



*Research Report No. 54*

**IMPACT OF OWNERSHIP AND  
CONCENTRATION  
OF LAND ON SCHOOLING:  
THE CASE OF RURAL PUNJAB**

**SOCIAL POLICY AND DEVELOPMENT CENTRE**

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**IMPACT OF OWNERSHIP AND CONCENTRATION  
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**By**

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## 1. INTRODUCTION

Most of the economic reforms at poverty reduction are oriented either towards augmenting income and employment opportunities for the poor, moderating their cost of living, improving their human capital by access to basic service, or mitigating against the worst manifestations of poverty. These are all important elements of a comprehensive and integrated poverty reduction strategy. But the impact of many of these reforms takes time. Furthermore, there is no guarantee that improvements made will endure over the long term. One approach that is seldom emphasized and takes least priority, but that has the potential of achieving both results, is a change in the underlying distribution of assets, especially agricultural land, brought about either through reform or sequestration of such assets and their subsequent redistribution.

Land is the paramount asset in a rural economy. However, according to the World Bank (2002) report, almost one-half of rural households own no land. The report further states that around 2 percent of households own more than 40 acres of land and control 44 percent of land area. Collectively, large and very large farmers control 66 percent of all agricultural land. These inequalities are reflected by the Gini coefficient of land concentration, which according to the report is 0.78.

Research on poverty in Pakistan indicates that high rural poverty is due to the highly skewed distribution of land ownership in the country. Further, the incidence of poverty is high among the rural landless, and access to land takes a high proportion of households out of the poverty trap (SPDC, 2000). Lack of land ownership is, therefore, both a cause of poverty as well as a consequence of it.

The political economy aspects of land concentration and landlessness are also important. The feudal elites enjoy enormous political power because of their monopoly over the votes of their tenants in elections. The nexus of relationships between the feudal class, the bureaucracy, and agencies of law and order also ensures that the rural rich enjoy privileged access to such inputs as irrigation and credit, while smaller farmers are marginalized in the process.

The purpose of this research is to demonstrate how ‘landlordism’ (land concentration and landlessness) impede education attainments and consequently, increase poverty and income inequality. The study is based on the latest data of the Agricultural Census (2000) for Punjab<sup>1</sup> province, which is the heartland of Pakistan’s agriculture. School Life Expectancy (SLE), which is a useful composite measure, is constructed on data for student enrollments which has been made available by the Population Census (1998).

The paper is organized as follows. The next section provides details of the methodology for constructing SLE and other variables. The model is also specified in this section. The third section discusses the main regression results, while a conclusion is provided in the last section.

## **2. VARIABLES, DATA AND THE MODEL**

A simple model of school enrollment is specified and level of district economic development (*IED*), land concentration (*Gini* of land ownership), proportion of tenant households (*T*) and proportion of households with no access to land (*NI*) are treated as the key primary

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<sup>1</sup> The main agrarian regions of Pakistan are Punjab and Sindh. Punjab is, in general considered to be more advanced in terms of transition from traditional forms of agricultural than Sindh, where semi-feudal relations continue to prevail. The analysis is restricted to Punjab province only due to non-availability of latest data for Sindh. Within Punjab, the northern districts of the Potoharp plateau and surrounding highlands can be contrasted with the rest of the province in their agronomy. While these areas in northern Punjab rely mainly on rain-fed agriculture, the rest of Punjab is served with canal irrigation and tubewells. This irrigated area can be further subdivided between Central and Southern Punjab. Southern Punjab has a higher concentration of land ownership, and a stronger political presence of powerful landowners. In this regard, Southern Punjab shares some features of the agrarian economy of Sindh where large landlords dominate rural economic and political life.

determinants of human capital formation through formal schooling. Further, a dummy variable ( $SP$ ), which takes the value of 1 for districts of southern Punjab<sup>2</sup> and 0 otherwise, is also included. The inclusion of the dummy variable is supported by the fact that districts of southern Punjab are in sharp contrast to other areas of the province in terms of higher concentration of land ownership and a stronger political presence of powerful landowners. The specific equation is given below with  $\mu$ , which is a standard stochastic term of the model.

$$SLE_i \equiv \alpha + \beta_1(IED)_i + \beta_2(Gini)_i + \beta_3(T)_i + \beta_4(NI)_i + \beta_5(SP)_i + \mu_i \quad (1)$$

The computational detail of School Life Expectancy (SLE), Index of Economic Development (IED) and Gini is provided in the following sub-sections.

