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Impact of Agricultural Extension Services on the use of Seed in Balochistan Province

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Abstract: The aim of the paper is to assess the impact of agriculture extension packages in terms of increase in agricultural productivity and increase in farmers' income through the use of quality seed in the province of Balochistan. To this end we interviewed 300 farmers in 5 districts of Balochistan. They were selected at random in order to get their responses regarding the use of recommended variety of seeds by the learned extension workers. The introduction of improved variety of seed to the farmers is one of the technological interventions leading towards the growth of crop production. Regarding the use of seed, the role of the different change agents has been somewhat non-competitive in motivating the farmers for the use of technology. The role of the elders has been on the top, convincing 32% farmers to accept the change of using the recommended variety of the seed and extension workers succeeded 23% farmers to shift from the traditional seeds to the new improved varieties. The role of the fellow farmers, progressive farmers & other non-categorized actors covers the rest of the farmers. Referring to seed suppliers in Rabi season, the major seed suppliers are the private shops from where 62% farmers in the province procure seed from and the second major source of seed is the self-stored seed of the farmers which is 22% of the total. Farmers who have stuck with the same variety for more than 10 years are almost half (48%). Referring to the support requested to have quality seeds, the highest number of farmers (47%) has asked for assistance in the area of knowledge about types and use of certified quality seed followed by the next higher number (23%) of farmers, who have requested for the provision of information about supply centers providing quality seeds.

Keywords: Agricultural extension, production, public sector, private sector, seeds, Balochistan

1. INTRODUCTION

In the province of Balochistan, compare to other sectors of the economy the agriculture sector plays an important role accounting for 60 percent of provincial GDP and a source of employment for more than 65 percent of the labor force. The Province being vast, scattered and thinly populated is also well known for its peculiar topology and largest culturable waste area. Having such position the province necessitates the need to analyze the biological technology side of agriculture. Increase in productivity, conservation of fertile silt, resistance of the intense calamities and above all increase in production leading to higher income of the growers and self sufficiency of the country are the important consideration in this regard. In such context, it is necessary to assess the existing position and the expected nature of agriculture. Such analysis to examine the biological progress in agriculture can be tested on the basis of biological inputs; fertilizer use, pesticide use, plant protection measures and improve seeds application. In this connection, research needs to be done to address the queries that what has been done so far in transferring new technologies and improved practices, to what extent? by whom? and with what impact on the farmers in the province of Balochistan. Specifically, the present paper is designed to assess the impact of agriculture extension packages in terms of increase in agricultural productivity and increase in farmers' income through the use of quality seed in the province of Balochistan.

Objectives

The major objectives of the paper include;

- An impact assessment of extension services in terms of increase in agricultural productivity and increase in farmers' income through use of improved variety seeds in the province of Balochistan.

A comparison of the public sector efficiency with that of private sector in terms of extension efforts to use the certified variety seeds by the farmers.

To formulate policy recommendations.

The paper would address the queries that what has been done so far in transferring new technologies and improved practices, to what extent? by whom? and with what impact on the farmers in the province of Balochistan.

2. RESEARCH METHODOLOGY

The present study was conducted in five districts of Balochistan in order to capture the response and reaction of the farmers towards the use of certified variety of seeds by the learned extension worker. The selection of the 5 five sample districts ; Khuzdar, Lasbella, Naseerabad, Qilla-Saifullah and Quetta out of 26 was purposive and based on the criteria including ecological conditions, types of important crops cultivated and different well known crop problems

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attempted to be addressed during the extension process. The random selection process was adopted for the selection of farmers that helped include different land holding sizes, tenure status, irrigation mode etc. Around 60 farmers from each of the five districts were selected at random for interview and discussion. The whole analyses of this study have been based on the responses of the farmers from the five districts.

The information collected from farmers where 300 farmers selected at random from five districts constituted the main component of the study where the analyses relied upon. For that purpose, a questionnaire was structured that was used to obtain all the required information.

