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The Change in Land Distribution in the Punjab – Empirical Application of an Exogenous-endogenous Model for Agrarian Sector Analysis

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Agrarian South Asia is undergoing significant technical and structural change. The debate on the direction of the change in the agrarian structure has been somewhat myopic. The neoclassical and Chayanovian schools argue that the land distribution is not worsening to eliminate the middle owner group of the peasantry. The Marxist and structuralist schools argue, in complete contrast, that polarisation of the land distribution is rapidly eliminating the middle group of the peasantry.

This study attempts to broaden the existing dichotomous framework. An agrarian sector – and by analogy all agrarian sectors – cannot be assumed to be homogenous in the production conditions and, therefore, in the direction of change. To capture regional differentials, a theoretical exogenous-endogenous model is specified for agrarian sector analysis. Factors exogenous to a region are used to explain homogeneity in the change between regions. Factors endogenous to specific regions are used to explain differentials in the change between regions.

This exogenous-endogenous model is used to predict the direction of agrarian change in the two major regions of the Punjab, i.e., the canal colonies and the South-West. The model predicts an increase in the concentration of operated area in the canal colonies but a constancy in this concentration in the South-West. Empirical analysis of representative villages from each region confirms these predictions as well as the usefulness of the model.

1. INTRODUCTION

This study is a micro analysis of change in the distribution of operated area over time in two villages of the Punjab. There is considerable controversy over whether the Green Revolution, so successful in the Punjab, has increased concentration of operated area. Existing micro studies show either an increase or a decrease in concentration. This study uses an exogenous-endogenous model to show two divergent trends coexisting in the Punjab. The canal colony village, with a typically low concentration of operated area, has become more concentrated over time. The South-Western Punjab village, with a typically high concentration of operated area, has remained constant over time. These results also contrast with Hayami and

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Kikuchi's model which would have predicted the opposite. The exogenous-endogenous model implies that a land reform policy must take into account these critical regional differentials that exist even within one province.

Part I. Expected Changes in the Distribution of Operated Area Over Time

2. THE LITERATURE ON MICRO CHANGES IN THE DISTRIBUTION OF OPERATED AREA IN SOUTH ASIA

A large body of literature on agriculture in South Asia looks at the change in the structure of land holdings. The Marxist literature lacks empirical rigour because it applies theoretical models based on European history to South Asian agrarian change. The Green Revolution literature recognizes the specificities of agrarian sectors but does not allow for the possibility of significant regional differentials within an agrarian sector. Hayami and Kikuchi provide a model for regional discrimination.[1] However, this study questions the generalizability of the Hayami-Kikuchi model and offers an alternative exogenous-endogenous model.

The Marxist debate on agrarian change has been prolific. There are empirical debates on the mode of production in the Indian Subcontinent.[2] These refer to earlier classical debates on the agrarian question in 19th century Europe,[3] early 20th century Russia,[4] later 20th century China,[5] and Latin America.[6] There are also the current formal models of stratification based on endowments.[7] Much of this current work only tries to define categories of land owners and producers, without explaining the change in these categories. The empirical work does not theoretically explain

[1]Y. Hayami, and M. Kikuchi (1981) *Asian Village Economy at the Crossroads – An Economic Approach to Institutional Change.* University of Tokyo Press.

[2]See Vanguard (ed). (1978) *Studies in the Development of Capitalism in India.* Lahore: Vanguard Publishers.

[3]See K. Kautsky (1976) The Agrarian Question in Europe. *Economy and Society* 5 : 1.

[4]See V. I. Lenin (1967) The Development of Capitalism in Russia, Collected Works Vol. 3, Progress Publishers, Moscow; and Chayanov, A. V., 1966, The Theory of the Peasant Economy, Homewood.

[5]See Mao Tse-Tung (1967) *How to Differentiate the Classes in the Rural Areas.* Peking: Foreign Language Press.

[6]See E. Laclau (1967) Feudalism and Capitalism in Latin America. *New Left Review* May-June.

[7]See P. K. Bardhan (1984) Land, Labour and Rural Poverty, Essays in Development Economics, Columbia University Press. Bardhan applies Roemer's model of agrarian class formation to Indian data.

contemporary changes in the structure of land holdings.[8] The theoretical and historical work does not follow through with an empirical analysis of contemporary change.[9]

In contrast, some classical polar positions like Lenin's and Chayanov's are useful; not because of their predicted changes, because these are far removed from existing circumstances, but because of the relevance of the underlying mechanisms. Lenin predicted for late 19th century Russia that the middle peasantry would mostly be proletarianized because of the disproportionality between its assets and reproduction needs.[10] Chayanov predicted the stability of the same middle peasantry, based on its ability to cut consumption.[11]

These mechanisms are used in two sets of literature that do explain contemporary changes in the sturcture of landholdings in South Asia. These are the Green Revolution literature and the farm-size productivity literature.

Increasing income inequality and land concentration in Asia in the seventies led to blaming the newly adopted HYV technology. Although the technology was neutral to scale, the lumpiness in investment implied differentials in the adoption across farm size. And the requirement of controlled irrigation implied differentials in adoption across regions. The HYV-induced increase in profits per acre provided an incentive towards increasing farm size through eviction of share tenants and buying out poorer farmers.[12]

This concentration of land was facilitated in many countries, like Pakistan, by other factors. Landlords were reluctant to share the HYV-induced increase in income with their tenants. But they could not tax this increase away through higher rental shares just because a different seed was being used. This created an incentive for landlords to evict share-tenants. This incentive was added to by the state's lowering of land-ownership ceilings, which were designed to promote intensive production on self-cultivated area and reduce the expansion of owned area based on sharecropping-out. The ability to evict sharecroppers and resume sharecropped-out area for self-cultivation was increased by the state's maintenance of an overvalued exchange rate, making tractorization cheaper, and reserving agricultural credit for tractors.

A parallel inducement towards tractorization, and concentration of operated

[8] See A. Rudra (1978) Capitalist Development in Agriculture. In Vanguard (ed) *op. cit.*

[9] See J. Banaji (1977) Modes of Production in a Materialist Conception of History. *Capital and Class* No. 3.

[10] V. I. Lenin (1967) *op. cit.*

[11] A. V. Chayanov (1966) *op. cit.*

[12] See H. Cleaver (1972) The Contradictions of the Green Revolution. *American Economic Review* May; T. J. Byres (1972) The Dialectics of India's Green Revolution. *South Asian Review* 5 : 2.

area is given by the proposition of a supervision constraint. Sen explains the co-existence of large and small farms, especially small sharecroppers, as the exploitation of the cheap labour of small farms by the large farms.[13] Small farms have been noted to have a higher total output per cultivated acre than large farms because of a higher labour input per acre.[14] Unemployment drives the small farms to continue to increase their family labour on the farm till a point where its marginal product falls below the market wage rate. Large farms, on the other hand, were found to cease using labour well above the point where its marginal product equalled the wage rate. This gap between the market wage and the higher marginal value product at which large farms stopped hiring labour is explained by Sen as the additional cost to the large farms of family supervision of hired labour. If the family size places a limit on the hiring of labour, and so on self-operated area, then large owners can rent out this unsupervisable area on a fixed rent. But when this fixed rental market does not operate, as in regions of the Indian Subcontinent, this unsupervisable area can be sharecropped-out to small farms, so using their cheap labour as well. However, the possibility of tractorization allows large farms to increase their operated area without a proportionate increase in hired labour, and so without running into the supervision constraint.[15] This is an additional argument predicting the eviction of tenants and concentration of operated area.

In Pakistan and the Punjab, these inducements towards the eviction of sharecroppers, tractorization, and concentration of operated area apply. A number of studies have tested for polarization based on aggregate data for the Punjab. For instance, in a comparison of the 1960 and 1972 censuses for the Punjab, Hussain found that the middle category of 7.5 to 25 acre farmers had decreased in area and number, while the smaller and larger categories had increased.[16] This trend towards polarization was also confirmed by his sample survey of 100 farmers chosen from the entire Punjab.

There is one major problem with this kind of empirical result and the theoretical framework which it uses. The result is based on data aggregated for the entire Punjab. But there is no justification for aggregating a small number of farms from

[13] Abhijit, Sen (1981) Market Failure and Control of Labour Power: Towards an Explanation of Structural Change in Indian Agriculture, Parts I and II. *Cambridge Journal of Economics* 5 : 201.

[14] R. A. Berry and W. R. Cline (1979) *Agrarian Structure and Productivity in Developing Countries*. John Hopkins, Baltimore.

[15] A. Sen (1981) *op. cit.* The concept of supervision costs can also be enlarged to include other labour costs like search, screening, maintenance, nutrition and tying costs. This literature is examined in detail in Chapter 8 on forms of use of labour power.

[16] S. A. Hussain (1980) The Impact of Agricultural Growth on the Agrarian Structure of Pakistan: With Special Reference to the Punjab Province, 1960–1978, *op. cit.*

such a heterogenous province. All the literature discussed above posits one trend to be prevailing uniformly across the agrarian sector. This assumption, however, is invalid unless proven empirically.

