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Impact of Ownership and Concentration of Land on Schooling

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Abstract

The study argues for land reform in Pakistan by demonstrating an inverse relationship between students' enrollment and land concentration and landlessness for 50 districts of the Punjab and Sindh provinces. 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.

I. 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 services, 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.

The evidence suggests that indeed the distribution of land within and across countries affected the nature of the transition from an agrarian to an industrial economy and has been significant in the emergence of

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sustained differences in human capital, income levels and growth patterns across countries.

The adverse effect of the implementation of universal public education is magnified by the concentration of land ownership. Hence, as long as landowners have affected the political process and thereby the implementation of education reforms, inequality in the distribution of land ownership has been a hurdle for human capital accumulation, slowing the process of industrialization and the transition to modern growth. In societies in which agricultural land ownership was distributed rather equally, growth enhancing education policies were successfully implemented.

The process of development in Korea, for instance was marked by a major land reform followed by a massive increase in governmental expenditure on education. During the Japanese occupation in the period 1905-1945, land distribution in Korea became increasingly skewed and in 1945 nearly 70% of Korean farming households were simply tenants (Eckert, 1990). In 1949, the Republic of Korea instituted the Agricultural Land Reform Amendment Act that drastically affected landholdings. Land reforms and the subsequent increase in governmental investment in education were followed by stunning growth performance that permitted Korea to nearly triple its income relative to the United States in about twenty years, from 9% in 1965 to 25% in 1985.

North and South America also provide evidence for differences in the process of development, and possibly overtaking, due to the effects of the distribution of land ownership on education reforms within land-abundant economies. As argued by Engerman and Sokoloff (2000) the original colonies in North and South America had vast amounts of land per person and income levels comparable to the European ones. North and Latin America differed in the distribution of land and resources. The United States and Canada were deviant cases in their relatively egalitarian distribution of land. For the rest of the new world, land and resources were concentrated in the hands of a very few, and this concentration persisted over a long period. These differences in land distribution between North and Latin America were associated with significant differences in investment in human capital.

Goyal (1996) argues that in Himachal Pradesh (an Indian State), land reforms have paid dividends in terms of more children going to school. A high land person ratio and more equal distribution of land have distorted the feudal structure. People are better placed now in participating in school matters and sending their children to school.

Besides growth and human capital accumulation, the political economy aspects of land concentration and landlessness are also important. The land-owing 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.

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 state of poverty further causes households to drop their children from the schooling system. The out of school children assist their families in sustaining livelihoods in rural areas.

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 the main agrarian regions of Pakistan (Punjab and Sindh provinces). 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 some stylized facts about land distribution in Pakistan. The details of the methodology for constructing SLE and other variables are furnished in section 3. The model is also specified in this section. The fourth section discusses the main regression results, while a conclusion is provided in the last section.

2. Land Ownership Pattern in Pakistan

According to the World Bank (2002) report, almost one-half of rural households in Pakistan 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 for rural Pakistan.

A schematic view of distribution of land ownership in the Punjab and Sindh provinces is portrayed in the following figures. One may easily grasp the extent of disparity in the distribution from the figures. About 56 percent of farm households (less than 5 acres) have command over only 16 percent of land in the Punjab province, while 5 percent of farmers (over 25 acres) enjoy ownership of 31 percent of total available land. In the Sindh province 46 percent farm households (less than 5 acres) own 13 percent of land while 3 percent (over 25 acres) occupies 26 percent farm area.

