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LENTIL PRODUCTION IN HIGHLAND BALOCHISTAN: CURRENT STATUS

by

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INTRODUCTION

Lentils are one of the oldest food crops grown and used by man. Today lentils are found throughout the world and are grown on about 3 percent of the total world area under pulses. Some countries in West Asia, with Mediterranean climates, have proportionately a much higher hectarage under lentils. For instance, Jordan has 75 percent of its total area under pulses devoted to lentil production. The proportions are 51 percent, 28 percent and 24 percent for Syria, Turkey and Iran respectively (Webb and Hawtin, 1980).

The Indian sub-continent is another important lentil growing area. Pakistan in the period 1975 - 85 had a total area of 75,900 ha under lentils, constituting 4.9 percent of the total area under pulses in the country. This produced 30,700 t with an average yield of 393 kg/ha. Seventy-five percent of this production was from the Punjab with the remainder being produced in the Sind and NWFP. However, the area under lentil in Balochistan was almost negligible being less than 100 ha (Government of Pakistan, 1988)

Lentils are an important and valuable human protein source and they are generally a far cheaper protein option than meat alternatives. In Pakistan the relative price of red meat was approximately five times that of lentils in 1989. Therefore, the potential for lentils to become a more important source of dietary protein in Pakistan seems large at present. Lentils are in general able to produce grain better than other temperate food legumes in harsh Mediterranean climatic conditions. The Balochistan highlands largely experience such climatic conditions and therefore lentils appear to be a suitable legume species for wider and more intense cultivation. Legumes are at present not widely grown in the wheat based farming systems of the highlands. The introduction of more legume crops to the system would be of additional benefit by decreasing cereal monocropping and by helping to sustain soil fertility conditions.

Research Methodology

(a) All secondary information on lentils available with the provincial planning and development bureau of statistics and with the agriculture department were collected and compiled for this report.

(b) A formal survey was conducted in November, 1988 in the southern, central and northern areas of highland Balochistan. On the basis of informal surveys and data gathering, it was determined that a sample size of 77 farmers including 23 from Khuzdar district, 31 from Kalat, Kachhi, Quetta and Pishin districts and 23 from Loralai and Zhob districts would be a sufficient and adequately representative sample. Within the three selected regions of highland Balochistan, villages as well as farmers were selected for questioning at random with the initial proviso that they were currently lentil producers.

The information described, analyzed and interpreted below is on the basis of areas. The areas are defined as follows:

Area 1. Khuzdar District
Area 2. Kalat, Kachhi, Quetta and Pishin Districts
Area 3. Loralai and Zhob Districts

Objectives of the Study

The present survey was undertaken as a first step to gather baseline information on:

(a) The present status of the lentil crop, its area, production and yields in highland Balochistan;

(b) The reasons why so few farmers grow lentils; and,

(c) The opportunities for future increases in the area and production intensity of lentils in highland Balochistan.

Present Status of Lentil Production in Balochistan and Highland Balochistan in Particular.

Until recently an overwhelming majority of farmers in Balochistan were strictly subsistence oriented. Wheat is not only the staple food for the Baloch, it is also the only food other than animal byproducts available to a large percentage of the population in the province. This explains the present desire to grow wheat as a winter crop whenever growth conditions are favorable. There has also been a historical social stigma attached to the growth and consumption of lentils which were considered to be only suitable for "poor people". Whatever the reasons, the

area of lentils grown in Balochistan is at present very small as is shown in Table 1.

Table 1. Area Under Lentil in Balochistan, Highland Balochistan and Khuzdar District.