Hayami and Kikuchi examine this possibility of variation in trends across regions, within the same society.[17] They contrast the cases of two villages in the Philippines rice bowl in 1976, East Laguna and South Laguna. The area in both villages was mostly owned by absentee landlords and farmed by small share-croppers. But the ownership of land in South Laguna was much more concentrated than in East Laguna. This specific factor critically reversed the impact of forces common to both villages on their landholding structures.

The new rice technology increased yields in both villages. Slowly rising fixed rents and faster growing yields led to an increase in profitability in both villages. In addition, the population pressure created a large landless labour pool in both villages. But in the less concentrated village, a large part of this landless labour force was coopted as sub-tenants, paid through the increased profitability, and the distribution of the operated area did not worsen. Conversely, in the more concentrated village of South Laguna, the number of small farms increased and their mean farm size dropped, while the mean farm size of large farms increased.

Hayami and Kikuchi attribute the polarization in South Laguna to the greater inequality of wealth and power and its institutionalized acceptance. This concentration of land and the increased bargaining power of the growing farms would have had high social enforcement costs in East Laguna, and so it did not take place.

There are three points to be made about this model. First, endogenizing of the structure of the operated area is very important. Second, the implication of the model that existing concentration generates further concentration, or its converse, that lower concentration socially inhibits its increase, is not necessarily valid. Large farms, as seen, have their own constraints, which may inhibit expansion. Third, constancy in the skewness of land distribution can itself conceal a variety of changes.

3. HYPOTHESES ABOUT CHANGE IN THE DISTRIBUTION OF OPERATED AREA BETWEEN 1970 AND 1984 IN TWO CONTRASTING VILLAGES

The Model

In this study an exogenous-endogenous model is used to predict change in the distribution of operated area in two contrasting villages of the Punjab. The abstract theoretical framework predicts that agrarian capital accumulation in a region is determined by the interaction of a set of exogenous and endogenous factors.

[17] Y. Hayami and M. Kikuchi (1981) *op. cit.*

Exogenous factors like state policy are common to all regions in an agrarian sector. This introduces homogeneity in the pattern of accumulation between regions. Endogenous factors specific to a region, like the distribution of owned and operated area, irrigation endowments, forms of land rental, and other market conditions, can vary between regions and lead to heterogeneity in the pattern of accumulation between regions.

Empirical Survey

The Punjab is a heterogeneous province in terms of the endogenous, regionally specific factors cited in the model. It consists of two distinct major regions, the canal colonies, and the Southern-Western Panjab. Important characteristics specific to the canal colonies are: a relatively less concentrated distribution of the operated area, a relatively low incidence of sharecropped area, a canal irrigation system established earlier, and therefore more developed factor markets for land and labour. In contrast, Southern-Western Punjab has: a more concentrated distribution of the operated area, a higher incidence of sharecropping, a canal irrigation system developed later, and therefore less developed factor markets for land and labour.

To capture a possible divergence in the trends between the two regions of the Punjab, one village has been surveyed from each region. Chak 323 in Tehsil and District Toba Tek Singh was chosen to typically represent the major characteristics of the canal colonies cited above. Rahimabad+ (Rahimabad+Mahmoodabad) in Tehsil Sadiqabad, District Rahim Yar Khan, was chosen to typically represent the major characteristics of South Punjab as cited above. Data on the operated area was collected for 1970 and 1984.

Hypotheses

Change in the operated area of producers over the period 1970–84 is expected to be determined by one exogenous and one endogenous factor in the two villages.

The exogenous factor is HYV-induced profitability plus land ownership ceilings. This can lead to an increase in the concentration of operated area due to: (a) eviction of sharecroppers and reduction of their areas, (b) increased fixed renting in by some producers, and (c) increased buying of land by some producers.

The exogenous factor is expected to operate in both villages, Chak 323 and Rahimabad+. However, the increase in concentration of operated area is expected to be modified in one village by a factor endogenous to that village and its region. This endogenous factor is the distribution of operated and owned area in 1970.

First, in the typical canal colony village of Chak 323, the distribution of operated area in 1970 was less concentrated than in the typical South Punjab village of Rahimabad+. Farms operating more than 150 acres had only 15 percent of the

village operated area in Chak 323, and more than 53 percent in Rahimabad+. Second, in 1970 the largest size class rented in more than 30 percent of its operated area in Chak 323 and rented out only 10 percent. Conversely, in Rahimabad+ the largest size class rented in no area and rented out almost twice its operated area. Third, a fixed-rent land leasing market operated in Chak 323 in 1970, but was not relied on at all in Rahimabad+. So, sharecropping was the minor form of land rental in Chak 323, but the only form of rental available in Rahimabad+.

These structural characteristics endogenous to each village show that in 1970 the largest size class of operators was increasing its operated area by leasing in, in Chak 323, but was decreasing its operated area by sharecropping out in Rahimabad+. So, in Chak 323, the exogenously given HYV-induced tendency to increase operated area by resuming sharecropped area and increasing leased in and owned area would be expected to operate unconstrained.

However, in Rahimabad+ in 1970, the largest size class of operators appears to be faced by a supervision constraint. The mean owned area for this size class was 906 acres in Rahimabad, compared to 113 acres in Chak 323. This 9 times larger mean owned area gives a much larger unsupervisable non-self-cultivable area in Rahimabad, unless the number of family males is also 9 times greater in Rahimabad. The lack of a fixed rental land market then implied the sharecropping-out of this unsupervisable area.

According to Sen's model, the possibility of tractorizaton should result in the resumption of this sharecropped-out area by this largest class for self-cultivation, implying an increase in concentration. However, three factors militate against this in Rahimabad+. First, mean operated area for this size class was already very high in Rahimabad+, at 876 acres in 1970, compared to the 143 acres in Chak 323. Second, tractors were already being used in both villages; so they must already have determined an upper limit to the self-cultivated area. In the case of Chak 323, this upper limit on self-cultivable area could well be above the mean of 154 acres operated in 1970 because they were still renting in. In the case of Rahimabad+, this upper limit could not be above the mean of 876 acres operated in 1970, because they were renting out. Third, legal land-ownership ceilings (150–300 owned acres) would not affect rented in or owned area in Chak 323, but would affect the owned area of the largest size class in Rahimabad+. As a rule of thumb, farms already operating between 200 to 250 acres in 1970 would not be expected to increase their operated area further in either of the two villages. This affects the largest size class of operators in Rahimabad+.

Then concentration of operated area cannot really increase further in Rahimabad for three reasons. First, concentration could increase if landlords resumed sharecropped-out area for self-cultivation, but the relative lack of family supervision constrains that, despite tractorization. Second, concentration could increase if

landlords evicted sharecroppers and rented out this area on a higher rent compatible with HYV-enhanced profitability. But the lack of a fixed rental land market prevents that. A third option would be to sell some sharecropped-out area. This would reduce the area of small sharecroppers. But it would also reduce the owned area of large landlords and increase the owned area of smaller landowners. The net effect would keep concentration of operated area constant. So the endogenous factor will prevent concentration of operated area in Rahimabad+.

There is now one exogenous and one endogenous factor determining change in the distribution of operated area between 1970 and 1984 in each village. This gives the following testable hypotheses:

(i) Owners and lessees operating <250 acres in 1970 can increase operated area;
(ii) Owners and operators operating >250 acres in 1970 will keep operated area constant, or decrease it;
(iii) Share tenants in 1970 will decrease operated area;
(iv) (i) and (iii) imply an increase in the concentration of operated area in Chak 323 between 1970 and 1984; and
(v) (i) to (iii) imply that concentration of operated area will not increase in Rahimabad+ between 1970 and 1984.

Part II. Change in the Distribution of Operated Area in Chak 323 and Rahimabad+ between 1970 and 1984

In the empirical analysis, Section 4 examines change in the conventional categories of operated area. These categories of owner, owner-cum-tenant, and tenant do not differentiate between fixed-rent leasing and sharecropping. Nor do they give rented out area. Both these are needed to test the hypotheses formulated and are examined in Section 5. Transition is examined in Section 6.

4. CHANGE IN THE CONVENTIONAL CATEGORIES OF OPERATED AREA

The broader hypotheses (iv) and (v) are taken up first, because they describe the direction of change in the distributions of operated area between 1970 and 1984. Hypotheses (i)–(iii) explain the direction of the change through the components of operated area and these are taken up next.

Hypothesis (iv) predicts that concentration of operated area will have increased between 1970 and 1984 in Chak 323. Hypothesis (v) predicts that concentration of operated area will not have increased between 1970 and 1984 in Rahimabad+.

In Table 1 the Gini coefficients for concentration of operated area confirm both hypotheses. In Chak 323, the Gini coefficient for operated area increased from 0.4564 in 1970 to 0.6151. This means that concentration of operated area increased in Chak 323. In Rahimabad the Gini coefficient for operated area was 0.6559 in 1970, and it remained virtually constant, creeping to 0.6584 in 1984. So concentration of operated area remained constant in Rahimabad+.

