakistan. Two types of sampling approaches explicitly were used i.e. simple random sampling and systematic sampling for selecting respondents for this study. One hundred (100) Extension Field Staff were selected by using the systematic sampling method whereby every *Kth* number was randomly selected. Fifty (50) farmers were also selected through the simple random sampling procedure. Total, one hundred fifty (150) respondents (researchers=50; extensionists=50; farmers=50) were chosen as sample. Data were collected through comprehensive questionnaire. The Quetta district was purposively selected because of the all core extension activities and presence of functional agencies involved in agricultural technology transfer were run either research institute or extension wing in linkages context. Statistical Package for the Social Sciences (SPSS) a computer program (version 22.0) was used for quantitative data analysis. Aforesaid results show that effective linkages between research, extension and farmers remained non-significant concerning with the dissemination of modern technologies. Based on achieved results, the study recommended thatformation of technical experts team which should comprise the representatives of agriculture research institute and extension wing that should be drawn a policy agenda, cooperative efforts, and joint priority setting which constitute to guide the development goals of sustainable agriculture growth at province level so as to diminish the misinterpretation and stimulate to strengthen the communication sections. The study further recommends the promotion of the advisory services with the collaboration of the farming communities in order to disseminate the new technology and often appropriate practices by means of productive linkages.

Keywords: Balochistan, extension, EFS, farmers, linkages, Quetta

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INTRODUCTION

Linkage mechanism was labeled as the reciprocal communication and occurrence of a working relationship among two or more organizations with sharing a common objective in order to regular contact and enhanced output (Oladimeji *et al.,* 2006). World-wide agricultural extension distribution system was regarded as the inimitable configuration which stimulate the transfer of technology process and exchange the convenient information form the intended recipients and expand their practical knowledge so as to elevate their socio-economic condition towards liable means and in achieving Millennium Development Goals (MDGs). By and large agricultural extension services was the massive inspiration instrument, which may support to evolve the innovations that uphold the sequential crop productivity and end the poverty dimension not only developing but also in developed countries (Anderson and Feder, 2003). There is a rising importance on refining the linkages mechanism relationship between research-extension-farmers on knowledge based in developing and developed countries (Rolling, 1990). Imprudently agricultural extension delivery system has unsuccessful regarding disseminating often new practices towards its intended recipients in developing and developed countries due to weak linkages between key system actors (Doamekpor, 2005). Preceding eras the causes for letdown of agricultural extension services because of outmoded procedure, linear extension model, top-down elegance, bureaucratic approaches, poor liaison, managerial style and low competency level of front extension field staff (World Bank, 2003). Liaison contrivance was considered as an effective tool for the agriculture growth in extension context (Rivera and Carey, 1997). Linkages mechanism debates between these three pivotal portions of the agricultural advisory and support services were actually feeble or missing. Conversely, linkages between its diverse mechanisms (research-extension-farmers) with the term of agricultural expansion outlook was weak (Mubangizi *et al.,* 2004). Accordingly a knowledge gap occurs on factors influencing research–extension–farmers linkages. Inadequate growth with the term of agricultural prospects in various countries has been credited by poor linkages between key system (research-extension-farmers) as a results unproductive technology delivery structures, deprived information packaging and nonexistence of communication systems (FAO, 2004).

The research-extension-farmers triangular relationship continuum was considered as utmost vigorous in the process of generating and diffusing new skills and know-hows towards intended farmers, which achieving the generally joint venture objectives of enhance the food security and crop production. However, effective communication linkages whereby achieved through the appropriate communication between the key system actors. Equally farmers and extension agents are the clients of research. Linkages instrument between research, extension (adaptive research) and farmers are part and parcel for three dimension and determination. Without occurrence of key system actors the dual goals of sustainable agriculture may perhaps not possible. However, Agriculture Research Institute (ARI) at province level innovate the new technology and did not directly links to access the farming communities. Whereas Agriculture Extension Wing disseminate the practical aspects of the technology, while farming communities are the final receivers to adopt the technology. In this

connection, tie between the research-extension-farmers are excessively essential in order to ensuring to the broadening dissemination of latest technology to farmers as effective degree. But unfortunately existing linkages between research- extension-farmers at province levelexhibited miserable portrait or alternatively missing, three sets of clients are not efforts adequately towards the betterment and development of sustainable rural development as a results whole procedure are suffering. Linkages between Agriculture Extension Wing and Agriculture Research Institute are all but non-existing. Policy makers and donor organizations have acknowledged poor links between research-extension as considered a foremost limiting factors for technological and progressive agriculture changes. However, specific have sought to increase those links through policy changes and institutional reorganizations (World Bank, 1985). Keeping in view above mentioned facts the research study was carried out in order to denote and explore the perceived perceptions of the respondents regarding linkage mechanism between research-extension-farmers about technology interventions in Balochistan context and point-out the possible areas of enhancement for dynamic linkages.

