

The role of Agricultural Extension and Communication  
in Arid Zone Research

1986-94

Alvi, A.S., S.H. Raza, A. Hussain, A. Razzaq, T. Javed.

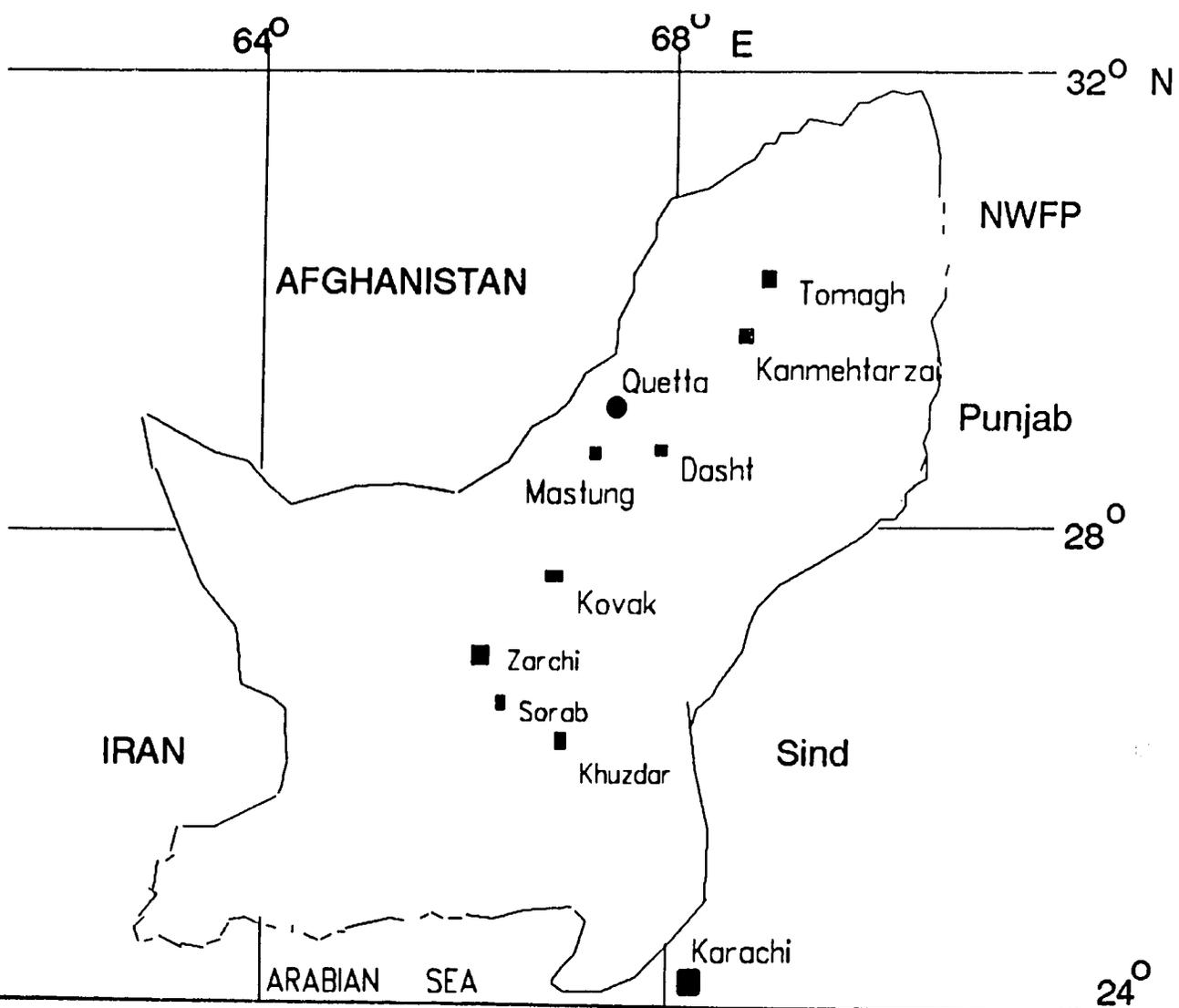
**ROLE OF AGRICULTURAL EXTENSION & COMMUNICATION  
IN ARID ZONE RESEARCH**

1986-94

Prepared by

Dr. Abdul Sattar Alvi  
Syed Hassan Raza  
Abid Hussain  
Abdul Razzaq  
Tariq Javed

**Agricultural Extension And Communication Section  
Arid Zone Research Institute, Quetta.**



Activities/Places	Quetta	Dasht/ Mastung Spozand	Kovak	Zarachi/ Tomagh/ Kalat	Loralai		
Replacement Evaluation Trials Cereal & Forage Summer Crops.	5 ha.	3	-	2	-	-	
Economic Parameters Later Harvesting Trials.	2 ha.	1	3	2	-	-	
Improvement of grazing potential of Rangeland Introduction of FMSB.	20 ha.	10	5	5	10	20	-
Sheep & goat production/Fattening practices.	200 Mos.	-	-	200	400	2000	-
socio Economic of AZRI h. & Farmer's options.	20 Places	35	40	45	35	75	40
Extension Activities of [ Generated technologies.	500 Mos.	150	75	60	55	70	75

Activities were stopped due to the shortage of manpower and funds.