The observed difference in trends in the distribution of operated area in the two regions shows the usefulness of the exogenous-endogenous framework. The results of this exogenous-endogenous framework also contradict Hayami and Kikuchi's model.

The observed changes in the distribution of operated area for Chak 323 and Rahimabad now need to be explained in terms of the components of operated area. In Chak 323, Hypotheses (i) and (iii) expect an increased concentration of operated area due to owners under 250 acres resuming sharecropped-out area and share tenants losing area. It is also expected due to fixed-renting in lessees under 250 acres increasing this area.

In Rahimabad+ Hypotheses (i)–(iii) do not expect an increase in concentration of operated area because owners already operating more than 250 acres cannot increase their operated areas further. However, these large owners are expected to sell some area and so reduce sharecropped-out area. Sharecropped-out area is also expected to be resumed by operators under 250 acres.

The first step in testing hypotheses (i)–(iii) is to examine the distribution of owned area. Table 1 shows that in Chak 323 the concentration of owned area

Table 1

Gini Coefficients for Change in Operated and Owned Area

		Gini Coefficients	
	Village	1970-71	1983-84
Operated Area	Chak 323	0.4564	0.6151
	Rahimabad+	0.6559	0.6584
Owned Area	Chak 323	0.5397	0.5355
	Rahimabad+	0.8376	0.7824

[Sample Survey 1984].

does not explain changes in the concentration of operated area. Concentration of owned area decreased slightly, as the Gini coefficient dropped from 0.5397 in 1970 to 0.5355 in 1984. This does not explain an increase in the concentration of operated area in Chak 323. In fact, if the concentration of owned area decreased, then concentration of rented area must have increased sharply to result in an overall increase in the concentration of operated area.

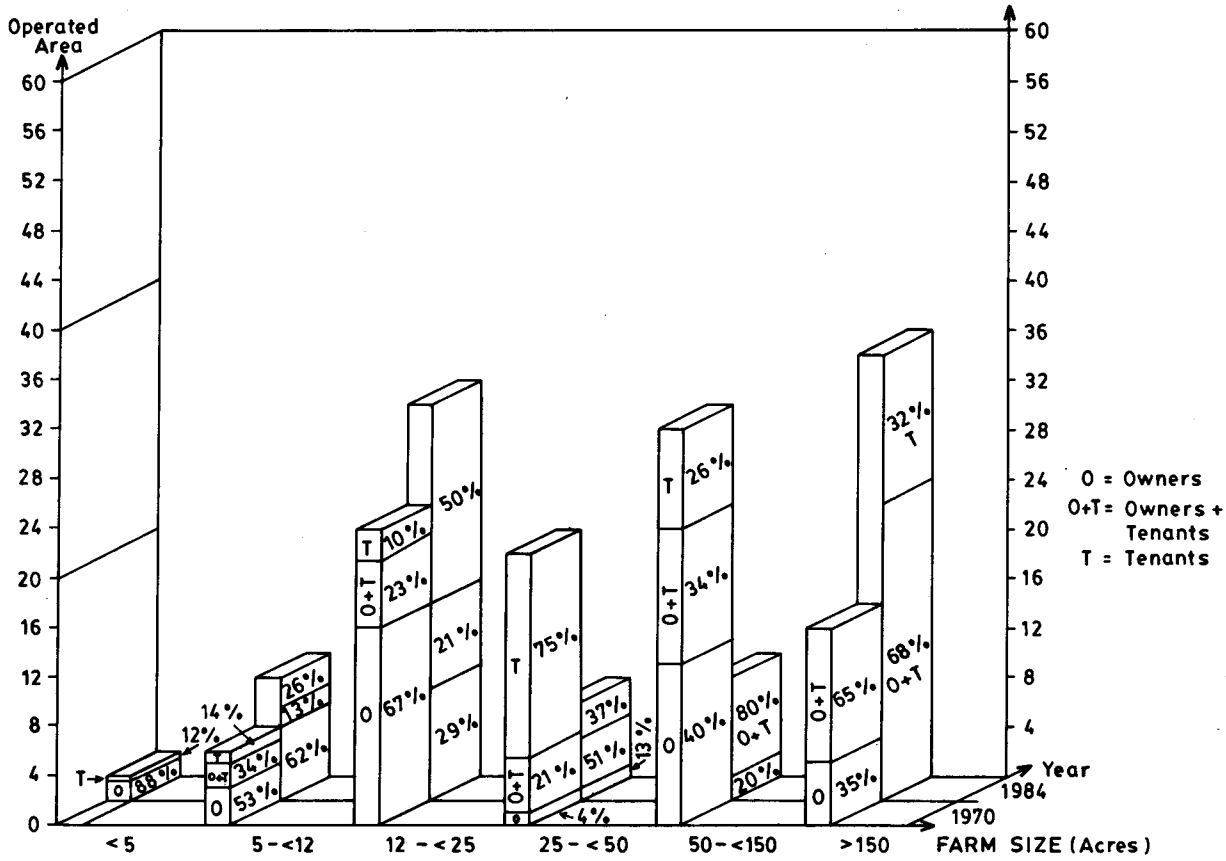
In Rahimabad+ change in concentration of owned area again does not wholly explain change in the concentration of operated area. Table 1 shows that concentration of owned area decreased, as the Gini coefficient dropped from 0.8376 in 1970 to 0.7828 in 1984. But concentration of operated area remained constant in Rahimabad+. So concentration of rented area must have increased to compensate for the reduction in concentration of owned area. So both in Chak 323 and Rahimabad+, change in the tenurial distribution is required to explain change in the size distribution of operated area. A tabular comparison between the size and tenurial distribution of 1970-71 and 1983-84, as given by Tables A1–A3 in the appendix, can be quite copious. As an alternative to these tables, Graph 1 plots this information in 4 dimensions.

The horizontal x axis plots the six size classes into which operated area is divided. The vertical y axis plots the percentage of total area that is operated by each size class. The lateral z axis, which gives depth to the graph, plots the two years of 1970 and 1984. Each size class has two joined blocks. The percentage area operated by a size class in 1970 is indicated by the height of the first of the two joined blocks. The percentage area operated by that size class in 1984 is indicated by the height of the second of the two joined blocks. This visual presentation makes it easier to compare the size distributions of operated area in 1970 and 1984, rather than scanning Table A1.

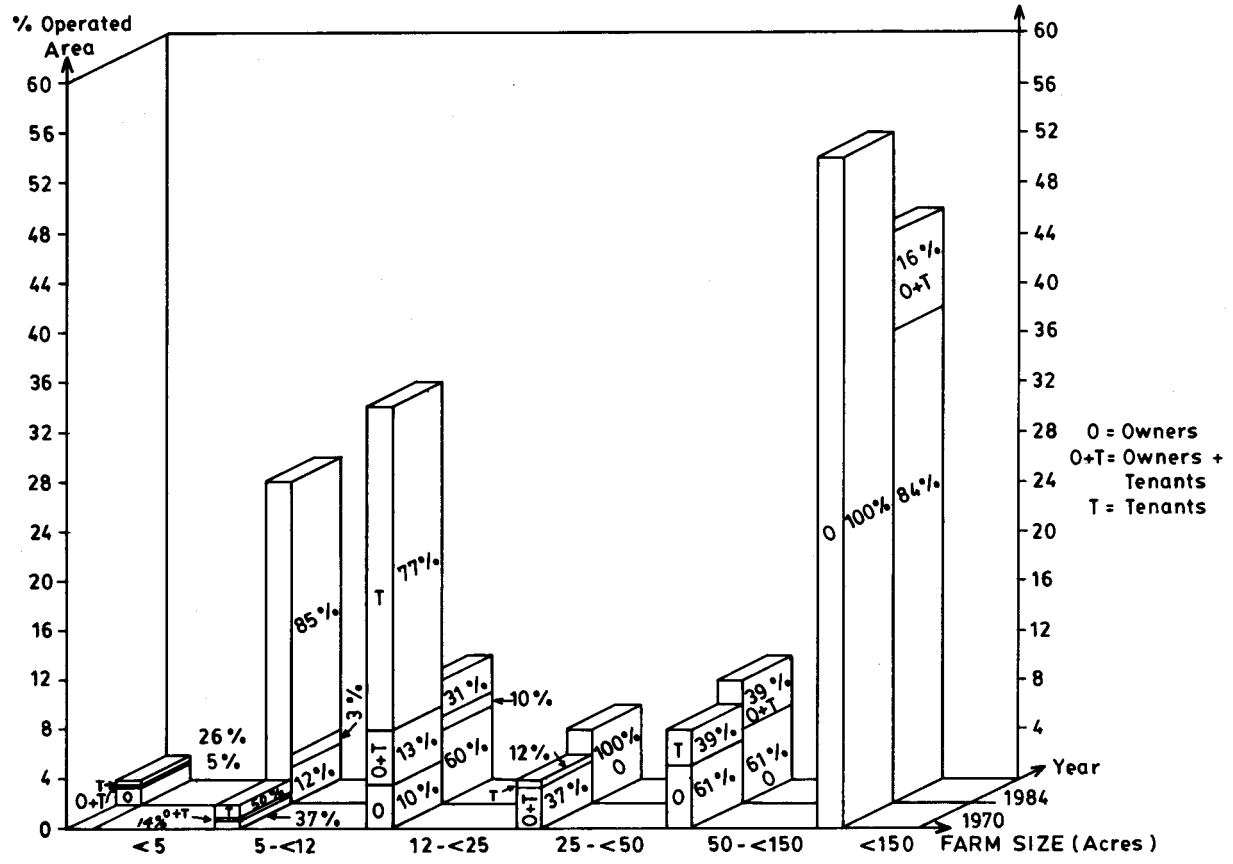
The tenurial distribution of operated area of each size class in the conventional categories of owners, owner-cum-tenants, and tenants is indicated within the height of each block. The height of each block is divided into the relative areas of these 3 tenurial categories. These percentage areas are also written on each block. The visual presentation makes it easier to compare the tenurial distribution of operated area within each size class in 1970 and 1984, rather than scanning Tables A2 and A3.