As already mentioned, major emphasis of the study has been laid down on primary data, however, where necessary information from secondary sources has also been used in support of the primary data. The sources of secondary data are mainly from agriculture department; Directorate of Agriculture Extension, Agriculture Research Institute and unpublished record and documents.

The analysis of the data collected from the field and available in the project reports has been done under a manual tabulation plan and by feeding figures in tables in computer software. The data collected from the field has been presented in a tabular form to better express the indicators set for the components of the project. The analysis has been confined to simple percentages and averages of the responses for comparison of the opinions of the beneficiaries as informants. Tables have mostly been structured on the basis of the required information across schemes. However, cross tables where information described vertically have been compared with variables horizontally in a few as needed.

3. RESULTS AND DISCUSSION

In Pakistan the public sector has limited success in the provision of agricultural extension services to the farmers. In order to fill the gap, the private sector has come forward to accelerate the pace of development in agriculture. This trend is more evident in underdeveloped areas like Balochistan where the public sector has almost failed to provide these services to the farmers. After the passage of 18th amendment in the constitution, Agriculture along with the provision of important agricultural inputs specially the management of seed business, had become a provincial subject. This would further limit the provision of seed to the farmers due to the limited capacity of the provinces to provide important agricultural inputs. The Department of Agriculture in Balochistan has been providing certified seeds of wheat and rice to the farmers to a very small extent. Some of the seed is produced at departmental farms, while the rest is arranged from seed corporations of the other provinces. Three varieties of wheat namely; Zarghoon, Zamindar and Zardana have been evolved at Agriculture Research Institute Quetta, but due to insufficient multiplication facilities, seed is not available in large quantities. A seed processing plant has been installed at the Agriculture Development Institute, Khanpur, and District Jaffarabad. The plant can process the seed of wheat, rice, pulses and soybean. Due to lack of sufficient seed, the facility is not being fully exploited. Another seed processing facility oilseeds has been established at Granada Farm at Jhal Magsi but that also could not meet the growing demands of the farmers**.(Table-1)**

Use of Seeds & the Role of Public/Private Sectors Types of Seeds Used
Table-1. Seed Types Used in Five Sample Districts (both certified and uncertified)

Produce	Seed Type in Use	Area of Seed Use
Crops Wheat	Zardana, Zarghoon, Inqilab, Bakar, Local	In all five districts
Rice	Inferior varieties (Irri-9, Russian basmati) Semi-fine varieties, Hybrid (Dagga, Orega) Atomic (Sarshar, Shuaa, Dokri-83	Naseerabad, also in Khuzdar & Lasbella
Vegetables	Riograldae, Shalkot, Other	In all five districts. 90% farmers use Riograldae.
Tomato	Chilton 89, Saryab surkh	Pukara is used in hot areas. Other varieties in cold areas such
Onion	Pukara, Amonia- hybrid	as; Quetta & Qilla Saifullah districts. Chilton-89 is used by
Cauliflower	Majesto, Snow-drift, Snow grace	approx. by 60% farmers
Carrot	T-29 red, New croda	In all five districts
Okra	Subzpari	In all five districts
Chilies	Thalhar	In all five districts
Radish	Harboi White, Early menu	In all five districts
Spinach	Bolan-90, Faisalabad-1	In all five districts
Egg Plant	Sarawan, Long-purple	In all five districts In all five districts
Fruits	Tor Kulu, Shin Kulu, Kaja, Model Gala	In all apple producing districts; including Qilla Saifullah,
Apple	Narai, Sardai, Char Maghz	Quetta & Khuzdar sample districts**.** Mainly Tor Kulu & Kaja
Apricot	Al-Baltha	are produced
Peach	President, Black Ambar	In all chilly areas including the above three sample districts
Plum		In all chilly areas including the above three sample districts In all chilly areas including the above three sample districts

Source: ARI & Agric. Extension Data

The farmers in most of the districts use local variety rather than the certified varieties as indicated in the above table. This is mainly due to two reasons; one that motivation has not been done up to the required level by the extension workers, secondly; availability of the certified seeds is also a problem in most of the areas in these districts. Other than the local variety in these districts, the prominent certified varieties used are; Khuzdar-'Bhakar', in Lasbella-'Inqilab', in Naseerabad-'Inqilab', in Qilla saifullah-'Zardana' and in Quetta-'Zardana'. This necessitates more efforts to be undertaken by extension workers.