### 2.1 *School Life Expectancy (SLE)*

According to the World Education Report (UNESCO, 1995), the SLE is defined as “the number of year of schooling which the child can expect to receive in the future, assuming that the probability of his or her being enrolled in school at any particular future age is equal to the current enrollment ratio for that age”. Taking the reference age-range to be 5-24, SLE for  $ith$  district may be expressed as:

$$SLE_i = \sum_{j=5}^{24} E_{ij}$$

where  $E_{ij}$  is the enrollment rate at age  $j$  in district  $i$ . Thus, SLE expresses in a compact form the enrollment position for the district over the 19-year schooling cycle. As Ram (1999) pointed out, the advantage of SLEs is that they are based on enrollment rates in the standard

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<sup>2</sup> The dummy variable  $SP$  represents 13 districts of southern Punjab, viz., Vehari, Sahiwal, Pakpattan, Multan, Lodhran, Khanewal, D.G.Khan, Rajanpur, Layyah, Muzaffargarh, Bahwalpur, Bahwalnagar and R.Y.Khan.

age-range for schooling, and the difficulty of combining enrollment rates for three conventional levels is avoided.

Student population in different age-cohorts is taken from the Population Census (1998). For this exercise, SLE is computed separately for rural males, rural females and combined rural enrollments.

## **2.2 *Index of Economic Development (IED)***

As the National Accounts do not report Gross Domestic Product at the district level, the district's economic development is represented by a composite development index. Various attributes or indicators have been integrated to develop a composite Index of Economic Development. These indicators measure the economic potential and achieved levels of income and wealth; extent of mechanization and modernization of agriculture; housing quality and access to basic residential services; and the development of transport and communications. A brief description of individual indicators is given below.

Household income and wealth is the most discussed welfare attribute in literature. Direct income data at provincial or district levels are not available; therefore various proxies are used to estimate the income and wealth position of a district. For the rural economy, *cash value of agricultural produce per rural person* and *livestock per rural capita* are used. All major and minor crops are considered to estimate the district's cash value from agriculture. This indicator is based on the aggregation of 43 crops, including fruits and vegetables. Different types of livestock have been aggregated by assigning weights as recommended by the FAO (Pasha and Hassan, 1982) to reflect the capital value of various animals and poultry. For the urban part of a district, *per capita value added in large-scale manufacturing* is used to proxy the level of urban income. Value added by the small-scale component could not be included due to the lack of

data. On the assumption that there may be a direct link between the number of bank branches in a district and the volume of bank deposits, *number of bank branches per capita* is used as a crude measure of the district's wealth. *Per capita car ownership* is also used to proxy the district's income and wealth in the urban areas.

Modernization of agriculture is another area of development which has direct or indirect effects on the prosperity and standard of living of the rural population. To capture the process of mechanization in agriculture, *tractors per 1000 acres of cropped area* is used. *Consumption of fertilizer per 100 acres of cropped area* is also used as the indicator of modernization in agriculture. In addition, *irrigated area per 100 acres of cropped area* is used to capture the access to canal irrigation systems and tube-wells.

Shelter is one of the basic needs, and housing conditions are one of the key determinants of the quality of life. For IED, the *proportion of households using electricity, gas and inside piped water connections* is used. The quality of housing stock is represented by the *proportion of houses with cemented outer walls and RCC/RBC roofing*. *Rooms per persons* is used to proxy adequate housing in a district.

Three indicators have been included to portray the level of development of the transport and communication sector in a district. Roads and the transportation network have a significant impact on socialization and modernization. Therefore, *metalled road mileage per 100 square miles of geographical area* of a district is included in the index. With regard to the availability of transport vehicles, a summary measure, viz., *passenger load carrying capacity* is included. Different vehicles are aggregated assigning weights as recommended in Pasha and Hassan

(1982). *Number of telephone connections per 1000 persons* is also used to observe the distribution of this important indicator of the standard of living.

Diverse sources are used to gather data for the above indicators. Major sources include; District Census Reports (1998), Provincial Census Reports (1998), Agriculture Statistics of Pakistan (1998-99), Provincial Development Statistics, Crop Area production (1997-98), Census of Manufacturing Industries (1995-96). Further, to fulfill the missing gaps or for updating various information, unpublished data are obtained from the provincial Bureaus of Statistics, State Bank of Pakistan and the Ministry of Agriculture.

