The Pakistan Development Review
32:4 Part II (Winter 1993) pp. 1187–1198

Non-farm Income and Inequality in Rural Pakistan*

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In the past many researchers and policy-makers have viewed the rural economy of the Third World as being synonymous with agriculture. According to this view, rural households receive the bulk of their income from the production and sale of crops.

Within the past few years this view has begun to change. There is now a growing recognition that the rural non-farm sector–which includes such diverse activities as government, commerce, and services–also plays a vital role in the economies of many rural Third World households. Household budget surveys in developing countries suggest that non-farm income represents between 13 and 67 percent of total rural household income.[1] According to these surveys, the contribution of non-farm income to total rural income is especially high in those areas where unfavourable labour-to-land ratios constrain income-earning opportunities in agriculture.

Despite the growing attention being focused on non-farm income, there is still no general agreement about the impact of this income source on poverty and income distribution. On the one hand, studies by Chinn (1979) and Ho (1979) in Taiwan indicate that non-farm income reduces rural income inequality. On the other hand, studies by Reardon, Delgado and Matlon (1992) in Burkina Faso, and Collier, Radwan and Wangwe (1986) in Tanzania find that non-farm income has a negative impact on rural income distribution.

This paper proposes to clarify the impact of rural non-farm income on poverty and income distribution by analysing the results of a new rural household survey in Pakistan. The paper seeks to make two contributions. First, it uses decomposition techniques to pinpoint the contribution of five different sources of rural income–including non-farm income–to total inequality. Second, the paper decomposes the sources of non-farm income inequality with a view to

*Owing to unavoidable circumstances, the discussant's comments on this paper have not been received.

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Author's Note: I am grateful to Jane for valuable computer assistance.

[1]In their review of 13 rural household budget surveys, Braun and Pandya-Lorch (eds) (1991) find that the share of non-farm income in total rural income ranges from 13 percent (Brazil) to 67 percent (Burkina Faso).

understanding the differential impact of various types of non-farm income on income distribution.

1. THE DECOMPOSITION OF INCOME INEQUALITY

At the start of any decomposition exercise, the question arises: what measure of inequality should be chosen for the analysis? Several different inequality measures have been proposed in the Literature [Fields (1980)]. Following Foster (1985) and others, the chosen measure for decomposition should have five basic properties. They are: (1) Pigou-Dalton transfer sensitivity; (2) symmetry; (3) mean independence; (4) population homogeneity; (5) decomposability.

Several measures of inequality meet these five properties. These measures include Theil's entropy index T, Theil's second measure L, the coefficient of variation and the Gini coefficient.[2] The two Theil measures, however, are not decomposable when sources of income are overlapping and not disjoint. While the need for non-overlapping groups is not restrictive when inequality is decomposed over regions, this restriction rules out using the two Theil measures here because many of the survey households receive income from several different sources. This study is therefore based on the two remaining inequality measures: the coefficient of variation and the Gini coefficient.

The decomposition of the coefficient of variation can be expressed as follows:

$$\Sigma w_i c_i = 1;\ w_i = \frac{\mu_i}{\mu};\ c_i = \rho_i \frac{\sigma_i / \mu_i}{\sigma / \mu} \qquad \cdots \qquad \cdots \qquad (1)$$

where W_i C_i is the so-called "factor inequality weight" of the i-th source in overall inequality; μ_i and μ are the mean income from the i-th source and from all sources, respectively; C_i is the relative concentration coefficient of the i-th source in overall inequality; ρ_i is the correlation coefficient between the i-th source and total income and σ_i and σ are the variance of income from the i-th source and from all sources, respectively.[3]

The decomposition corresponding to Gini coefficient can be expressed as follows:

$$\Sigma w_i g_i = 1;\ w_i = \frac{\mu_i}{\mu};\ g_i = R_i \frac{G_i}{G} \qquad \cdots \qquad \cdots \qquad (2)$$

[2]For an overview of these four inequality measures, see Anand (1983), pp. 89-91.

[3]A more complete description of the decomposition of the coefficient of variation and the Gini coefficient is contained in Adams and Alderman (1992).

Where $w_i g_i$ is the "factor inequality weight" of the i-th source in overall inequality; g_i is the relative concentration coefficient of the i-th source in overall inequality; R_i is the correlation ratio between source and total inequality; and G_i and G are the Gini coefficients of the i-th source and total income, respectively.