Introduction of Quality Certified Seed (QCS) Seed

Under the intensive cultivation method, application of improved varieties of inputs and improved techniques/practices helps increase per acre productivity. In fact, the use of improved rather recommended seed variety causes a visible difference in productivity. Few considerations are of immense importance while, discussing the new seed varieties, such as; the knowledge/information about the new variety, knowledge about availability place/centre, the related use precautions, testing evidences and the relative productivity edge over the old varieties. The extension worker plays a key role in introducing a new variety to the farmers because changing the attitude of farmers and persuading them to adopt new variety is quite a cumbersome task. In this study, some important dimensions related to change such as; switching from an old variety of an input to the new one, the length of time since the change adopted and the role of the change agent (introducer) introducing change towards a new variety or practice, have been taken into consideration.

The knowledge about QCS has been disseminated by different sources; extension workers of agriculture department, progressive farmers, elders and fellow farmers. In regard with the wheat seed, the role of extension workers has been in match with that of the elders and fellow farmers in terms of introducing new variety of seeds to the farmers.

In fact, extension workers of the agriculture department on average have succeeded in approaching 30% of the farmers effectively, followed by fellow farmers 28% and elders 27%. An absolute large number of farmers (94%) in Khuzdar district have highly benefited from fellow farmers, while in Lasbella; extension workers in persuading majority of the farmers (57%) have played major role. In Qilla Saifullah district, highest numbers of farmers (46%) have been persuaded by elders while, in Quetta district, the highest number (51%) by extension workers. **(Table-2).**

Table-2: Wheat Seed Types Used by Farmers in Five Sample Districts

District	Seed Type in Use (% farmers)		Role of Change Actors (% farmers motivated)	
Khuzdar	Local	28.28	Fellow Farmer	93.75
	Bhakar	23.23		
	Zardana	22.22	Extension Worker	6.25
	Other	26.26		
Lasbella	Local	69.37	Elder	80.58
	Ink lab	9.01	Private Firm	9.71
	Zardana	2.7	Extension Worker	4.85
	Other	18.92	Other	4.85
Naseerabad	Local	52.38	Extension Worker	56.96
	Inqilab	13.33	Private Firm	26.58
	Zardana	5.95	Fellow Farmer	15.19
	Other	28.33	Other	1.27
Qilla Saifullah	Local	41.67	Elder	46.43
	Zardana	41.67	Extension Worker	30.95
	Panjpai	5.95	Private Firm	14.29
	Other	10.71	Other	8.33
Quetta	Local	60.49	Extension Worker	50.98
	Zardana	28.4	Fellow Farmer	33.33
	Bakar	6.17	Elder	7.84
	Other	4.94	Private Firm	7.84

Source: Survey Data

Perception of Change in Production Due to Quality Seed

The recommended new variety of seed is the most crucial factor in the process of increase in the agricultural production not only due to the higher productivity of the new improved seed but also due to its disease resistance characteristics, the point that is preferably taken into consideration during the research process for evaluation of variety of new seed. The agents mentioned above (section 3.4.2) disseminate the information about new seed variety to farmers. The issue that how much farmers benefited from the new variety of seed, has been addressed through the perception of farmers, rather than going into the complications of quantification of the change in produce. Before going into the detail of knowing about how much benefit farmers have realized in the result of change in seed, it is important to know first that how many farmers, as per their perception, have experienced the change in seeds. **(Table-3).**

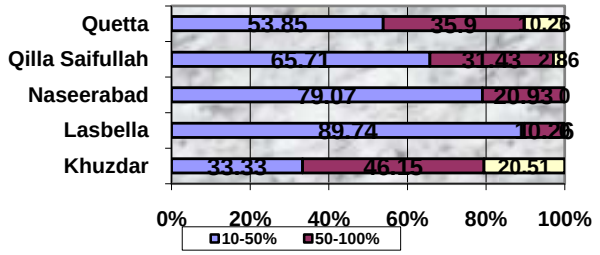
Table-3. Perception of Farmers about the Change in Production due to the Use of Quality Seeds

