
CONTRIBUTION OF AGROFORESTRY TOWARDS THE SOCIO-ECONOMIC DEVELOPMENT OF CHARSADDA DISTRICT, NWFP (PAKISTAN)

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ABSTRACT

A socio-economic survey was conducted in 1990 in the Charsadda district of the North West Frontier Province, Pakistan to develop a sound knowledge of the area, its people and the crops they grow. Data were collected from 270 farmers (138 owners, 41 owner-cum-tenants and 91 tenants) using a questionnaire containing 29 questions of both qualitative and quantitative nature.

Charsadda's farmers grow a number of trees on their farmlands. Some of these trees (*Populus deltoides*, *Dalbergia sissoo* and *Salix* spp.) are used in wood based industries and generate US\$ 2 million income and contribute to the economic uplift of the area.

The study also showed significant differences of tree growing among ownership categories at tehsil as well as district level.

INTRODUCTION

Farmers in Charsadda District, NWFP have long planted various kinds of trees as part of land management systems. But the introduction of *Populus deltoides* Bartr. is of extraordinary significance, having dramatically changed the rural landscape. Poplar's multipurpose features, have made it an extremely popular tree in the district. As a result there is a great demand for poplar wood to sustain many wood based industrial enterprises in Pakistan (Sheikh *et al.* 1986; Marjan, 1990; Siddiqui, 1990).

In addition to poplar, farmers in Charsadda

also grow trees of several other species. The most important are Shisham (*Dalbergia sissoo* Roxb.), Willow (*Salix tetrasperma* L. and *Salix babylonica*), Persian Lilac. (*Melia azedarach* L.), Mulberry (*Morus alba* L), *Ailanthus altissima* Desf. Kikar (*Acacia nilotica* Del.), Ber (*Ziziphus jujuba*). The plane tree (*Platanus orientalis* L.), Gums (*Eucalyptus camaldulensis* Dehnhardt), Semal (*Bombax malabaricum* DC) and Siris (*Albizia lebbek* Benth).

In Charsadda district, land is fertile and sufficient water is available for year-round irrigation. The fact that the farmers of Charsadda grow trees on their farms in conjunction with agricultural crops is a clear demonstration that they recognise the usefulness of trees and indicates the great potential of agroforestry in the district.

MATERIALS AND METHOD

Charsadda district (34° 02' - 34° 32' N and 71° 30' - 71° 56' E) covers 950 km² of Pakistan's North West Frontier Province. Charsadda is the head-quarters of the district which is divided into three tehsils/sub-tehsils, i.e. Charsadda, Shabqaddar and Tangi. These tehsils/sub-tehsils are divided into 22, 20 and 19 Patwar Circles respectively.

A pilot social survey was conducted through a questionnaire. Prior to the formal survey, a pretest of five farmers in each occupational category (owner, owner cum-tenant and tenant) in Charsadda tehsil, five in each category in Tangi tehsil and four in each category in Shahqaddar sub-tehsil was made. The questionnaire proved

satisfactory and was not modified for the formal survey (Nichols, 1991)

To initiate a preliminary survey meetings were held with Director General, Pakistan Forest Institute, Peshawar, Director General, Agriculture, Chief Conservator Forests (NWFP), Conservator of Forests Peshawar, Conservator of Forests Wildlife, Divisional Forest Officer Charsadda, Veterinary Doctor, Medical Officer, Medical representative, Engineers, School Headmasters, Religious Leaders, Ex-Agricultural Director, Ex-Superintendent (Prison) and Retired Patwaries. Discussions were also held with key informants, balanced as six elderly people, six political leaders and representative farmers from each of three occupational categories (three from each class).

During the preliminary survey, ten wood traders, five middlemen, ten transporters of farm-wood, nine peasants who worked in the fields, and three herders were also contacted. These people were approached because of the depth of their knowledge of agricultural activities, including agroforestry.