An income source can be defined as inequality-increasing or inequality-decreasing on the basis of whether or not an enlarged share of that income source leads to an increase or decrease in overall income inequality. From the decomposition Equations (1) and (2) it follows that the i-th income source is inequality-increasing or inequality-decreasing according to whether c_i (or g_i) is greater than or less than unity.[4]

2. DATA SET

Data come from a three-year survey of 727 households in three provinces in rural Pakistan.[5] Since the goal of this survey was to analyse the determinants of rural poverty, the survey was *not* designed to be representative of the rural population as a whole in Pakistan. In each province the poorest district was selected on the basis of a production and infrastructure index elaborated by Pasha and Hasan (1982). The selected districts included Attock (Punjab province), Badin (Sindh province) and Dir (Northwest Frontier province). Since rural poverty also exists in relatively prosperous areas, a fourth district Faisalabad (Punjab province) was added to the survey.[6]

Total income for each household was divided into five sources:

(1) *Non-farm*–Includes wage earnings from non-farm labour, government and private sectors employment plus profits from non-farm enterprises;
(2) *Agricultural*–Includes profits from all crop production including home production and crop by-products plus returns to own agricultural labour;
(3) *Livestock*–Includes net returns from traded livestock (cattle, poultry) plus imputed values of home-consumed livestock plus traction power;
(4) *Rental*–Includes rents received from ownership of assets such as land, machinery and water; and
(5) *Transfer*–Includes pensions (government), internal and international remittances and *zakat* (payments to poor).

[4]This analysis ignores feedback effects, that is, the effects that a change in any source income share might have on distribution within any source income. Of course, such an assumption might be quite unrealistic for large changes in any source income share.

[5]This study was undertaken by the International Food Policy Research Institute (IFPRI) working in collaboration with Pakistani research institutes–Applied Economic Research Centre (University of Karachi), Punjab Economic Research Institute (Lahore), the University of Balochistan (Quetta) and the Centre for Applied Economic Studies (University of Peshawar).

[6]The sample was randomly drawn with all rural residents in the selected districts having an equal probability of being included. Landowners who reside in urban areas, therefore, are not included in the sample. Since unweighted samples generally tend to miss the apex of a distribution, the fact that there are, for example, far fewer households owning 3,000 acres of land than there are households owning 3 acres may lead to a slight under representation of the skew of landholding in any moderately sized sample.

Table 1 presents summary data for the five income sources. This table shows quite clearly the importance of non-farm income. In each of the survey years non-farm income represents the single most important income source, accounting for between 29.8 and 34.9 percent of total rural income. In each year agricultural income represents the second most important source of income.

Table 1

Summary of Income Data from 1986-87, 1987-88 and 1988-89 Surveys in Rural Pakistan

Source of Income	1986-87		1987-88		1988-89	
	Mean Annual per Capita Household Income[a] in Rupees[b]	Standard Deviation	Mean Annual per Capita Household Income[a] in Rupees[b]	Standard Deviation	Mean Annual per Capita Household Income[a] in Rupees[b]	Standard Deviation
Non-farm	1007.39	1158.40	1204.65	1364.28	959.54	1086.19
Agricultural	831.38	1997.31	862.14	1632.01	885.35	2377.22
Transfer	596.82	1592.44	525.29	1461.70	242.91	812.57
Livestock	534.88	641.98	444.21	832.35	435.05	718.71
Rental	408.49	1556.63	412.43	1366.50	446.66	1500.70
Total	3378.95	3145.43	3448.72	3009.36	2969.70	3280.01

N = 727 households.

Notes: [a]Mean income figures include negative source incomes recorded for some households in various years.

[b]In 1986, 1 Pakistani Rupee = US$ 0.062. All rupee figures in constant 1986 terms.

In Table 2 the five sources of income are presented by income quintile group aggregated over the entire three year period. The results underscore the importance of non-farm income for the poor. According to the data, households in the lowest income quintile group receive over 40 percent of their mean per capita income from non-farm income. This percentage figure is almost twice that received by the poor from any other income source, including agriculture! Evidently, the very real land constraints in rural Pakistan–42.1 percent of the households in the sample are landless–"force" the poor to seek the bulk of their livelihood from outside agriculture.[7]

3. INCOME INEQUALITY IN RURAL PAKISTAN, 1986–1989

Decomposing the coefficient of variation and the Gini coefficient provides two ways for measuring the contribution of any income source to overall income inequality. First, it can be asked whether inequality in an income source serves to

[7]For more on this point, see Klennart (1988).

