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DIFFERENCES BETWEEN SHARECROPPED AND OWNER-OPERATED FARMS IN SINDH, PAKISTAN: Some Theoretical and Empirical Observations.

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The two most common types of farms in Sindh are sharecropped and owner-operated farms. Despite similarities, there are many differences between these two tenurial arrangements. These differences are analysed and empirical evidence is examined in order to account for them. Differences in land utilisation and cropping patterns, livestock and animal power, credit and input use, and seasonal and family labour use are explored using data (both secondary and primary) from the 1970s. The empirical evidence supports the contention that differences in tenure lead to systematic differences in both production and resource use.

I. Introduction

The relationship between factor markets and the characteristics of prevailing land tenure conditions is being increasingly recognised as a significant determinant of the pattern of agrarian development. Developing agriculture is characterised by imperfect markets for land, labour and capital, and differential access to these markets has long been regarded as an important issue in development. In an agrarian economy, certain agents participate simultaneously in several such markets but the implications of such interlinked markets have begun to be investigated only recently.

Sharecropping and owner cultivation using family labour are two common forms of land tenure in all agrarian economies. The former arrangement provides one of the better examples of a system that is based upon interlinked markets. Very often a landlord and tenant enter into a comprehensive contract that encompasses several markets: in land renting, in labour hiring, in production and consumption credit, in cost sharing of purchased inputs

and sometimes even in the marketing of output. The latter system does not entail complex arrangements and small owner operators face a different set of imperfect market relations.

In recent years there has arisen a body of theoretical literature dealing with the interlinking of markets under different forms of tenure.[1] Theory suggests that the different interlinking of markets affect different systems of tenure in different ways. For example, small owner operators have limited access to new inputs simply because they have limited access to credit and, thus, the necessary capital to buy these inputs. Sharecroppers, in comparison, have easier access to credit if their contracts include credit being provided by the landlord. The sharecropper's borrowing activities can have important implications for the use of new innovations, and the landlord can influence this use by providing new inputs to the tenant.

The interlinking of markets is a way of dealing with both the riskiness and imperfections in the factor markets. It also helps to overcome problems associated with the assymetry of information between different agents. In a poor agrarian economy the term market has to be interpreted in a boarder sense. It does not simply refer to a formal, organised market. Some markets may be monetised while others may not. Some markets may clear through price adjustments while others clear by quantity rationing. Many transactions are personalised and may not conform to the textbook notion of impersonal markets. However, as Bardhan (1980) argues, personalised transactions do not suggest the inapplicability of the market principle. Such transactions may simply provide a way of reducing some of the market costs of work monitoring, contract enforcement and search.

The province of Sindh in Pakistan provides an agrarian and institutional structure that displays many of the above mentioned characteristics. Most farms are under sharecropping with complex interlinked contracts. There are also a large number of small to medium sized farms being operated by owners using predominantly family labour. This paper looks at the relationship between the markets for land, labour and credit and these two systems of tenure in Sindh. The differences between sharecropped and small to medium sized owner-operated farms in Sindh will be seen in the light of the interaction between the system of tenure and the factor markets.

II. Sindh Agriculture and the Theory of Tenancy

Earlier literature on tenancy has dealt primarily with the issue of relative

[1] For a concise review of this literature up to 1980, see Bardhan (1980).

allocative efficiency of alternative contractual arrangements.[2] The predominance of share tenancy as the major form of tenure in many parts of the world, particularly in the context of developing agriculture still remains to be explained and the above mentioned debate is only of limited use in this matter. The literature dealing with economic factors that explain the sharecropping phenomenon is relatively recent.[3]

The most obvious explanation given for the existence of sharecropping is that it provides a method of sharing the risks of agricultural production between the landlord and the tenant. Under wage contracts or self-cultivation the risk is borne entirely by the landowner and under fixed rent contracts entirely by the tenant. If efficiency could be ensured then the risk sharing advantages of sharecropping would lead to its dominance over other forms of tenure.

Both Stiglitz (1974) and Newbery (1975a) have argued that sharecropping may have no additional risk sharing advantages over a mix of rental and wage contracts.[4] Newbery-Stiglitz (1979), have attempted to find explanations for the widespread existence of sharecropping with multiple sources of risk and uncertainty. The general proposition is that sharecropping can be understood by focusing on the input markets and is a response to inadequacies in these markets.[5]

A generalised picture of sharecropping in Sindh shows a tenurial form where, to a large extent, the terms of the contract are standardised. In any particular area, with similar competing parties, one would expect this to be the case. Both the sharing of the produce and the sharing of costs between the landlord and the tenant are, by and large, fixed. The use of purchased

[2] Adam Smith first asserted the relative inefficiency of share contracts. Marshall (1890) later hypothesised that sharecropping leads to a Pareto inefficient allocation of labour. This inefficiency was taken for granted for many years and it was Johnson (1950) who revived the issue. The conclusions, still controversial, that writers like Johnson (1950), Cheung (1969), Bardhan-Srinivasan (1971) and Newbery (1975), among others, come to is that sharecropping need not necessarily be inefficient in the use of resources. This discussion does not go into the details of the issue of efficiency. First, it has been dealt with extensively by many writers other than those already mentioned and it seems futile to repeat the exercise. Second, as will be discussed later, the issue is of secondary relevance in the context of Sindh.

[3] Some of this literature discusses the differential impact of transactions costs and risk sharing on the choice of contracts. In particular, Cheung (1969) in the context of pre-Communist China, Rao (1971) in the context of India and Reid (1973) for the postbellum American South. Some of the factors explaining the incidence of share tenancy in India have been dealt with by Bardhan (1977, 1979).

[4] The reasoning is very general, and does not require any restriction on the kind of production risk, nor of attitudes to this risk.