DATA COLLECTION

i. Sampling

There are 27000 farmers in the district 9000, on average, in each of the three tehsils. Out of this number, 270 farmers were interviewed. The stratification of sampling was as given below:

ii. Stratification

The land tenure pattern was the primary means of differentiating three strata:

Stratum I	Owner farmers
Stratum II	Tenant farmers
Stratum III	Owner-cum-tenant farmer;

iii. Sample location

Two stage sampling was adopted. The number of farmers operating the land is almost equal (9000) in each of the three tehsils. Each tehsil constituted a stratum. Nine patwar circles were randomly sampled from each tehsil, giving a total of (27) patwar sample circles. One village was sampled at random within each of these circles. In each sampled village ten farmers were randomly sampled from a contact farmers list provided by the agricultural officer of the area. Since 9000 farmers operated on the land in each tehsil the sampling intensity was 1%. Provision was made for the replacement of listed farmers.

iv. Farmer survey

The farmer survey generated two kinds of data; qualitative and quantitative. The survey sought to establish specifically education level, proportion of male/female, number of dependents, livestock numbers, size of landholding, perception of the house-hold's head with regard to agroforestry, types of trees grown, number of marketable trees on the landholding, planting disposition and annual income of the household.

RESULTS

Significance testing

Chi-squared tests were used to compare observed frequency distributions with the expected frequencies for questions pertaining to professional status, livestock, contiguity of land, attitudes to trees, volume of wood sold in the previous year, wood disposal, negative effect on agricultural crops, source of tree seedlings etc. This was done in order to observe differences in the inclinations and perceptions of farmers in different farmer categories at both district and tehsil levels.

Professional Status

At district level approximately half (138-51%) of the farmers are owners, a further third (91-33%) are tenants, with the remaining farmers (41-16%) being owner-cum-tenants. At tehsil level however, there are large differences in these categories (Table 1). The overwhelming majority of farmers in Charsadda are owners (62-69%),

whereas fewer than half the responses come into this category in Tangi (40-44%) and Shahqaddar (36-40%).

Contiguity of Land

Of the 270 farmers interviewed, 105 (39%) worked non-fragmented farmland, while 165 (61%) worked fragmented farmland (Table 2).

Table 1. Professional status of farmers

Tehsil	Owner	Owner-cum-tenant	Tenant	Total
Charsadda	62	5	23	90
Tangi	40	13	37	90
Shahqaddar	36	23	31	90
Total	138	41	91	270
Percent	51	15	34	100

Table 2. Comparison of farmers working fragmented and non-fragmented lands by ownership category and tehsil, in Charsadda District, North West Frontier Province, Pakistan

Tehsil	Status	Fragmented	Non-fragmented	Total
Charsadda	Owner	38	24	62
	Owner-cum-tenant	3	2	5
	Tenant	13	10	23
	Sub-total	54	36	90

Tangi	Owner	19	21	40
	Owner-cum-tenant	10	3	13
	Tenant	16	21	37
Sub-total		45	45	90
Shabqaddar	Owner	27	9	36
	Owner-cum-tenant	19	4	23
	Tenant	20	11	31
Sub-total		66	24	90
Total		165	105	270

Attitude of Farmers to Trees

259 responses (96%) stated that they were receptive to the idea of tree growing, 145 (54%) indicated willingness to have extensive tree cover

while the other 114 (42%) favoured limited tree cover only. 11 returns (4%) indicated dislike of trees on the farm, though few already had some trees growing on the farm.