The index is constructed along the lines proposed by Filmer and Pritchett (1999) through the use of the Principal Component Analysis (PCA) on the fore mentioned indicators. The PCA searches for the linear combinations of the variables selected that account for the maximum possible variance in the data. The exercise was undertaken on the full sample and principal components were used to rank districts according to their economic level of development.

### **2.3 *Gini Index of Land Ownership (Gini)***

The *Gini* coefficient compares the Lorenz curve of a ranked empirical distribution with the line of perfect equality. The line assumes that each element has the same contribution to the total summation of the variable under investigation. The *Gini* coefficient ranges between 0 and 1. Score of 0 indicates that there is no concentration of the variable in any single category (perfect equality), and score of 1 indicates that there is total concentration of the variable in a single category (perfect inequality).

*Gini* coefficients for this exercise are computed from the grouped data of Agricultural Census 2000, and hence the magnitudes of coefficients are lower as compared with the *Gini*

computed from individual farm-level data. The standard formula for computing *Gini* for grouped data is furnished below.

$$Gini = \left| 1 - \sum_{i=1}^N (\sigma Y_{i-1} + \sigma Y_i)(\sigma X_{i-1} - \sigma X_i) \right|$$

where;

- N = Number of Categories  
 $\sigma$  = Cumulative Distribution of Values  
Y, X = Proportion of farms and land area owned respectively

### 3. MAIN RESULTS

A schematic view of distribution of land ownership in Punjab province is portrayed in Figure 1. One may easily grasp the extent of disparity in the distribution from the figure. About 56 percent of farm households (less than 5 acres) have command over only 16 percent of land in the province, while 5 percent of farmers (over 25 acres) enjoy the ownership of 31 percent of total available land.

**FIGURE 1**  
**DISTRIBUTION OF LAND OWNERSHIP – PUNJAB PROVINCE**

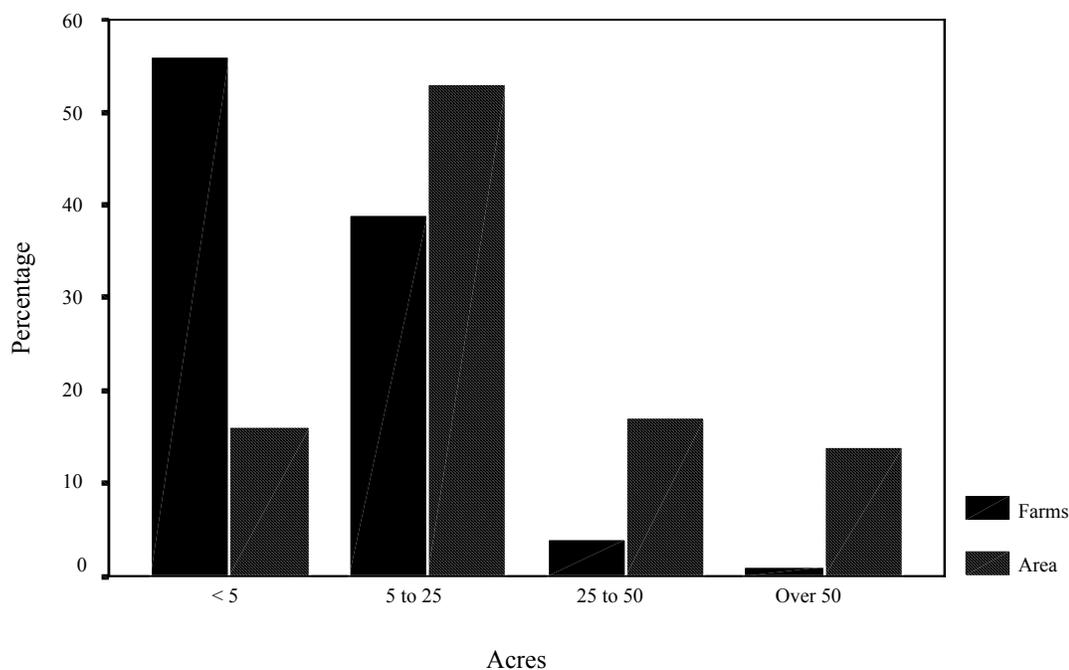
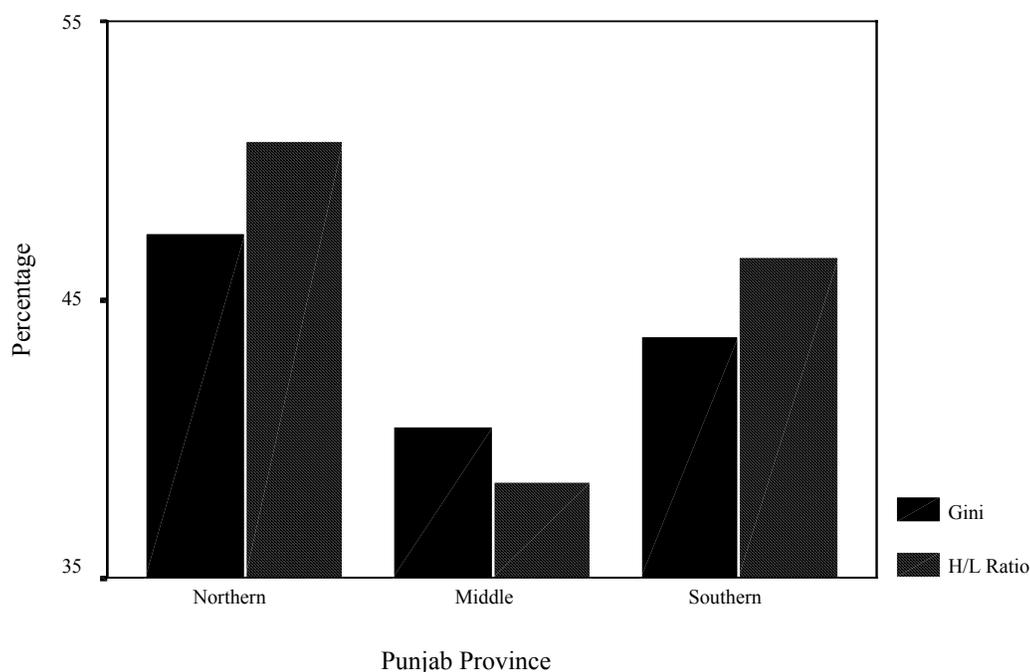