Figure-1: Distribution of Land Ownership – Punjab Province

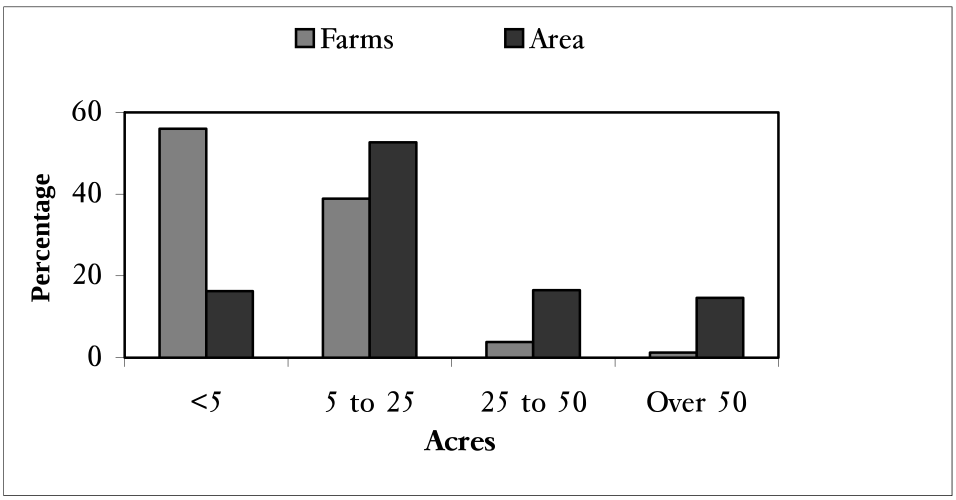
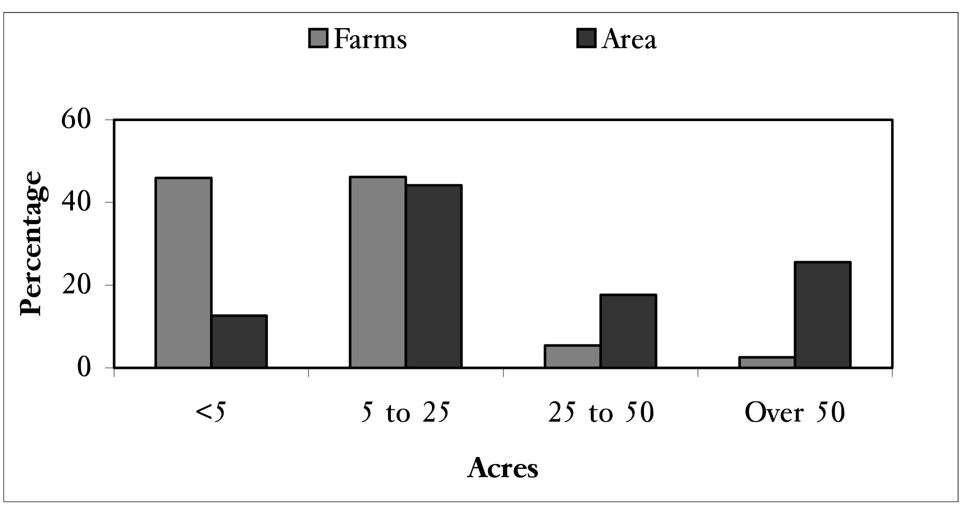


Figure-2: Distribution of Land Ownership – Sindh Province



3. 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 (Nl) are treated as the key primary determinants of human capital formation through formal schooling. The specific equation is given below with μ, which is a standard stochastic term of the model.

$$SLE_i \equiv \alpha + \beta_1(IED)_i + \beta_2(Gini)_i + \beta_3(T)_i + \beta_4(Nl)_i + \beta_5(SINDH)_i + \mu_i \qquad \textbf{(1)}$$

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

3.1. School Life Expectancy (SLE)

According to the World Education Report (UNESCO, 1995), the SLE is defined as "the number of years 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 the *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 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 the 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.

The index is constructed[1] along the lines proposed by Filmer and Pritchett (1999) through the use of the Principal Component Analysis (PCA) on the afore 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].

3.2. 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.

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[1] 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 fill 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.

[2] The results of the Principal Component Analysis (factor loading and communality) are provided in the Appendix, Table A.1.

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

where;

N = Number of Categories

σ = Cumulative Distribution of Values

Y, X = Proportion of farms and land area owned respectively

4. Empirical Findings

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 afore 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.

Table-1: Description of Variables Used in Regression Analysis

	Median	Maximum	Minimum	Standard Deviation
Rural School Life Expectancy (Years)	5	10	2	2
Rural School Life Expectancy – Male	6	11	3	2
Rural School Life Expectancy – Female	3	9	1	3
Index of Economic Development (%)	28	100	1	21
Land Ownership Gini (%)	0.54	0.67	0.44	0.05
Tenant Households (%)	0.06	0.31	0.01	0.06
No Access to Land (%)	0.53	0.94	0.16	0.15

Note: Figures of schooling years are rounded.

On the average, as reflected by the median, 5 years of schooling is estimated for rural areas (Table 1). Male SLE is 6, while a lower attainment

(3 years) is estimated for rural females. A maximum *Gini* coefficient[3] (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 54 and data also reveal that except for eight districts, all districts have Gini more than 50 percent. A maximum of 31 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 53 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 generates 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[4] (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 through Table-4). Therefore, the model used appears econometrically reasonable and theoretically close to what is feasible.

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[3] 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.

[4] 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: Regression Result [Rural Areas] Dependent Variable: School Life Expectancy

Variables	Coefficients	Std. Error	t-Statistic	Prob.
Index of Economic Development (%)	0.0583	0.0178	3.262	0.0021
Gini – Land Ownership (%)	-0.0879	0.0442	-1.983	0.0534
Tenant Households (%)	-0.1443	0.0367	-3.922	0.0003
No Access to Land (%)	-0.0886	0.0255	-3.471	0.0012
(Constant)	14.0467	2.7686	5.073	0.0000
R-squared	0.3906	Mean dependent var.		5.3755
Adjusted R-squared	0.3364	S.D. dependent var.		2.0963
S.E. of regression	1.7075	Akaike info. Criterion		4.0026
Sum squared residual	131.21	Schwarz criterion		4.1938
Log likelihood	-95.066	F-statistic		7.2124
Durbin-Watson statistics	1.5898	Prob. (F-statistic)		0.0001

Notes: All Coefficients are statistically significant at least at 5% level.