Table 2

Sources of Income by Mean Annual per Capita Household Income Quintile Group

Income Quintile Group	Mean Annual per Capita Household Income[a] in Rupees[b]	Percent from Non-farm Income	Percent from Agricultural Income	Percent from Transfer Income	Percent from Livestock Income	Percent from Rental Income
Lowest 20%	1222.90	40.6	21.1	12.7	20.8	4.9
Second 20%	1938.48	42.7	23.3	10.9	18.9	4.2
Third 20%	2585.30	40.6	24.6	10.4	19.7	4.6
Fourth 20%	3571.95	40.2	24.7	13.4	15.3	6.4
Highest 20%	6993.80	21.1	29.5	16.6	9.7	23.1
Total	3262.48	37.0	24.7	12.8	16.9	8.7

N = 727 households.

Notes: [a] Mean income figures calculated by averaging household income over the three years (1986-87 to 1988-89) and then dividing by average household size.
[b] In 1986, 1 Pakistani Rupee = US$ 0.062. All rupee figures in constant 1986 terms.

increase or decrease overall income inequality. Second, it is possible to identify how much of the overall inequality is due to any particular income source.

Table 3 reports the decomposition results with respect to the distinction between inequality-increasing versus inequality-decreasing sources of income. Both decompositions agree that for all three years two income sources–non-farm and livestock–represent inequality-decreasing sources of income. This means that additional increments of non-farm or livestock income will serve to reduce overall income inequality. Both decompositions also agree that for all three years two sources of income–agricultural and rental–represent inequality-increasing sources of income.

Table 3

Relative Concentration Coefficients of Source Incomes in Overall Inequality

Source of Income	1986-1987		1987-88		1988-89	
	c	g	c	g	c	g
Non-farm	0.223	0.606	0.329	0.619	0.265	0.741
Agricultural	1.590	1.250	1.282	1.125	1.903	1.149
Transfer	1.321	1.260	1.409	1.304	0.675	1.017
Livestock	0.274	0.475	0.576	0.795	–0.082	0.511
Rental	2.188	1.769	2.310	1.682	2.031	1.728

N = 727 households

Notes:

$$c_i = \rho_i = \frac{\sigma_i/\mu_i}{\sigma/\mu}, \; g_i = R_i \frac{G_i}{G}$$

All estimates based on annual per capita household income expressed in constant 1986 terms.

Table 4 presents the decomposition results for relative factor inequality weights of source incomes in overall income inequality. The results show that non-farm income makes a relatively small contribution to overall inequality. Depending on the year, the two decompositions suggest that non-farm income accounts for between 6.7 and 23.9 percent of overall inequality. Of the five income sources, only livestock income consistently makes a smaller contribution to overall inequality.

4. SOURCES OF NON-FARM INCOME INEQUALITY IN RURAL PAKISTAN

Since non-farm income has such a favourable impact on income distribution, it seems useful to decompose the sources of non-farm income. Such an analysis can answer the question: Do all types of non-farm income have a favourable effect on inequality?

Non-farm income can be divided into five sources:

Table 4

Factor Inequality Weights of Source Incomes in Overall Inequality

1986-87				1987-88				1988-89			
Source of Income	wc	Source of Income	wg	Source of Income	wc	Source of Income	wg	Source of Income	wc	Source of Income	wg
Agricultural	0.391	Agricultural	0.308	Agricultural	0.320	Agricultural	0.281	Agricultural	0.567	Agricultural	0.343
Rental	0.265	Transfer	0.223	Rental	0.276	Non-farm	0.216	Rental	0.305	Rental	0.260
Transfer	0.233	Rental	0.214	Transfer	0.215	Rental	0.201	Non-farm	0.086	Non-farm	0.239
Non-farm	0.067	Non-farm	0.180	Non-farm	0.115	Transfer	0.199	Transfer	0.055	Transfer	0.083
Livestock	0.043	Livestock	0.075	Livestock	0.074	Livestock	0.102	Livestock	–0.012	Livestock	0.075
Total	1.000		1.000		1.000		1.000		1.000		1.000

N = 727 households.

Notes :

$$w_i = c_i, \text{ where } w_i = \frac{\mu_i}{\mu}, \; c_i = \rho_i \frac{\sigma_i/\mu_i}{\sigma/\mu}$$

$$w_i = g_i, \text{ where } w_i = \frac{\mu_i}{\mu}, \; g_i = R_i \frac{G_i}{G}$$

All estimates based on annual per capita household income expressed in constant 1986 terms.

(1) *Unskilled labour*–Includes wages from any unskilled non-farm activity, such as construction and ditch digging;
(2) *Self-employment*–Includes profits and earnings from shopkeeping and artisan activities (e.g. bricklaying, shoe repair) plus labour/construction contracting;
(3) *Government employment*–Includes wages from all grades (grades 1 to 22) of government service;
(4) *Private sector*–Includes wages from a private sector company (e.g. Dawood Hercules Fertilizer Company); and
(5) *Other*–Includes other non-farm wages.