Year	Area Under Lentil Crop (ha)		
	Balochistan	Highland Bal.	Khuzdar District
1984-5	132	115	115
1985-6	129	92	92

Source: Agricultural Statistics, Government of Balochistan

If the Government of Balochistan's reported statistics are true estimates, the area of lentil production in the province is negligible. Not only is the area small, lentil cultivation also seems to be limited to a small area of the province, Khuzdar district. However, it is likely that these official figures are considerable underestimates of the actual hectarage grown. AZRI scientists in 1985-6 and subsequent seasons have observed lentils grown commonly in Kalat, Chagai, Quetta, Kachhi, Loralai and Pishin districts which have been overlooked in the official statistics (S.H. Raza Pers. Comm., 1989)

CHARACTERISTICS OF LENTIL FARMERS

Land and Animal Ownership

The lentil producers interviewed were also involved in the production of other crops. They were therefore, asked about their total holdings. The following Table shows the average size of land holding in each of the three locations.

Table 2. Total Land Holdings of Lentil Producers in Highland Balochistan.

Land type	Average Land Holding (ha)		
	Area 1	Area 2	Area 3
Irrigated	7	6	6
Sailaba#	21	9	10
Khushkaba	4	8	10
TOTAL	32	23	26

Sailaba land receives run-on water, Khushkaba does not.

The data from Table 2 show that, on average, the farmers interviewed were larger land holders than average for dryland crop enterprises in upland Balochistan (approx.

20ha, Nagy and Sabir, 1987). It is plausible therefore that lentil producers are restricted to those farmers with land surplus to their domestic wheat needs. However, the total land area under lentil was less than 0.5 ha per respondent per year which implies that this land shortage factor should not be overemphasized.

The farmers were also interviewed about their animal holdings (Table 3).

Table 3. Average Animal Ownership by Lentil Producers in Highland Balochistan.

Animal	Average ownership by lentil producers		
	Area 1	Area 2	Area 3
Sheep	12	29	45
Goats	10	13	8
Camels/cattle	5	2	4

The animal ownership of lentil farmers is also higher than the norm for household animal raisers (Buzdar et al. 1989) and their greater apparent wealth of animals is likely to be a function of their larger landholdings and relative prosperity.

Mixed and Diversified Farming

The farmers growing lentils were asked about their total farming enterprise and distribution of their resources between farming activities. Table 4 shows the combination of enterprises reported by the survey respondents.

Table 4. Farmer Involvement in Various Agricultural Enterprises.

Enterprise type	Percent farmer involvement		
	Area 1	Area 2	Area 3
Rainfed farming only	9	0	4
Rainfed + livestock	70	97	87
Rainfed +LS +irri. frm.	21	3	9

The information in the Table shows that the persons interviewed largely belonged to a specific class of farmers. In this particular class, the vast majority of farmers were engaged in both rainfed agriculture and livestock raising. Although some farmers were engaged in irrigated agriculture, lentils were only produced under rainfed conditions.

Labour Input for Lentil Production.

Lentils are generally sown by broadcasting and the major uses of labour are for crop hand harvesting. Lentil harvesting is not only time consuming but also in Balochistan is considered to require extra skill to avoid wastage. The farmers were asked about the labour which they employed to do their lentil harvesting (Table 5).

Table 5. Lentil Harvesting in Highland Balochistan.

Labour for Harvest	Percent of farmers		
	Area 1	Area 2	Area 3
Male family labour	61	51	74
Female family labour	30	48	26
Hired labour	5	1	-
Friends/relatives	4	-	-

Since in most cases the area under lentils was small (less than 0.5 ha), most of the harvesting could be achieved by family members. Male labour appears to be more important in this "skilled" activity.

Crop threshing is another area requiring the use of labour, animals or machinery. The farmers were asked to give their estimates of the labour requirement for lentil threshing as compared with wheat threshing (Table 6)

Table 6. Labour Requirements for Lentil Threshing in Comparison to Wheat.

Labour as compared with wheat	percent of farmers			
	Area 1	Area 2	Area 3	All
75 percent less	56	68	74	68
50 percent less	22	32	26	27
25 percent less	9	-	-	1
10 percent less	9	-	-	3
50 percent more	4	-	-	1

The data shown in Table 6 shows conclusively that farmers felt that lentils required considerably less paid labour for threshing than wheat as this need was largely fulfilled by their female family relatives. Threshing costs are a substantial factor in determining production profitability for wheat (Rees et al., 1989) as hired labour is often required.