District	Use of Quality seeds (%)	Change in Production	% Farmers
Khuzdar	88.37	50%	20.93
		100%	53.49
		200%	18.60
		NA*	6.98
Lasbella	69.49	25%	13.56
		50%	52.54
		100%	5.08
		NA*	28.81
Naseerabad	34.29	10%	1.43
		25%	18.57
		50%	11.43
		100%	14.29
		NA*	54.29
Qilla Saifullah	61.67	50%	30.00
		100%	30.00
		NA	40.00
Quetta	82.00	10%	10.00
		25%	14.00
		50%	24.00
		100%	32.00
		200%	4.00
		NA*	16.00

Source: Survey Data *N.A: Information not available because farmers could not respond.

How much the level of production has changed? The answer to this question, though, is based on rough estimate of the farmers realizing change in production, yet it gives a range of change in production. The highest number of farmers (64%) claim the change in production within the range of 10-50%, while, 29% are firm that they have benefited by 50-100% increase in production level due to change in seed. This indicates that majority of the farmers believes in 50% increase in production, if the seed is of good quality and improved one. The range of change in production is somewhat broader because the farmers could not estimate the correct change and had no record thus broader range helped them in estimation roughly. **(Fig.-1)**

Fig.-1: Change in Production due to the Use of Quality Seeds



Sources of Seed Supply

Lack of good variety of seeds has been always a problem and a large number of farmers deprived from high yielding variety, despite their high desire for such variety. Information derived from research findings (un-quoted) reveals that in Pakistan only 6% (5-10%) farmers obtain new improved/certified seed each year. Generally, the sources of seed supply are; private shops, progressive farmers, agriculture departments and farmers seed self stored. The seed obtaining source at the district level is the extension workers of the department. The progressive farmers usually get seed through agriculture department in bulk and later on pass on such seed to other farmers, thus benefiting from social and political gains in the result. (**Table-4)**

Table-4: Seed Supply Source & Adoption of Quality Seeds by Farmers in Rabi Season

District	Seeds Supply Source	% Farmers benefiting (%)	Quality Seed Adopt. Since (yrs)	% Farmers s
Khuzdar	Private Shop	93.62	> 10	34.69
	Self Stored	5.32	> 5	60.20
	Prog. Farmer	1.06	< 5	5.10
Lasbella	Private Shop	76.00	> 10	39.34
	Self Stored	10.00	> 5	8.20
	Prog. Farmer	6.00	< 5	52.46
	Other Crops	8.00		
Naseerabad	Private Shop	38.24	> 10	32.41
	Prog. Farmer	21.57	> 5	42.59
	Self Stored	17.65	< 5	25.00
	Other Crops	22.55		
Qilla Saifullah	Private Shop	62.50	> 10	55.42
	Self Stored	22.50	> 5	33.73
	Agriculture Department	7.50	< 5	10.84
	Other Crops	7.50		
Quetta	Self Stored	53.52	> 10	76.54
	Private Shop	40.85	> 5	18.52
	Agriculture Department	4.23	< 5	4.94
	Prog. Farmer	1.41		

Source: Survey Data

In Rabi season, the major seed suppliers are the private shops from where 62% farmers in the province procure seed[1] and the next key source of seed supply to 22% farmers is the seed stored by the farmers themselves from the previous stock of their produce. The third source of seed supply is the progressive farmers[2] who account for 12% share in seed supply to the farmers. In only two out of the five districts, Quetta and Qilla Saifullah, agriculture department has played a

[1] Such seeds are usually the traditional not the new improved variety.