[5] The focus of these issues related to sharecropping is essentially that markets and institutions cannot be analysed in isolation. Outside of the specific context of sharecropping, this point has been made sometime ago, amongst others, by Gotsch (1972).

inputs and credit borrowing from the landlord are negotiable. The landlord has other means at his disposal (for example, control of irrigation water, or the threat of eviction) to negotiate with the tenant. Essentially, though, there is little variablity in the terms of the contract.

It is well known that most markets in LDC agriculture are highly imperfect and fragmented. In Sindh, land distribution is highly skewed. Khan (1981) gives evidence based upon Sindh government figures regarding land distribution. For 1976, over 40 per cent of the owners had farms less than 6.25 acres and these farms covered just over 8 per cent of the owned area. On the other hand, for the same year, 8 per cent of the owners had farms larger than 50 acres and these covered over 40 per cent of the owned area. Landowners wield enormous power, both economically and socially, because of the monopolistic land market. Thus, most of the tenants are not in a very strong bargaining position and one cannot assume that both parties have equal leverage when negotiating a contract [as Cheung (1968, 1969) does]. The markets for all inputs are inefficient and the capital market, in particular, is highly imperfect. Different groups have different access to these inputs and the prices that each group faces may vary. Thus, as Griffin (1974) has argued, different forms of tenure (sharecropping, leasehold, self-cultivation) may allocate resources differently but each may be behaving efficiently (in an economic sense) with respect to the prices each faces. Tenants value the link between the land and the credit markets and minimise their uncertainty by assuming the burden of indebtedness.

Bardhan (1980) views sharecropping as a partial response to the various inadequacies and imperfections in the labour market. In Sindh, there is a problem of the imperfect marketability of family labour due to both social and economic constraints. There is an absence of an adequate market for managerial or manual skills both from the landlord's and tenant's point of view.[6]

Transactions cost (including cost of supervision and the monitoring of labour) associated with different forms of tenure vary and landlords in their effort to minimise these costs would prefer the form of tenancy that enables them to do so. Fixed rent contracts involve the least transactions costs but this advantage is offset by the possibility of lower (relative to other forms of tenure) landlord's earning under fixed rent contracts. Sharecropping provides the best compromise. Under sharecropping, tenants may also perform certain important functions that are less likely under alternative contracts. For example, in Sindh, landlords regard the supervision of canal flows by

[6] Newbery-Stiglitz (1979) suggest that sharecropping may perform a distinct role in overcoming the imperfections in the labour market especially when information is costly. Hallagan (1978) arrives at similar result.

share tenants as one of the tenant's more important functions. Under wage contracts, water management can be inconvenient and costly for the landlord. Wage workers have little incentive to perform this task and either close supervision would be necessary or the task performed by the landlord or a manager. Under sharecropping landlords can also ensure some maintenance of soil quality and also ensure minimum labour inputs by imposing restrictions on the tenants regarding alternative uses of their labour. Such practices are fairly common in Sindh.

Braverman-Stiglitz (1981) have dealt with the issue of interlinked markets and tenancy contracts. Their analysis primarily deals with borrowing by the tenants from their landlords for consumption needs. It is demonstrated that increased borrowing can lead to increased tenant's effort. In the presence of positive externalities the landlord will encourage tenant's borrowing. It is shown that linkages between the land and credit markets can benefit both the tenant and the landlord.

Cost sharing is seen by both Newbery-Stiglitz (1979) and Braverman-Stiglitz (1981) as an incomplete device for ensuring efficiency under conditions of uncertainty. If fertilizer, and other inputs, are strongly complementary to labour, the landlord has an incentive to supply these inputs to the tenant since this will also result in an increased level of tenant effort. Thus interlinking the input market and the tenancy contract is an additional device for creating positive externalities for both tenant and landlord.

In Sindh, the credit, input and land markets are interlinked under sharecropping. Not only does the landlord provide credit for consumption, he also supplies inputs (mainly fertilizer) to the tenant on credit as part of the contract. Repayment is from the harvest and if the crop fails, repayment is deferred to the next harvest. The tenant is assured a minimum subsistence under extreme conditions (e.g., crop failure) but ends up accumulating debt which eventually has to be paid. There is an implied understanding that the tenant is tied to the landlord until all debts are settled. Most of the tenant borrowing these days is for production inputs. The Braverman-Stiglitz analysis could be extended to include borrowing for production purposes since this directly affects output and is likely to increase both the landlord's and the tenant's returns. The argument is clearly strengthened by this additional factor.

Most landlords in Sindh charge little or no interest on loans to their tenants. There is a charge over the market price of inputs but this is attributed to transport costs. In any case, this charge is usually less than the rate charged by government lending agencies. Bardhan-Rudra (1978, 1980) report that landlords in four states of India (W. Bengal, Bihar, U.P. and Orissa) very often give loans to their tenants at interest rates well below

the market rate and, as in Sindh, give interest free consumption loans in many cases.

Landlords in Sindh also seem to encourage the use of chemical fertilizer and HYVs and, having easier access to these inputs and knowledge about new seed varieties or techniques, readily provide both inputs and information to their tenants. This observation seems to go against the argument put forward by Bhaduri (1973, 1979) that, because of the interlinking of credit and land markets, landlords would discourage innovations. Bhaduri's argument is that since innovations would increase the tenant's income, they would reduce his demand for borrowing, the landlord's income from lending would decline and may offset the increase in his income because of the increased output. Thus, landlords may resist innovations which are not in their interest. Srinivasan (1979) and Newbery (1975b) have both argued against this reasoning on various grounds.[7]

Given the nature of the markets for land, labour and credit in Sindh and in the light of the above arguments the following explanation is presented as a plausible and theoretically consistent one. Landlords prefer sharecropping mainly because of the nature of the labour market. Sharecropping provides them with a guaranteed supply of labour and they can minimise their transactions and monitoring costs through their greater bargaining power and easier access to various inputs including credit. Tenants prefer this form of tenure not simply because it provides them with a certain measure of security in an otherwise uncertain world but it provides them with access to land and to another very scare resource, credit. The landlord is their source of credit. Thus, the landlords value the link between the land and the labour markets and use this link to minimise their uncertainty and transaction costs.

