

## FARM AREA, CULTIVATED AREA AND IRRIGATED AREA DISTRIBUTION IN PAKISTAN, 1972-90

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The rural scene in Pakistan is dominated by small farmers. Nearly one-fourth of the country's population subsists under extreme poverty conditions. About 43% of the rural population is below the poverty line. With the growth of the economy, the distribution of income is becoming further skewed. Substantial inequalities exist in the distribution of farm area, cultivated area and irrigated area between different farm-size groups and these inequalities are increasing over time, causing rather skewed distribution of income in rural areas. A lexicographic ordering of distribution of the above mentioned resources between different farm-size groups is recommended.

Key words: farm area distribution, lexicographic ordering, Pakistan, Theil index

### INTRODUCTION

Even after 50 years of concerted efforts towards industrialization, Pakistan is yet predominantly an agricultural country. Although migration from rural to urban areas has increased considerably over the past two decades, nearly three-fourth of the population still makes its living through farming and lives in the country side. This makes agricultural sector the largest employer in the economy, accounting for 54% of the country's total labour force and supporting, directly or indirectly, 70% of its population (Economic Survey, 1996-97).

The rural scene in Pakistan is dominated by small farmers. They constitute 50% of the total population and cultivate almost 60% of the available land. They, however, own a very small resource base, leading to a subsistence production pattern. As a consequence, they live on the brink of poverty, which keeps them away from the mainstream. The performance of these tillers of soil is key to the prosperity of the agriculture sector, which can ultimately lead to the success of the national economy (NCA, 1988). Almost all Governments in the country have realized strategic role of agriculture in the economy of Pakistan. Attempts have been made in the past to transform traditional agriculture into a more progressive and dynamic sector. Despite concerted efforts, significant progress has, however, not been achieved in developing an agrarian economy in general and in improving economic lot of farming community in particular.

Even to-date nearly one - fourth of the country's population subsists under extreme poverty conditions and almost 50% of this still lives in rural areas. They

include small farmers, and other non-farm rural households (NCA, 1988). This scenario is supported by a number of studies. Naseem (1986) considered that 43% of the rural population lived below poverty line. A World Bank Report indicated that the highest 20% of the population share 40% of income and consumption. Another source indicated that 30% of the population in Pakistan lived in absolute poverty (Anonymous, 1994).

It has been argued that growth of the economy as a whole and transformation of agriculture into more commercialized sector have improved the socio-economic status of population. As such, significant part of rural population has moved above poverty line. Nevertheless, many analysts have concluded that distribution of income has further skewed, an outcome often attributed to the so called process of development. It has been emphasized that benefits of development have not trickled down to the rural masses at an appropriate pace (Adams and Alderman, 1993; Anonymous, 1994; Richard and Jane, 1995). As such, agriculture income is the major source of income inequality in rural Pakistan (Adams and Alderman, 1993 and Richard and Jane, 1995). This income inequality leading to poverty, is the outcome of defects in the mechanism of income distribution which is subject to wide diversity in the ownership, use, and access to income - generating resources between the farming community in particular and the rural masses in general. As Sen (1986) argues thin famine is not only the consequence of decline in economic activity, but can also take place in the wake of worsening conditions of some sections of the society because of losing command over resources in

comparison with other segments of the society. With this background it becomes imperative to study that how the major productive resources are distributed among farming communities which are dominated by small and medium farmers (together they are 90% of the farming community, control 60% of the farm area, and are 50% of the total population).

**MATERIALS AND METHODS**

The main body of cross-section data of Pakistan at national level for different farm-size groups comes from three agricultural census reports conducted by the Agricultural Census Organization of the Government of Pakistan in the years 1972, 1980 and 1990 pertaining to the decades of the 1960s, 1970s and 1980s. These grouped data have been used for the purpose of analysis. Along with these three census reports, other Government of Pakistan publications pertaining to different years have been used in the analysis as supporting documents. For the estimation of inequality in the holding of above mentioned productive resources among different farm-size groups, we have used Theil's information theoretic inequality measure, defined as:

$$T(X:Y) = \sum_{i=1}^n X_i \ln \frac{X_i}{Y_i}$$

Where,

$X_i$  = Relative share of the *i*th farm-size group, as a proportion of the total in any of the attributes for which inequality is being measured, and,

$Y_i$  = Relative proportion of the cultivating household in *i*th farm-size group out of total cultivating household.

