

Introduction^{1,2}

In the 1960s, Java suffered from severe and widespread poverty. During that period, Malthusians predicted starvation and misery on a broad scale in Java resulting from explosive population growth and severely limited agricultural resources (Booth and Damanik 1989). However, tremendous strides have been made in economic development and poverty alleviation since that time. The development and spread of high-yielding rice varieties coupled with sound macroeconomic and agricultural policies have led to increased incomes and markedly improved lifestyles for the majority of people living in Java. Strong rural growth led by the rice economy, along with broad-based economic growth throughout Java, have resulted in significant reductions in rural poverty in recent years. Analysis of household data for Java indicates that between 1984 and 1990, for example, the proportion of the population living in poverty in rural Java dropped from 23.7 to 12.6 per cent (World Bank 1990; **Business News** 1992).³

By the late 1980s, researchers had begun to write about how widespread poverty on Java in the 1960s had given way to more localized 'pockets of poverty' (Mackie and Zain 1989; World Bank 1990), and within a few years this term was widely used to characterize remaining poverty on Java. These so-called pockets of poverty were typically defined

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³ These figures were calculated using the Government of Indonesia's official poverty line. However, the finding that poverty has declined in Indonesia is robust to the choice of the poverty line (World Bank 1993; Wiebe 1994).

Targeting the Poor in Rural Java

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by their geographic, or agro-climatic, features and by their distances from currently thriving economic regions. While this new characterization of poverty helped to highlight the importance of growth in reducing poverty, it also focused attention on the need for targeted programmes to eliminate persistent poverty on Java (Timmer *et al.* 1992). Moreover, the emergence of regional patterns of poverty suggested a role for anti-poverty programmes that were geographically targeted.

While the idea of 'pockets of poverty' provides a useful framework for thinking about targeting the poor, most descriptions of regional or localized poverty only partially characterize the salient features of wealth and poverty in rural Java. For example, most descriptions of pockets of poverty have tended to focus on geographic and spatial characteristics across regions, but have paid little attention to how individuals or households with different characteristics fare across different regions. In addition, most descriptions of regional poverty have tended to be anecdotal. Few attempts have been made to measure how income and poverty in so-called pockets of poverty compare with those in rural Java as a whole.

Extensive measurement of poverty has been carried out at the province level in rural Java (Huppi and Ravallion 1991; **Business News** 1992; Bidani and Ravallion 1993; World Bank 1993), but such analysis provides only limited information about patterns of intra-Java poverty. In an attempt to better understand such patterns, the World Bank (1990) examined variations in average per capita expenditure levels across *kabupaten* (districts), the administrative level below the province. Although *kabupaten*-level analysis provides considerably more detail on patterns of development within rural Java, it still conceals information important to understanding regional poverty and the poor. From the perspective of income and poverty, the *kabupaten* is to some degree an arbitrary unit of analysis. Many *kabupaten* are extremely heterogenous, spanning coastal fishing, wetland, rainfed, and mountain

farming regions – each of which have very different economic circumstances and problems.⁴

Recent Government of Indonesia programmes have attempted to target poverty at a more local (and homogenous) level. For several years, *Pengembangan Kawasan Terpadu* (PKT or Integrated Regional Development) targeted grants to the *kecamatan* (sub-district) level for a range of locally determined economic activities or small infrastructure projects. In 1993, *INPRES Desa Tertinggal* (IDT or Presidential Instruction on Backward Villages) initiated a programme to target grants to the *desa* (village) level. These grants, dispersed to groups of poor villagers through the rural banking system, generally are used to establish revolving loan programmes that help finance villagers' income-generating enterprises. These programmes, however, have relied on non-income measures to target poverty (Wiebe 1993; Biro Pusat Statistik 1994). And a recent review of the PKT programme allocations cast doubt on how well these measures facilitated effective targeting of the poorest regions (Timmer *et al.* 1992).