III. Comparison of Sharecropped and Owner-Operated Farms in Sindh

Tenant farming is still the dominant form of tenure in Sindh agriculture and, according to the 1972 Census of Agriculture, 63 per cent of all farms were tenant farms. Owner operated farms made up 24 per cent of all farms and the remainder were part owned and part rented. 61 per cent of all farm area was under tenancy and, of this, approximately 87 per cent was under sharecropping, the rest being under fixed rent or other rental contract. Table 1 gives the distribution of farm area in Sindh by tenure and farm size.

[7] Even though Bhaduri's argument may hold under certain conditions it seems that in Sindh landlords can manage to manipulate cost shares to their own benefit. Output shares are maintained at their legal levels but there is reportedly widespread disregard for legally stipulated cost shares and landlords appear to have benefitted from the new innovations.

TABLE 1

Distribution of farm area by tenure and farm size

Farm Size (Acres)	Owner Operated Area	Tenant Operated Area			
		Total	Sharecropped	Leased	Other
< 1.0	75	25	23	2	*
1.0 to< 2.5	46	54	52	2	*
2.5 to< 5.0	31	69	67	2	*
5.0 to< 7.5	25	75	72	2	1
7.5 to< 12.5	19	81	78	3	*
12.5 to< 25.0	33	67	63	4	*
25.0 to< 50.0	55	45	35	10	*
50.0 to<150.0	74	26	9	16	1
150.0 and above	75	25	2	19	5
All Farms:	39	61	53	7	1

Source: Government of Pakistan (1976), p. 25.

Sharecropping and owner operated farms are the main forms of tenure, covering 92 per cent of all farm area between the two. Most of the tenant operated farms tend to be small (1 to 12.5 acres) or medium (12.5 to 25 acres) sized farms. The very small farms (less than 1 acre), which make up less than 0.5 per cent of farm area, and farms larger than 25 acres have a much higher proporation of owner operators.

There are essentially two kinds of owner operated farms: those that utilize family labour, using wage labour only when necessary, and those that use predominantly wage labour. The former are mainly small to medium sized farms (upto 25 acres) and the latter mainly large farms (50 acres and above). Most of the large holdings are rented out. Of the tenant operated farms over 79 per cent are between 5 and 25 acres and over 40 per cent between 7.5 and 12.5 acres. A negligible number are larger than 50 acres (Table 2).

Thus, a majority of the farms in Sindh use family labour whether they are sharecropped (as almost all the tenant farms are) or owner operated. Only a very few large farms use predominantly wage labour under owner or manager supervision. In particular, looking at farms between 5 and 25 acres one can be fairly certain that wage labour is used only when family labour is insufficient.

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5.0 to< 7.5	25	75	72	2	1
7.5 to< 12.5	19	81	78	3	*
12.5 to< 25.0	33	67	63	4	*
25.0 to< 50.0	55	45	35	10	*
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TABLE 2

Distribution of tenant and owner farms by farm size

Farm Size (Acres)	Owner Operated Farms	Tenant Operated Farms
<5.0	27.3	17.7
5.0 to < 7.5	14.8	18.7
7.5 to < 12.5	22.0	40.1
12.5 to < 25.0	22.2	20.4
25.0 to < 50.0	8.8	2.6
50.0 and above	5.5	0.5

Source: Government of Pakistan (1976), pp. 16, 22.

The characteristics of the factor markets have an important bearing on the behaviour of farmers working under different forms of tenure. The nature of the sharecropping relationship in Sindh will also influence the difference between the two kinds of farming systems.

The 1972 Census of Agriculture provides a good introduction to an aggregated view of different froms of tenure in Sindh and is a good basis to begin a comparison between sharecropped and owner operated farms. There are certain limitations to the Census data that are of relevance to this study. There is information on three categories of farms: owner operated, tenant operated and owner-cum-tenant operated farms, the last being part owned and part rented farms. Some of the data are for owner operated area and tenant operated area. Thus, all forms of tenant farms are lumped into one category. Also, there is no distinction between family operated farms and farms using wage labour. However, given the fact that almost 90 per cent of all tenant area was under sharecropping it will be assumed that the information on tenant farms or tenant area is primarily about sharecropping. Concentrating on the small to medium sized farms we are likely to be looking at an even greater proportion of sharecropped farms. These size groups also cover most of the owner operated family farms. The large sized farms are likely to be farms using mostly wage labour. The WAPDA survey can be used for further and more rigorous elaboration.[8] The comparison will be of the

[8] The WAPDA survey is officially known as the '1977 Agricultural Economics Survey of the Indus Basin' and was conducted by the Master Planning and Review Division of WAPDA in collaboration with the World Bank. The survey covered the whole of the Indus Basin and included over 2000 farms. In Sindh, 717 farms were surveyed. Of these 354 were sharecropped and 289 were owner operated. The farms were classified by agroclimatic zone. Sindh has been divided into 3 broad zones – Zone I covering the right bank in Upper Sindh, Zone II the central wheat-cotton growing belt and Zone III the southern regions. Zones I and III are mainly non-perennially irrigated and Zone II perennially irrigated. All farms surveyed were under canal irrigation.

following: (a) Land utilization and cropping patterns. (b) Livestock and animal power. (c) Credit and input use. (d) Seasonal and family labour use.[9]

III.1. Land Utilization and Cropping Patterns

Tenants are likely to use land as intensively as possible since land is a relatively scarce resource for them. Landlords would encourage them to cultivate as much of the rented area as is possible so as to maximise their own returns to this asset and to ensure a maximum amount of labour input on the part of the tenant. Tenants are also likely to rent in land that is more readily cultivable and of a fairly reasonable quality. Smaller owner operators may have more waste land than tenants. Thus, on average, one would expect tenants to cultivate a larger part of their farm area than owner operators, who are likely to possess a greater proportion of uncultivable land, of poor soil quality or lacking adequate irrigation and water facilities. Such land is not likely to be rented out. As farm size increases the proportion of uncultivable land is also likely to increase.