The value of *T* varies between zero (perfect equality) and  $\ln(1/Y_i)$  meaning perfect inequality. It has justification for such a type of grouped data as reported earlier (Sarnpath, 1990b; Gill and Sampath, 1992). Detailed theoretical discussion has been reported by Cowell, 1977). We further decomposed the Theil's measure to know interprovince and intraprovince inequality in the distribution of a resource among various farm-size groups. Decomposition procedure can be explained as follows:

- Let  $S_g, g = 1 \dots G$  for the *g*th province,
- $Y_g$  = *g*th province's household share,
- $X_g$  = *g*th province's resource share.

Then

$$X_g = \sum_{i \in S_g} X_i, Y_g = \sum_{i \in S_g} Y_i, g = 1 \dots G$$

Now writing  $Y_i$  for the *i*th farm-size group household population share of *g*th province and  $X_i$  for *i*th farm-size group resource share and,

$$P_i = \frac{X_i}{X_g}, n_i = \frac{Y_i}{Y_g}, i \in S_g, g = 1 \dots G$$

Then, the inequality decomposition can be written as follows:

$$I(X:Y) = I_0(X:Y) + \sum_{g=1}^G Y_g I_g(X:Y)$$

Where,

$$I_0(X:Y) = \sum_{g=1}^G X_g \ln \frac{X_g}{Y_g} \text{ and}$$

$$I_g(X:Y) = \sum_{i \in S_g} P_i \ln \frac{P_i}{n_i}; g = 1 \dots G.$$

**RESULTS AND DISCUSSION**

All the three agricultural census reports of Pakistan, being used as a base, provide farm size-wise data of various economic quantities. The reports classify the entire farms into nine operational size-wise categories and provide data relating to all the variables that this paper deals with, and more. The variables/resources and the data that constitute this paper are comparable and consistent with one another. The analysis is conducted at the aggregate Pakistan level; Overall pattern of distribution and inequality was studied and then the aggregate level of analysis was decomposed into two components, namely, the within province and across province inequality. The farm area distribution indicates about the pattern of operational holding between farm-size groups. The cultivated area distribution is important from a welfare point of view, since it determines earning potential and overall farm income, especially in the short-run. The importance of irrigated area cannot be denied; it not only helps in boosting agricultural production, but also plays an important role in poverty reduction both directly and indirectly. Directly, it helps by increasing agricultural production and productivity. Indirectly, irrigation helps in increasing the employment of landless labourers and small and marginal farmers through its positive impact on land use and cropping intensities and agricultural productivity. Moreover, in an arid climate like Pakistan, the irrigated area is the life blood of agriculture and in this regard in a World Bank report, O' Mara (1988) notes: "In an arid or semi-arid environment water is the factor input that

Distribution of farm area in Pakistan

Table 1. Distribution pattern of FA, CA and IA between farm-size groups

| Resource | Total inequality           |       |       | Between province inequality                 |       |       |
|----------|----------------------------|-------|-------|---|-------|-------|
|          | 1972                       | 1980  | 1990  | 1972  | 1980  | 1990  |
| FA       | 0.578                      | 0.614 | 0.756 | 0.022                                       | 0.009 | 0.063 |
| CA       | 0.422                      | 0.487 | 0.594 | 0.017                                       | 0.022 | 0.040 |
| IA       | 0.384                      | 0.443 | 0.597 | 0.046                                       | 0.049 | 0.075 |
|          | Within province inequality |       |       | Within province inequality/total inequality |       |       |
| FA       | 0.556                      | 0.604 | 0.692 | 0.963                                       | 0.985 | 0.916 |
| CA       | 0.405                      | 0.465 | 0.554 | 0.960                                       | 0.955 | 0.932 |
| IA       | 0.337                      | 0.395 | 0.522 | 0.879                                       | 0.891 | 0.874 |

FA: Farm Area; CA: Cultivated Area; IA: Irrigated Area.