## TABLE OF CONTENTS

Contents	Page
Introduction	4
Achievements	
A) Field Activities	
1. Farmer's Managed trials in the Kovak Valley, Balochistan: The Effect of Variety and addition of fertilizer on wheat production.	7
2. Farmer participation in the establishment and management of reserves of FWSB	9
3. Involving farmers in Water Harvesting Studies	10
4. Comparative performance of camel drawn seed drill with the traditional wooden plow/planter for rainfed area.	12
5. Veterinary Camp at Kovak	13
6. Local Tree plantation to see their survival capacity in pure rainfed area.	14
7. Integrated Agricultural Production and Resources Management for Kovak Valley, Balochistan.	15
B) Research in Extension Issues	
1. Cooperative farmer Survey to obtain comments about AZRI technologies	16
2. Agricultural Extension Survey & Community profile study	16
3. Anthropological field study on community profile	17
4. Mechanical Sheep Shearing	17
5. Agricultural Fair/Exhibitions	18
6. Farmer's day	18
7. Post Graduate Research Work	18
C) Information transfer and Media Production	
1. Workshops arranged	19
2. Mass Media & Strengthening of AZRI Resource Center	20
D) Scientific Staff in the work during 1986-94	21
Future Thrusts	21
Staff in Position during 1994-95	22

## INTRODUCTION

The importance of linking Agricultural Research and Agricultural Extension has been well recognized. Agriculture Research consists of the scientific processes of generating new knowledge and translating this new knowledge into technologies. The primary function of Agriculture Extension is to make these technologies available to farmers by providing relevant information and training them in how to take advantage of new technologies with their own production environment and goals. In addition, extension services provide information for researchers to maintain awareness of actual farmer problems. Therefore, we can say that research is dependent on extension to disseminate its output to the end users (farmers) and to obtain their views about that technologies and provide feed back to the scientists for further development in it.

Agricultural extension for dry land farming and livestock management in upland Balochistan is a discipline in which little research has been undertaken in the past. The agricultural communities are essentially under tribal organization and communication infra structure (roads, telephones, transport etc.) is, at present, only at the beginning of the development process. In upland Balochistan at least four major languages are spoken within the different tribal and urban communities: Urdu, Baluchi, Brahui and Pashto. Naturally this substantially increases the problem of dissemination of agricultural information. These problems are further enhanced by not insignificant levels of illiteracy among the rural male and female population. In addition, the density of the rural population is very low and the transhumance is a common practice. This makes regular contact with farmers exceedingly difficult. The Provincial Department of Agriculture in Balochistan has a network of extension officers. Their role at present places a major emphasis on irrigated agriculture. Extension services per se for livestock and rangeland management not formally exist. However, some infrastructure through veterinary officers and officials of the Forestry Department were operated.

The policy of the extension /communication research group at AZRI has been to assist, where possible, existing extension services in Balochistan and to actively involve them in AZRI's research program. The intention is to stimulate personal interest in jointly evolved technological innovations by AZRI and provincial extension agencies and thereby ensure commitment to their wider dissemination in rural Balochistan. In addition, the extension/communication group is attempting to pinpoint the major constraints to extension in the province and to examine whatever communication pattern are common in rural communities. It is hoped,

that enhanced understanding of communication pattern, will improve extension methodologies developed in association with mass media agencies and provincial extension services.

Prior to 1986 AZRI did not have an active extension group, therefor, no available experience existed within the institution, which could serve a basic for program development. Moreover, expertise and experience in extension were also largely lacking in the main research partners in the MART/AZR project, PARC and ICARDA, as neither institution currently has a mandate for extension. The program had therefore to be developed from first principals. The AZRI extension program has consequently been continuously developed and revised through deliberate evaluation of the options and constraints dictated by circumstances within and beyond AZRI and PARC systems.

The objectives of Agricultural Extension and Communication Section includes:

1. to transfer AZRI generated technologies and technical information to those who need and will use it for better yield and production.
2. to serve the needs of the provincial agricultural extension agencies and policy makers by providing them the tested technologies for dissemination to the masses and making them aware of the needs of the farmers by conducting basic surveys.
3. to identify design, organize and conduct short training for provincial/AZRI staff and farmers on the basis of when and where required.
4. to develop informatory and promotional material e.g., printed material, video cassetts or display boards for different occasions ( extension programs, workshop or promotional activities)
5. to improve and strengthening the AZRI Resource Center by creating links with provincial, national and international institutes for similar nature.