Changes in the Area Under Lentil in Highland Balochistan

Ninety percent of those presently growing lentil, revealed that their families were growing the crop at the time of the establishment of Pakistan in 1947. This means that very few farmers have switched to lentil production during the last four decades. The farmers who indicated that their families have been growing lentil for over 42 years, were also interviewed about the increases or decreases in their area under lentils during these years. The data in Table 7 summarizes the responses.

Table 7. Changes in Area under Lentils During the Past Four Decades.

Lentil cropped area	percent of farmers
Percent less area	
25 percent	6
50 percent	11
90 percent	1
Percent more area	
25 percent	7
50 percent	23
70 percent	13
75 percent	1
100 percent	1
Percent same area	37

The responses indicated by the data shown in Table 7 indicate that there has been some increase in lentil production in the past 40 years, but this has not been large.

Reasons for Farmers Not Growing More Lentils in Highland Balochistan

During the survey, the farmers were asked why they do not grow more lentils. The following Table shows their responses.

Table 8. Reasons for Not Bringing More Area Under Lentils.

Farmer reasons for Not growing more lentils	Percent of Farmers		
	First	Second	Third
Low demand/prices	47	12	21
Prefer wheat for security	19	56	22
High input costs	13	12	28
Land shortage	9	8	-
Lentil never grown in area	4	9	12
Lower lentil yields	2	1	5
Wheat straw more useful	1	-	11
Labor non-availability	-	2	5

The highest percentage of farmers indicated that lack of demand for the crop was the main reason for their unwillingness to grow more lentils. The second most important reason cited was that of preferring wheat over lentil and other crops due to concerns for domestic food security. The fact that food security is now a secondary consideration suggests that, due to recent improvements in means of transport and communication, farmers seem to be less worried about food security and that economic factors may in the future play a more important role in their decision making process. Additionally, farmers at present lack official incentives for enhanced production as this is not a crop receiving any priority at present from local extension or credit services.

CHARACTERISTICS OF LAND AND LAND USE FOR LENTIL PRODUCTION

Perceptions of Farmers About the Type of Land Required for Lentil Production

Farmers were asked to consider the relative production needs of lentils and wheat with specific reference to the type and suitability of land required for either crop. Their responses are presented in Table 9.

Table 9. Quality of Land Used for Lentil Production.

Land quality	Percent of farmers	
	Khushkaba	Sailaba
Same as used for wheat	33	14
Better than wheat land	25	74
Poorer than wheat land	42	12

Eighty-six percent of the farmers surveyed were growing lentil in their sailaba fields and a large majority of these farmers also chose to give lentils preferential consideration in terms of land quality than wheat. In contradiction, those 14% of farmers growing lentils under Khuskhaba conditions opted for poorer quality land than used for wheat to grow their lentil crops.

Cropping Sequences Used by Lentil Producers

To establish previous crop sequences involving lentils the farmers were asked about lands on which they were growing the same winter crop as they did the previous year. The following data presented in Table 10 shows the farmer responses.

Table 10. Continuity of Crop Sequences in Highland Balochistan on Specific Fields.

Crop	1987-1988		1986-1987		1985-1986	
	k/aba	s/aba	k/aba	s/aba	k/aba	s/aba
Area 1						
Lentil	43	50	57	50	43	64
Wheat	43	50	29	36	29	22
Barley	-	-	-	7	14	-
Fallow	14	-	14	7	14	14
Area 2						
Lentil	67	89	67	75	67	89
Wheat	-	4	-	11	33	4
Barley	-	-	-	-	-	-
Fallow	33	7	33	14	-	7
Area 3						
Lentil	-	65	-	69	-	57
Wheat	-	13	-	13	-	26
Barley	-	4	-	9	-	4
Fallow	-	18	-	9	-	13

The predominant cropping sequence seems to be continuous monoculture on individual fields. The farmers perceive this system to be beneficial as they believe that yields are higher, in case of all crops, if sown in the same field as the year before. It suggests that soil borne diseases are not a major issue and also possibly that inoculation by native Rhizobia may be of importance. It is possible in most sailaba system fields, that are receiving silt annually from run-on water, that this monocropping policy is less destructive than it might be in other locations.

