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**Agrarian Change, Farm Size, Tenancy and Land  
Fragmentation in India's Semi-Arid Tropics**

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*Agrarian Change, Farm Size, Tenancy and Land Fragmentation in India's Semi-Arid Tropics*

Much of the prevailing wisdom about agrarian change in South Asia stems from perceptions about and experiences in irrigated agriculture, particularly in the Indo-Gangetic plain. Views about the 'frozen', uncompetitive nature of land markets, economic polarization, distress sales as a means to accumulate land, increasing landlessness, landlords' exploitation of tenants, and extreme fragmentation of holdings are common (Myrdal, 1968; Ladejinsky, 1965).

Such thinking was the consensus view immediately following independence when agrarian relations in several parts of India were essentially feudal. The response by the central and state governments was to enact legislation designed to abolish intermediaries, secure title and occupancy rights for tenants, control rents paid by tenants, limit holding size, and consolidate holdings.

The importance of agrarian reform did not go unnoticed by Indian economists. Writings on agrarian structure and reform occupied more pages of the *Indian Journal of Agricultural Economics* in the late 1940s and early 1950s than those on any other topic.

During the last 20 years issues related to the land market have receded in importance on the agricultural policy agenda. Still, the earlier authoritative assertions persist. Compared to land markets in Southeast Asia, those in South Asia often look more imperfect and hence more susceptible to reinforcing and accentuating political and economic inequality within a village, locality or region (Hayami, 1981).

The aim of this paper is to determine how well the perceived stylized facts fit representative, predominantly dryland agricultural, regions and villages in India's Semi-Arid Tropics. The villages are representative of five broad soil, climatic and cropping regions of India's Semi-Arid Tropics. Data collection in three study regions, Mahbubnagar (in Andhra Pradesh) and Sholapur and Akola (in Maharashtra) started in 1975 when a panel was drawn from a random stratified sample of small, medium and large farming and landless labour households in each village. Forty households were selected in each village, 10 from each stratum (Jodha *et al.*, 1977). Household and farm management data were collected by a resident investigator at 3 to 5 week intervals (Singh *et al.*, 1985). In 1980, similar household panels were initiated in Sabarkantha district of Gujarat and in Raisen district of Madhya Pradesh. Two villages per

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five study regions and a panel of 40 households in each village gives a sample size of 400 households.

This paper is a condensed version of a chapter in Ryan and Walker (forthcoming) which is a synthesis of the results of the ICRISAT village studies in the three regions selected in 1975. The geographic coverage in the paper is wider than Ryan and Walker, as findings from the five study regions are reported.

Four topics related to land and agricultural development are analyzed: (1) agrarian change; (2) farm size and land productivity; (3) tenancy; and (4) land fragmentation and subdivision. The presentation of these topics is organized along a common three-part format. First, and at the risk of building a straw man, the conventional wisdom is described to put the results from the study villages in perspective. Then, the findings are summarized. Finally, explanations are put forward to account for the results. The paper concludes with several implications for agrarian policy.

## AGRARIAN CHANGE: THE SHAPING OF THE DISTRIBUTION OF LANDHOLDINGS

Based on National Sample Survey (NSS) data, Raj (1976) marshalled some empirical evidence to support the view of increasing economic polarization where wealthier landowners accumulate property at the expense of smaller and more marginal farm households. Raj's interpretation of the evidence and the hypothesis of increasing economic polarization in the pattern of landholdings did not go unchallenged in the Indian agricultural economics literature (Vyas, 1979).

Gradually, in the 1980s, an empirical consensus has emerged on the pattern of agrarian change. A significant and steady decline in the area under large holdings and a rise in both the total area and number of small and marginal holdings is reliably documented by analysts using diverse data sources (Laxminarayana and Tyagi (1982), NCAER (1986) and Bussink and Subbarao (1986)). Fairly fresh evidence from in-depth village studies in India's Semi-Arid Tropics also supports these trends. In particular, large landholders losing ground both absolutely and proportionately is reported in Attwood (1979); Caldwell *et al.* (1982), Harriss (1986), and Gadre *et al.* (1987).