This article examines the regional and household characteristics of income poverty in rural Java. By combining recent field evidence with analysis of data from Indonesia's 1987 household consumption/expenditure survey, SUSENAS, and its 1986/87 economic census, PODES, the article attempts to develop a richer, more complete 'anatomy' of poverty than has been available previously. The objective is to strengthen the information base from which decisions on targeting poverty may be made. To do this, the paper redraws the map of rural Java, examining poverty across five major agro-economic zones. The paper also examines the relationship between distance and poverty as well as how poverty is distributed across individuals and households with different characteristics. The analysis is carried out first using descriptive statistics. This is followed by analysis of the relationship between income poverty and household and regional characteristics using a logit model. A logit model allows one to estimate how key household and regional variables

⁴ Until recently, Indonesian household surveys were designed to facilitate statistically unbiased inferences down to the province level. However, tests on special sub-samples designed to be unbiased at the *kabupaten* level indicate a high level of consistency of *kabupaten*-level poverty estimates (Wiebe 1994).

affect the probability of a household living below the poverty line, holding other factors constant.

2 The Data

The descriptive and quantitative analysis presented below is carried out using 1987 SUSENAS and 1986/87 PODES data, collected by Indonesia's Central Bureau of Statistics (CBS). Findings from extensive field surveys, conducted in Central and East Java and Yogyakarta between June 1991 and May 1992, are also presented to help highlight or clarify results found in the larger data sets.

The 1987 SUSENAS survey collected household demographic, education, consumption expenditure, and income data from a stratified random sample of 11,933 households in rural Java. Java-wide inferences may be made from the sample data by weighting household or individual observations by 'inflation factors' calculated by CBS. Although income data were collected in the 1987 SUSENAS, monthly household per capita expenditure is used as a proxy for household per capita income. Household expenditure is measured with greater accuracy than income (van de Walle 1988). The official rural poverty line is used in measuring poverty. In 1987, the poverty line was Rp. 10,294 per capita household expenditure per month (about \$US 6.26 per month).⁵

The PODES census collected socio-economic variables from all villages on Java. The 1987 SUSENAS and 1986/87 PODES can be linked at the village level by a series of identification codes. Linking the data sets facilitates analysis of the relationship between household expenditure, or poverty, with a variety of local economic and environmental

conditions that is not possible using the SUSENAS alone. To examine regional patterns of poverty, five different regions are defined to correspond to the major agro-economic zones observed in the field: coastal areas, wetland areas, mixed farming areas, dryland areas, and upland areas.⁶

3 The Anatomy of Poverty in Rural Java

In 1987 there were nearly 12.6 million poor people living in rural Java, representing 14.0 per cent of households and 17.9 per cent of the total population (Table 1). The incidence of poverty is lower measured at the household level than at the individual level because poor households, on average, are larger than non-poor households.⁷ Per capita expenditure levels and poverty varied considerably across provinces. Average per capita expenditure levels were 29.2 per cent higher in West Java than in Central Java. The incidence of poverty was between two and two-and-a-half times higher in Central and East Java than in West Java or Yogyakarta. In terms of the number of poor, the 1987 SUSENAS data suggest that over 80 per cent of rural poverty on Java was located in Central and East Java.

Recent accounts of poverty in rural Java suggest that province-level measures of poverty provide only limited information on identifying or effectively targeting regional concentrations of poverty in rural Java (Hardjono and Hill 1989; Mackie and Zain 1989; World Bank 1990; Timmer *et al.* 1992). Although precise accounts of poverty differ, they tend to emphasize the following patterns. Persistent poverty in rural Java tends to be concentrated in the dryland and mountain areas where agro-climatic endowments are relatively poor, infrastructure (road,

⁵ The Indonesian Government's poverty line is used in this paper to facilitate comparisons with official poverty numbers for the period. Value data are presented in Indonesian Rupiah; in 1987, the average exchange rate was Rp. 1,643.8 per US Dollar.