[2] Who usually obtain seed from the agriculture research centres/extension offices and the private sources?

role in arranging seed to the 12% farmers (mentioned above) through extension workers. This indicates that in case of seed supply the role of private sector is much dominant and ahead of the public sector. However, as a note of caution, private shops are not the centres of the latest improved variety of seeds. These shops are rather suppliers of traditional or back dated seeds, which perhaps do not fill the gap of the supply of quality seeds, a presumed function of the private sector. In real terms, it should be the responsibility of the private not the public sector to provide seed. If we look into the district-wise detail, in Khuzdar, private shop accounts for supply to highest number, 94% as compared to other districts. In Quetta district, self-stored seed is the main source of supply benefiting 54% farmers, while in Lasbella, Naseerabad and Qilla Saifullah, besides private shops, self stored seed, progressive farmers are the main sources of seed supply respectively **(Table-5).**

Table-5: Wheat Seed Supply Source & Adoption of Certified Seed by Farmers in Kharif season

District	Seed supply source	Farmers' benefiting from source (%)	Adoption of Certified Seed variety since (yrs)	% Farmers
Khuzdar	Private Shop	100.00	> 10	18.81
			> 5	59.41
			< 5	21.78
Lasbella	Private Shop	68.75	> 10	32.71
	Self Stored	17.71	> 5	41.12
	Prog. Farmer	12.50	< 5	26.17
	Other	1.04		
Naseerabad	Private Shop	59.42	> 10	45.95
	Prog. Farmer	20.29	> 5	37.84
	Self Stored	14.49	< 5	16.22
	Other	5.80		
Qilla Saifullah	Private Shop	82.72	> 10	48.75
	Self Stored	12.35	> 5	35.00
	Prog. Farmer	3.70	< 5	16.25
	Other	1.23		
Quetta	Private Shop	76.47	> 10	34.48
	Self Stored	13.73	> 5	39.66
	Prog. Farmer	5.88	< 5	25.86
	Other	3.92		

Source: Survey Data

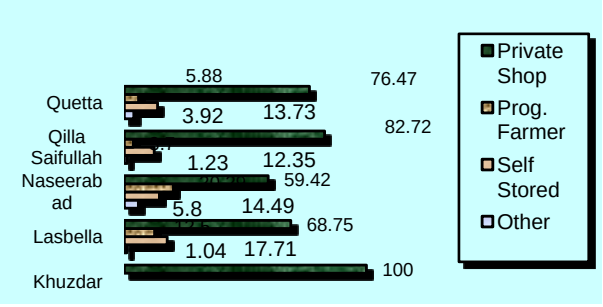


Fig. 2: Sources of Seed Supply

In Kharif season, the role of the seed suppliers in the province has not been on scientific lines indicated by the fact that at the provincial level, role of the private shop has been highly dominant supplying seed to 77% cultivators, where as the progressive farmers have outreach to 8% and seed stored by the farmers meet need of 12%. In Khuzdar district, there is no supplier of seed other than private shop. In other districts too, private shops are the major source but other sources are also playing their role. The role of progressive farmers as a source of seed supply is better than that in the Rabi season but contrary to the role of self-stored seed.

Farmers Experience of Quality Seeds Use

The pace of adoption of change by the farmers can be easily understood by assessing the frequency of adjustment of farmers to new improved varieties of seeds. There have been frequent changes in seed variety based on the frequency of releases by the research institutes at governmental level in the country as well as provinces. How much a farmer adjusts to the new varieties from time to time after discarding the old ones? Depends on a number of factors such as;

- frequency/number of evolved varieties
- effective dissemination of knowledge of new varieties to farmers
- availability of new varieties
- knowledge about new tested certified varieties
- affordability of farmers to purchase, and
- assurance of risk coverage

The success degree of agriculture extension workers (both public and private sectors) can be judged through an average time the farmers confine themselves to one variety. Shortest the period of continuing the same variety, highest the effectiveness of an extension worker in area and vice versa. However, exceptions are there showing that varieties having more potential sustain for longer period. In Rabi season, considering the transition pace of switching from the old variety to the new one, surprisingly, on the average, 81% of the farmers have not switched to any new variety of seed during the last five years. Farmers who have stuck with the same variety for more than 10 years are almost half (48%) of the total. This indicates the inability of extension workers to introduce new variety or non-release of new variety by research institute in the province.