LENTIL YIELD AND PRODUCTION PROBLEMS

Farmer Perceptions of Lentil Yield Responses in Relation to Land Quality.

The farmers considered better quality land to be those fields that were receiving more and better plowing and leveling and were well embanked allowing a greater likelihood of successful sailaba run-on moisture accumulation.

Table 11. Lentil Yield Increments if Grown on Good Instead of Poor Quality Land.

Increase over poor quality land

	Percent of farmers	
	Khushkaba	Sailaba
0 percent	20	-
50 percent	40	89
100 percent	40	11

In both the khushkaba and sailaba systems farmers seem to believe that there is a large potential difference in yields between good and poor quality land. This suggests that they recognise an incentive to manage their lentil fields as well as possible prior to sowing.

Actual Estimates of Lentil Yields During the Last Three Years.

The farmers were asked to estimate their actual yields in the past three years. 1985-6 was considered to be an average to poor year in terms of rainfall, 1986-7 to be a good to normal year and 1987-8 to be a poor to average year.

Table 12. Lentil Yields in Highland Balochistan

Year	Yield kg/ha in highland Balochistan.			
Sailaba	Area 1	Area 2	Area 3	Mean
1987-88	316	461	233	337
1986-87	616	594	292	501
1985-86	385	538	374	432

				423
Khushkaba				
1987-88	350	-	288	319
1986-87	236	-	317	277
1985-86	460	-	164	312

				303

In the southern central region (Khuzdar), as well as the northeast (Zhob/Loralai) there do not seem to be substantial yield differences between Sailaba and Khushkaba land which is a surprise given the responses on land quality given in Tables 9 and 11. Yields are clearly low and suggest that a potential for increase exists.

Problems with the Production of Lentils as Perceived by Farmers.

The farmers were asked about the main problems they experienced when growing lentils. The results were:

Table 13. Production Problems of Lentil Producers

Problem	Percent of farmers		
	Area 1	Area 2	Area 3
Birds	17	61	4
Wild Fauna	13	30	22
Insects/pests	96	100	96
Frost	13	23	7

It is evident from the data given in Table 13 that insects are a major concern for farmers. It was not possible to ascertain definitely from the farmers which insects were involved, but from their descriptions the likelihood is that aphids and army worms are the major contributors to yield losses.

LENTIL CONSUMPTION AND MARKETING IN HIGHLAND BALOCHISTAN

Lentil Consumption and Disposal

The farmers were asked to detail the various ways in which they use their lentil grain and straw. These are shown in the following Table.

Table 14. Lentil Consumption and Disposal in Highland Balochistan.

Consumption/disposal	percent produce	
	Grain	Straw
Human consumption	70	-
Sale	10	-
Poor/religious tax etc.	10	-
Relatives/friends	4	7
Next year seeds	6	-
Sheep/goats	-	23
Draft animals	-	70

It is evident from the data presented in Table 14 that only a small proportion (10%) of lentil production is available for sale outside of domestic uses. Furthermore, the suggestion that only six percent of the crop is used for next year's seeds implies, using the average yields of Table 12, that seed rates may be as low as 25 kg/ha. This could be a major factor in the low yield levels obtained.

For the straw, most of the production is being consumed by the household draft animals and any increases therefore would perhaps have greater implication for the nutrition of the farmers' sheep and goats, if their draft animal's feed requirements are already being met.

Lentil Consumption by Households

Despite the currently very restricted hectarage under lentils in highland Balochistan, consumption, in contrast, is widespread and sustained. Boiled lentil grains are used separately, or with bread, as curries and soups are also now becoming popular among segments of society. As part of the lentil survey, households were asked about the extent of their lentil consumption. The data in the following Table shows household responses.

Table 15. Consumption of lentil by households.

Number of times	Percent of farmer households			
	Area 1	Area 2	Area 3	All
1-3 times a week	91	77	78	82
4-5 times a week	9	23	22	18

The questionnaire included questions about no use and use more than 5 times in a week. The data in these categories were negligible and were therefore excluded from the analysis.