Therefore, one would expect that the smaller the farm size the higher the intensity of land use is likely to be for both kinds of farms, the tenant farms should have a higher intensity than owner operated farms.[10] Both the Census data (Table 3) and the WAPDA survey (Table 4) support this and the results are consistent across agroclimatic zones.

TABLE 3

Average intensity of land use by tenure and size

Size of Farm (Acres)	Tenant Farms	Owner Farms
All farm sizes	95	71
>1.0	100	94
1.0 to > 2,5	99	95
2.5 to > 5.0	98	93
5.0 to > 7.5	99	90
7.5 to > 12.5	97	86
12.5 to > 25.0	95	79
25.0 to > 50.0	89	73
50.0 to >150.0	74	58
150.0 and above	74	48

Source: Government of Pakistan (1976), p. 90.

[9] The comparisons will essentially focus on sharecropped farms and owner operated family farms since these two types of farms constitute most of the farms in Sindh. Wherever necessary, reference and comments relating to other types of farming systems will be made.

[10] The intensity of land use is defined as the proportion of cultivable area that was cultivated.

TABLE 4

Distribution of farms by intensity of land use

Average Intensity of Land use	Tenant Farms				Owner Farms			
	Sind	Z1	Z2	Z3	Sind	Z1	Z2	Z3
50%	4.5	2.8	4.5	6.9	12.6	11.9	11.2	16.9
50% to 75%	5.6	1.9	6.3	9.7	16.5	8.5	18.0	20.0
75% to 100%	81.9	87.7	84.1	68.1	65.3	76.3	65.8	53.8
100%	7.9	7.5	5.1	15.3	5.6	3.4	5.0	9.2

Source: WAPDA Survey, 1977.

Note: Z1 = Zone 1, Z2 = Zone 2, Z3 = Zone 3.

For the farm sizes that are of particular relevance to us (5 to 25 acres) the difference is less pronounced, though still consistent.

A further measure of land use is the cropping intensity, which is defined as the total cropped area in one year as a proportion of the total cultivated area. Tenants are likely to have not only a higher intensity of land use but also a higher cropping intensity. Landlords are likely to encourage multiple cropping for various reasons. First, this would increase revenues and their total share. Second, it would ensure a greater labour input on the part of the tenant and since landlords cannot directly control this input, encouraging a greater cropping intensity would be an indirect way of doing so. Tenants, too, would benefit from a greater cropping intensity and thus would have little objection to the landlord's suggestions.

Multiple cropping is fairly standard practice in the perennial canal areas of Sindh and the owner operated farms are no exception. Again, one would expect smaller farms to use land more intensively and thus cropping intensity should decline as farm size increases. The Census data (Table 5) show that tenant farms have a slightly higher proportion of farms with an average cropping intensity greater than 100 per cent, than owner operated farms although the difference is not substantial.

This difference is generally true for most farm sizes and especially so for the farms ranging from 5 to 25 acres. Both categories of farms have a very high proportion of farms with an average cropping intensity greater than 100 per cent (about 94 per cent for tenant farms and about 85 per cent for owner operators). Most farms have multiple cropping. Those that do not, generally have good reason, such as limited water availability in the winter season or very poor soil quality.

TABLE 5

Cropping intensity by tenure and farm size

Farm Size (Acres)	Farms with average intensity											
	<50%		50% to <75%		75% to <100%		100% to <125%		125% to <150%		150% & above	
	O	T	O	T	O	T	O	T	O	T	O	T
All farms	3.4	1.2	7.5	2.6	4.3	2.0	47.6	58.0	6.8	5.3	30.3	30.8
<1.0	0.6	1.7	0.0	0.0	0.4	0.0	35.9	51.6	1.2	0.0	61.9	46.7
1.0 to < 2.5	1.2	0.2	1.2	0.3	0.1	0.1	45.9	60.8	2.2	0.7	49.4	37.8
2.5 to < 5.0	1.4	0.7	2.3	0.5	1.0	0.3	45.4	49.6	6.5	3.2	43.4	45.7
5.0 to < 7.5	2.2	1.1	3.1	1.2	2.3	0.7	51.6	48.4	7.2	4.9	33.6	43.8
7.5 to < 12.5	2.5	1.1	6.3	2.5	3.5	1.9	49.4	61.2	8.4	6.2	29.8	27.1
12.5 to < 25.0	4.3	1.8	12.6	5.4	7.4	4.0	48.6	64.8	7.8	6.4	19.3	17.7
25.0 to < 50.0	7.8	3.5	15.8	6.0	9.9	8.8	45.2	63.6	7.2	6.1	14.1	12.1
50.0 to <150.0	9.9	4.9	20.2	15.8	9.9	11.6	41.8	55.9	6.3	7.7	11.9	4.0
150.0 and above	11.9	4.3	19.3	19.5	!7.5	13.4	39.4	50.9	5.3	0.0	6.5	11.9

Source: Government of Pakistan (1976), pp. 97 and 103.
Note: O = Owner operated farms, T = Tenant operated farms.

TABLE 6

Cropping intensity by agroclimatic zone

Farms with Average Cropping Intensity	Tenant Farms				Owner Farms			
	Sind	Z1	Z2	Z3	Sind	Z1	Z2	Z3
50%	1.7	0.0	2.3	2.8	11.9	1.7	13.0	18.5
50% to 75%	1.7	1.9	1.7	1.4	12.3	3.4	19.3	3.1
75% to 100%	15.3	13.2	20.5	5.6	11.2	11.9	11.8	9.2
100% to 125%	31.1	16.0	31.8	51.4	31.9	25.4	30.4	41.5
125% to 150%	8.8	2.8	12.5	8.3	7.4	6.8	7.5	7.7
150% and above	41.5	66.0	31.3	30.6	25.3	50.8	18.0	20.0

Source: WAPDA Survey, 1977.
Note: Z1 = Zone 1, Z2 = Zone 2, Z3 = Zone 3.