Table 3. Number of responses for attitudes to trees

Tehsil	Status	Preferred presence of trees			Total
		Many	Some	No	
Charsadda	Owner	20	37	5	62
	Owner-cum-tenant	1	4	0	5
	Tenant	6	15	2	23
Sub-total		27	56	7	90
Tangi	Owner	22	16	2	40
	Owner-cum-tenant	9	4	0	13
	Tenant	26	11	0	37
Sub-total		57	31	2	90
Shabqaddar	Owner	11	24	1	36
	Owner-cum-tenant	10	13	0	23
	Tenant	9	21	1	31
Sub-total		30	58	2	90
Total		114	145	11	270

Source of seedlings

The responses to this question revealed that government's seedling distribution programme appeared ineffective. Only 16 farmers (6%) out of

the 270 interviewed indicated acquisition of seedlings from the forest department. The majority (106 39%) obtained their seedlings from commercial private nurseries. There was no response from 8 farmers who did not have trees on their land.

Table 4. Sources of seedlings of farmers

Tehsil	Category	Source of seedlings			
		Forest Deptt.	Commercial nursery	Own	None
Charsadda	Owner	4	21	34	3
	Owner-cum-tenant	0	3	2	0
	Tenant	1	11	10	1
	Subtotal	5	35	46	4
Tangi	Owner	6	18	15	1
	Owner-cum-tenant	1	7	5	0
	Tenant	0	17	19	1
	Subtotal	7	42	39	2
Shabqaddar	Owner	3	29	3	1
	Owner-cum-tenant	0	16	7	0
	Tenant	1	18	11	1
	Subtotal	4	63	21	2
Total		16	140	106	8

Wood disposal

Eighty seven farmers (32%) reported no problem in the disposal of wood. Among the rest, however, a lack of a marketing infrastructure and the low prices paid for the wood were frequent

problems. Low prices dissatisfied 151 respondents (56%) while (79%) complained about the marketing process. Forty seven respondents cited both problems.

Table 5. Number of farmers facing varying problems in wood disposal, by tehsil and farmer category, Charsadda District, North West Frontier Province, Pakistan.

Tehsil	Owner				Owner-cum-tenant				Tenant			
	None	Marketing	Price	Marketing & price	None	Marketing	Price	Marketing & price	None	Marketing	Price	Marketing & price
Charsadda	49	1	4	8	5	0	0	0	2	0	17	4
Tangi	8	17	14	1	2	3	5	3	1	2	25	9
Shabqaddar	14	9	4	9	5	0	10	8	1	0	25	5
Total	71	27	22	18	12	3	15	11	4	2	67	18

Effect of trees on crop yield

Of the 86 respondents who thought trees hindered agricultural crops, 22 (26%) identified shade as the source of interference and a further

22(26%) identified competition for root space. Twenty seven (32%) said simply that trees reduced the yield of agricultural producedue due to combined effect of shade and roots. The remaining 15 respondents gave differing reasons.

Table 6. Number of responses given for categories of reasons as to how trees may hinder agricultural crops, by tehsil and farmer category.

Tehsil	Status	Shade	Roots	Shade & Roots	Other	Total
Charsadda	Owner	6	2	1	1	10
	Owner-cum-tenant	1	2	2	0	5
	Tenant	2	3	4	3	12
	Subtotal	9	7	7	4	27
Tangi	Owner	4	1	2	1	8
	Owner-cum-tenant	2	3	4	2	11
	Tenant	0	6	5	3	14
	Subtotal	6	10	11	6	33
Shabqaddar	Owner	2	0	2	0	4
	Owner-cum-tenant	2	2	3	2	9
	Tenant	3	3	4	3	13
	Subtotal	7	5	9	5	26

Any other comments

Sixty six farmers in the district stated that they would like to see more in the way of loans and grants to aid their tree planting efforts, while 101 farmers said that they would like to see an improvement in the land tenure system, 89 farmers said that some technical help in tree planting is needed, while another 103 claimed that free

seedlings would benefit them in their tree planting endeavours.

Out of 359 farmer responses, 66 were in favour of having loans and grants, 101 responses indicated the desire for improvement in the land tenure system 89 responses wanted technical help and 103 responses were in favour of obtaining free seedlings.