The AZRI extension & communication programs is divided into three distinctive but interrelated parts: (A) field activities, (B) extension research and (C) information transfer and media production.

## A) Field Activities

An extension group performs a basic technology transfer function and additionally can contribute the technology generation. This role of contributing of AZRI technology generation and evaluation was mainly performed through field activities in the extension programs.

## B) Research and Extension Issues

The premier responsibility of Extension research is to provide a better understanding of the socio-cultural setting into which dry land technology will be introduced. Extension research should produce relevant information which local extension workers can use directly in their extension activities and which can be used to enhance the in-service training of extension workers.

Extension research should produce relevant information to local farmers, which can be used directly in their field activities. Farmer's practices and perceptions in soil moisture conservation, water harvesting, introducing of improved high yield cereal, food and forage legume crops and enhancing of forage reserve of FWSB, need to be better understood in order to pave the way for AZRI generated technologies.

## C) Information Transfer and Media Production.

The following responsibilities were fixed to require a range of communication media production and utilization:

1. to produce "Extension Media" to promote AZRI generated technologies. The cooperation and endorsement of the technology transfer agencies that will actually use this media in their extension programs is required.

2. to produce A/V material and training aids to serve the needs of AZRI scientists in scientific presentation.

3. to produce communication media for the transference of AZRI generated technologies and required dry land agriculture information for research and extension colleagues and policy makers. The services should include research reports, bulletins, newsletter, library information services.

4. to produce communication media to introduce and promote AZRI activities and achievements to increase its credibility; and thus obtain support from policy makers, donors, development agencies and the general public.

## ACHIEVEMENTS

### A) FIELD ACTIVITIES

#### 1. Farmer's Managed Trials in the Kovak Valley, Balochistan: The Effect of variety and addition of fertilizer on wheat production.

A series of farmer managed trials were initiated during 1987-1989 with the objectives to test the results of scientists managed agronomy trials under farmer managed conditions, evaluate farmers technical abilities and to provide a vehicle for close contacts with farmers.

A simple trial comparing the productivity of the local wheat cultivar and an improved cultivar, Blue Silver with and without phosphate fertilizer (60 kg/ha P<sub>2</sub>O<sub>5</sub> as triple super phosphate was initiated in 1987 in Kovak Valley. The improved variety Blue Silver was chosen as suitable for spring planting. Twenty farmers participated in the trial, sowing the four treatment as a single replicate, individual quarters of the field selected by the farmers for the experiment. Four samples were taken in each treatment for yield estimation, the rest of the crops were harvested by the farmers for their own purposes.

Results are shown in Table 1. Averaged over all locations and both varieties phosphate fertilizer increased grain yields by 21%. The improved variety consistently outyielded the local variety in this spring planting trial and showed a much higher response to phosphate with and overall increase of 31% increased in grain yield. Straw yield were unaffected by fertilizer or by variety.

Table 1 Grain and straw yield (Kg/ha dry weight) of farmer managed trial, Kovak 1987 (Spring planting). Results of 20 farmers fields analyzed as CRD with each site treated ad replicate.

-----			
Grain yields (Kg/ha)			
	Local	Blue Silver	Mean
-----			
-phosphate fertilizer	304	348	326
+phosphate fertilizer	329	478	403
Mean	316	413	365
S.E.	24.0	24.0	17.0
Probability	NS	<0.1%	<0.1%

### Straw yields (Kg/ha)

-Phosphate fertilizer	923	907	915
+Phosphate fertilizer	929	927	928
Mean	926	917	922
S.E.	56.1	56.1	39.7
Probability	N/S	NS	NS

#### Variety Treatment Comparison:

On average, Blue Silver produced 44 Kg/ha more than the local variety and resulted in a net revenue gain of Rs. 88/ha. No additional labour or costs were involved in this treatment. Seventy percent of the twenty cooperating farmers obtained a higher yield with blue silver than with the local variety in the trials. It should be noted that these results refer to spring planting only.

#### Fertilizer Treatment- Comparison with control:

To pay for the fertilizer cost of Rs 253.5/ha the farmer requires an additional 127 kg of wheat grain at the selling price of Rs. 2/kg. On average, the breakeven point is 304 kg/ha (the control), plus 127 kg/ha for a total of 431 kg/ha which represents the yield of the farmer would have to get before fertilizer application would pay.

#### Blue Silver with & without Fertilizer Comparisons:

The yield gain resulting from the addition of phosphate fertilizer to Blue Silver of 130 Kg/ha is 3 Kgs above the required gain of 127 Kg/ha to over the fertilizer costs.