Present study was aimed to explore the emergent linkages mechanism between research-extension-farmers in Balochistan province: Explicitly the study sought to following specific objectives: (1) To identify the possible areas about linkages mechanism as perceived by the public extension field staff and farmers (2) To identify the major factors affecting the linkages mechanism between the key system actors in the study area (3) To developed the conceptual linkages mechanism about agricultural extension system and (4) to determine suitable means of improving and wide-ranging strategies for firming the linkages mechanism at province level on a viable means.

METHODOLOGY

The quantitative research paradigm (descriptive type) was used in the present study. The Quetta district was selected purposively because all core extension activities and presence of functional agencies involved in agricultural technology transfer were run either research institute or agric: extension in linkages context. A series of closed-ended fixed-choice questions and queries were developed about possible linkage arrangement between key system actors. Two types of sampling approaches explicitly used i.e. simple random sampling and systematic sampling for selecting of respondents for this study. One hundred (100) Extension Field Staff were selected by using the systematic sampling method whereby every *Kth* number was randomly selected. Fifty (50) farmers were also selected through the simple random sampling procedure. Total one hundred fifty (150) respondents (researchers=50; extensionists=50; farmers=50) were chosen as sample. Keeping in view objectives, aims and scope of the present study, it was obviously decided to use face-to face communication (personal interview) of the respondents in the study areas in order to elicit the primary data or information. Three experts of Agriculture and Cooperative Department, Government of Balochistan were examining the validity of questionnaire or inquiry form. A comprehensive questionnaire was firmly designed based on review of related literature and available texts in order to capture a full range of perceptions and opinions of the respondents about linkages mechanism issues in Balochistan

province. Respondents ranked the extent to which they agree to each of the 17 linkages mechanism and arrangement on a five (5) point Likert type of scale whereas one 1 stand for “not at all influential links”, 2 stand for “slightly influential links”, 3 stand for “somewhat influential links”, 4 stand for “very influential links” and 5 stand for “extremely influential links”. Likewise 18 constructs about linkage mechanism were presented to the public extension field staff to specify the extent of perceptions promise by using five (5) point Likert type of scale (level of effect) whereas one 1 stand for “not at all effective”, 2 “stand for slightest effective”, 3 stand for “trend to effective”, 4 stand for “effective” and 5 stand for “very effective”. Face validity were reputable by a panel of experts comprising of Agriculture Extension Wing. A pilot study was directed with 15 respondents who had not been included as a part of sample frame in order to determine the reliability of the questionnaire for the study. Cronbach’s Alpha program depicted that the score was 0.866 to 0.870 which showed that interval consistency of the research instrument (inquiry form) was excellent as suggested by George and Mallery (2003). The sample size for both populations was determined by using McCall (1980) table “selecting sample size from a given population” at the 0.05 percent error rate. Thus, the present research study was afirst attempt to identify the communication and knowledge gap regarding linkages mechanism at province level. Statistical Package for the Social Sciences (SPSS) a computer program (Version 22.0) was used for quantitative data analysis. For the comparison among and between for the groups One-Way ANOVA, Duncan Multiple Range Test (DMRT) and Independent Samples *t-test* was performed and applied to rank the means.

RESULTS AND DISCUSSION

Respondents were enquired to specify their perceptions regarding the existing present linkages between research, extension and farmers. While F-value was found significant at the probability level 0.05, Duncan Multiple Range Test (DMRT) was applied to rank the means as shown in Table 1. The non-significant variables were greater in number (>50%) than the significant factors. This may be due to the reason that same linkages mechanism or systems (top-down) were existed in the different realm. Therefore, it was concluded that comparatively poor linkages existed between research, extension and farmers. Somewhat similarly a result was found by the (Kimenye, 2006) in Kenya who was reported that a field day was the significant variables about effective linkages between researchers-extension field staff and farmers.