A. Chak 323

Graph 1A for Chak 323 clearly shows the polarization behind the increase in concentration of operated area indicated by the Gini coefficients. The three size classes under 25 acres increased their share of total operated area between 1970 and 1984. The two classes between 25 and 150 acres decreased their share of total operated area between 1980 and 1984. The largest size class above 150 acres in-



Graph 1A: Chak 323 : Operated Area Changes between 1970 and 1984.



Graph 1B: Rahimabad+ : Operated Area Changes between 1970 and 1984.

creased its share of total operated area between 1970 and 1984. Table A1 shows that the mean operated areas of the three gaining smallest size classes increased only by 2 acres. On the other hand, the largest size class above 150 acres increased its mean operated area from 154 acres in 1970 to 223 acres in 1984, that is, by 69 acres.

The depletion in the share of operated area of the two size classes between 25 and 150 acres, and the increase in the share of the largest size class above 150 acres, is explained by changes in the tenurial distribution in Graph 1A. The size class operating between 25 and 50 acres in 1970 consisted predominantly of pure tenants' area, (75 percent). By 1984, tenants' area had shrunk to 37 percent of this size class. The size class operating between 50 and 150 acres in 1970 comprised 25 percent of pure tenants' area. By 1984, tenants' area had been eliminated in this size class. This reduction in tenants' area in the size classes between 25 and 150 acres was not through outright evictions. Otherwise, tenant area proportions in the lower size classes would not have increased. The size class between 12 and 25 acres had only 10 percent tenants' area in 1970, but by 1984 tenants' share had increased to 50 percent. The size class between 5 and 12 acres had only 14 percent tenants' area in 1970, but by 1984 tenants' share had increased to 26 percent. So there appears to have been a systematic reduction in the plot sizes of tenants operating between 25 and 150 acres, pushing most of them into the size classes below 25 acres.

On the other hand, some tenants rented in more area to climb into the largest size class above 150 acres. This size class had no pure tenant area in 1970, but by 1984 almost 33 percent was tenants' area. Also, in 1970, this largest size class comprised 35 percent of owned area. But by 1984 all owners were additionally renting in area. So the polarization of the distribution of operated area in Chak 323 has been based on the depletion of the size classes between 25 and 150 acres and the increase in the shares of the size classes above and below. Most tenants between 25 and 150 acres had their plot sizes reduced and so fell into lower size classes.

Some tenants increased their rented in area to rise into the largest size class above 150 acres. This largest size class increased its share of total operated area by renting in more area. But the conventional categories of owners, owners-cum-tenants, and tenants do not distinguish between sharecropping and fixed-rent leasing which hypotheses (i) and (iii) require. They predict that share tenant's area will be reduced, which implies in terms of Graph 1A that they will have dropped into the categories below 25 acres. On the other hand, owners and lessees are expected to have increased their operated area by leasing in more land, implying in terms of Graph 1A that some of them are climbing into the largest size class above 150 acres. Increased leasing in will have increased the operated area of this largest size class. These conventional categories also do not show rented out area; so the resump-

tion of sharecropped-out area also needs to be confirmed. These are taken up in Section 5.

B. Rahimabad+

Graph 1B for Rahimabad+ shows the change in size classes between 1970 and 1984 leading to the constant concentration of operated area given by the Gini coefficients. The largest size class above 150 acres decreased its share of total operated area between 1970 and 1984. The size classes between 25 and 150 acres both increased their share of the operated area between 1970 and 1984. The size class between 12 and 25 acres lost area substantially, while the lower size class between 5 and 12 acres gained area substantially between 1970 and 1984. So, the major depletion of the 12–25 acres size class is compensated by the reduction of the largest size class above 150 acres and the increase in the shares of all the other size classes. The constancy in the concentration of operated area hides this major change in the shares of the size classes. The largest size class above 150 acres decreased its mean operated area from 876 acres in 1970 to 456 in 1984, that is, by 420 acres (Table A1). The other size classes marginally decreased their mean operated area by 2 acres, except the depleted 12–25 acres size class, which gained an acre.

These changes in the area shares of size classes are explained by changes in tenure in Graph 1B. The largest size class above 150 acres decreased its share by decreasing owned area. This size class cultivated only its owned area in 1970. By 1984, its owned area had more than halved (Table A3). The size class operating between 50 and 150 acres in 1970 also decreased its owned area by a quarter, (Table A3). As a result of the decrease in owned area by operators above 50 acres, the smaller size classes all increased their owned area proportions. This illustrates the decrease in the concentration of owned area shown by the Gini coefficients. The decrease in the concentration of owned area on its own should have resulted in a decrease in the concentration of operated area. But it was accompanied by a decrease in tenants' area which left operated area constant. The decrease in tenants' area explains the major depletion of the size class between 12 and 25 acres. In 1970, tenants' area comprised 77 percent of the operated area of this size class. By 1984, tenants' area had been reduced to 31 percent of this size class. The size classes between 25 and 150 acres also contained 12 percent and 39 percent of tenants' area, respectively, and by 1984 it had been completely eliminated. Here, as in Chak 323, the reduction in tenants' area was not wholly caused by outright evictions but by a systematic reduction in tenants' plot sizes. Otherwise, the lower size class between 5 and 12 acres would not have increased its shares of operated area and of tenants' area so abruptly. Only a systematic reduction in the plot sizes of tenants operating between 12 and 150 acres would have dropped most of them down into the size classes below 12 acres.

In Rahimabad+, the tenants who lost area are known to be share tenants because there are few lessees. However, the conventional tenurial categories do not show rented out area, and hypotheses (i) and (iii) predicted the resumption of sharecropped-out area by operators under 250 acres. This is seen in the next section.