Figure 2 summarizes this distribution in term of inequality coefficients. Besides plotting *Gini* coefficients, ratio (H/L Ratio) of the average landownership between small farmers (less than 5 acres) and large farmers (over 100 acres) is also added in the graph. The figure also provides a comparative picture of different regions of the province. As expected, comparatively lowest inequality appeared in middle Punjab. Middle Punjab has the lowest proportion of its workforce in agriculture, but the ‘landlordism’, as measured by the concentration of land ownership, is the least conspicuous of all the regions. Although, northern Punjab has a relatively higher *Gini* value than southern Punjab, other indicators of education and economic development are relatively better. For instance, rural SLE for northern Punjab is 6.69 as against 4.91 for southern Punjab. Similarly, the rural literacy rate of northern Punjab is significantly higher than southern Punjab. The comparative figures for ratios of average land holdings between small and large farmers depict the same trends as *Gini* and prop up the inequality thesis.

**FIGURE 2**  
**INEQUALITY IN LAND OWNERSHIP BY REGIONS**



The main objective of this research is to show empirically or to quantify the effect of land concentration and landlessness on the level of the district's enrollment. For this purpose, the fore mentioned model is estimated separately for rural combined enrollment, rural males and rural females. Table 1 gives a description of the variables used in the regression analysis, while ordinary least-square (OLS) estimates are provided in Table 2 through Table 4 for combined, male and female enrollments respectively.

<b>TABLE 1</b>				
<b>DESCRIPTION OF VARIABLES USED IN REGRESSION ANALYSIS</b>				
	<b>Median</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Standard Deviation</b>
Rural School Life Expectancy (Years)	6	3	10	2
Rural School Life Expectancy – Male	7	4	11	2
Rural School Life Expectancy – Female	4	2	9	2
Index of Economic Development (%)	22	1	100	20
Land Ownership Gini (%)	53	44	67	5
Tenant Households (%)	6	1	12	3
No Access to Land (%)	45	17	79	13
<b>Note:</b> Figures are rounded.				