⁶ Coastal regions are defined as all villages designated as coastal in the PODES. Wetland areas are defined as inland (non-coastal) villages situated less than 700 metres above sea level in which over 75 per cent of the agricultural land is irrigated. Mixed farming areas are comprised of inland villages below 700 metres in which between 25 and 75 percent of the agricultural land is irrigated. Dryland areas are comprised of inland villages

below 700 metres in which less than 25 per cent of agricultural land is irrigated. Upland areas are all inland villages, irrigated or not, situated at more than 700 metres above sea level. Although it would have been desirable to distinguish between coastal fishing and farming villages (since economic conditions are often quite different between the two) the data did permit this type of disaggregation.

⁷ In 1987, the average household in rural Java had 4.3 members. The average poor household had 5.4 members, while the average non-poor household had 4.1 members (SUSENAS, 1987).

Table 1 Poverty in rural Java, 1987, by province*

	Per cent Below Poverty Line	Head Count	Average Per Capita Monthly Expenditure (Rp.)	
			Poor	Total
All Rural Java Province	17.9	12,550,417	8,505	17,550
West Java	9.0	2,085,972	9,025	20,236
Central Java	23.7	4,837,210	8,542	15,662
Yogyakarta	10.1	222,360	8,581	19,879
East Java	22.1	5,404,875	8,459	16,366

Source SUSENAS 1987.

Notes *Jakarta Province is not included because it is defined as completely urban.

irrigation, or social service) is relatively underdeveloped, and economic activity, based primarily on agriculture, remains largely seasonal. Lowland irrigated and mixed farming regions generally have better agricultural endowments and infrastructure, and their economies tend to be relatively well developed and diversified. Lowland irrigated and mixed farming regions tend to be more prosperous than dryland and upland regions, and, consequently, the incidence and severity of poverty are generally thought to be much lower. Coastal fishing regions may also be quite poor – particularly those north-coast villages that continue to rely on traditional, low-yield fishing technologies.

Regional patterns of poverty are commonly reinforced by greater distances from thriving economic or administrative centres. Greater distances, often coupled with relatively poor transportation infrastructure, result in relatively high transactions costs that reduce the profitability of, and sometimes seriously inhibit, commercial production and trade from more remote areas. The above patterns of regional

wealth and poverty persist even in the face of considerable labour market integration and seasonal and permanent migration from nearly all areas of Java.⁸

The 1987 SUSENAS and PODES data support several important features of this description of regional poverty in rural Java. The data indicate that average per capita expenditure is lowest and the incidences of poverty are highest in dryland and upland regions (Table 2).⁹ Average per capita expenditure is between 12 and 17 per cent lower in dryland and upland areas than in mixed farming and wetland regions, while the incidences of poverty are 46 to 87 per cent higher.¹⁰ While the SUSENAS/PODES data show a relatively high average expenditure and low incidence of poverty in coastal areas, this finding may result in part because it is impossible to distinguish in the data between coastal farming and fishing villages in the SUSENAS/PODES data set. To the extent that coastal regions (as defined in the data) include well-irrigated farming villages, the high average expenditure and low incidence of poverty result may reflect the relative

⁸ See Naylor (1989) for detailed analysis of rural labor market integration on Java, and Guest (1989) for an account of migration patterns from several rural Javanese villages.

⁹ The number of poor reported in Table 2, and others using linked SUSENAS-PODES data set, differ slightly from the number or poor reported in tables using the SUSENAS data only. This is because, in linking the two data sets, observations from several villages were lost due to data coding errors.

¹⁰ The depth of poverty, measured here by average per capita expenditure levels of the poor, is slightly worse in upland and dryland regions than elsewhere in rural Java; however, average expenditure levels among the poor are extremely low in all regions and seem better characterized by their similarities than their differences (Table 2).