#### Sensitive thinking:

It is learned by this trial that a strict supervision of experimental conditions eg. of seed rate may not be the most appropriate methodology. In future years we may adopt a more flexible approach with farmers modifying the technological innovations under trial in accordance with their individual circumstances.

It is also evident that there is a need to invest more time in fostering interest and cooperation with the local extension services. This may not only involve the locally based agent but also include members of Quetta based Adaptive research and Extension Project teams.

## 2) Farmer Participation in the establishment and management of reserves of FWSB.

The specie of genus *Atriplex*, commonly known as salt bush have high productivity and an ability to establish under arid condition. This makes them strong candidate for introduction into degraded rangeland of the area. These range lands have an inherently low productivity due to environmental constraints and chronic overgrazing which has depleted the natural vegetation.

The objective of the work is to involve farmers in the establishment and management of forage reserves of four wing salt bush & the marginal lands near foot hills where scarcity of water is a limiting factor can be utilized.

One year old FWSB seedlings were planted at Miangundi, Kovak and Spezand in February, 1992 to establish with the participation of local farmers. This adaptive research was conducted in on-farm trial with full participation of farmers who was encouraged to give their views of the technology at all times of the evaluation stages. The planting at 3 sites are differed as followed:

**Kovak:** Seedlings were planted on slightly sloping land.

**Miangundi:** Seedlings were planted on sloppy and gravelly land, just above on earthen bunds.

**Spezand:** Seedlings were planted on plain area.

In March / April, 1992 about 8,000 FWSB seedlings were planted with 4 m row and one meter plant spacing on marginal land in Kovak, Spezand and near Miangundi village. Soil was gravelly an every where. Most of the planting of FWSB was conducted on heavy degraded lands where competition with native plants is low. However, a study was conducted on the initial establishment and survival of seedlings among the aggressive local plant species. For this purpose a 4500 meter square dense stand of *Artimisia maritima* (sagebrush) was selected in Miangundi and about 750 FWSB seedlings were planted among the sagebrush stand in April 1992. Initial data on establishment of FWSB showed about 85% survival which indicates that this plant specie can compete with the local flora.

Four wing saltbush introduction & forage reserve trials with farmer participation produced encouraging results during 1992-93. These results showed that one rain fall after the plantation

was needed to achieve essentially 100% survival of transplants on harsh sites. A FWSB forage research planting at spezand has demonstrated the productive potential grown under good soil condition, even the moisture was not so much compared to other areas.

Data on plant survival , crown diameter and plant height were recorded in June, 1993. A diagonal transect was stretched between opposite corners of the plots and alternate plants coming in contact with the line were measured for their crown diameter and plant height. After recording these observation, the plants were cut to ground level and the leaves, twigs and stems separated,, weighed and dried. The results were averaged across the plants sampled and converted to a hectare.

Plants at Miangundi were taller, wider and were productive than at the other two locations since the rainfall is higher and fairly well distributed.

**Table 2 . Field Observation at Kovak, Miangundi & Spezand**

Location	Plant height (cm)	Crown diameter (cm)	Leaves & twigs
Kovak	60.5	80.0	980
Miangundi	72.0	94.0	2500
Spezand	59.0	76.0	995

### 3) Involving farmers in Water Harvesting Studies

In Balochistan, the largest province of Pakistan, agriculture out put is low and unpredictable due to low and erratic rainfall, A&RI scientists are trying to introduce the technologies which will enable farmers to increase their crop yield. The technology known as "Water Harvesting" in one in which the upper area of sloppy fields is used to catch the rain water which runs on to the other area where a crop is planted. These results a higher crop yields since the crop receives additional moisture.

Previously this technology has shown pyramis under experimental condition, and the research has been conducted with out the involvement of farmers. The objective of this work is to involve farmers in testing and verification of this technology, while establishing and managing of catchment basin water harvesting technique. An adaptive extension-research program was conducted in On-farm trial with full participation of farmer, who was encouraged to do all the field work by himself.

The trials were set up at dasht (Combala, Killi Zareef), Spezand and Kovak sites. At each site, there were two treatments, namely, a control on which the whole area was cropped and a 1:1 catchment-to-cropped area on which the upper half was a smoothed catchment. The catchment was set up by first ploughing with a tractor-mounted moldboard, then pulverizing & levelling the soil with a heavy tractor mounted wooden plank. Once the catchments have been set up they should remain effective for many years with only minor maintenance cost.

Only the site at Kovak gave results, the others having been rendered unusable for a variety of reasons. As already indicated, the rain began very late in the season and then was heavy enough to cause some water logging.