<b>TABLE 2</b>				
<b>REGRESSION RESULT [PUNJAB–RURAL]</b>				
<b>DEPENDENT VARIABLE: SCHOOL LIFE EXPECTANCY</b>				
<b>Variables</b>	<b>Coefficients</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
Index of Economic Development (%)	0.04	0.02	1.87*	0.07
Gini – Land Ownership (%)	-0.12	0.07	-1.74*	0.09
Tenant Households (%)	-0.19	0.09	-2.10*	0.04
No Access to Land (%)	-0.06	0.03	-1.71*	0.09
Dummy for South Punjab	-1.17	0.63	-1.87*	0.07
(Constant)	16.05	4.71	3.41*	0.00
R-squared	0.46	Mean dependent var.		6.16
Adjusted R-squared	0.37	S.D. dependent var.		1.94
S.E. of regression	1.54	Akaike info. Criterion		3.86
Sum squared residual	66.47	Schwarz criterion		4.13
Log likelihood	-59.64	F-statistic		4.84
Durbin-Watson statistics	2.08	Prob. (F-statistic)		0.00
<b>Notes:</b> * Coefficients are statistically significant at least at 10% level. Included 34 districts of Punjab. Statistics of White test is insignificant with the probability of 0.25				

<b>TABLE 3</b>				
<b>REGRESSION RESULT [PUNJAB – RURAL – MALE]</b>				
<b>DEPENDENT VARIABLE: SCHOOL LIFE EXPECTANCY</b>				
<b>Variables</b>	<b>Coefficients</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
Index of Economic Development (%)	0.03	0.03	1.09	0.28
Gini – Land Ownership (%)	-0.10	0.06	-1.78*	0.09
Tenant Households (%)	-0.16	0.09	-1.79*	0.08
No Access to Land (%)	-0.05	0.03	-1.52	0.13
Dummy for South Punjab	-1.20	0.57	-2.11*	0.04
(Constant)	15.73	3.40	4.63*	0.00
R-squared	0.39	Mean dependent var.		7.30
Adjusted R-squared	0.28	S.D. dependent var.		1.82
S.E. of regression	1.55	Akaike info. Criterion		3.87
Sum squared residual	66.85	Schwarz criterion		4.14
Log likelihood	-59.74	F-statistic		3.55
Durbin-Watson statistics	2.12	Prob. (F-statistic)		0.01
<b>Notes:</b> * Coefficients are statistically significant at least at 10% level. Included 34 districts of Punjab. Statistics of White test is insignificant with the probability of 0.22				

<b>TABLE 4</b>				
<b>REGRESSION RESULT [PUNJAB – RURAL – FEMALE]</b>				
<b>DEPENDENT VARIABLE: SCHOOL LIFE EXPECTANCY</b>				
<b>Variables</b>	<b>Coefficients</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
Index of Economic Development (%)	0.05	0.02	2.23*	0.03
Gini – Land Ownership (%)	-0.17	0.07	-2.35*	0.03
Tenant Households (%)	-0.24	0.10	-2.53*	0.02
No Access to Land (%)	-0.07	0.04	-1.94*	0.06
Dummy for South Punjab	-1.00	0.66	-1.52	0.14
(Constant)	18.10	4.94	3.66*	0.00
R-squared	0.53	Mean dependent var.		4.94
Adjusted R-squared	0.45	S.D. dependent var.		2.17
S.E. of regression	1.62	Akaike info. Criterion		3.96
Sum squared residual	73.33	Schwarz criterion		4.23
Log likelihood	-61.31	F-statistic		6.30
Durbin-Watson statistics	1.93	Prob. (F-statistic)		0.00
<b>Notes:</b> * Coefficients are statistically significant at least at 10% level. Included 34 districts of Punjab. Statistics of White test is insignificant with the probability of 0.24				

On the average, as reflected by the median, 6 years of schooling is estimated for rural areas (Table 1). Male SLE is 7, while a lower attainment (4 years) is estimated for rural females. A maximum *Gini* coefficient<sup>3</sup> (67 percent) is computed for ‘Muzaffargarh’, which is a district of southern Punjab. On the other hand, the lowest magnitude of *Gini* is 44 percent, which is associated with ‘Faisalabad’ (a district of middle Punjab). Nonetheless, table 1 shows a median *Gini* of 53 and data also reveals that except for three districts, all districts have *Gini* more than 50 percent. A maximum of 12 percent tenant households are reported in the Agriculture Census with a median of 6 percent. Households with no access to land (non-farm including livestock holders) have a median of 45 percent.