### *Landlessness and the concentration of landholding*

Data from a retrospective survey in 1984 are consistent with that emerging consensus. Across the ten villages, landgainers, who were landless in 1950 shortly after independence, outnumbered landlosers, who owned land in 1950 and possessed less than 0.5 acres in 1982, by a ratio of 6:1. The majority of landgainers purchased land through self-generated savings.

The finding of landgainers outnumbering landlosers is unlikely to be affected by selectivity bias in the failure to account for people who lost land and subsequently left the village. Loss of land under extenuating circumstances was not a motivation for emigration among the few panel household heads who emigrated since 1975. Some of these emigrants still own land in their villages.

In general, the concentration of owned land holding has not increased appreciably since 1950. The movement toward equality in land ownership was greatest in the villages where the distribution of landholding was the most skewed in 1950. In six villages, the snapshot of the land ownership distribution in 1982 unambiguously shows less inequality than the picture taken in 1950; in two, transparent conclusions cannot be drawn because the Lorenz curves, depicting the distribution of owned holdings in 1950 and 1982, cross; and in the other two villages, where land was most equitably held of the study villages in 1950 and where the largest holding in the sample did not exceed 30 acres in 1950 or 1982, the concentration of owned holdings has increased somewhat.

The shedding of land by the larger land-owning households in 1950 is the overriding consideration in the trend towards broadening equality in the ownership distribution. In each region, the upper one-third landed households in 1950 parted with about half of their holding by 1982. In contrast, the smallest tercile of land owners in 1950 had on average the same amount of land in 1982. Smaller holdings also disproportionately bought more land than larger holdings characterized by greater relative sales. For the small holders in the lowest tercile, purchases compensated for sales so that the mean size of landholding did not fall.

#### *Land market activity and distress sales*

Given the ecological and demographic conditions of the villages, the land market should be inactive, and the distress motive should loom large in accounting for why land is offered for sale (Binswanger and Rosenzweig, 1986). But the retrospective data do not reinforce the perception of a frozen land market. Purchase and sale transaction since the father's inheritance to 1982-3 were greater than the number of sample cultivator households in each study region. Across the ten villages, about as much land was bought and sold as was partitioned through inheritance.

Undeniably, the land market is thin because the reservation price of the seller usually exceeds the offer price of the buyer. The land market is also personal. But entry as a buyer is not restricted. Property rights to land are well established and secure, limiting the scope for opportunistic land grabbing.

The relatively low incidence of distress sales is a major reason why purchases and sales in the land market have not led to greater inequality in land ownership. Only a small minority of the land sales since 1950 were to cancel debt to satisfy short-run consumption needs (Cain, 1981). When the frequency of sales is charted over time we see no evidence of clustering in bad production years, which is what Binswanger and Rosenzweig's analysis of production relations would predict.

Raising money for dowry and financing the purchase of assets were the most common reasons given by respondents for selling land. The felt need for social investment in dowry by large land-owning households was associated with heightened land market activity.

### *Forces shaping the pattern of landholding*

Increasing population pressure should be assigned pride of place in explaining changes in landholding in the recent past. Between 1951 and 1981, the increase in village population has ranged from 35 to 50 per cent. In addition to the demographic transition, the low rate of net emigration is a main contributor to village population growth.

Immigration into the villages since 1950 has not contributed significantly to landlessness. The unimportance of immigration in explaining landlessness reflects the lack of agricultural economic growth in these dryland study villages. Institutional considerations also played a major role. Although little land has changed hands directly because of land ceiling and tenancy legislation and although land ceilings are relatively easy to evade, the threat of confiscation is perceived as real by large farmers.

Land transactions since inheritance were often associated with productive investment. Land owners sometimes sold more remote dryland fields and either purchased land adjacent to their well or sank the sales receipts into well digging, desilting or deepening. The profitability of wetland agriculture was further enhanced by public subsidies on fertilizer, diesel and, most importantly, electricity. Such subsidies and the greater pace of technical change in irrigated agriculture certainly diminished acquisitive pressures on predominantly rainfed land.

Conspicuous for their absence were events, such as the great depression in the early 1930s in Attwood's (1979) study village or the fall in cotton prices following the American Civil War (Catanach, 1970), that significantly determined the course of land ownership. Undoubtedly, because of substantial government assistance, the 'never in a hundred years' Maharashtra drought in 1971-3 was not one of those events.