5. CHANGE IN THE BASIC COMPONENTS OF OPERATED AREA

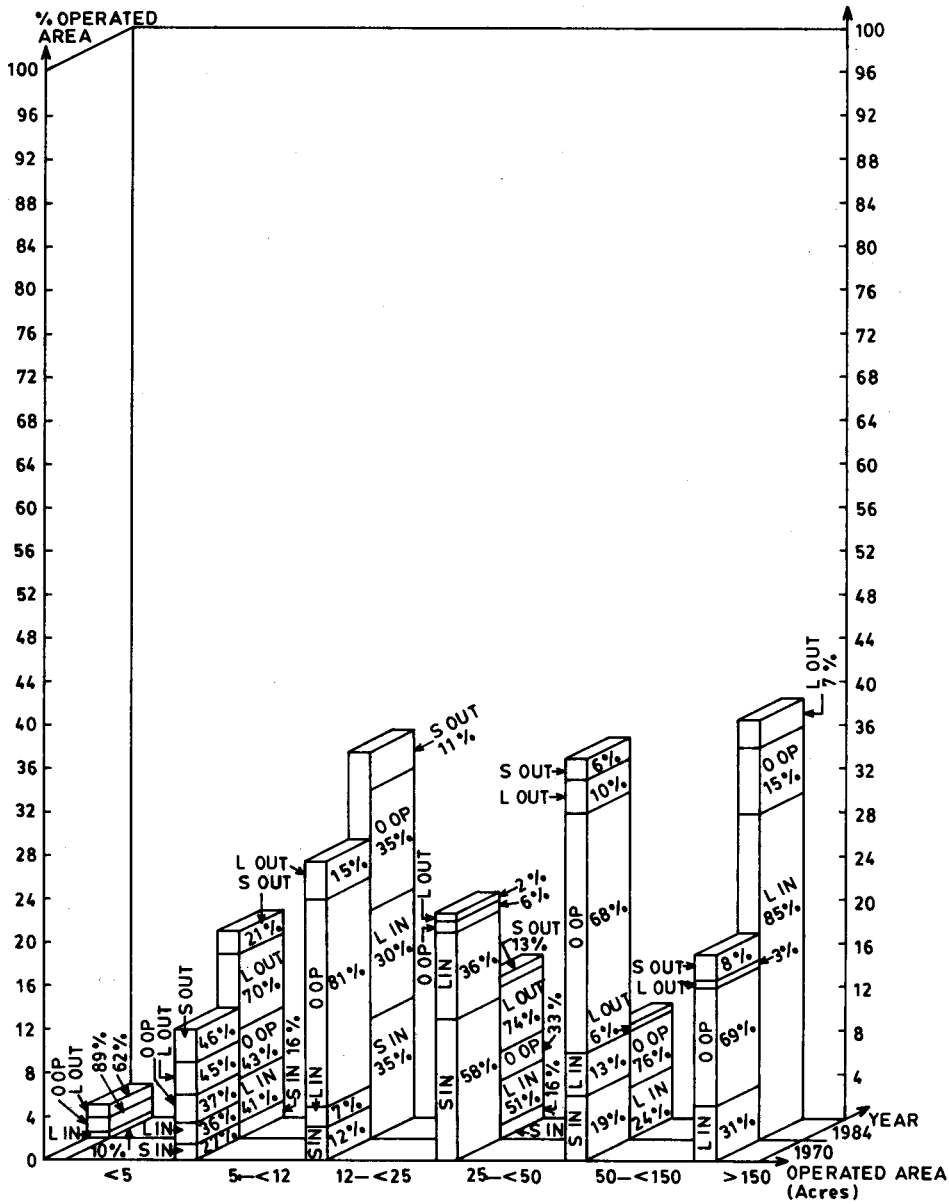
Operated area is defined as an area owned plus leased in plus sharecropped in, minus leased out and minus sharecropped-out. So, operated area is a vector of all these five components. Change in the operated area shares of size classes needs to be explained in terms of changes in these five tenurial components.

Table A4 in the appendix takes for each size class each of these tenurial components as a percentage of the operated area in that size class. For instance, the size class operating between 5 and 12 acres in 1970 owned 127 percent of its operated area, leased in 36 percent of its operated area, sharecropped in 27 percent of its operated area, leased out 45 percent of its operated area and sharecropped-out another 46 percent of its operated area. The percentages of operated area owned plus leased in plus sharecropped in, minus leased and sharecropped-out, sum to 100. Table A5 shows the change within each size and tenure category between 1970 and 1984.

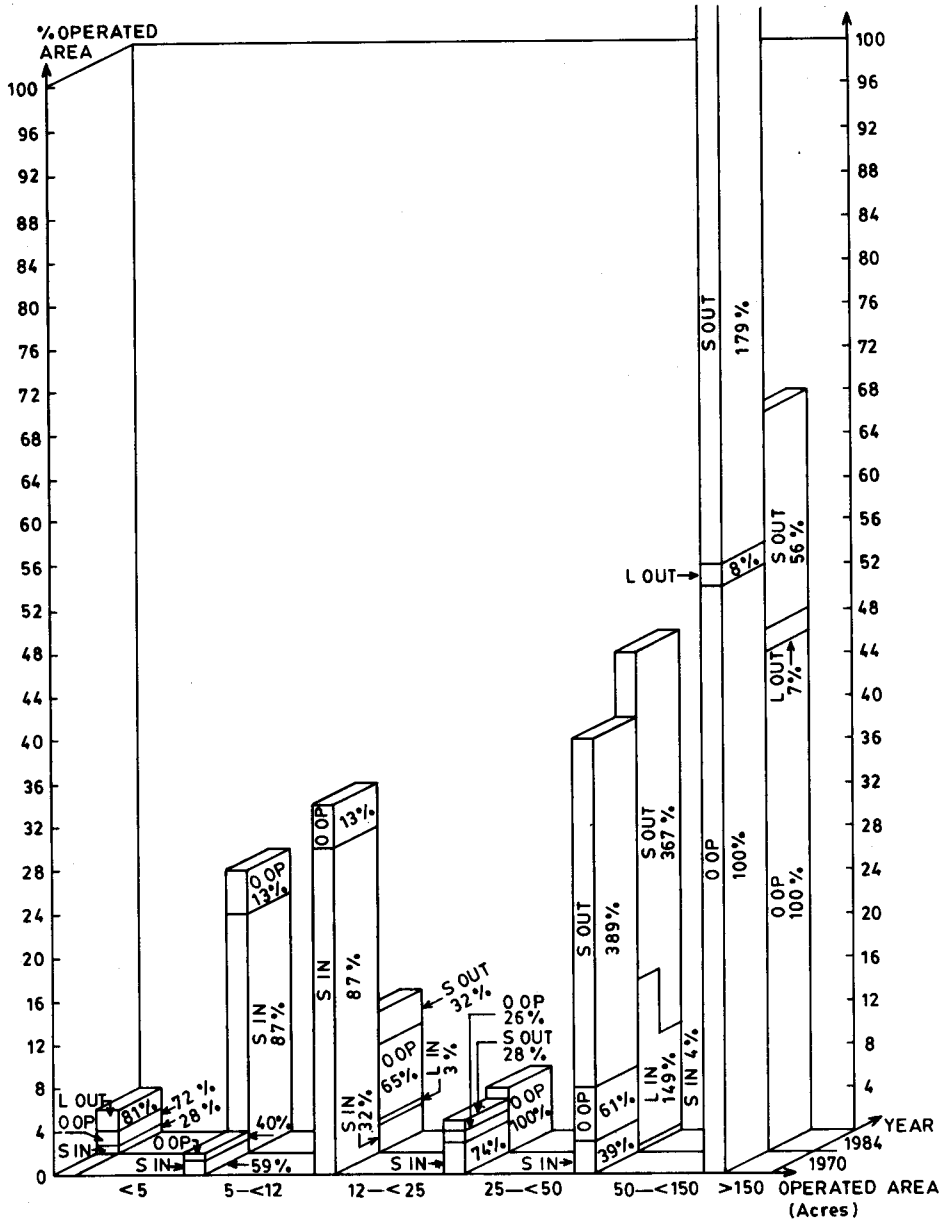
Rather than scanning Tables A4 and A5, these tenurial components are also presented in 4-space in Graph 2. The distribution of size classes in Graph 2 remains as in Graph 1. The tenurial distribution within the height of each block is now broken up into the five components of operated area.

A. Chak 323

There are three queries from Graph 1A to be answered by Graph 2A. Tenants' decreased area in the size class between 25 and 150 acres has to be confirmed as sharecropped area. Tenants' increased area in the size classes above 25 acres has to be confirmed as leased in area. Resumption of sharecropped-out area has to be confirmed. In Chak 323, the size classes between 25 and 150 acres were largely depleted through a reduction in tenants' rented in area. Graph 2A shows that the size class between 25 and 50 acres sharecropped in 58 percent of its operated area in 1970. By 1984, only 16 percent of its operated area was sharecropped in. The size class between 50 and 150 acres sharecropped in 19 percent of its operated area in 1970. By 1984, it had no sharecropped in area. On the other hand, the lower size class between 12 and 25 acres sharecropped in 12 percent of its operated area in 1970. By 1984, however, it sharecropped in 35 percent of its operated area. So, clearly, the plot sizes of sharecroppers between 25 and 150 acres were reduced, causing most of them to fall into the lower size class between 12 and 25 acres. The



Graph 2A : Chak 323 : Changes in the Components of Operated Area between 1970 and 1984.



Graph 2B : Rahimabad+ : Changes in the Components of Operated Area between 1970 and 1984.

mean sharecropped in area in Chak 323 dropped from 14 acres in 1970 to 7 acres in 1984. So, the reduction in sharecropped in area was not based on the eviction of sharecroppers, because this would still have kept the mean sharecropped in area high. The number of sharecroppers remained almost constant, while their plot sizes were decreased.

Leased in area as a proportion of operated area increased for each size class. But Table A5 shows that leased in acreage only increased for size classes below 25 acres and above 150 acres. So, on the one hand, leased in area began to substitute for sharecropped in area for the size classes under 25 acres. On the other hand, the largest size class above 150 acres increased in area proportion and acreage to increase its operated area. This size class leased in only 31 percent of its operated area in 1970. But by 1984 it was leasing in 85 percent of its operated area. So the pure tenants who rose to this largest size class in 1984 are lessees. Finally, sharecropped out area formed only 6 to 8 percent of the two largest size classes above 50 acres in 1970. This was completely eliminated by 1984. Smaller size classes below 50 acres continued to rely on sharecropping-out area. But sharecropped-out area was not systematically relied upon by the larger size classes in Chak 323 as it was in Rahimabad+.

So Graph 2A has confirmed hypotheses (i) and (iii) for Chak 323.