Computer predictions were made of rainfall probabilities during different periods in Kovak Valley, where annual rainfall was around 277mm, and the amount of run-off which could be expected from a compacted silty clay loam. These predictions indicated that in half the years an additional 100 or 200 mm could be generated from a catchment area (basin) representing the upper half of the total field, with the lower half of the field respectively, farming the infiltration, run-on cropped area.

Plants at Kovak were more productive than at dasht sites. The poor growth and low productivity at Dasht is largely a result of heavy rain fall in December, 1992 just after the planting of crop which created the problem of crust formation, due to which emergence process could not start.

Table 3. Yields (Kg/Ha) of grain & TDM in CBWH trial at Kovak (1992-93)

Treatment	Control	1:1	cv%	LSD 5%
Grain	303	521 a1	20.3d	129
TDM	1707	2653 a	11.0 d	464

1. The different letters in the same column means that the corresponding values differ significantly (P<0.05)

Water harvesting increased significantly the TDM production of wheat crop with the 1:1 treatment generally than to control. Grain yields was also significantly better in 1:1 treatment compare to control.

These findings, were in line with those of previous years and confirmed that CBWH has a modest potential for increasing

yields and reducing the risks of crop production in those areas of very erratic and variable rainfall.

#### 4) Comparative performance of camel drawn seed drill with the traditional wooden plough/planter for rainfed areas.

In rainfed agriculture most of the cereal crops are sown using draft animals , mainly camels in Balochistan. One of the most important mean of assisting such areas is the development, adaptation and evaluation of new agriculture technology that can be adopted by small farmers. Few years ago, the agronomy section collaborated with a private agriculture machinery firm in Faisalabad in designing and fabricating a three farrow camel drawn seed drill fore rainfed areas of Balochistan. The drill can work easily in both large and small plots

The camel drawn seed drill is a piece of improved equipment designed by the AZRI scientists specially for the farmers of rainfed areas of Balochistan. The effectiveness and performance of this drill was tested under farmer's condition. The objective of the work is to test a camel drawn seed drill under farmer's condition and to compare it with the traditional wooden plough/planter.

To compare this new camel drawn seed drill with the traditional wooden camel plow, field plots were established at Spezand, Dasht and Mastung. At each location, the plots were sown in mid-December, 1992. The crop were sown with local wheat and improved Barley (Arabic Abaid) with out fertilizer. Land preparation, seed rate and seeding depth for both of improved and the traditional plough were kept constant.

Table 4. Working time comparison of camel drawn seed drill & traditional wooden plow.

Location	Crop	Camel drill hours/ha	Wooden plow hours/ha
Kolpur	Cereal	5.6	12.7
Mastung	Cereal	6.0	13.0
Spezand	Cereal	5.8	13.0

**Table 5 .Total dry matter & Grain Yield for Wheat & Barley  
planted by improved seed drill and camel plough  
(kg/ha)**

Site:	Spezand	Dasht	Mastung	Camel-drawn seed drill	Local camel plough	Over-all mean	CV (%) -
TDM:	1883	1530	1860	1887	1698	1793	6.4
Grain:	451	471	525	518	459	489	5.8

Statistical analysis indicated that there was significant ( $P < 0.05$ ) difference for both TDM and Grain yield. These results indicate that the improved seed drill was slightly better than local plough planting.

Measurement of the time taken for planting by each method were carried out and the seed drill took approximately half the time that the traditional plough took to plant a similar area. Such a saving in time would enable farmers to plant their whole area within a shorter times when conditions were favorable, or alternatively to plant a larger area.

There are various aspects of the drill which still need to be improved; it appears to be rather heavy and is difficult to turn at the end of each row; the on/off control lever is badly positioned and could injure the operation. Transport from field to field is likely to be slow and laborious.

## 5. VETERINARY CAMP AT KOVAK

A temporary camp was organized jointly by the livestock department (Government of Balochistan) and AZRI at Kovak on April at 29, 1987.

This was one of a wide-ranging series of veterinary camps organized by the provincial livestock department, but was the first of this type in Kovak valley. Livestock is the main source of family income and human food in the Kovak valley. Sheep and goats are the dominant farms of livestock, totalling numbers is around 27,000 head. Almost all families have a small number of poultry which are used for family consumption. Camels are used as draft animals.

In table 6 the numbers of animals treated are presented for treatments against the three majors animal health constraints: enterotoxemia, anthrax and internal parasites. The impact of this

intervention will be assessed in the Kovak valley over the next two years. However, the implications for successful livestock extension activities were clearly noted and include the chance for "face to face" training for farmers with livestock department officers, and an opportunity for large scale farmers 'exposure to audio-visual training materials.

Table 6 . Treatments administrated at temporary veterinary camp in Kovak valley on April 8 and 9, 1987.