Last, but not least, the initial conditions for polarization in landholding were not present in the villages. Only one of the villages has a recent history of landowner absenteeism. The incidence of pure tenancy is also very low. Therefore, a scenario of landowners evicting tenants in response to abrupt technical change was and is extremely unlikely.

## FARM SIZE AND LAND PRODUCTIVITY AND QUALITY

Based on the Farm Management Studies, a negative relationship between owned area and production per acre of owned area was conclusively documented in the 1950s (Barry and Cline, 1979). The inverse association was still visible six years after the advent of the Green Revolution (Bhatta, 1979). Findings from more recent micro-studies suggest that the inverse relationship between land productivity and farm size has weakened considerably (Parthasarathy, 1987). The two explanations most commonly put forward to account for the inverse relationship are the superior land quality of small *vis-à-vis* large farms and labour market dualism reflected in a higher effective wage cost of hired than family labour (Bhalla, 1979).

### *The importance of farm size in determining average land productivity*

Much of the empirical research on the relationship between farm size and land productivity fails to account for possibility of differential effects of changes in operated area (through tenancy holding owned area constant) *vis-à-vis* adjustments in owned area (Verma and Bromley, 1987). Binswanger and Rosenzweig (1986) have shown that there are theoretical reasons relating to labour supervision and access to collateral to support the case for differential effects.

Results in four of the five regions confirm the Binswanger and Rosenzweig hypothesis that operational and owned holding will be signed differently: *ceteris paribus*, operated area is negatively associated with land productivity while owned area is positively correlated. Only in the more irrigated villages was an inverse relationship between land productivity and owned area (weakly) supported in multivariate regression analysis.

In general, several other considerations overshadowed farm size in accounting for the variation in annual land productivity among cultivator panel households within the same study region. In each region, the strongest statistical correlate to average land productivity was land quality, measured by percentage irrigation, and land value. The strength of this relationship reflects the presence of considerable variation in land quality within the villages.

Differences in land productivity among caste groups were also quite sizeable and statistically significant in three regions. Castes with significantly higher land productivity had one trait in common – their traditional and primary occupation was farming.

Apart from the effect on operated area, the longer-term propensity to engage in tenancy transactions was associated with significant differences in land productivity in three of the five regions. In the rainfall-assured, black-soil villages, where dryland can be productively and profitably farmed, the ranks of farmers who sharecrop out their land is largely filled by individuals who are not that committed to farming. Some suffer from alcoholism or are addicted to gambling. Others are primarily interested in occupations outside agriculture. Thus, information on tenancy behaviour over several years is valuable in identifying management skills and commitment which translate into higher land productivity. Because such management differences exist and are manifested in the market for tenancies, more economic value can be produced from land with tenancy than if farmers were restricted to cultivating their own landholding.

### *Land quality*

In some of the study villages, large farmers own higher-priced land less susceptible to crop failure, in others, small farm households possess superior quality land, and in yet others land revenue rates, land prices, or the incidences of crop failure are not significantly different between large farm and other cultivator households (Singh and Walker, 1982). These results are location specific, and they cast doubt on the universality and applicability of broad generalizations about farm size and land quality in India's SAT.

One land quality-related feature common to several of the study villages is the

inferior soil quality of sharecropped compared to owner-operated plots. Across the villages, the mean per hectare value of owner-operated plots was about 15 per cent higher than sharecropped plots (Singh and Walker, 1982).

## TENANCY

When one thinks about tenancy in South Asia, or anywhere in the world for that matter, the stereotype that comes in mind is large landlords exploiting tenants in narrowly specified, rigid contractual arrangements. That stereotype appears to be what the framers of tenancy legislation had in mind in India in the late 1940s and early 1950s.

### *Extent and type of tenancy*

The incidence and characteristics of sharecropping and fixed rent tenancies display considerable regional and even locational specificity in India's SAT. In the study villages with greater access to irrigation or characterized by a more assured production environment, 80 to 90 per cent of gross cropped area is owner-operated. In contrast, in the most drought prone villages, 30–40 per cent of gross cropped area is share-cropped.