(1) Concentration of operated area between 1970 and 1984 is caused by depletion in share and acreage of the size classes between 25 and 150 acres, and by increase in share and acreage of the size classes above and below.
(2) The depletion of the size classes between 25 and 150 acres is largely due to the systematic reduction of sharecroppers' plot sizes, pushing them into the size class between 12 and 25 acres.
(3) The depletion in size classes between 25 and 150 acres could also be due to the increased leased in area of fixed-rent tenants, raising them into the largest size class above 150 acres.
(4) The largest size class above 150 acres, which operated a mean acreage of 154 acres in 1970, vastly increased its leased in area and reduced its small sharecropped-out area to reach a mean operated acreage of 223 acres.
(5) The two largest size classes above 50 acres completely eliminated their small sharecropped-out areas.

B. Rahimabad+

The major query from Graph 1B to be answered by Graph 2B is the reduction of sharecropped-out area in Rahimabad+. The reduction in owned area by the largest size class above 150 acres also did not come out clearly.

Graph 2B shows that the two largest size classes above 50 acres systematically relied on sharecropping-out area in 1970. The size class between 50 and 150 acres sharecropped-out 389 percent of its operated area. By 1984, it still sharecropped out 367 percent of its operated area. Table A5 shows that this size class reduced its sharecropped-out acreage significantly. But it also sold owned area in the same proportion, so keeping the sharecropped-out percentage constant. In Graph 2B, the largest size class above 150 acres sharecropped out 179 percent of its operated area in 1970. By 1984, it reduced sharecropped-out area significantly, down to 56 percent. Table A5 shows that this largest size class decreased its sharecropped-out acreage significantly. It also sold its owned area significantly. Interestingly, the sale of owned area accounts for the reduction in sharecropped-out area. So, this size class with its mean operated area of 876 acres could not resume sharecropped-out area to further increase its operated area. In fact, it almost halved its mean operated area to 456 acres. Nor could it increase its leased out area significantly. So this largest size class, well above 250 operated acres, faced a supervision constraint, both in 1970 and 1984.

Faced with HYV-enhanced profitability and unwillingness to share the increased income with share tenants, plus the threat of land reforms, this largest size class above 250 acres had two options and it pursued both. It chose to decrease its investment in agriculture and sold land. This allowed it to decrease sharecropped-out area without increasing its operated area and without significantly increasing its leased-out area. Second, it attempted to tax the extra income of its share tenants by altering the sharecropping contract. The portion of the altered contract that can be seen here is the systematic reduction in sharecroppers' plot sizes. Graph 2B again clearly shows the reduction in sharecropped area of tenants operating between 12 and 150 acres, and the increase in sharecropped in area of tenants operating between 5 and 12 acres. This was a reduction in plot sizes, rather straight evictions, because the number of sharecroppers remained almost constant between 1970 and 1984, while the mean sharecropped in area decreased from 15 to 6 acres.

So Graph 2B has confirmed hypotheses (i)–(iii) for Rahimabad+.

(1) A constant concentration of operated area between 1970 and 1984 disguised the significant reduction in share and acreage of the largest size class above 150 acres, and the depletion in share and acreage of the size class between 12 and 25 acres.

(2) Both the largest size classes above 50 acres resumed sharecropped-out acreage and sold acreage, but the size class between 50 and 150 acres kept its mean operated area constant between 1970 and 1984.

(3) The largest size class above 150 acres, already operating a mean 876 acres in 1970, halved its operated area to 456 by 1984.

(4) This largest size class above 150 acres could only reduce its sharecropped-out area by selling it because it was constrained from increasing operated area and leased-out area.

(5) This largest size class above 150 acres additionally attempted to tax share tenants' HYV-enhanced income, partly by systematically reducing their plot sizes. Resultantly most share tenants were reduced to the size class under 12 acres.

6. TRANSITION ACROSS SIZE CLASS AND TENURE BETWEEN 1970 AND 1984

In Chak 323, concentration has resulted from the depletion in share and acreage of the size classes between 25 and 150 acres and an increase in the share and acreage above and below this. The argument has been one of transition of operators from the 25 to 150 acre size classes, sharecroppers falling below and lessees climbing above. But an evidence of this transition is still needed. In Rahimabad+ there has been a reduction in the share and acreage of the size class above 150 acres and the size class between 12 and 25 acres. Reduction in the size class above 150 acres has been through sale of owned area. Reduction in the size class between 12 and 25 acres has been through a decrease in plot sizes of share tenants. Again, an evidence of this transition is needed. Tables 2 and 3 show such a transition. Table 2 is a transition matrix that shows the movement of farms across size classes between 1970 and 1984. Table 3 is a transition matrix that shows the movement of farms across size and tenure classes between 1970 and 1984.

In Table 2, the 1970 size classes are marked down the vertical axis and the 1984 size classes are marked across the horizontal axis. The diagonal cells then show the number of farms that have remained constant in each size class between 1970 and 1984. The above diagonal cells show the number of farms moving up from their 1970 size classes. The below diagonal cells show the number of farms moving down from their 1970 size classes.

A. Chak 323

Table 2A shows for Chak 323 that from a 1984 population of 128 farms only 35 percent remained constant between 1970 and 1984. 41 percent of the 1984 farms had decreased in size class and 23 percent had increased in size class between 1970 and 1984. The majority of off-diagonal numbers shows clear evidence of polarization.

The depletion of the size classes operating between 25 and 150 acres is clearly seen. Reading the table horizontally, there were 34 farms in these two size classes in 1970. By 1984, only 7 remained within these two size classes, one rose up,

Table 2A

Chak 323 Population : Size Transition Matrix

Operated Area in 1970 \ 1984	Number of Farms in Size Categories							
	0	1–<5	5–<12	12–<25	25–<50	50–<150	> 150	Total
0	0	0	4	13	0	0	0	17
1–<5	0	0	0	0	0	0	0	0
5–<12	0	11	14	7	0	0	0	32
12–<25	0	6	9	23	2	1	2	42
25–<50	0	0	3	10	5	0	1	19
50–<150	0	0	9	4	1	1	0	15
>150	0	0	0	0	0	1	2	3
Total	0	17	39	57	8	3	5	128

Table 2B

Rahimabad+ Population : Size Transition Matrix

Operated Area in 1970 \ 1984	Number of Farms in Size Categories							
	0	1–<5	5–<12	12–<25	25–<50	50–<150	>150	Total
0	0	0	61	0	0	7	0	68
1–<5	0	2	0	0	0	0	0	2
5–<12	0	22	1	1	0	0	0	24
12–<25	0	7	150	27	2	2	0	187
25–<50	0	0	1	5	5	0	0	11
50–<150	0	0	0	5	0	3	1	9
>150	0	0	0	0	5	3	7	15
Total	2	31	214	38	9	14	8	315

[Sample Survey 1984].

while 26 dropped below. So the depletion of these classes was based on a substantial downward transition. The size class between 25 and 50 acres was seen to be the modal plot size of sharecroppers in Chak 323, and now this is confirmed to have been reduced.

The increase in the area of the largest size class above 150 acres is also seen to be through transition. Three farms rose into this size class, two from the size class between 12 and 25 acres and one from the size class between 25 and 50 acres.

Table 3A shows the transition in tenure behind this transition in size class. To restrict the number of size and tenure classes, the size classes are collapsed from 6 to 3, into those below 12 acres, between 12 and 50 acres, and above 50 acres. The tenure classes are collapsed into pure owners and those renting in some area. The 1970 size and tenure classes are given along the vertical axis. The table shows the number of farms in each 1970 category that changed in size class and tenure by 1984. So the table is read horizontally.

Aggregation of the size classes decreases the transition between size classes seen in Table 2A. Table 3A shows that from total owners and tenants, a majority of 76 farms remained constant in size class. 23 farms from the total increased and 31 decreased. From the 23 that increased in size class, 18 did not change in tenure. 5 went from owners to tenants and none went from tenants to owners. This implies that no tenants were able to buy area to increase their size class.

In fact, owners had to rent in area to increase in size class, as did two owners below 12 acres and three owners between 12 and 50 acres. Of the 18 who did not change tenure, 15 were tenants and only 3 owners. So increase in size class depended upon renting in rather than buying.

Of the 31 farms that decreased in size class, 26 did not change in tenure, 5 went from tenants to owners, and none went from owners to tenants. Of the 26 that did not change in tenure, 13 were owners and 13 tenants; so both decreased equally. The 5 tenants who became owners show that they were owner-cum-tenants in 1970, renting in some area which was reduced. So they decreased in size. So Table 2 substantiates a very large transition from the 25 to 150 acres size class downwards and a smaller transition upwards. The upward transition is almost wholly based on increased renting in area rather than buying. The downward transition is mostly based on decreasing rented in area.

B. Rahimabad+

Table 2B shows that in Rahimabad+, from a population of 317 farms in 1984, only 14 percent remained constant between 1970 and 1984. 63 percent of the 1984 farms decreased in size class, while only 23 percent increased in size class between 1970 and 1984.