The WAPDA data (Table 6) show a slightly smaller proporation of farms with high cropping intensity than the Census data.

The Northern Zone (Zone 1) has a higher average cropping intensity for both categories of farms and the Central Zone (Zone 2) the lowest. Once again, sharecropped farms have a slightly higher average cropping intensity than owner operated farms.

An analysis of variance on the WAPDA data confirms that there are consistent differences in land utilization. For both the intensity of land use and the cropping intensity the differences are highly significant and owner operated farms have lower intensities than sharecropped farms. The tests were repeated for farm sizes of 5 to 25 acres only and the differences in land use of the two kinds of farms remain consistent. The results are given in Table 7.

TABLE 7

Differences in land utilisation

Analysis of Variance on	F Statistic	F Level	Deviation from Grand Mean	
			Owners	Tenants
Intensity of Land Use	45.4	0.0001	− 5.6	4.5
Intensity of Land Use for farms 5 to 25 acres	34.9	0.0001	− 5.8	3.6
Cropping Intensity	45.9	0.0001	−15.0	12.1
Cropping Intensity for farms 5 to 25 acres	32.9	0.0001	−16.4	10.1

Source: WAPDA Survey, 1977.

Given that there are consistent differences between the two sets of farms with respect to the amount of land utilised and the number of crops planted, one can now compare them with respect to the kinds of crops grown. Table 8 gives an aggregated cropping pattern for owner and tenant farms.

Tenant farms have a marginally lower area under food grains than owner farms. This area decreases slightly as farm size increases, as one would expect, for both the sets of farms. The difference between the two appears to be for cash crops, pulses and fodder crops.

TABLE 8

Cropping pattern by tenure and farm size

% Area Under	Tenant Farms				Owner Farms			
	All	A	B	C	All	A	B	C
Food Grains	56	59	57	55	57	60	58	58
Cash Crops	23	15	22	26	22	15	18	21
Pulses	12	17	12	10	9	13	13	10
Fodders	7	7	7	7	9	10	10	9
Vegetables	1	1	1	1	1	1	1	1
Others	1	1	1	1	1	1	1	1

Source: Government of Pakistan (1976), pp. 153 and 169.
Note: A = 5.0 to <7.5 acres, B = 7.5 to <12.5 acres, C = 12.5 to <25 acres.

Landlords, it is argued, prefer sharecropping to wage contracts because it reduces their risk and transactions costs, given the nature of the labour market. One of the most important implications of the moral hazard problem is likely to be for the cropping pattern of sharecropped farms. Owner operators using predominantly family labour have little or no transactions costs and thus have this relative advantage over sharecropping landlords who still have to monitor the labour input and behaviour of their tenants. Different crop characteristics, attitudes regarding transaction costs and risk, and soil and water conditions are all likely to combine in various ways to determine the cropping pattern on different kinds of farms.[11]

Table 9 gives the results on an analysis of variance performed on the WAPDA data regarding the cropping pattern on owner operated and sharecropped farms. The analysis is first for all farms sizes and subsequently for farms between 5 to 25 acres.

The results show some systematic differences in the area devoted to different crops under the different systems of tenure. In particular, the

[11] There are other considerations apart from those mentioned which may influence the choice of crops. For example, sharecropping landlords are likely to prefer certain cash crops from a pure profit motive. Food grains are less likely to vary across farms since all farmers must fulfill certain subsistence requirements. Landlords would certainly encourage sharecroppers to grow cash crops. Small farms, however, would have to devote more area to food crops and to fodder to meet certain minimum requirements. Since tenants keep fewer livestock than owner operators (see the following section on livestock) their fodder requirements are less and this should be reflected in the cropping pattern.

difference in area devoted to sugarcane was particularly significant.[12] This difference remains significant for farms between 5 and 25 acres. Owner farms grow less cotton, on average, than sharecropped farms and the difference is significant at 0.3 per cent level. This significance increases for both improved varieties of cotton and for farms between 5 and 25 acres. For wheat, the difference between the two kinds of farms of size 5 to 25 acres is insignificant. This is understandable given that wheat is the main subsistence crop. For the rest of the crops the results are mixed.

TABLE 9

Comparison of cropping patterns

Analysis of Variance on Crop Area as % of Farm Area for	F Statistic	F Level	Deviation from Grand Mean	
			Owners	Tenants
Cotton	0.900	0.300	− 3.10	2.50
Cotton (5 to 25 acres)	5.600	0.020	− 5.40	3.40
HYV Cotton	2.800	0.090	− 3.90	3.10
HYV Cotton (5 to 25 acres)	9.200	0.003	− 5.10	3.10
Wheat	1.800	0.180	− 7.40	5.90
Wheat (5 to 25 acres)	0.140	0.700	1.50	− 0.92
HYV Wheat	4.400	0.040	− 9.20	7.40
HYV Wheat (5 to 25 acres)	0.300	0.600	− 1.70	1.00
Sugarcane	4.320	0.040	24.70	−19.90
Sugarcane (5 to 25 acres)	6.100	0.010	26.90	−16.50
HYV Sugarcane	9.500	0.002	26.50	−21.30
HYV Sugarcane (5 to 25 acres)	9.500	0.002	26.70	−16.40
Rice	2.500	0.100	−11.60	9.30
Rice (5 to 25 acres)	0.340	0.600	− 3.90	2.40
HYV Rice	0.100	0.700	0.97	− 0.78
HYV Rice (5 to 25 acres)	8.600	0.004	10.10	− 6.20
Oilseeds	1.100	0.300	−13.60	10.90
Oilseeds (5 to 25 acres)	0.200	0.600	− 3.90	2.40
Pulses	4.300	0.040	−11.30	9.10
Pulses (5 to 25 acres)	0.001	0.900	− 0.20	0.10
Fodder crops (5 to 25 acres)	0.050	0.800	1.60	− 1.00

Source: WAPDA Survey, 1977.