This regional variation has persisted since the village studies started in 1975. For the same drought prone villages, where tenancy is most prevalent, the level of tenancy today is about the same as chronicled by Dantwala and Donde (1949) for villages in the same region after independence.

Reverse tenancy with the smallest farm households leasing out their land to larger farm households is quite common. Farming small amounts of land does not confer much economic advantage over participation more actively in the casual labour market or temporarily migrating for off-farm work. The absence of a well-developed market for hiring draft power also increased the supply of tenancies by small farm households who often do not own bullocks.

Although both sharecropping and fixed renting coexist in each village, sharecropping is more common. But the incidence of pure sharecropping is low, about 1 household in 25 during any cropping year. As in much of India, most tenancy is mixed: sharecroppers and fixed renters also cultivate their own land during the cropping seasons.

### *Terms, conditions, explanations, and changes*

The brief duration of most leases is another feature of tenancy that is widely shared by the study villages. The majority (about 60 per cent) of sharecropping and fixed rent contracts were for only one cropping season. Although enforcement of tenancy legislation has been directly responsible for the transfer of only about 100 acres in the study villages, landowners are certainly aware of the threat of losing land to tenants on longer term leases (Cain, 1981).

Several other generalizations can be drawn about the terms and conditions of

sharecropping transactions (Jodha, 1981). The diversity of arrangements to reflect individual landowner and tenant circumstances is conspicuous. Oral tenancy agreements are often flexible enough to incorporate mid-season production contingencies. Linked transactions between land and other factor and product markets are not that prevalent accounting for about 12 per cent of tenancy transactions. Many tenancy arrangements improved the risk bearing capacity of the landowner as risk was transferred to or shared by the tenancy (Walker and Jodha, 1986). Finally, unless the owner provided a considerable quantity of purchased inputs, the tenant chose the cropping system. Taken together, these five generalizations all point to the overriding conclusion that tenancy agreements are entered into by mutual consent and not by coercion.

Although farmers gave many reasons for tenancy, the most common explanation for most transactions centred on resource adjustment (Jodha, 1981). In particular, with tenancy, land:bullock ratios were more equitable between owners and prospective tenants than without tenancy, which to some extent also compensates for incomplete insurance markets in these dryland agricultural villages where production risk is high.

The market for tenancies is also dynamic. Tenant groups farming well-irrigated land was unheard of 20 years ago in the study village where it now occurs. More recently, in response to a tightening labour market, large farmers in one of the villages have shown a preference to give prospective permanent hired help tenancy contracts instead of employing them as regular farm servants.

### *Production efficiency and sharecropping*

Classical economists and, later and more formally, Marshall indicted sharecropping for its inefficiency because of diminished incentives to apply variable inputs to land. The main competing school of thought is Cheung's approach (1969) which assumes that landlords can effectively and inexpensively monitor tenants' effort on sharecropped land.

Building on Bell (1977), Shaban (1987) assessed the productive inefficiency of sharecropping in the study villages by comparing factor intensities and productivity indices between owned and sharecropped land within the same household. Controlling for the effects of soil quality and the use of irrigation, sharecropping was associated with a sizeable decline in output and in the average use of family labour and bullock draft. Differences in fertilizer use were explained by variation in access to irrigation. Hence, the village data confirm the popular perception that sharecropping does result in efficiency losses in dryland agriculture. Landlords cannot cost effectively monitor the work performance of tenants.

## FRAGMENTATION AND SUBDIVISION

Seasoned observers of agrarian structure and reform in India agree on one thing: land fragmentation exacts a heavy toll in economic inefficiency (Dantwala, 1959; Ladejinsky, 1965; Mosher, 1966; Nanavati, 1953 and Thorner 1965).



Consolidation potentially enhances the attractiveness of farm investment opportunities particularly those, such as tubewell irrigation, relating to land and water management. In spite of these apparent benefits and operational programmes in most states, consolidation schemes have only been successful on a widespread scale in irrigated Punjab, Haryana and western Uttar Pradesh.