Treatment	Sheep & Goat	Camel
Vaccination Enterotoxemia	5,757	Nil
Vaccination Anthrax Spore	6,202	43
Dosing Liverfluke & worms	6,202	43
Castration	10	Nil
<b>Total</b>	<b>18,171</b>	<b>86</b>

During 1987-89 period of extension group activities 10 mobile veterinary aid camps were organized in collaboration with the provincial livestock department. The number of animals vaccinated and drenched was around 70,000. Excellent cooperation was received from the management of the livestock department and their local veterinarian and stock assistants in the Mastung and Kalat areas. The concept of using veterinary camps as a vehicle for livestock extension was discussed thoroughly and this is an opportunity for further AZRI cooperation with the livestock department. Further more, in cooperation with PTV and PBC several TV and Radio Programs were produced on the spots at these camps which highlights their potential functions as vehicle for agricultural extension.

6. Local tree plantation to see their survival capacity in pure rainfed area.

More than 5,000 Mulberry saplings were planted in the Kovak valley, either in blocks or in homesteads by farmers. An on going survival and performance trial is being conducted which

consists of species such as local Mulberry, *Eleagnus herbasus*, *Alanthus angustifolia*, *Robinea pseudocacia*, and *Prunus eburnea*. These multipurpose tree trials are a cooperative effort with the local forestry department, Mustang Office. Fourwing Saltbush (*Atriplex canescens*) seedling transplant evaluation/ introduction trials are under way presently in farm fields at Gajan and Mollazai villages in the Kovak Valley.

## **7. Integrated agricultural production and resources management for Kovak Valley, Balochistan.**

The farmers in the valley are agro-pastoralist with mixed agricultural activities. The major crops are wheat, barley and cumin. Their production depends upon the availability of rains (150-300 mm). Arid Zone Research Institute started activities during 1985. A number of AZRI technologies were tested their and found feasible but latter on due to shortage of funds and manpower these activities were stopped.

Socio-economically Koval Valley is a representative backward area for highland Balochistan which is comparatively nearer to Quetta. The past experience while interacting with the farmers of the area shows that they are cooperative and receptive to the new technologies provided they are beneficial for their socio-economic uplift. Agricultural Extension and Economic Sections strongly felt and recommended that AZRI multidisciplinary technologies should be taken to this area as an integrated project.

The objectives included participation & involvement of local farmers in AZRI generated technologies like catchment basin water harvesting technology, Range Improvement activities and survival feeding of small ruminants in Kovak Valley to improve their production performance.

With the participation of local eight farmers of different sites at Kovak, the technology of catchment basin water harvesting was established. Two sites were selected for establishment of forage reserve of FWSB namely Kund village and Azam Khan village. About 3,500 seedlings were planted during 1993-94 in and around fenced area at both the sites. The participated farmers were given training to establish forage reserve. The feeding practice of a basal ration ( 250 gm wheat straw/head/day) with 300 gm barley + 200 gm cotton seed cake/head/day was demonstrated to the local farmers. The drenching activity was also carried out. One learned young local farmer of Kovak valley named Haji Khan was given training on the feeding and drenching strategy to the small ruminants.

## **B) Research in Extension Issues**

### **Achievements**

#### **1. Cooperative Farmer Survey to obtain comments about AZRI technologies.**

A cooperative farmer survey was made in the area of twenty cooperative farmers in Kovak who participated in the farmers managed trials. The prime objective of the survey was to obtain comments from farmers about the technologies being tested in their fields and to gather background information.

One-half of the cooperative farmers planted wheat in their field in the Jan-Feb period which made up 25% of their total 1986-87 wheat planting. Ninety-five percent said that the wheat planted in the Autumn (1986) out-yielded the wheat planted in the Jan-Feb (1987) period. Farmers have planted wheat in the Jan-Feb period in 4 to 5 years out of the past ten years. The major reason for planting in Jan-Feb period is insufficient rainfall in Autumn.

Farmers took a keen interest in the trials and 95% could name and readily discuss the treatments of the trial.

#### **2. Agricultural Extension Survey and Community Profiles Study.**

A community profile study and an agricultural extension survey were conducted by AZRI in the five regions where on-farm agronomy and livestock research are being conducted. The objectives of both studies were to obtain significant baseline information about the nature of community social organization and structure, indigenous communication pattern, flow of agriculture information, and current access to institutional extension messages. This information is required to aid in the identification of appropriate strategies for technology transfer and in the support of agricultural extension programs.

An assessment of the farmer's preparedness to receive agricultural extension information was made from the data obtained on information availability concerning agricultural production and practices within the villages. The data indicate that the current level of access to agricultural extension services is almost non-existent, because the provincial government agricultural extension

services have very limited resources. Access to livestock extension services is much greater than crop extension agencies in dry land areas. Information about livestock health was available from the provincial livestock department in all five locations to a minority of livestock producers (43% for all five locations).