Research extension linkage

By nature agriculture research was considered as acts revolutionize and inventions of technology with the term of constant developments to keep agricultural science continuously upward and moving advancing. Agricultural extension disseminates the practical aspects and production recommendations of the technology to the end-users in order to improving their production and marketing (FAO, 2005). Both were reliant on each other for their effective operation and catalyst for knowledge useful utilization. The main task of extension was assessing the impact of technology and broadcast the beneficial aspects of the technology to the farmers. However, the gap between technology dissemination and adoption process indicating the ineffective

linkages between key system actors were existed at a greater extent. Similar, in practical, the extension wing has not been providing the powerfully client-oriented, demand-driven and action-oriented programs. Communication and linkages between research institute and extension services was weak (Rees *et al.,* 2000). At province level the extension services have been provided by means of a command-and-control mode (top-down) whereby the overall extension activities relatively embedded and fixed technology packages. The research-extension connection had been actual deprived and EFS have been involved in diverse non-extension activities which was not constitute to interrelated their common responsibilities and obligations. Further, Linkages gaps exist between the research and extension because of communication difficulties subsequently outcomes of irrelevant technologies did not reaching the farmers door steps (Bourgeois, 1990). Substitute or innovative liaisons were imperative factor of information to bridge the gap left by the weak linkages (Kimenye, 2006). Fruitful efforts with the respect of formulating linkages mechanism may be required by both sides of key system actors in order to achieve common development goals of empowerment and crop productivity of household.

Table 1. Research-extension–farmers perceived scores regarding linkages mechanism (n=150)

Linkages areas	**Research EFS**		**Extension EFS**		**Farmers respondents**		**F. Value**	**Sig***
	M	**SD**	**M**	**SD**	**M**	**SD**		
Improve vegetable varieties	3.22b	1.250	1.68a	0.935	1.42a	0.882	44.132	0.000**
Improve crop varieties	1.48a	0.838	2.24b	1.464	1.24a	0.686	12.310	0.000**
Improve fruit varieties	1.62b	1.104	1.10a	0.303	1.32ab	0.767	5.375	0.006^{NA}
Crop husbandry	1.34a	0.981	1.34a	1.002	1.54a	1.146	0.609	0.545^{NA}
Marketing channel and distribution	1.52a	0.788	2.56b	1.127	2.46b	1.388	12.924	0.000**
Value chain	2.02b	1.253	1.98b	.979	1.12a	0.593	13.454	0.000**
New input (fertilizer, pesticide)	1.78a	1.329	3.18b	1.304	3.54b	0.761	32.031	0.000**
Soil fertility	3.90b	0.673	3.56a	0.786	4.14b	0.639	8.570	0.000**
Food security	1.64a	1.064	2.28b	1.178	2.28b	1.088	5.524	0.005*
Latest irrigation technology	4.08b	0.528	3.64a	0.776	3.96b	0.532	6.657	0.002**
Agriculture implementation	2.44a	0.540	2.68b	0.551	2.46ab	.613	2.737	0.068^{NA}
Credit facilities	1.94a	0.549	1.90a	0.839	2.14a	0.534	1.919	0.150^{NA}
Processing of Agric-product	1.98a	0.552	1.92a	0.922	2.14a	0.606	1.273	0.283^{NA}
Livestock production	2.00b	0.606	1.80b	0.638	1.50a	0.735	7.217	0.001**
Bee-keeping	2.88a	1.023	2.74a	1.290	3.00a	1.293	.579	0.562^{NA}
Agro-forestry	2.16a	0.618	2.24a	0.656	2.00a	0.534	2.039	0.134^{NA}
Mushroom farming	1.42a	0.991	3.42b	0.949	3.30b	1.054	62.967	0.000**

Scale *1=Not at all influential links, 2=Slightly influential links, 3=Somewhat influential links, 4= Very influential links, 5=Extremely influential links
Significant at 0.05 Level
SD = Standard deviation
RO=Rank order
NA=Non-significant
* *Significant at 0.0 Level

Table 2. Public extension field staff & farmers perceived scores about linkages mechanism (n=150)

Linkages	Public Extension			Farmers			Std. err. diff.	t-value	Sig*
	M	SD	RO	M	SD	RO			
Joint research and development	2.46	1.36	14	3.44	.993	1	.19594	-5.001	.000**
Sharing of technical expertise	3.11	1.10	7	3.26	1.04	2	.18490	-.811	.419 NA
Mobilization of farming communities	3.53	.96	1	3.22	.953	3	.16607	1.867	.065 NA
Exchange of infrastructure	2.59	1.43	12	3.20	1.16	4	.21240	-2.872	.005*
Social gathering	3.38	1.08	3	3.14	1.12	6	.19284	1.245	.216*
Farm visits	3.38	1.03	4	1.60	1.05	14	.18084	9.843	.000**
Home visits	3.09	1.23	8	1.26	.723	17	.16072	11.386	.000**
Field days	3.52	1.12	2	1.64	1.27	12	.21232	8.855	.000**
Joint campaign	2.43	1.55	15	3.20	1.10	5	.22041	-3.493	.001**
Demonstration plots	3.15	1.21	6	1.88	.982	11	.18472	6.875	.000**
Informal contact	2.65	1.13	10	2.18	1.12	10	.19457	2.416	.018 NA
Exhibition and display	2.62	1.17	11	1.28	.757	16	.15860	8.449	.000**
Conference	2.00	1.21	17	1.06	.313	18	.12929	7.271	.000**
Workshop	2.19	1.16	16	1.64	1.08	13	.19223	2.861	.005*
Seminar	1.88	1.23	18	1.30	.909	15	.17815	3.256	.001**
Publication	2.49	1.29	13	2.70	1.01	8	.19360	-1.085	.280 NA
Wall-chalking	3.23	1.10	5	2.80	1.03	7	.18308	2.349	.021 NA
Print material	3.08	1.01	9	2.20	1.14	9	.19069	4.615	.000**