Support Requested by Farmers to Access Quality Seed

Keeping in view the poor status of farmers adopting the recommended seed in the five districts representing the Balochistan province and the inability of outreach of extension workers with full strength and potential, the farmers have identified few areas, which they think, can help solve their problem of obtaining and using improved recommended seeds varieties. The areas they have identified are;

- Knowledge about types and use of latest varieties
- Information about supply centres where new recommended varieties of seeds are available
- Developing linkage with contact persons supplying genuine improved varieties
- Other (training facilities, seed supply on credit, exposure to model farms for new varieties grown etc.)

By looking at the average of five districts, in other words, the province, one can conclude that the highest demand of support reflected through highest number of farmers (47%) is for knowledge about types and use of new varieties of seeds. The second highest demand requested by 23% farmers is for information about supply centres providing quality seeds to farmers. For district-wise information, detail can be seen in **(Table-6)**

Table-6:Support Requested By Farmers to have Proper Knowledge & Access to Quality Seeds

District	Support Requested (Farmers (%))	Kind of Support	Percent
Khuzdar	65.12	Knowledge about type/use	65.00
		Information about supply center	22.50
		Linkage with contact persons	12.50
Lasbella	69.49	Knowledge about type/use	61.11
		Information about supply center	25.93
		Linkage with contact persons	7.41
		Linkage with contact persons	5.56
Naseerabad	72.86	Knowledge about type/use	55.93
		Information about supply center	32.20
		Other(specify)	10.17
		Linkage with contact persons	1.69
Qilla Saifullah	58.33	Other(specify)	64.10
		Knowledge about type/use	33.33
		Information about supply centers	2.56
Quetta	76.00	Knowledge about type/use	53.33
		Information about supply center	33.33
		Other(specify)	13.33

Source: Survey Data

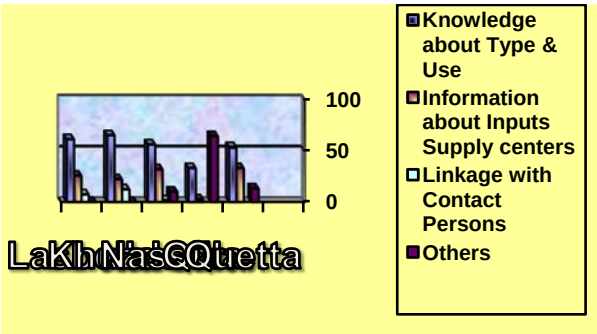


Fig. 3: Seed related Support Demanded by Farmers

As regards the provision of good and new variety of seeds, the solution suggested by the farmers is forwarded in shape of demand from government to provide new varieties of seeds. The nature of the demand after discussion with the extension workers of the agriculture department and senior staff at district level staff had a peculiar view of the matter who expressed explicitly that the farmers expect free delivery of the certified quality seed from the government[3].The data given below in **(Table-7)** indicates the intensity of demand at least from three districts; Lasbella, Qilla Saifullah and Quetta. Contrary to Lasbella and Qilla Saifullah where the farmers were expecting new variety seeds in free, the Quetta farmers did not expect much from the government as free but were of the opinion, that based on the releases of the research centres, government is in a position to supply and multiply the new variety of seeds at reasonable cost. Source: Survey Data

Table-7. Solution of Seed Problem by Farmers

District	Farmers Responded (%)	Solution to Seed Problem
Khuzdar	23.3	Government to provide seed
Lasbella	50.8	Government to provide seed
Naseerabad	10.0	Government to provide seed
Qilla Saifullah	33.3	Government should be responsible for seed
Quetta	28.0	Government can arrange pure seed

In case of improved seed provision, based on support requested by farmers, the highest number of farmers (47%) has asked for assistance in the area of knowledge about types and use of new varieties of seeds. The second highest demand raised by 23% farmers is for information about supply centres providing quality seeds to farmers. Similar to the situation of fertilize, extension workers can fill the gap related to the lack of knowledge about types & use as well as information and linkage about the supply centres..

[3] The demand of the farmers in district Lasbella discussed by the extension staff at the office of the EDO agriculture.