The table clearly shows the depletion of the size class between 12 and 25

acres. In 1970 this size class had 187 farmers. By 1984 only 27 farmers remained in this size class, 4 rose up, while 159 dropped down. So the depletion of this size class was based on an overwhelming downwards transition. The size class between 12 and 25 acres was seen to be the modal plot size of sharecroppers in Rahimabad+, and now this modal plot size is confirmed to have been reduced.

The depletion of the largest size class above 150 acres is also based on downwards transition. From 15 farmers in the size class above 150 acres in 1970, 7 were constant, while 8 dropped below. Table 3B shows that there was very little tenurial change underlying this size change. The categories of total owners and total tenants show this. It also shows that this change has been predominantly in one direction, from tenants to owners. 10 farms increased between these 3 aggregated size classes, 7 by becoming owners. 144 farms decreased between these 3 size classes, 26 by becoming owners. 115 farms remained constant, but 20 became owners. Only 2 farms went from owner to tenant.

So Table 2 substantiates a very large transition from the 12 to 25 acre size class downwards, and a very small transition upwards. The upwards transition is based almost wholly on buying of area rather than increased renting in. The overwhelming downwards transition is based largely on decreasing rented in area.

7. CONCLUSIONS

In this micro study, change in the distribution of operated area over time has been contrasted between a less concentrated canal colony village and a highly concentrated Southern-Western Punjab village. An exogenous-endogenous model has proved useful in explaining this differential in trends. Exogenous factors common to the entire agrarian sector explain the homogeneity in trends between regions. Endogenous factors specific to each region explain the differentials between regions.

In the canal colony village Chak 323, the exogenous factor of HYV-enhanced profitability per acre has created an incentive to increase operated area. The increase in operated area is largely because landlords cannot raise share rents and are reluctant to allow tenants' income to increase. The government-legislated land-ownership ceilings are also designed to reduce sharecropped-out area. The ability to increase self-cultivated area is constrained by the availability of male family labour to supervise the increased hired wage labour. This constraint is eased through the possibility of cheap labour augmenting tractorization, which allows intensification of cultivation without proportional increases in hired labour. The impact of this exogenous factor is an increase in the concentration of operated area over time.

This concentration is seen to result from the depletion of two size classes operating between 25 and 150 acres, and the increase in share and acreage of the size classes below and above. The size class between 25 and 50 acres was the model area operated by sharecroppers in 1970. A systematic reduction in the plot sizes

Table 3A

Chak 323 Population : Tenure Transition Matrix

Status in 1970		No. of Farms Changed in Size and Tenure by 1984								
		Area Increased			Area Constant			Area Decreased		
Area	Tenure	From Owner to Tenant	No Tenure Change	From Tenant to Owner	From Owner to Tenant	No Tenure Change	From Tenant to Owner	From Owner to Tenant	No Tenure Change	From Tenant to Owner
<12	Owner	2	3	NA	3	16	NA	NA	NA	NA
	Tenant	NA	14	0	NA	4	8	NA	NA	NA
12–<50	Owner	3	0	NA	2	16	NA	0	8	NA
	Tenant	NA	1	0	NA	20	3	NA	9	0
>50	Owner	NA	NA	NA	1	1	NA	0	5	NA
	Tenant	NA	NA	NA	NA	2	0	NA	4	5
Total	Owner	5	3	NA	6	33	NA	0	13	NA
	Tenant	NA	15	0	NA	26	11	NA	13	5

Table 3B

Rahimabad+ Population : Tenure Transition Matrix

Status in 1970		No. of Farms Changed in Size and Tenure by 1984								
		Area Increased			Area Constant			Area Decreased		
Area	Tenure	From Owner to Tenant	No Tenure Change	From Tenant to Owner	From Owner to Tenant	No Tenure Change	From Tenant to Owner	From Owner to Tenant	No Tenure Change	From Tenant to Owner
<12	Owner	0	0	NA	0	10	NA	NA	NA	NA
	Tenant	NA	1	7	NA	67	10	NA	NA	NA
12–<50	Owner	0	0	NA	1	20	NA	0	0	NA
	Tenant	NA	2	0	NA	6	10	NA	134	26
>50	Owner	NA	NA	NA	1	12	NA	0	5	NA
	Tenant	NA	NA	NA	NA	0	0	NA	5	0
Total	Owner	0	0	NA	2	42	NA	0	5	NA
	Tenant	NA	3	7	NA	73	20	NA	139	26

[Sample Survey 1984].

of sharecroppers caused them to fall into the lower size classes, especially increasing the share and acreage of the size class between 12 and 25 acres. A few lessees increased their fixed rented-in area to rise into the largest size class above 150 acres. Increase in the leased in area of this size class raised its mean operated area from 154 acres to 223 acres.

In the Southern-Western village of Rahimabad+, the exogenous HYV tendency towards concentration is constrained by an endogenous factor. This endogenous factor is the distribution of operated and owned area in Rahimabad in 1970. The very large mean owned areas of the size class above 150 acres, of over 900 acres, meant that this size class sharecropped out more area than it operated. So this size class was constrained by supervision problems in 1970. A further increase in concentration of operated area is prevented by three conditions. Tractors were already being used by this size class in 1970; so they could not be expected to further increase their already high operated areas by resuming sharecropped-out area. The lack of a fixed rent leasing market in Rahimabad+ prevented resuming sharecropped-out area and leasing it out. The only way in which sharecropped-out area could be decreased was by selling it, disinvesting in low-profit sharecropping-out. Even so, the reduction in share tenants' area would be balanced by the reduction in owned and operated area of this largest size class above 150 acres and would not lead to an increase in the concentration of operated area.

Therefore, the existing level of concentration in Rahimabad+ could not increase further. But the constancy in the concentration of operated area disguised the depletion in share and acreage of the largest size class operating above 150 acres and the size class operating between 12 and 25 acres. The largest size class halved its mean operated area and reduced its sharecropped-out area by selling owned area. This size class also attempted to decrease its share tenants' income by systematically reducing their plot sizes. So the size class between 12 and 25 acres which was the modal area operated by sharecroppers in 1970 was depleted. Sharecroppers fell into the lower size classes, increasing the share and acreage of the size class between 5 and 12 acres.

Appendix Table A1

Chak 323 : Size Distribution of the Operated Area in 1970 and 1984

Operated Area (Acres)	All Operators 1970					All Operators 1984				
	No	Area	Mean Area	No %	Area %	No	Area	Mean Area	No %	Area %
<5	0	0	0.0	0.0	0.0	17	34	2.0	14.4	1.4
5–<12	25	190	7.6	24.3	6.7	36	271	7.5	30.5	10.9
12–<25	43	676	15.7	41.7	23.9	51	817	16.0	43.2	32.9
25–<50	19	648	34.1	18.4	22.9	7	219	31.3	5.9	8.8
50–<150	13	887	68.2	12.6	31.3	3	255	85.0	2.5	10.3
>150	3	461	153.7	2.9	15.2	4	891	222.8	3.4	35.8
Total	103	2862	27.8	100	100	118	2487	21.1	100	100

Appendix Table A1

Rahimabad+ : Size Distribution of the Operated Area in 1970 and 1984

Operated Area (Acres)	All Operators 1970					All Operators 1984				
	No	Area	Mean Area	No %	Area %	No	Area	Mean Area	No %	Area %
<5	2	8	4.0	0.9	0.1	33	86	2.6	11.0	1.8
5–<12	24	192	8.0	10.2	2.3	214	1223	5.7	71.3	25.0
12–<25	187	2738	14.6	79.6	33.2	32	506	15.8	10.7	10.4
25–<50	8	288	36.0	3.4	3.5	9	306	34.0	3.0	6.3
50–<150	9	641	71.2	3.8	7.8	7	487	69.6	2.3	10.0
>150	5	4380	876.0	2.1	53.1	5	2280	456.0	1.7	46.6
Total	235	8247	35.1	100	100	300	4888	16.3	100	100

[Sample Survey 1984].

Appendix Table A2

Chak 323 Population : Farms Operated Area (Row %)

Operated Area (Acres)	1983-84					1970-71				
	Owner	Owner + Tenant	Tenant	All Farms	Non Operator	Owner	Owner + Tenant	Tenant	All Farms	Non Operator
<5	88.2	0.0	11.8	100.0	0.0	00	0.0	0.0	100.0	0.0
5–<12	61.6	12.9	25.5	100.0	7.7	52.6	33.7	13.7	100.0	32.1
12–<25	28.9	21.1	50.1	100.0	11.0	66.6	23.1	10.4	100.0	0.0
25–<50	12.8	50.7	36.5	100.0	12.8	4.3	21.1	74.5	100.0	0.0
50–<150	20.4	79.6	0.0	100.0	0.0	39.9	34.3	25.8	100.0	5.9
>150	0.0	67.6	32.4	100.0	0.0	34.8	65.2	0.0	100.0	0.0
Total	20.6	45.2	34.2	100.0	5.6	38.2	33.3	28.5	100.0	4.0

Appendix Table A2

Rahimabad+ Population : Farms Operated Area (Row %)

Operated Area (Acres)	1983-84					1970-71				
	Owner	Owner + Tenant	Tenant	All Farms	Non Operator	Owner	Owner + Tenant	Tenant	All Farms	Non Operator
<5	69.8	4.7	25.6	100.0	0.0	0.0	0.0	100.0	100.0	0.0
5–<12	12.0	2.7	85.3	100.0	0.0	36.5	13.5	50.0	100.0	0.0
12–<25	59.5	9.9	30.6	100.0	21.3	9.9	13.3	76.9	100.0	0.0
25–<50	100.0	0.0	0.0	100.0	0.0	0.0	88.5	11.5	100.0	28.1
50–<150	61.4	38.6	0.0	100.0	97.7	61.0	0.0	39.0	100.0	0.0
>150	83.6	16.4	0.0	100.0	46.6	100.0	0.0	0.0	100.0	175.3
Total	61.7	13.3	25.0	100.0	33.7	62.0	7.8	30.2	100.0	94.1

[Sample Survey 1984].