Scale * 1=Not at all effective, 2=Slightest effective, 3=Trend to effective, 4=Effective. 5=Very effective
Significant at 0.05 Level SD = Standard deviation RO=Rank order NA=Non-significant
**Significant at 0.0 Level

Extension farmers linkage

Agriculture extension was going through continuous and rapid variations since its formal inception. Over the past decades, the agricultural sector in general and the crop production sector especially have gone through many changes. Extension conventionally has played a heavy role in given that information and often new technologies to the farmers (FAO, 2009). Satisfactory extension services frequently bridge the gap between research-extension-farmers in holistic ways (Nahdy *et al*., 2011). Unfortunately, despite the fact the provincial agricultural extension system not be able to achieve their joint objectives and did not fulfill the present day needs and requirements of the farming communities resulting ill-chosen blanket recommendations and low crop yield. Extension programs have been framed keeping in the view and consideration of the farmer's belief (Belay, 2003). Front line extension field staff did not paid the frequent visits to the farmer's field. The current operating system of extension was lag down due to strong political influence. In this regard the junior officers given preference and priority over the senior officers based on political liking and nepotism rather than efficiencies basis. Privilegesand obligations render for the resource-rich farmers that negate marginalfarmer's needs.Similar, latest technology ensembles for the resource-rich and influential farmers consequential which leads to widening the gap between the Agriculture Department and small/ poor farmers.

Table 3. Vital areas, bottlenecks, descriptions, outcomes and solutions regarding research-extension-famers linkages at province level

Research extension linkage	Areas	Core bottle-necks and challenges	Descriptions	Outcomes	Solutions
	Policy	Top-down (leading approach).	The flow of info top-down. Extension packages have been framed which excluded the marginal farmer's priorities and needs.	Consequently, farmers have a lack of drivable chance to select packages.	Holistic approach is needed as long as conceivable.
	Policy	Managerial style.	Political system influence and adversely affected the entire extension theme and dimension.	Rigid bureaucratic approaches, show down the pace of total extension events.	Bottom-up approach is desirable as long as possible, political influence and involvement eliminate.
	Operational	Research and extension have different mandate.	Both extension, research different entities and different line of enquiry, priority programs.	No clear Direction between key system actors about linkages.	Propagate combined programs with the term of linkages at province level.
	Operational	Rivalry mode instead of collaboration between key systems.	The access of research institute to the farmers was restricted. Low competency level of EFS of extension wing.	As a results deteriorating of collective cooperating of common goals.	Promote the linkages of research, extension and integrated efforts at provincial level prerequisite.
	Operational	Concentration to the resource rich farmers and ignore the poor farmer's needs.	Paying attention towards poor farmers was as the limiting factors either research or extension advisory services.	Indiscretion produces poor performance of agriculture sectors & low crop yield.	Encourage the multi-dimensional approaches like holistic approaches are needed.
Extension farmers linkage	Policy	Bureaucratic procedures.	Bureaucratic snag mark it difficult for the EFS to function properly for the farmers demands.	Affect the entire extension system.	Rooted-out the bureaucratic role in extension activities.
	Policy	Technology transfer.	EFS responsible to transfer the latest technology to the farmers.	Low competency level of front EFS.	In-services trainings program arranged for extension field staff.
	Operational	Weak accountability of EFS.	Extension Field Staff are the accountable to their supervisors.	Nonexistence of acceptable standards of out come,	Operative check and balance methods are enterprise at grass root level.

Continued.