### **3. Anthropological field study on community profiles.**

An anthropological field study was conducted at Kovak, Zarchi, Khuzdar, Dasht and Tomagh , by a short term consultant for the extension group. In the rural areas particularly where AZRI on-farm research activities were being carried out. This study is aimed at providing community profiles which described the historical background, ethnic composition, natural resource base, pattern of interaction and leadership among the members of the farming community.

An agricultural extension survey was conducted to investigate (a) selected social characteristics and attitude of farmers, (b) indigenous communication pattern and factors influencing the flow of communication within and between rural communities, and (c) local and institutional sources of agriculture information. Recommendation was made for appropriate extension approaches and methods based on these data.

### **4. Mechanical sheep shearing**

In order to provide the latest technical know how in mechanical sheep shearing , a two days first ever workshop on sheep shearing, grading and handling was held at Arid Zone Research Institute, Quetta in 1993. A two member Australian team including Dr. Murray Ellis, sheep shearing expert and grading expert and Dr. Robert R. Howe, FAO Chief Technical Advisor, visited AZRI for the said workshop alongwith Dr. M.A. Naqvi, National Coordinator Sheep and Wool and Dr. Waheed Ahmed, FAO National Consultant. Participants were mainly sheep farmers from Quetta, Kalat and Loralai as well as professional staff from Livestock department. The team demonstrated the mechanical sheep shearing with imported shearing machine as well as grading and handling procedure. Participants got On-hand training of mechanical sheep shearing and showed keen interest in adopting this technology. The director AZRI emphasized the importance of mechanical sheep shearing and grading for optimizing farmer income from the sale of wool in Balochistan. Director General, Livestock, stressed the need for future collaboration between AZRI and Livestock Department of Balochistan, for disseminating this technology among Balochistan Livestock farmers whose mainstay is the production and selling of sheep and sheep production including wool.

## 5. Agricultural Fare/Exhibition

AZRI has participated regularly at the provincial agricultural fare/ exhibition in Balochistan and at the NARC open House in Islamabad. The Sibi Festival has been regularly attended and organized by extension group since 1986. A number of farmers, officers and officials of government and private sector, social workers, college & school students, women and children used to visit AZRI stall, where AZRI research work and activities were presented and explained with different aids and models etc.

## 6. Farmer's days.

Farmer's days were organized eight times in major AZRI research sites i.e., Loralai, Muslimbagh, Kovak, Khuzdar and Mianghundi, where farmer's participation trials on water harvesting technique, performance of improved varieties of cereal, food and forage legume crops and establishment and management of forage reserve of FWSB on marginal lands were explained to the farmers and staff of different newspapers, TV and PBC having the purpose to ascertain the views of farmers and encourage them to adopt the technologies suitable for the areas.

## 7. Post-graduate Research Work.

Extension issue research on rainfed agriculture and water stress agriculture was undertaken, when guidance and assistance to Post Graduate students of Government Girls College, Quetta were given on the water stress study & collection of literature on the rainfed agriculture and water stress to complete the following M.Sc. Post Graduate Research Thesis:

1. Total Dry Matter and Growth of Sorghum under Green House condition as affected by Water Stress.
2. The effect of Water Stress on the Growth and Total Dry Matter of Pearl Millet under Green House Condition.
3. The Effect of Water Stress on the Growth and Total Dry Mater of Spring Wheat under Green House Condition.

## C) Information Transfer and Media Production

### Achievements.

#### 1. Workshops arranged

a. In 1985-86 four workshops were held on farming systems research methodology ( in cooperation with FSP), range management research at Maslakh, introduction to biometrics and English language. Participants included staff from AZRI, Balochistan provincial research agencies and representatives of PARC and the other provinces of Pakistan.

b. Five workshops were held during 1986-87 season including AZRI and provincial agricultural agencies staff on the following subjects;

1. Introduction to microcomputers
2. The appropriate use of analysis of variance.
3. Introduction of MSTAT statistical package.
4. Range ecology
5. English language (written and spoken)

c. Three provincial level training workshops and one national seminar in extension issues during 1987-89 have been organized by the extension group. Assistance was provided in mass media relations and communication media production for the national workshops and seminars organized by the other AZRI research groups. The subjects of workshops and seminar were as under:

1. Video Production Techniques.
2. Written Material in Agricultural extension
3. Planning for effective agricultural communication
4. Seminar on Livestock research and extension.

d. One workshop in 1990 on water harvesting for provincial staff of agriculture was held at AZRI at the request of Balochistan Department of Agriculture. A seminar on " Water resources development and its management in arid areas " was held.

e. An international workshop on small ruminants was held in 1992 at Quetta. Participants came from Afghanistan, Morocco, Iraq, Pakistan and Turkey, as well as from ICARDA headquarters and the Ankara Office. The Pakistani participants came from the provincial Livestock Department, from NARC and PARC, and from the FAO/UNDP sheep and wool project at NARC.