Appendix Table A3

Chak 323 Population : Change in the Tenure and Size Distribution of Operators between 1970 and 1984

Operated Area (Acres)	Change between 1970 and 1984 In							
	Area of Operators				Percent Change			
	Owner	Owner + Tenant	Tenant	All Farms	Owner	Owner + Tenant	Tenant	All Farms
<5	+30	0	+4	+34	+	0.0	+	+
5–<12	+67	–29	+43	+81	+67.0	–45.3	+165.4	+42.6
12–<25	–214	+16	+339	+141	–47.6	+10.3	+484.3	+20.9
25–<50	0	–26	–403	–429	0.0	–19.0	–83.4	–66.2
50–<150	–302	–101	–229	–632	–85.3	–33.2	–100.0	–71.3
>150	–150	+321	+289	+461	–100.0	+114.2	+	+107.0
Total	–569	+181	+43	–345	–52.6	+19.2	+5.3	–12.2

Appendix Table A3

Rahimabad+ Population : Change in the Tenure and Size Distribution of Operators between 1970 and 1984

Operated Area (Acres)	Change between 1970 and 1984 In							
	Area of Operators				Percent Change			
	Owner	Owner + Tenant	Tenant	All Farms	Owner	Owner + Tenant	Tenant	All Farms
<5	+60	+4	+14	+78	+	+	+175.0	+975.0
5–<12	+77	+7	+947	+1031	+110.0	+26.9	+986.5	+532.0
12–<25	+31	−313	−1950	−2232	+11.5	−86.2	−92.6	−81.5
25–<50	+306	−255	−33	+18	+	−100.0	−100.0	+6.3
50–<150	−92	0	−250	−154	−23.5	0.0	−100.0	−24.0
>150	−2475	+375	0	−2100	−56.5	+	0.0	−47.9
Total	−2093	+6	−1272	−3359	−41.0	+0.9	−51.0	−40.7

[Sample Survey 1984].

Appendix Table A4

Chak 323 : Components of the Operated Area

Operated Area (Acres)	Percent of Operated Area in 1970					
	Operated Area	Owned Area	Leased-in Area	Share Cropped-in Area	Leased-out Area	Share Cropped-out Area
<5	100	0	0	0	0	0
5–<12	100	126.8	36.3	27.4	44.7	46.3
12–<25	100	95.1	7.1	12.3	14.6	0.0
25–<50	100	7.6	36.4	58.2	2.0	0.0
50–<150	100	82.8	12.6	19.3	9.7	5.9
>150	100	78.7	31.3	0.0	2.6	8.1
Total	100	70.8	21.2	24.1	10.4	6.2

Continued –

Appendix Table A4 – (*Continued*)

		Percent of the Operated Area in 1984				
<5	100	151.4	10.8	0.0	62.2	0.0
5–<12	100	134.3	41.3	15.5	69.7	21.4
12–<25	100	45.8	29.5	34.9	0.0	11.0
25–<50	100	120.1	50.7	16.4	74.0	12.8
50–<150	100	81.6	23.5	0.0	5.5	0.0
>150	100	22.4	84.5	0.0	7.0	0.0
Total	100	58.9	51.5	14.6	18.1	7.1

[Sample Survey 1984].

Appendix Table A4

Rahimabad+ : Components of the Operated Area

Operated Area (Acres)	Percent of Operated Area in 1970					
	Operated Area	Owned Area	Leased-in Area	Share Cropped-in Area	Leased-out Area	Share Cropped-out Area
<5	100	0	0	100.0	0	0
5–<12	100	40.6	0.0	59.4	0.0	0.0
12–<25	100	12.5	0.0	87.5	0.0	0.0
25–<50	100	55.9	0.0	74.0	0.0	28.1
50–<150	100	449.6	0.0	39.0	0.0	388.6
>150	100	286.7	0.0	0.0	8.0	178.7
Total	100	194.3	0.0	36.2	4.2	126.1

Continued –

Appendix Table A4 – (*Countinued*)

		Percent of the Operated Area in 1984				
<5	100	153.5	0.0	27.9	81.4	0.0
5–<12	100	12.6	0.0	87.7	0.0	0.0
12–<25	100	97.6	2.8	31.6	0.0	32.0
25–<50	100	100.0	0.0	0.0	0.0	0.0
50–<150	100	314.8	148.9	3.7	0.0	367.4
>150	100	160.7	2.2	0.0	7.0	55.8
Total	100	128.5	16.1	26.1	4.7	66.0

[Sample Survey 1984].

Appendix Table A5

Chak 323 : Change in the Components of Operated Area

Operated Area (Acres)	Change between 1970-71 and 1983-84										
	Operated Area	Owned Area		Leased-in Area	Share Cropped-in Area	Leased-out Area		Share Cropped-out Area		No.	
		Self operators	Non-operators			Self operators	Non-operators	Self operators	Non-operators	Self operators	Non-operators
<5	+34	+56	0	+4	0	+23	0	0	0	+71	0
5–<12	+81	+165	−40	+43	−10	+104	0	+10	−40	+11	−4
12–<25	+141	−347	+78	+181	+202	−99	0	0	+90	+8	+6
25–<50	−429	+122	+92	−125	−341	+85	+64	0	+28	−12	+1
50–<150	−632	−474	−52	−52	−171	−72	0	0	−52	−10	−1
>150	+460	−139	0	+618	0	+51	0	−35	0	+1	0
Total	−345	−617	+78	+669	−320	+92	+64	−25	+26	+15	+2

Countined –

Appendix Table A5 – (*Continued*)

	Percent Change within each Size and Tenure Category between 1970 and 1984										
<5	+	+	0	+	0	+	0	0	0	+	0
5–<12	+43	+93	−66	+62	−19	+122	0	+37	−66	+44	−57
12–<25	+21	−54	+	+377	+243	−100	0	0	+	+29	+
25–<50	−66	+249	+	−53	−91	+653	+	0	+	−63	+
50–<150	−71	−70	−100	−46	−100	−84	0	0	−100	−77	−100
>150	+107	−41	0	+458	0	+464	0	−100	0	+33	0
Total	−12	−33	+69	+112	−47	+31	+	−40	+23	+15	+25

[Sample Survey 1984].

Appendix Table A5

Rahimabad+ : Change in the Components of Operated Area

Operated Area (Acres)	Change between 1970-71 and 1983-84										
	Operated Area	Owned Area		Leased-in Area	Share Cropped-in Area	Leased-out Area		Share Cropped-out Area		No.	
		Self operators	Non-operators			Self operators	Non-operators	Self operators	Non-operators	Self operators	Non-operators
<5	+78	+132	0	0	+16	+70	0	0	0	+31	0
5–<12	+1031	+76	0	0	+958	0	0	0	0	+190	0
12–<25	−2232	+45	+108	+14	−2237	0	0	+54	+108	−155	+6
25–<50	+18	+226	−81	0	−213	0	0	0	−81	+1	−3
50–<150	−154	−1475	+476	+375	−232	0	0	−1178	+476	0	+7
>150	−2100	−1930	−6965	+50	0	+160	−350	+60	−6615	0	−2
Total	−3359	−2926	−6462	+439	−1708	+230	−350	−1064	−6112	+67	+8

Continued –

Appendix Table A5 – (*Continued*)

	Percent Change within Size and Tenure Category between 1970 and 1984											
<5	975	+	0	0	+200	+	0	0	0	+1550	0	
5–<12	+537	+97	0	0	+840	0	0	0	0	+792	0	
12–<25	–82	+13	+	+	–93	0	0	+	+	–83	+	
25–<50	+6	+283	–100	0	–100	0	0	0	–100	+13	–100	
50–<150	–24	–51	+	+	–93	0	0	–47	+	0	+	
>150	–48	–43	–87	+	0	+	–100	+40	–86	0	–40	
Total	–41	–37	–80	+	–57	+	–100	–40	–79	+29	+100	

[Sample Survey 1984].