[12] Of the cash crops, sugarcane has one peculiar characteristic that needs to be mentioned. Because of a sugar shortage all sugarcane has to be sold to the sugar mills by law. Each mill has an area designated to it and all cane grown in that area must be sold to that mill. Mill owners, to encourage cane growing, extend credit to farmers and also supply inputs for cane growing and pick up the output at harvest. Landlords may discourage their tenants from cane growing since they prefer them not to have alternative sources of credit. Apart from illustrating the importance that landlords attach to interlinked tenancy and credit contracts this may suggest a further reason why other cash crops may be preferred to sugarcane on sharecropped farms.

The characteristics of different crops that are most likely to influence the transactions costs are the labour intensity of the crop, the uncertainty in the production of a crop and the potential for entrepreneurial input (which would include managerial ability, the importance of timing regarding sowing, fertilizing, etc., and other crucial decisions). However, it becomes difficult to separate out the effects of each of these characteristics and the relative strength of each effect is likely to give rise to different implications for the differences in cropping patterns. The results do not necessarily show any consistent pattern in the differences between the two types of farms with respect to cropping patterns.

III.2. Livestock and Animal Power

Animal power is the primary source of power in Sindh and all farms possess at least one pair of bullocks, the larger farms having more. Share-croppers must possess a pair of bullocks as a prerequisite to sharecropping. No rental market for bullock power exists in Sindh.

Raising of livestock has not been a common commercial activity in Sindh. Most of the livestock is raised for personal milk or meat consumption. For a number of reasons landlords discourage their tenants from devoting much time to such activity. First, livestock require a fair amount of labour input which may detract from crop raising. Second, livestock output (milk, ghee, etc.,) is not shared with the landlord. At best, one animal per household may be tolerated and any more are strongly discouraged.

Sharecroppers prefer to keep some livestock and usually such activity is the responsibility of the women. This appeases the landlord since the tenant devotes most of his own time to cropping. In fact, livestock raising is, in a number of cases, a constant source of conflict between the tenant and his landlord. Owner operators have no restricting influences. Apart from milk cows and/or buffaloes they also tend to raise sheep and goats and some poultry. Sharecroppers have little or none of these.

There is no published data on livestock that is disaggregated for owner and tenant farms. The WAPDA survey does have information on livestock and Table 10 gives the results from an analysis of variance.

Owner farms keep more bullock pairs, the difference being highly significant (at the 0.0050 per cent level). The difference is understandable since owner farms, on average, were larger than sharecropped farms and there was a greater percentage of larger farms in the owner operated category. Comparing the 5 to 25 acres size group the difference is greatly diminished as one would expect. This bias, due to the size difference of the owner farms, is also very likely to influence the results for milk animals as well.

Owner farms own significantly more of both milk buffaloes and cows,

TABLE 10

Comparison of livestock and animal power

Analysis of Variance on	F Statistic	F Level	Deviation from Grand Mean	
			Owners	Tenants
Bullock pairs	8.07	0.0050	0.32	–0.26
Bullock pairs (5 to 25 acres)	2.17	0.1400	0.09	–0.05
Milk buffaloes	33.20	0.0001	0.78	–0.63
Milk buffaloes (5 to 25 acres)	23.80	0.0001	0.52	–0.32
Milk cows	10.06	0.0020	0.25	–0.20
Milk cows (5 to 25 acres)	3.14	0.0800	0.15	–0.10

Source: WAPDA Survey, 1977.

particularly the former. The differences are slightly less for the 5 to 25 acres size group. Beef cattle are rarely bred and the few that are, are predominantly on owner farms, as are sheep, goats and poultry.

III.3. Credit and Input Use

The credit and the land market are closely linked under sharecropping in Sindh and most landlords provide production credit to their tenants. Such credit is not readily available to owner operators (mainly small to medium sized farms) who have to resort to other sources of credit, such as the commercial and agricultural development banks. This difference in access to credit is clear from Table 11.

Over 50 per cent of the sharecroppers use production credit as compared to only 16.9 per cent of the owner operators. Of those using such credit, 90.7 per cent of the sharecroppers obtain credit from their landlord while only 10 per cent of the owner operators get credit from moneylending landlords.[13] The rest use other sources (banks, etc.).

[13] Some landlords do give production loans to small owner operators but these cases are relatively

TABLE 11

Sources of production loans by tenure

Credit use for Production	Tenant Farms				Owner Farms			
	Sind	Z1	Z2	Z3	Sind	Z1	Z2	Z3
% using credit	51.1	47.2	61.9	30.6	16.9	16.9	19.4	10.8
For these the major source is:								
The landlord	90.7	86.0	92.7	91.3	10.0	10.0	9.7	11.1
Banks	—	—	—	—	54.0	40.0	54.9	66.7
Others	9.3	14.0	7.3	8.7	36.0	50.0	35.4	22.2

Source: WAPDA Survey, 1977.

Note: Z1 = Zone 1, Z2 = Zone 2, and Z3 = Zone 3.

Most small to medium sized farmers do not qualify for commercial loans. Neither would sharecroppers. With their landlord, however, all the collateral they need is their tenancy contract. For small owner operators to extend their landholding as collateral is, as may be expected, too great a risk.

Since sharecroppers get production credit from their landlords in the form of fertilizers and seeds they not only have access to credit but also to these inputs. Landlords can use their influence to acquire these inputs, especially if there is a shortage, and they would naturally prefer to provide these inputs first to their tenants and then to other small farmers. It should follow that the sharecropped farms would use more fertilizers, purchased seed and all purchased inputs than owner operated farms.