Table 5 presents summary data for the five sources of non-farm income. The data reveal that three sources of non-farm income predominate: self-employment, unskilled labour and government employment.

In Table 6 the five sources of non-farm income are presented by income quintile group aggregated over the three-year period. The results show the dependence of the poor on two particular sources of non-farm income: self-employment and unskilled labour. Households in the lowest income quintile receive more than their quintile shares of non-farm income–32.3 and 28.7 percent, respectively–from self-employment and unskilled labour. By contrast, the poor receive only 12.2 percent of their non-farm income from government employment.

Table 7 reports the decomposition results with respect to the distinction between inequality-increasing and inequality-decreasing sources of non-farm income. With only one exception, both decompositions agree that unskilled labour represents an inequality-decreasing source of non-farm income. In comparison, both decompositions agree that government employment represents an inequality-increasing source of non-farm income. These results suggest that non-farm income has a kind of "dual impact" on income distribution. While additional increments of non-farm unskilled labour have a favourable impact on inequality, more non-farm income from government employment tends to increase inequality.

5. CONCLUSION

Two key findings emerge. First, the study shows the importance of rural non-farm income for the poor. When the sample households are ranked by per capita income, those in the lowest income quintile group receive over 40 percent of their total income from non-farm sources. This percentage figure is almost twice that received by the poor from any other rural income source.

Second, the study shows that non-farm income has a favourable impact on income distribution. Not only does non-farm income represent an inequality-decreasing source of income, but in any given year it accounts for only a small proportion–between 6.7 and 23.9 percent–of overall income inequality. Of the five sources of rural income, only livestock income consistently makes a smaller contribution to overall income inequality.

Table 5

Summary of Non-farm Income Data

Source of Non- farm Income	1986-87		1987-88		1988-89	
	Mean Annual per Capita Household Income[a] in Rupees	Standard Deviation	Mean Annual per Capita Household Income[a] in Rupees	Standard Deviation	Mean Annual per Capita Household Income[a] In Rupees	Standard Deviation
Self- employment	305.61	764.79	361.64	893.07	228.07	586.89
Unskilled Labour	237.48	588.43	239.60	608.48	269.05	681.45
Government Employment	209.80	618.50	322.09	810.93	259.49	683.84
Private Sector	139.06	466.48	200.31	512.97	177.60	507.84
Other	115.45	369.28	81.01	300.51	25.33	123.70
Total	1007.39	1158.40	1204.65	1364.28	959.54	1086.19

N = 727 households.

Note: To ensure comparability with Table 1, the mean income figures in this table include those households with no income in various non-farm categories.

[a]All rupee figures in constant 1986 terms.

Table 6

Sources of Non-farm Income by Mean Annual per Capita Household Income Quintile Group

Percent of 727 Households Ranked by Mean Annual per Capita Income[a]	Percent Non-farm Income from Self- employment	Percent Non-farm Income from Unskilled Labour	Percent Non-farm Income from Government Employment	Percent Non-farm Income from Private Sector	Percent Non-farm Income from Other
Lowest 20%	32.3	28.7	12.2	13.9	12.9
Second 20%	27.6	27.7	21.3	13.8	9.5
Third 20%	26.7	26.9	22.5	16.7	12.2
Fourth 20%	30.5	22.4	25.7	15.9	4.9
Highest 20%	28.9	18.3	32.2	18.4	2.1
Total	28.3	23.6	25.0	16.3	7.0

N = 727 households.

Notes: [a]Mean income figures calculated by averaging household income over the three years (1986-87 to 1988-89) and then dividing by average household size.

Table 7

Relative Concentration Coefficients of Source Incomes in Non-farm Inequality

Source of Non-farm Income	1986-87		1987-88		1988-89	
	c	g	c	g	c	g
Self-employment	1.223	1.110	1.335	1.094	0.852	0.893
Unskilled Labour	0.870	0.947	0.736	0.881	0.980	1.036
Government Employment	1.032	1.035	1.072	1..122	1.116	1.099
Private Sector	1.002	0.984	0.888	0.955	0.984	1.008
Other	0.615	0.774	0.281	0.561	0.279	0.505
N = 727 households						

Notes:

$$c_i = p_i \frac{\sigma_i/\mu_i}{\sigma/\mu}, g_i = R_i \frac{G_i}{G}$$

All estimates based on annual per capita household income expressed in constant 1986 terms.

On the basis of these findings, policy-makers in Pakistan who are interested in reducing poverty and improving income distribution would be well-advised to pay more attention to non-farm income.

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