Table 7. Number of responses to categorised additional comments, by tehsil and farmer category,

Tehsil	Status	Loans and grant	Land tenure	Technical help	Free seedlings	Total Responses
Charsadda	Owner	23	3	20	36	116
	Owner-cum-tenant	0	3	1	2	
	Tenant	0	15	5	8	
	Sub-total	23	21	26	46	
Tangi	Owner	20	2	21	18	119
	Owner-cum-tenant	2	9	5	2	
	Tenant	1	30	3	6	
	Sub-total	23	41	29	26	
Shabqaddar	Owner	16	3	15	17	124
	Owner-cum-tenant	3	10	10	10	
	Tenant	1	26	9	4	
	Sub-total	20	39	34	31	
Total		66	101	89	103	124
		18%	28%	25%	31	

Livestock population

The farmers of Charsadda district keep a large number of animals. Cows and buffaloes, which are reared for milk production, are particularly popular. Sheep and goats are unpopular animals.

Wood sold in previous year

In the year preceeding the survey, 151 (56%) of the 270 farmers in the district sold less than 2 m³ of wood for uses other than fuel. A further 74 (27.5%) sold between 2 and 4 m³, with another 25 (9%) selling from 4 to 6 m³, 4 (1.5%) selling 6 to 8 m³, 6(2%) selling from 8 to 10 m³, 2 (1%) selling between 10 and 12 m³ and another 8 (3%) selling more than that.

Table 8. Livestock population by tehsil and ownership category in Charsadda District, North West Frontier Province, Pakistan.

Tehsil	Category	Number of households	Buffaloes	Equines	Bullocks	Goats	Cows	Sheep	Other	Total
Charsadda	Owner	62	67	54	51	22	9	8	57	268
	Owner-cum-tenant	5	7	8	3	2	0	1	3	24
	Tenant	23	25	36	25	12	7	3	20	24
	Sub-total	90	99	98	79	36	16	12	80	420
Tangi	Owner	40	29	21	137	14	55	6	69	331
	Owner-cum-tenant	13	10	4	21	53	8	5	13	114
	Tenant	37	13	30	51	13	126	45	31	309
	Sub-total	90	52	55	209	80	189	56	113	754
Shahqaddar	Owner	36	31	7	59	29	23	12	36	197
	Owner-cum-tenant	23	20	13	27	24	20	6	34	144
	Tenant	31	14	21	29	21	32	0	36	154
	Sub-total	90	65	41	115	74	75	18	106	494

Table 9. Wood sold in previous year by farmers of Charsadda District, North West Frontier Province, Pakistan.

Tehsil	Category	Number of house-holds	< 2 m ³	2-4 m ³	4-6 m ³	6-8 m ³	8-10 m ³	10-12	> 12
Charsadda	Owner	62	14	23	11	2	4	2	6
	Owner-cum-tenant	5	4	1	0	0	0	0	0
	Tenant	23	23	5	2	0	0	0	0
	Sub-total	90	34	29	13	2	4	2	6
Tangi	Owner	40	24	11	4	0	0	0	1
	Owner-cum-tenant	13	8	4	0	1	0	0	0
	Tenant	37	29	7	1	0	0	0	0
	Sub-total	90	61	22	5	1	0	0	1
Shabqaddar	Owner	36	14	15	6	0	1	0	0
	Owner-cum-tenant	23	16	5	1	1	0	0	0
	Tenant	31	26	3	0	0	0	1	1
	Sub-total	90	56	23	7	1	1	1	1

DISCUSSION

Charsadda District is one of the most active centres of agroforestry activity in Pakistan. Hundreds of truck loads of wood are sold every year to downstream users, bringing a substantial income to the district. Through these activities, a number of people are employed, both within and outside Charsadda district. The results of the study have shown a number of differences among farmer categories and tehsils.