### *Extent and cost of land fragmentation*

Empirical results from analysis of the retrospective survey and plot cultivation data in the ten study villages show that land fragmentation, measured independently of farm size, is not an important problem in the dry Semi-Arid Tropics of India (Ballabh and Walker, 1986). Holdings are much less fragmented than in some other Indian regions, most notably eastern India, where consolidation could foster the harnessing of unexploited groundwater resources. Moreover, untapped resources are not abundant; thus, the opportunity cost of reduced productivity potential usually attributed to fragmentation is considerably less than in the more favourably endowed environments. Furthermore, from the private prospective of individual farmers, the level of land fragmentation is not increasing appreciably over time. Holdings today are about as fragmented as they were 25 years ago.

Although farmers perceived that the cost of fragmentation exceeded the benefits from holding more spatially dispersed holdings, estimates at the household or field level did not show *ceteris paribus* that land productivity was lower on more fragmented farms. Indeed, for three of the five regions, household net returns per hectare were strongly and positively correlated with land fragmentation (after accounting for variation in household resource endowments and personal characteristics in a regression analysis). To explain this finding, one can hypothesize that less able farmers deselected themselves from the set of fragmented landholders by selling land to more committed farmers. While that hypothesis merits closer scrutiny, the evidence was clear from the detailed longitudinal plot and household data that fragmentation was not an economic liability at prevailing levels of technology.

From the more social perspective of watershed-based development, which figures prominently in the central and state governments' plans for dryland agriculture, a different picture emerges. Within a watershed, encompassing one or more villages, fragmentation in number of owners and/or cultivators and plots, is rising.

### *Subdivision*

Largely because of land subdivision at inheritance, plot size is also decreasing. About one plot in three was subdivided among sons at inheritance (Ballabh and Walker, 1986). Still, the potential to subdivide land was much greater than what was actually realized. Several plot, household and regional characteristics significantly influenced subdivision, but the impact of demographic determinants was most pronounced. More heirs and older heirs increased the predicted probability of plot subdivision. Turning to land characteristics, plot size had a less

marked effect on subdivision than the total land endowment in number of plots and farm size. But, small plots, falling below the 25 per cent cumulative percentile, were much less likely to be subdivided than others. Variation in soil quality also had a marked effect on the decision to subdivide land. Villagers were extremely reluctant to subdivide plots on shallower soils.

## CONCLUSIONS

Much of the conventional wisdom, described at the outset of this paper and prevailing in the 1950s, 1960s and on into the 1970s, about agrarian change in South Asia does not presently hold for these dryland study villages. The case for increasing household differentiation and economic polarization in the ownership of land is clearly rejected by our empirical analysis. Some measure of land reform has been implicitly and cost effectively achieved through increasing population pressure and land ceiling regulations.

Tenancy legislation has to some extent served its purpose and has led to the demise of contractual forms that were conducive to the exploitative acquisition of land. Now pure tenancy is rare in the villages, mixed tenancy is relatively common, and so is reverse tenancy. The agrarian landscape the legislation was designed to modify represents a substantial departure from current village reality.

One popular belief was supported. Sharecropping was indicted for its productive inefficiency. Mixed tenants cultivated the land they own significantly more intensively than the land they sharecropped.

Two aspects of these efficiency losses warrant comment. First, they are attributed primarily to the suboptimal utilization of labour and bullock draft per unit of land. Allocation of purchased inputs at these relatively low use levels was not affected significantly by alternative tenurial forms. Secondly and more importantly, it would be wrong to infer that banning or legally eliminating sharecropping would yield significant gains to society. If the option of sharecropping was made less available, some of the owners would have had to fallow land that was sharecropped. Others would have cultivated land (destined for sharecropping) as or even more extensively than did prospective tenants.

Based on our results, one would be hard pressed to recommend that investing in consolidation programmes should be accorded a high priority in India's dry semi-arid tropics. The significance of differences in soil quality in influencing plot subdivision within the household highlights the degree to which soil heterogeneity can inhibit plot exchange in a consolidation programme within a village. Soils are much more homogeneous in the areas of northwestern India where government consolidation programmes have recorded notable successes.

Finally, to the extent that land fragmentation is a problem it should be tackled at its source by making it less attractive for heirs to resort to the equal division of all plots. Land subdivision is not preordained but is conditioned by forces that operate at the plot, household and regional levels. Comparative research on ways to increase the cost of plot subdivision at inheritance should be assigned a high priority on the consolidation research agenda.

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