Table-3: Regression Result [Rural–Male] Dependent Variable: School Life Expectancy

Variables	Coefficients	Std. Error	t-Statistic	Prob.
Index of Economic Development (%)	0.0530	0.0180	2.9417	0.0051
Gini – Land Ownership (%)	-0.0584	0.0454	-1.2869	0.2047
Tenant Households (%)	-0.1399	0.0359	-3.8914	0.0003
No Access to Land (%)	-0.0869	0.0261	-3.3298	0.0017
(Constant)	13.637	2.7059	5.0397	0.0000
R-squared	0.3589	Mean dependent var.		6.5274
Adjusted R-squared	0.3019	S.D. dependent var.		2.0454
S.E. of regression	1.7089	Akaike info. Criterion		4.0043
Sum squared residual	131.428	Schwarz criterion		4.1955
Log likelihood	-95.108	F-statistic		6.2991
Durbin-Watson statistics	1.6496	Prob. (F-statistic)		0.0004

Notes: Except Gini, all coefficients are statistically significant at least at 1% level.

Table-4: Regression Result [Rural–Female] Dependent Variable: School Life Expectancy

Variables	Coefficients	Std. Error	t-Statistic	Prob.
Index of Economic Development (%)	0.0646	0.0185	3.4783	0.0011
Gini – Land Ownership (%)	-0.1197	0.0463	-2.5822	0.0131
Tenant Households (%)	-0.1504	0.0394	-3.8174	0.0004
No Access to Land (%)	-0.0923	0.0263	-3.5026	0.0011
(Constant)	14.577	3.0298	4.8114	0.0000
R-squared	0.4048	Mean dependent var.		4.1133
Adjusted R-squared	0.3519	S.D. dependent var.		2.2615
S.E. of regression	1.8205	Akaike info. Criterion		4.1308
Sum squared residual	149.152	Schwarz criterion		4.3220
Log likelihood	-98.2705	F-statistic		7.6525
Durbin-Watson statistics	1.54404	Prob. (F-statistic)		0.0000

Notes: Except Gini, all coefficients are statistically significant at least at 1% level.

Table-2 contains OLS estimates of the 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 year of schooling (on the average a decrease of *Gini* from 0.54 to 0.49 will have an increase from 6 to 7 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. Further, the effect of district development on female enrollment is also larger than male enrollment. 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.

5. 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 output. 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 landlordism with school enrollment rates. Analysis has been carried out on data of Punjab and Sindh provinces, which are Pakistan's agricultural heartland. 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 that of male.

- To conclude, land ownership concentration reduces human capital and increases income inequality, thus constraining growth rates. Therefore, educational policies and programs should take into consideration landlordism as an impediment to human capital formation through the formal schooling system.

Appendix

Table – A.1: Results of Principal Component Analysis [Factor Loadings and Communality]

Indicators	Factors 1	2	3	4	5	Communality
Proportion of houses with RCC/RBC roofing	0.858	-0.109	0.116	-0.236	-0.130	0.834
Proportion of households using cooking gas	0.814	0.309	0.229	-0.102	-0.265	0.890
Telephone connections per 1000 persons	0.800	0.051	-0.026	-0.138	0.045	0.664
Bank Braches Per Capita	0.773	0.107	-0.143	0.019	0.204	0.672
Households with inside piped water connections	0.760	0.218	0.065	0.073	-0.239	0.692
Proportion of households using electricity	0.733	-0.235	0.251	0.194	0.239	0.750
Proportion of houses with cemented outer walls	0.696	-0.424	-0.063	-0.223	0.051	0.720
Metalled road mileage	0.571	-0.434	0.409	0.067	0.208	0.729
CAR Ownership Per Capita	0.386	0.528	-0.228	0.151	0.474	0.727
Passenger load carrying capacity	0.461	0.511	-0.332	0.331	-0.026	0.694
Fertilizer Consumption	0.355	0.459	-0.032	0.454	-0.419	0.720
Large Scale Manufacturing Value Added	0.278	-0.335	-0.332	-0.079	-0.142	0.326
Irrigated area per 100 acres of cropped area	-0.315	0.390	0.657	-0.004	-0.215	0.730
Tractors Per 1000 Acres of Cropped Area	0.298	0.403	0.315	-0.554	0.112	0.669
Rooms per persons	0.014	-0.419	0.453	0.497	-0.151	0.651
Livestock Per Capita	-0.391	0.353	0.075	-0.404	-0.143	0.467
Cash Value of Agricultural Produce	-0.268	0.352	0.362	0.192	0.563	0.680

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