	Institutional Management	Inadequate volume in planning and implementation.	Implementation volume is inadequate due to the lack of technical expertise and trained manpower.	The delivery of extension services else has not been suitable in terms of coverage and quality of service.	Frequent and vigorous planning and implementation system executed.
	Quality of manpower	Insufficient incentives for EFS.	EFS are frequent workers and incentives for EFS as expected are often weak.	Accordingly, EFS are continuously discouraged.	Appropriate incentives and rewards given for EFS on priority and proficiency basis.
	Operational	Input supply remains a problem.	Accessibility of qualified service providers about input supplies.	Due to the deficient quality, quantity and lacking of proper coordination the prices affected and input supplies did not extent farmers on timely.	Proper mechanism regarding the market-orientation setup is required or and developed.
Farmers research linkage	Policy	Improper feedback.	Practical-orientation of agricultural technology.	Due to the lack of practical-orientation of agricultural technology resulting low crop yield and poor presentation of agriculture sectors.	Establish and strengthen effective functional structure for integration of research, extension and farmers.
	Technical sources	Deficient information networking.	Communication continuum enhance through the extension teaching methods with scientific communities.	Due to the lack of communication between system actors that causes small yield productivity.	Information sections reinforced and liasonized as an effective mode.

Farmers research linkage

Linkages between research and farmers were inadequate due to the lack of well-qualified and highly skilled manpower and personal attention of farmers. Incidentally, research neither have an efficient relationship with the farmers that absorbs its products, nor have active linkages with extension, In addition due to present deprived relationships the farming communities was not obtain the requisite feedback as a results practical application of extension was not acknowledged with the favor of farmers. Research institute did not directly access to contact the farmers and out of touch with farmers complications. Consequently adoption rate and

application by farmers was restricted. Henceforth, the connections between research institution extension services and farmers have usually been feeble.

CONCLUSION AND RECOMMENDATION

Present research study sought to shed a light on the linkages mechanism between research-extension-farmers in Balocistan, province Pakistan. In this regard, the overall performance of agriculture sector regarding linkage was on the ebb. However, ineffective linkages, nonexistence of policy agenda, unproductive M&E were the particular limiting factors and key problems. The results revealthat the respondents perceived that linkages mechanism did not effective between key system actors. Effective linkages between research, extension and farmers remain non-significant concerning with the dissemination modern of technologies. Therefore, null hypothesis 1 was rejected for seven out of seventeen categories about linkages mechanism and it was concluded that weak linkages exist between research institute, extension wing and farming communities. Similar, H_O2 was rejected in the favor of alternate hypothesis which was accepted for five out of eighteen categories about linkages mechanism as perceived by the extension field staff. Hence, it was concluded that comparatively poor linkages occurred between research institute and extension services. Based on achieve and aforesaid results the study were recommended the following suggestions. Linkages plays part and parcel role in the transfer of technology process in this regard formation of technical experts team which comprising the representatives of agriculture research institute and extension wing that should be drawn a policy agenda, cooperative efforts, and joint priority setting which constitute to guide the development goals of sustainable agriculture growth at province level so as to diminish the misinterpretation and stimulate to strengthen the communication sections. Embolden the advisory services with the farming communities in order to disseminate the new technology, innovation and appropriate practices by means of productive linkages. Farmers are the first and last ladders of the development process therefore it is suggested that encourage the front EFS and incentive should be provided to the EFS based onself-efficacy.

The main hardship of agriculture extension systemsby nature its top-down approachesthat denied the farmingcommunities preferences. In this connection, a policy direction at the grassroots should be planned and directed so that promotes the farmers participation in decision-making process. As an alternative of top-down style it is recommended that action-oriented program and bottom-up planning should be promoted. An appropriate Monitoring and Evaluation (M&E) system (s) should be developed so as to recognizing to remove the flaws and making system more need-based and result-oriented. The existing research and extension services should be re-organized by making it extra-creative so as solving farmers' problems through the adopting participatoryapproaches. Further, present research is also recommended that the information sections should be liaised with television, radio, printed/ electronic media, joint research development program, sharing of technical expertise, farm visits, home visits, field day, joint campaign, demonstration plot, exhibition, conference, workshop and seminar should be arranged under the umbrella of effective and dynamic linkages mechanism. Financial incentive should be provided to scientists and researchers in order to encourage them with the context of sharing information. The present agricultural

setup regarding linkages and information sections is ineffective in this connection, therefore it is suggested that re-structured the information sections and comprehensive information system should be supported and developed. Consistent mechanism tie was the convenient way for effective linkages tool which stream lining the entire process about facilitating the technology transfer process. Hence forth, the present study recommends that planners and policy makers should put in place regulatory mechanism, policy framework that could boost-up and stimulate linkages arrangements among key system actors.

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