The use of bio-chemical technology in Sindh is mainly confined to the use of chemical fertilizers and high yielding seed varieties. The use of pesticides is not common. Table 12 gives the Census data on fertilizer use.

rare and usually the landlord has other ties (familial or ancestral) with such farmers. Most of the loans to small farmers from landlords are, however, for consumption purposes. Part of the reason for this is that small farmers have little or no savings having used all their resources for production. In the case of any unexpected need they have to resort to loans. They prefer not to go to banks. Quite apart from a mistrust of such institutions and the effort involved, they know that the possibility of getting a loan is minimal. Local landlords are more familiar figures and likely to be more sympathetic to their woes, if only for ulterior motives.

TABLE 12

Fertilizer use by tenure and farm size

Farm Size (Acres)	% Farms Fertilized		% TCA Fertilized	
	Tenant	Owner	Tenant	Owner
All farms	61	55	49	49
< 1.0	46	40	32	37
1.0 to < 2.5	59	47	46	38
2.5 to < 5.0	52	50	40	38
5.0 to < 7.5	53	52	39	39
7.5 to < 12.5	64	55	50	41
12.5 to < 25.0	69	59	53	45
25.0 to < 50.0	69	64	53	55
50.0 to <150.0	72	63	62	57
150.0 and above	86	68	67	73

Source: Government of Pakistan (1976), pp. 249 and 257.

Note: TCA = Total Cropped Area.

Sixty one per cent of the tenant farms are using fertilizers as compared to 55 per cent of the owner farms. In general, both the proportion of farms using fertilizers and the proportion of area fertilized increases as farm size increases for both owner and tenant farm.

The WAPDA survey shows an even greater use of fertilizers with almost 82 per cent sharecropped farms and almost 70 per cent of owner farms using fertilizers (Table 13).

Of those not using fertilizers, most gave a lack of funds as the primary reason (46.9 per cent of the sharecroppers and 55.8 per cent of the owner operators). The lack of availability of fertilizers was the second most cited reason.

The use of HYVs in Sindh is also very common as seen in Table 14. Most of the farms in the WAPDA survey were using high yielding varieties of the major crops, namely wheat, cotton, rice and sugarcane. However, more sharecropped farms were using HYVs than owner operated farms.

The total value of fertilizers, seeds and all purchased inputs per total cropped acre was compared for the two sets of farms using the WAPDA data. An analysis of variance does show that sharecropped farms use more purchased inputs than owner farms. Table 15 gives these results.

TABLE 13

Constraints to and the use of fertilizers

	Tenant Farms				Owner Farms			
	Sind	Z1	Z2	Z3	Sind	Z1	Z2	Z3
% Farms fertilized	81.8	79.0	90.9	63.9	69.0	71.2	78.9	42.2
Of those not using, the reason for not using:								
Not easily available	26.6	54.5	6.3	15.4	12.8	18.8	3.0	18.9
Lack of funds	46.9	36.4	56.3	50.0	55.8	75.0	51.5	51.4
Other	26.5	9.0	37.5	34.6	31.4	6.3	45.4	29.7

Source: WAPDA Survey, 1977.

Note: Z1 = Zone 1, Z2 = Zone 2, Z3 = Zone 3.

TABLE 14

Use of high yielding varieties by tenure

% Farms using HYVs of the following	Tenant Farms				Owner Farms			
	Sind	Z1	Z2	Z3	Sind	Z1	Z2	Z3
Wheat	88.2	51.4	95.6	96.2	81.7	65.0	90.4	61.8
Cotton	92.7	71.4	93.5	100.0	78.9	100.0	88.0	7.1
Rice	75.0	95.0	28.3	79.2	70.6	90.4	59.6	59.1
Sugarcane	69.0	50.0	67.2	80.0	54.4	0.0	69.4	31.6

Source: WAPDA Survey, 1977.

Note: Z1 = Zone 1, Z2 = Zone 2, Z3 = Zone 3.

The results show differences that are consistently significant, for all farm sizes and for the 5 to 25 acres size group. For the latter the average difference for total fertilizer use and total purchased inputs per acre increases.

TABLE 15

Comparison of the use of inputs

Analysis of Variance on	F Statistic	F Level	Deviation from Grand Mean	
			Owners	Tenants
Fertilizer/acre	5.4	0.020	−17.7	14.3
Fertilizer/acre (5 to 25 acres)	4.2	0.040	−23.9	14.7
Seeds/acre	9.2	0.003	− 6.4	5.2
Seeds/acre (5 to 25 acres)	6.8	0.009	− 5.8	3.6
All inputs/acre	9.1	0.003	−24.5	19.7
All inputs/acre (5 to 25 acres)	6.2	0.010	−30.0	18.5

Source: WAPDA Survey, 1977.

Note: Input use is per cropped acre.

There is one point that needs to be made before one concludes that sharecroppers use more inputs per acre than owner operators. It has been frequently observed that within a geographical limit where agroclimatic conditions are similar the use of fertilizers per acre and the seed rate per acre is fairly standardised for all farmers regardless of tenancy. For example, if the farmer is growing high yielding wheat, the seed rate and fertilizer rate will be similar between farms under different tenure. However, tenants are likely to fertilize a larger proportion of the crop than owner operators. Thus, if two farms (one sharecropped and one owner operated) are cropping the same area, the former is likely to have more area under HYVs and more area being fertilized. Thus, averaging over the total cropped area the former will show a higher input rate per acre even though the rate per acre of only the fertilized area is probably the same. Tenants are using more inputs overall, but the per acre use by activity is similar to that of owner farms.[14]

[14] To illustrate this point, the farm level data were analysed for the major crops. Sharecropped farms and owner farms were compared to see if the fertilizer use per acre for selected crops was similar on both types of farms. Only the fertilized area for each crop was compared. For wheat, cotton and sugarcane the difference between farms in their fertilizer use per acre due to differences in tenure was not significant, suggesting that for these crops sharecropped and owner farms had similar fertilizer rates of use. For rice the difference attributable to differences in tenure was more significant but still not enough to warrant much attention.