Table 2 Poverty in rural Java, 1987, by major agro-economic region

	Per cent Below Poverty Line	Head Count	Average Per Capita Monthly Expenditure (Rp.)	
			Poor	Total
Coast	14.0	519,237	8,995	18,104
Wetland	13.1	2,020,522	8,823	18,913
Mixed Farming	16.8	3,064,298	8,642	17,924
Dryland	24.5	5,085,542	8,401	15,815
Upland	24.2	1,142,056	8,450	15,674

Source SUSENAS 1987 and PODES 1986/87.

prosperity experienced in many of the irrigated wetland villages (Table 2). The data also may reflect partially heterogeneity in fishing communities in Java. The recent field research indicated that while many fishing villages were poor – in fact, among the poorest communities in rural Java – some coastal villages with well-capitalized fishing enterprises were very prosperous.

The distance from economic and administrative centres also appears to affect local incomes and incidences of poverty. Although data on distances from villages to major commercial centres are not available, the PODES census includes data on the distance between each village and its *kecamatan* centre. *Kecamatan* are the governmental administrative unit directly above the village and in many rural areas also represent the nearest market town. *Kecamatan* are also frequently the sites of the

nearest secondary schools, formal financial institutions, and community health centres (PUSKEMAS). Average per capita expenditure falls and incidences of poverty rise considerably as the distance from the village to the *kecamatan* grows. In fact, average expenditure is at least 20 per cent lower in villages situated more than 6 kilometres from the *kecamatan* centre than in those located within two kilometres, and on average, incidences of poverty were between 75 and 80 per cent higher in these more distant villages (Table 3).

Although the SUSENAS/PODES data support several of the central components of recent (anecdotal) accounts of poverty in rural Java, the data also highlight an important feature of poverty omitted from recent accounts. The poor are well dispersed across rural Java. For example, 43 per cent of all rural poor in Java lived in relatively prosperous wetland

Table 3 Poverty in rural Java, 1987, by distance from village to Kecamatan Centre (in kilometres)

	Per cent Below Poverty Line	Head Count	Average Per Capita Monthly Expenditure (Rp.)	
			Poor	Total
0 to 2 km.	14.8	2,647,538	8,598	19,181
2 to 4 km.	14.2	2,206,877	8,773	18,093
4 to 6 km.	19.8	2,439,700	8,399	16,580
6 to 8 km.	25.9	2,070,283	8,560	15,341
Greater than 8 km.	26.7	2,467,287	8,520	15,178

Source SUSENAS 1987 and PODES 1986/87.

and mixed farming regions in 1987, not in so-called pockets of poverty (Table 2). Further, in spite of the relationship between distance and the incidence of poverty, only 38 per cent of the poor lived in villages more than 6 kilometres from the *kecamatan* centre (Table 3). Hence, simply identifying and targeting the poorest, most remote regions will miss significant numbers of the poor. Understanding other characteristics of the poor, therefore, will be important to effectively targeting poverty alleviation efforts in rural Java.

SUSENAS data indicate that 80 per cent of the remaining poor in rural Java reside in farm households. Average per capita expenditure in the farm sector is low, while both the incidence of poverty and the absolute numbers of poor are high. For example, average per capita expenditures in self-employed farm households are 11 per cent lower than average; among wage-earning farm households average expenditure is 22 per cent lower than among the rural population as a whole. The incidence of poverty among self-employed farm households is 30 per cent higher than average, whereas among wage-earning farm households (i.e., farm labour

households), the incidence of poverty is 59 per cent higher than average.

Farm sector poverty is not uniformly distributed across the major agro-climatic regions in rural Java. As with rural poverty more broadly defined, however, the distribution of farm sector poverty only partially conforms to recent descriptions of regional poverty. Among self-employed farm households, the incidence of poverty and the number of poor roughly coincides with descriptions of regional poverty. Average per capita expenditure levels among self-employed farm households are between 7.5 and 28.8 per cent higher in wetland and mixed farming areas than in dryland or upland regions. Moreover, the incidence of poverty in self-employed farm households in dryland and upland regions is **more than twice** that in wetland areas (Table 4). The absolute number of poor also conforms roughly to recent descriptions of regional concentrations of poverty. Over half the poor from self-employed farm households are located in dryland areas.