## 2. Mass Media & strengthening of AZRI Resource Center.

a. Mass media coverage was provided on the main activities of AZRI through the efforts of the extension group in releasing press bulletins and organizing press conferences.

b. Several extension group field activities have been visited by TV and radio staff.

c. Assistance was provided in mass media relation and communication media production for the national seminars organized by other AZRI research groups.

d. Two different teams of Afghan Refugees trainees under the program of EIL, UNHCR ( Experimental in International Living ) visited AZRI, where a detail lecture on AZRI activities was delivered.

e. A group of 19 PCS (Provincial Civil Services) trainees, selectees of Punjab Public Service Commission visited AZRI in March, 1993. A informatory lecture was delivered to them on AZRI activities.

f. All sorts of AZRI activities was communicated in shape of monthly, quarterly progress reports and AZRI news letter.

g. AZRI Research Center was improved and strengthened by increasing the number of books up to two thousands, preparation of catalogue cards, classification of books and eateries of periodical journals. Agricultural data-base (Agricola, Agris and Cabi) and some micro fiche and film material up to 1990 was collected.

### h. Publications:

1. DEL Castillo, G. 1988. Community Profiles: a set of Cultural Sketches of five regions in Balochistan. ICARDA Report-11.

2. Talug, C. (1987). What makes an Extension Worker successful. Proceedings of the first National training Course on Technology Transfer for Agricultural Extension staff. NARC Islamabad. 4 February 1987. Report-4.

3. Talug, G., Arshad Ali, G. Farid Sabir, D.J. rees, H. Raza, J.G. Nagi, M.B.A. Chaudary and M. Aslam. 1988. Farmer Managed Trial in the Kovak Valley, Balochistan: The effect of Variety and addition of fertilizer on wheat production. Report No.12.

4. Talug, C., C. Del Castillo and G.F. Sabir. (1989) The scope for improved agricultural extension and information transfer in Balochistan. Report-30.

5. Talug,C., M.B.A.Choudary, A.Ali and M.Asiam. 1989. Linking Agricultural research and Extension.Presented at the seminar on Livestock Research and Extension, sponsored by PARC, USAID and ICARDA. Report-38.

6. Talug,C., M.Asiam,A.Ali and M.B.A.Choudary.1988. The role of Extension in FSR.presented at the "international Seminar on Farming System research" Report-41.

7. Talug,C. Agricultural Extension at the Arid Zone Research Institute 1986-89: Rational and future prospects. Report-42.

**Scientific Staff involved in the work:**

1. Dr. C. Talug, Extension/Communication Specialist (1987-89)
2. Mr. Arshad Ali, Scientific Officer (1988-89)
3. Mr. Mohammed Bilal Ahmed Ch. Scientific Officer. (1987-94)
4. Mr. Mohammed Aslam, Scientific Officer. (1988-89)
5. Syed Hassan Raza, Principal Scientific Officer. (1992-94)
6. Mr. Abid Hussain, Scientific Officer. (1992-94)
7. Mr. Abdul Razzaq, Scientific Officer. (1992-94)
8. Mr. Tariq Javed, Librarian. (1984-94)

**FUTURE THRUSTS:**

**A) Field Activities**

Farmer participation in adopting AZRI generated technologies like catchment basin water harvesting technology, forage reserve of FWSB, cultivation of improved varieties of cereal, food and forage legume crops and livestock management activities.

**B) Extension Research**

1. Collaboration in field work of range & livestock management studies.
2. Coordination study of ecological & morphological adaptation of commercial plants like saffron, jojoba, guayule and cumin to arid condition.

3. Organization/ participation of workshop, seminars, farmer meetings, farmer's field days, agricultural fare/exhibitions to introduce the tested and approved technologies generated by AZRI.

#### C) Information Transfer and Media Production

1. Strengthening AZRI Resource center by creating linkages by provincial, national and international agencies.
2. Promotional video documentary about AZRI activities.
3. Communication of all sorts of AZRI activities in shape of monthly, quarterly, annually and AZRI Newsletter.
4. Development of informatory/promotional material like printing material, display boards etc.

#### STAFF IN POSITION DURING 1994-95

1. Syed Hassan Raza, Principal Scientific Officer.
2. Mr. Abid Hussain, Scientific Officer.
3. Mr. Abdul Razzaq, Scientific Officer.
4. Mr. Tariq Javed, Librarian.
5. Mr. Mohammed Khalid Akhtar, Library Assistant.