Perhaps because of the easier availability of credit to sharecroppers, more tenant households are under debt (for both production and consumption purposes combined) than owner households. Except for the small farm sizes, the proportion of households under debt declined for both tenants and owners as farm size increases, being more pronounced for the former (Table 16).

TABLE 16

Households under debt by tenure and farm size

Farm Size (Acres)	% Tenant Households Under Debts	% Owner Households Under Debts
All households	54	40
< 1.0	51	40
1.0 to < 2.5	49	44
2.5 to < 5.0	53	39
5.0 to < 7.5	55	43
7.5 to < 12.5	55	40
12.5 to < 25.0	53	40
25.0 to < 50.0	50	36
50.0 to <150.0	46	39
150.0 and above	36	39

Source: Government of Pakistan (1976), p. 289.

Sharecroppers, on average, are likely to have lower earnings than similar sized owner operators and thus have lower savings and/or assets. Sharing of the output with the landlord and bearing most of the cost burden leaves most sharecroppers with, what most of them consider to be, little more than subsistence. Thus, even though they may have easier access to credit, they also have more need for this credit. Sharecropping and indebtedness are closely linked. This indebtedness does lead to a dependence that could limit the freedom of choice for the sharecropper. Desperate conditions of poverty and unemployment push the tenant into an unequal relationship of mutual dependence with his landlord. Bardhan-Rudra (1978, 1980) find fairly similar conditions of sharecropping and dependence for various parts of Northern India.

III.4. Seasonal and Family Labour

Most small to medium sized farms in Sindh, whether they are sharecropped or otherwise, rely almost entirely on family labour. Both family size and adult members per household are similar between sharecroppers and owner operators, as one might expect. Also, one would expect the number of working family members to be independent of the size of the farm.

An analysis of variance shows there to be no significant difference between the number of adult working members on both kinds of farms (see Table 17).

TABLE 17

Comparison of labour use and family size

Analysis of Variance on	F Statistic	F Level	Deviation from Grand Mean	
			Owners	Tenants
Working family members by tenure	0.27	0.60	–0.01	0.01
Working family members by farm size	0.54	0.80		
Hired seasonal labour by tenure	2.04	0.15	1.00	–0.80
Hired seasonal labour by farm size	7.70	0.00		

Source: WAPDA Survey, 1977.

There is no significant difference across farm size. It cannot be concluded that the number of working family members is dependent either on tenure or farm size. The average family size for both owners and sharecroppers is approximately 4.5. As farm size increases there is a slight increase in the total number of dependents on the farm.

There is hardly any use of permanent hired workers on both kinds of farms. The WAPDA data show a few large owner operated farms using one or two permanent hired workers but in general their use is very rare. There is, however, a certain amount of casual labour hired on both farms. Share-

croppers use less hired seasonal labour on average than owner operators and this difference is significant at the 0.15 per cent level (see Table 17). Also, as farm size increases for both kinds of farms the number of hired seasonal labour increases, as is to be expected – and this increase is statistically significant.

There could be a number of reasons for the difference in the use of seasonal labour between owner operators and sharecroppers. Sharecroppers try to minimise paid labour costs since they receive only a fraction of the marginal product of labour. Sharecropped farms, on average, tend to be smaller than owner operated farms and this would account for some of the difference. Also, as was shown earlier sharecropped farms prefer to have less area devoted to labour intensive crops and are thus likely to have less of a need for the services of hired labour.

One interesting point that was observed was that most hired labour is task specific and wages are linked to effort (for example, harvesting wages in some cases may be linked to the area weeded) since this would clearly cut down on monitoring costs and discourage shirking. During peak periods, however, this becomes difficult if there is any labour shortage and most operators have to resort to paying higher fixed wages for hired labour.

IV. Conclusion

The purpose of this paper was to look at the differences between two kinds of farming systems in the province of Sindh, namely, sharecropped farms and owner operated farms using family labour. The intention was to see if there were systematic differences in key parameters that could be related to the differences in the way the factor markets are related to the different systems of tenure. Differences in land utilisation, cropping patterns, use of animal and labour power, use of inputs and the use of availability of credit were analysed. The general conclusion that one can draw is that there are several systematic differences between the two systems, in particular with respect to land utilisation and credit and input use. It appears that sharecropped farms are using modern inputs more extensively and the link between the availability of credit through the landlord and the use of inputs is crucial for this. Sharecropped farms also have a higher intensity of land utilisation and the explanation for this also lies in the interlinking of the factor markets under sharecropping. The data used dates from 1977-78 and from a randomly selected sample of farms in Sindh.

Khan (1981) analysed the relationship between land tenure and the productivity of land and the use of inputs. The data used was for a sample of randomly selected farms from both the Punjab and Sindh. Khan's results show that owner farms use more inputs (namely human labour, fertilizer and

farm power) than tenant farms. Land use, i.e., cropping intensity is higher on tenant farms than owner farms. The reasons cited for the latter are much the same as given in this paper. For the former difference the reason attributed is that allocative efficiency is greater on owner farms than tenant farms. While it may be true that allocative efficiency is higher on owner farms the argument presented in this paper is that given the conditions of the credit market and the role of the sharecropping landlord as creditor, sharecropped farms have easier access to credit and thus to modern inputs such as new seed varieties and fertilizers. In Sindh, in particular, these conditions hold and tenants do indeed use purchased inputs more extensively than small owner operators as the data given in this paper show. While there may be some bias in the results because there is no control on size for the two systems of tenure the analyses of variance for the 5 to 25 acres size group does take care of some of this bias. The significance and consistency of the results cannot be ignored simply due to this bias or specification error. Owner farms do tend to use more hired labour and do possess more animal power than tenant farms.

To fully understand the workings of the factor markets under different systems of tenure and to analyse the interlinking of various markets under sharecropping more detailed data on the credit market, input markets and labour hiring and labour conditions is necessary. The present paper points to various ways in which the workings of these markets are likely to influence different tenurial systems.

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