Before the analysis of the regression results of equation (1), the discussion warrants attention towards the simplistic nature of the specification relative to the complex process that generate the flow of human capital in the form of school enrolment (Ram, 1999). For instance, the role of relative prices and physical capital may be good candidates for inclusion in the equation to explain school enrollment. It was, however, not feasible to include these variables due to an absence of data. To econometrically evaluate the model specification, an important statistical test<sup>4</sup> (White, 1980) is applied. White’s test for the joint null hypothesis of no-specification-error and homoskedasticity is not rejected at the 5 percent level for any regression (Table 2 thorough Table 4). Therefore, the model used appears econometrically reasonable and theoretically close to what is feasible.

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<sup>3</sup> These *Gini* coefficients, as mentioned above, are computed from grouped data with 10 categories. Therefore, the magnitude is underestimated as compared with one computed with individual farm-level data.

<sup>4</sup> Basically it consists of taking the residuals from the model to be tested, and regressing the squares of these residuals on the (unduplicated) squares and cross-products of the model regressors. Then, under the null hypothesis, test statistic ( $nR^2$ ) is distributed as a chi-square with degree of freedom equal to the number of regressors in the test regression.

Table 2 contains OLS estimates of SLE model for rural combined enrollment rates. A good explanatory power of the model specification is estimated. The most obvious characteristic of the estimates is the quantitatively sizable magnitude of *Gini*, tenant households and households with no access to land. All relations are negatives and coefficients are significant. District economic development, which is used here as a proxy for the district's GDP or income, is positive and also statistically significant. One may easily interpret from the specification that holding district development constant, a ten percent decrease in inequality of land ownership is associated with an increase of 1.2 years of schooling (on the average a decrease of *Gini* from 0.53 to 0.48 will have an increase from 6 to 7.2 years of schooling). Similar interpretations are also visible regarding tenant households and households with no access to land.

The gender disaggregation of SLE suggests significant improvement in female enrollment in the absence of landlordism or lesser land concentration. Highest  $R^2$  and largest magnitudes associated with '*Gini*', 'tenant households' and 'no access to land' are evident in table 4. Even the significant levels are much higher as compared with male or combined SLEs. Two further observations emerge from this table. The effect of district development on female enrollment is also larger than male enrollment. Second, the phenomenon seems more or less uniform across the province, as the dummy variable for southern Punjab, although negative is not statistically significant. Comparatively, regression results for male SLE (Table 3) are statistically weaker, although they do not refute the significant inverse relationship of land concentration and landlessness on school enrollment.

#### 4. CONCLUDING REMARKS

Ownership of land, in situations where rural markets are incomplete and interlocked in character, can make a significant contribution to the food security and nutritional well-being of households, as well as to their ability to withstand shocks. The political economy

implications of land reforms are also important. Land reforms could virtually herald a revolution in the countryside and would probably constitute the single most significant act of empowerment of the poor in Pakistan.

There is also the view that implementation of land reforms could impose significant costs in terms of foregone agricultural output. In other words, there is a positive relationship between farm size and productivity, and truncation of large farms will lead to a loss of outputs. The empirical evidence for this relationship however is, at best, ambiguous and it is hoped that efficiency losses due to land reforms are likely to be marginal.

This research considers the issue of land reform from another perspective. It links the landlordism with school enrollment rates. Punjab and Sindh provinces are Pakistan's agricultural heartland. However, the analysis is restricted to only Punjab province (34 districts) due to non-availability of the latest data for Sindh. Following UNESCO (1995), a composite indicator of district's enrollment is computed with the age-wise enrollment data from the Population Census. This indicator, which measures the expected years of schooling in the 5-24 age group, is linked with the district's level of development, *Gini* for landownership, proportion of tenant households and proportion of households with no access to land. The results are statistically sound, coefficients are significant and signs are according to a priori expectation. The effects of landlordism on female enrollment is more conspicuous than male.

To conclude, educational policies and programs should take into consideration the landlordism as an impediment to human capital formation through formal schooling system.

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The paper argues for effective land reform in Pakistan by demonstrating an inverse relationship between students' enrollment and land concentration and landlessness for 34 districts of the Punjab province. With the help of enrollment data from the Population Census, a composite measure is constructed and linked with the inequality in ownership of land and landlessness. While the effect of the development level of districts on schooling is, as expected positive and substantial, both the Gini coefficient for land ownership and coefficient of landlessness are negative and statistically significant.