Two matters of concern among majority of the farmers are (a) how to raise highly productive nursery with high quality and technically advanced plants? a matter of concern expressed by 65% farmers and (b) the non availability of quality seeds to raise quality plants to be further treated a difficulty expressed by 16% farmers, have posed a big issue for farmers. Extension workers in the province, which can put the victimised farmers back on the track, can fill this gap of the two areas related to nursery raising. Around 2% farmers have informed about their experience of farmers' Field Days, while the rest 98% have not gone through that process. Farmers' Field Days provide an opportunity to farmers to share their experiences about new seed, new input, new technology or new practice. Thus, the extension workers have to fill this gap of arranging such opportunities.the result of perpetual research and introduced o the farmers from time to time to help them increase their production of different crops. The increase in production in the result of use of such variety, which replaces the traditional varieties, is reflective of a positive impact of this technology. The higher productivity of the new improved recommended seeds benefits the farmers in shape of higher production. Again, the perception of farmers was sought to assess the impact of the new technologies on fares. The response of 73% farmers who switched from using the old traditional seeds to the quality certified seed varieties (QCSV) during the last 5 to 10 years has been considered during the assessment of impact of the seeds. **(Table-8)**

Table-8: District Wise Change in Production Due to Seed

District	**Use of New Seed (%)**	**Change in Production**	**Farmers Benefited** (Percent)
Khuzdar	93.02	50 – 100	46.15
		10 – 50	33.33
		100 – 200	20.51
Lasbella	66.10	10 – 50	89.74
		50 – 100	10.26
Naseerabad	67.14	10 – 50	79.07
		50 – 100	20.93
Qilla Saifullah	58.33	10 – 50	65.71
		50 – 100	31.43
		100 – 200	2.86
Quetta	80.00	10 – 50	53.85
		50 – 100	35.90
		100 – 200	10.26

Source: Survey Data

How much the level of production has changed due to Certified Quality Seed? The answer to this question can be given through a rough estimate of the farmers who realized a change in production. Almost 2/3 of the farmers (64%) have been experiencing the change in production within the range of 10%-50%, on the average, farmers have realized 50% increase in production (similar to fertilizer) due to the use of CQSV.

Increase in income

The change in income of the farmers due to a change in production through certified variety of seeds is calculated as;

Share in income increase due to certified variety of seeds

Volume of change & farmers benefit;
- Increase in production: 50%
- Assuming no change in prices,
- Average period of production where increase in income realized): 5 years
- Average total change in income: 50% x 5= 250%
- Number of farmers benefiting from the increase: 52%

Total increase in income: (1) + (2): 50 + 50 = 100%

Change in use of Quality inputs

Seeds

The farmers' use of the quality certified seeds has been on lower side. For example in Rabi season, on the average, 81% of the farmers have not switched to any new variety of seed during the last five years.

Findings

- For the seed used in Kharif season, the role of the different change agents (mentioned above) has been somewhat non-competitive in influencing the farmers. The role of the elders has been on the top, convincing 32% farmers to accept the change of using the recommended variety of the seed for their production where the extension workers have been lagging behind in convincing 23% farmers to shift from the traditional seeds to the new improved varieties. The rest is the share of the fellow farmers, progressive farmers & other non-categorized actors.
- Referring to seed suppliers in Rabi season, the major seed suppliers are the private shops from where 62% farmers in the province procure seed from, while, the second major seed supply source to 22% farmers is the seed stored by the farmers themselves.
- In Kharif season, the role of the seed suppliers in the province has not been on scientific lines indicated by the fact that at the provincial level, role of the private shops that provide traditional old seed, has been highly dominant supplying seed to 77% cultivators.
- The analyses based on Survey Data indicate that in case of seed supply the role of private sector (non formal & non-organized) is much dominant and ahead of the public sector extension workers. On the average, private shops account supply seed to the highest number of farmers. Other main suppliers are; self stored seed, and seed provided by progressive farmers.
- In Rabi season, considering the transition pace of switching from the old variety to the new one,

surprisingly, on the average, 81% of the farmers have not switched to any new variety of seed during the last five years. Farmers who have stuck with the same variety for more than 10 years are almost half (48%) of the total.