At district level there is an association between land fragmentation and ownership category. Tenants are more likely to work non-fragmented lands, because when they pay rent they prefer large unified blocks over small scattered parcels, whereas owner-cum-tenant tends to rent small pieces of land. Tenants and owner-cum-tenants emerge as more susceptible to the problems of fragmentation than owners. Excessive fragmentation is a serious drawback to the implementation of agroforestry programme. The same has been observed by Ahmad and Chaudhry (1980) and Sheikh (1992).

In all three tehsils the attitude towards tree growing is almost the same, though differences exist among the ownership categories. Owners receive the lion's share of the benefits from tree planting while tenants and owner-cum-tenants benefit less, since the share they receive is less (Subhan, 1990).

Differences were found among farmer categories throughout the district with regard to sources of seedlings and provision of free seedlings. Although World literature (FAO, 1986) suggests provision of free seedlings has been a major mechanism in efforts to involve farmers in agroforestry. It is of interest that few farmers in Charsadda obtain seedlings from Forest Department. Tenants and Owner-cum-tenants cannot

afford to buy seedlings and indeed express greater desire for free seedlings from the Forest Department, whereas the owners are not concerned about the provision.

The major difference concerning marketing is that owners sell more wood than tenants and Owner-cum-tenants, owners having a greater capacity to grow trees in terms of the size of land available to them. There are misgivings generally about the disposal of wood in the district, though owners tend to be the group least concerned with the problems of wood disposal. In contrast, tenants are dissatisfied especially with pricing. Tenants are also more worried than owners about the problems of transporting the wood they produce to the market. Owners usually have access to mechanical transportation, which allows them to get their wood to market faster than the tenants, who use pack power (Anon 1989).

Within tehsils, the emphasis and inclination of different farmer categories relating to animal keeping varied a great deal. Results indicated significant association of owner category and buffalo keeping in Charsadda and Tangi tehsil. Buffalo keeping is quite common in Charsadda due to high proportion of owners living there, who keep these animals mainly as status symbols. Equines are kept by tenants in Shabqaddar for the purposes of traction and transportation of wood.

A significant association was also found among the ownership categories and the need for grants for tree growing in Tangi tehsil. Owners do not concern themselves with the question of grants since they have their own means of raising capital, such as business and shares in other ventures.

Significant associations were also observed between ownership category and the need for technical assistance to support tree growing, and between ownership category and the land tenure

system, in Tangi tehsil.

The study showed that 99% of the farmers in Charsadda district perceived a need for tree products. Most (77%) farmers had a combination of multipurpose and single use trees, though they prefer *Populus deltoides* and *Dalbergia sissoo*, generally in a linear configuration (96%) and used tree products for a variety of purposes.

Farmers in every category held a definite belief that there is a need to plant trees for present and future requirements (98%) but it is not usual for them to sell much wood, in fact more than half (54%) had less than 100 marketable trees on their land. This brings income, generally amounting to less than 100 000 rupees per family (95%), which means that they cannot afford to further their education - a necessity, since 80% are illiterate.

CONCLUSIONS

In all three tehsils, the attitude towards growing trees is positive, but differences exist in the level of perception among ownership categories. Tree growing on farmlands in Charsadda District provides a substantial income (approximately US\$ 2 million) to the farmers of the district each year. Most benefits are enjoyed by the owner category which controls the farmland on which most trees are grown and which has the capacity to buy a wide variety of seedlings. Tenants and owner-cum-tenants tend to establish and run their own nurseries as tree seedling sources and few farmers obtain tree seedlings from the Forest Department

Tenants and owner-cum-tenants suffer more from lack of land contiguity than do owners. Because of their greater wealth, owners have better access to markets for sale of wood produced. The tenants and owner-cum-tenants of Tangi tehsil are more inclined towards the keeping of sheep and goats than cows. Reformation in the land tenure system is urged by the tenant and owner-cum-tenant categories in Tangi tehsil, supporting comments that this is a

serious issue made by previous researchers

Loans, grants and technical assistance are sought particularly strongly by the tenant and owner-cum-tenant category of Tangi tehsil.

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