Table 2. Land use and cropping intensities by size of farm

| Size of farm     | Land use intensity |      |      | Cropping intensity |      |      |
|------------------|--------------------|------|------|--------------------|------|------|
|                  | 1972               | 1980 | 1990 | 1972               | 1980 | 1990 |
| Up to 5 hectares | 96                 | 96   | 97   | 119                | 129  | 148  |
| 5 - 10 hectares  | 94                 | 91   | 90   | 111                | 120  | 133  |
| Over 10 hectares | 89                 | 87   | 85   | 103                | 113  | 118  |

Source: Agriculture Census of Pakistan: 1972, 1980 and 1990.

determines the scale and intensity of agricultural production" and "thus, control over water is equivalent to control over income and wealth".

Table 1 provides estimates of inequality (in terms of Theil's information theoretic measure) pertaining to the resources, namely, farm area (FA), cultivated area (CA) and irrigated area (IA), across the nine farm-size categories. The following inferences may be drawn from the table:

Farm area inequality, which was already quite high in 1972, increased quite a bit in 1980 but went up substantially in 1990. A similar pattern is observed in the distribution of cultivated and irrigated area as well. In short, this trend is attributable to the following reasons: First, the ejection of tenants by large farmers due to the advent of the Green Revolution (this made self-cultivation more profitable); second, the maturity of Green Revolution and ever increasing commercialization of agriculture has further aggravated the pattern of distribution. Small and medium farmers are losing a lot of income because of this pattern of distribution, whereas they use the land better and maintain higher crop intensities.

The level of inequalities in cultivated area and irrigated area is rather low, indicating less inequality in the distribution of farm income than what is indicated by farm area, still, the levels of inequality in CA and IA distribution are very high. One of the reasons for this anomaly is the fact that as the size of farm increases, the proportion of farm area that is either uncultivated

or uncultivable also increases, either because large farmers hold land for other reasons such as prestige, power, and hedge against inflation, or because of poor quality soil or lack of rainfall or the presence of problems such as waterlogging and salinity. In the short-run, distribution analysis in terms of CA and IA can tell more about the nature of income and economic welfare distribution across farm-size groups than FA. But to understand the dynamics of distribution in the long-run we need to pay serious attention to farm area distribution since with improvement in technology and other infrastructural development, presumably uncultivated and uncultivable lands can be brought under cultivation. Comparing the level of inequality in 1972 with 1990, it becomes evident that it increased for farm area by 31%, while it went up by 41% and 55% for cultivated area and irrigated area respectively. This increase indicates that as the importance of resource increases, its distribution becomes more skewed over time. Moreover, around 90% of the level of inequality is explained by inequality in the distribution of resources across farm-size groups within the provinces and the rest is due to differences in the endowment of the resources between the provinces. The tillers of the soil who are losing income because of skewed distribution of above mentioned resources are, of course, better users of these resources. This situation demands that inequality in the distribution of these resources be rectified not only to improve the

welfare of tillers, but also to improve the welfare of the rural masses and hence of the people in the country as a whole. -

Table 2 reveals that, in all the periods under consideration, both the land and crop intensities decline as the farm size increases. When comparing three periods with each other, the picture emerges that land use intensity for the lowest farm-size category remained constant with negligible increase in 1990. However, in case of the other two higher land use categories, it gradually declined over the time period. But still it shows that, despite the rhetoric that large farms are progressive and mechanized and have better access to modern inputs, they showed less intensive use of land. Small farms. The small farmers have not improved substantially over time but have maintained their land use potential. The growth in cropping intensity was 24% on small farms, whereas it was <20% and 14% on medium and large farms respectively during the corresponding period. But in the census periods, the overall crop intensity was much higher on small and medium farms compared to large farms.

It is recommended on the basis of analysis carried out that a lexicographic ordering of distribution needs to be followed for these important resources of farm business so that more resources are diverted towards small farmers. These farmers are more productive; as it has been repeatedly argued and emphasized in a large body of literature. Resource diversion towards these farmers is a form of egalitarian policy by which the welfare of the deprived gets the highest weight.

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