- Regarding the support requested to have quality seed, the highest number of farmers (47%) has asked for assistance in the area of knowledge about types and use of certified quality seed. Likewise, another high demand raised by 23% farmers, is, for the provision of information about supply centres providing quality seeds to farmers.
- On the average, 87% farmers were found to be involved in the practice of seedbed preparation essentially, before cultivation of the crops. Usually, the seedbed operation is carried out for all crops except fruits.

4. CONCLUSIONS

The role of the different change agents regarding the introduction of certified variety of seed to the farmers has been somewhat non-competitive in motivating the farmers for the use of technology especially in kharif season. The role of the elders has been on the top, convincing 32% farmers to accept the change of using the recommended variety of the seed & extension workers succeeded 23% farmers to shift from the traditional seeds to the new improved varieties. The role of the fellow farmers, progressive farmers & other non-categorized actors covers the rest of the farmers. Referring to seed suppliers in Rabi season, the major seed suppliers are the private shops from where 62% farmers in the province procure seed from and the second major source of seed is the self stored seed of the farmers which is 22% of the total. Farmers who have stuck with the same variety for more than 10 years are almost half (48%)l. Referring to the support requested to have quality seed, the highest number of farmers (47%) has asked for assistance in the area of knowledge about types and use of certified quality seed followed by the next higher number (23%) of farmers, who have requested for the provision of information about supply centres providing quality seeds.

REFERENCES:

Ahmad, N. and M. Haq. (1994). Evaluation Study of Punjab Agricultural Extension and Adaptive Research Project-II, Punjab Eco. Res .Institute, Lahore, Pakistan.

Antholt, C. H. (1994). Getting ready for the Twenty-first Century: Technical change and institutional modernization in agriculture, World Bank Tech Paper No.217 Washington D.C.

Axinn, G. H. and S. Thorat, (1972) Modernizing World Agriculture: A comparative study of agricultural extension education systems New York

Bajwa R. 2004 Agricultural extension and the role of the private sector in Pakistan National Rural Support Program Islamabad, Pakistan

Davidson, A. P., M. Ahmad., and T. Ali (2001). Dilemmas of Agricultural Extension in Pakistan: Food for Thought, Agric. Res. & Ext. Network Pakistan

Government of Pakistan, (1988) Report of National Commission on Agriculture, Islamabad, Pakistan

Government of the Punjab, (2004) Agriculture Department Future Agricultural Extension Strategy Lahore, Pakistan

Hussain, S. S., D. Byerlee, and P. W. Heisey, Unpublished: (1994) Impact of the training and visit extension system on farmers knowledge and adoption of technology: evidence from Pakistan'. Agricultural Economics, Vol. 10, No. 1,. 39–48.

Khan, M., and M. S. Sarwar. (1984) Monitoring and Evaluation of Training and Visit System of Agricultural Extension in Punjab, Pakistan, Lahore: Punjab Eco. Res. Institute.

Lees, J. W. (1990) More than accountability: Evaluating agricultural extension programs Armidale, NSW: The Rural Dev. Centre, Uni of New England.

Maalouf, W. D. and R. T. Adhikarya, (1991) Extension coverage and resource problems: the need for public-private co-operation', Agric extension: Worldwide institutional evolution and forces for change, Amsterdam.

Prinsley, R., and J.D. Marks, (1994). The role of private sector in extension: A working paper. Rural Industries Res. and Dev. Corporation Occasional 943Pp. Australia

Swanson, B. E., and B. J. Farmer, (1990) The current Status of Agricultural Extension Worldwide, Report of the Global Consultation on Agric Ext, FAO, Rome

Swanson, B. E., and R. P. Bentz, (1997). Improving agricultural extension: A reference manual, Food and Agriculture Organization, Rome, Italy

Umali, D. L. and L. Schwartz, (1994). Public and Private Agricultural Extension: beyond traditional frontiers, World Bank. Washington D.C.