If it is assumed that an average household is growing less that 0.75 ha of lentil with an average yield of 300 kg/ha, then consumption per household will be approximately 4.3 kg/week which with 10 consuming members per household (Nagy and Farid Sabir, 1987) implies that each consumer is receiving somewhat less than 150 gm lentil per consumption occasion. This is not a large consumption figure and implies that there is scope, and perhaps need, for greater home consumption.

The farmer households were also asked about their personal preference between small seeded and large seeded lentils. Small seeded lentils in this case being represented by the local landrace which has a very small grain size (14.5 gm/1000 whole seeds) and "imported" normal sized lentils from Sind (25.2 gm/1000 whole seeds) or the Punjab (27.3 gm/1000 whole seeds) (Table 16).

Table 16. Lentil Preferences in highland Balochistan.

Lentil type	Percent of Farmer households			
	Area 1	Area 2	Area 3	All
Small seeded	26	42	0	25
Large seeded	74	58	100	75

In all the three areas individually and in all areas combined the overwhelming choice for consumption is large seeded lentils. This may have major implications for the marketing demand of the local ultra-small seeded lentils. The availability of a large seeded cultivar adapted to the environmental conditions of highland Balochistan could thus be of major importance in overcoming local demand constraints.

MARKETING AND PRICES OF LENTIL IN HIGHLAND BALOCHISTAN

The production of lentils in highland Balochistan is very small and whatever remains after home consumption, is marketed locally. Although only one local, Balochi variety is produced, there are at least three other varieties that are imported and sold in various town and city markets. The three main imported varieties are Sindhi, Punjabi and Turkish. A Quetta market survey indicated that most of the province's lentil requirements are met by imported Turkish material (approximately 25 gm/1000 whole seeds). The prices of various lentil varieties in the Quetta market during March, 1989 were as follows:

Table 17. Lentil Prices as Quoted in Quetta Market in March, 1989.

Name of Variety	Price Rs. per 40 kg
Punjabi (crushed)	370
Sindhi (crushed)	370
Turkish(crushed)	385
Balochi (crushed)	410

Informal consumer surveys have suggested that the predominance of sales of the Turkish material over Punjabi and Sindhi is as a result of their cleanliness. Lentils from Pakistani sources tend to be more greatly contaminated with stones, soil etc. than the Turkish material. This reason is apparently why an adverse price differential and overwhelming market share can be simultaneously maintained by Turkish lentils. Additionally, it has been suggested that local Balochi lentils do have a better flavour than the other alternatives, and can thus command a price differential, but only in a very limited sales volume. Prices of Punjabi material have apparently increased more than fourfold since 1975 (GOP, 1988).

CONCLUSIONS

It is evident that the growth, production, marketing and consumption of lentils in Balochistan is neither well understood nor documented. This paper attempts to redress this position.

Lentils are not a major crop in Balochistan, but potentially could be more important than seems to be the case today. As large increases are forecast in the human population and production of additional animal protein sources is being held back by lack of available range and crop residue resources (Nagy et al., 1989). Rural families are growing lentils in a subsistence manner and little of the product is marketed. Nevertheless, consumption is frequent and sustained. In the urban population

consumption also appears to be widespread, but this is dependent on imported material. In terms of preference, and taste, large seed size and seed cleanliness are all important considerations for consumers which outweigh small price differentials.

The scope for agronomic improvements to production in Balochistan seem reasonable with improved seed rates, water harvesting, insect control and provision of an improved large seeded frost tolerant variety being major possible interventions. Potential demand for additional straw consumption by domestic small ruminants seems large, with greater feed availability allowing the chance of a large increase in productivity (ICARDA, 1989). These conclusions largely underpin AZRI's research program which has been ongoing since 1985 and which has the identification of cold tolerant large seeded varieties and improved methods of water harvesting as its principal thrusts. Insect control issues and seed rate considerations will in the future receive more attention.

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