Patterns of poverty among farm labour households tell a very different story, however. Average per

Table 4 Poverty in rural Java, 1987, self-employed and wage-earning, by agro-economic region

	Per cent Below Poverty Line	Head Count	Average Per Capita Monthly Expenditure (Rp.)	
			Poor	Total
Self-employed				
All Rural Java	22.9	7,221,044	8,339	15,599
Coast	14.8	337,446	8,934	16,495
Wetland	14.0	686,882	8,776	17,943
Mixed Farming	19.1	1,364,528	8,264	16,026
Dryland	31.3	3,676,620	8,212	13,926
Upland	28.9	861,372	8,248	14,913
Wage-Earning				
All Rural Java	28.5	2,822,717	8,593	13,631
Coast	19.1	100,590	9,228	14,868
Wetland	27.4	719,474	8,643	13,926
Mixed Farming	30.4	898,245	8,659	13,454
Dryland	30.8	680,362	8,473	12,968
Upland	33.2	145,278	8,179	13,966

Source SUSENAS 1987 and PODES 1986/87.

Table 5 Poverty in rural Java, 1987, by education of household head

Highest level Completed	Per cent Below Poverty Line	Head Count	Average Per Capita Monthly Expenditure (Rp.)	
			Poor	Total
No Schooling	25.1	4,556,730	8,542	14,957
Some Primary School	20.5	5,677,012	8,566	15,957
Primary School	11.7	2,144,092	8,730	18,477
Lower Secondary School	4.3	129,948	9,045	24,948
Upper Secondary School	1.4	35,985	8,447	32,658
More Than Secondary	1.5	6,650	9,195	47,565

Source SUSENAS 1987.

capita expenditure levels among farm labour households in **all** regions are low, and with the exception of coastal regions, the incidence of poverty is well above average in all major agro-economic regions — ranging from 27.4 per cent in wetland areas to 33.2 per cent in upland regions. Further, in stark contrast to the notion that poverty is concentrated predominantly in poor regions, approximately 64 per cent of poverty among farm labour households is located in the ‘prosperous’ wetland and mixed farming regions.

The SUSENAS data also show a strong relationship between both income and poverty and the education level of the household head. Average per capita expenditures rise and incidences of poverty fall significantly as the household head’s education rises. For example, among those whose household heads have graduated from primary school average per capita expenditure is 23.5 per cent higher, and the incidence of poverty 53 per cent lower, than among those whose household head has no formal education (Table 5). Increases in expenditure levels and drops in the incidence of poverty are even more dramatic as education levels continue to rise.

Much weaker patterns are found, however, with respect to income and poverty and either the gender or age of the household head (Table 6). Average

per capita expenditure levels are slightly lower and the incidence of poverty slightly higher among those in female-headed households than in male-headed households. But the differences, both in absolute and percentage terms, are very small.¹¹

People living in households whose heads are between the age of 41 and 50 have the lowest per capita expenditure levels and the highest incidences of poverty. Per capita expenditures are higher and the incidence of poverty lower at both the lower and higher ends of the age distribution. This might be due to the fact that households headed by young or old people tend to have relatively low dependency ratios. Households headed by people at the young end of the age distribution also may have relatively high average levels of education, and hence incomes. As in the case of gender, however, variation in average per capita expenditures and poverty incidences across age categories is relatively low.¹²

The evidence begins to suggest an anatomy of poverty that differs somewhat from one described solely by pockets of regional poverty. Regional and spatial factors tell part of the story. However, patterns of remaining poverty may be better characterized by a household’s access to a range of productive resources or assets. For example, regional patterns of poverty in part reflect regional differences in

¹¹ If measured at the household rather than the individual level, the incidence of poverty among female-headed households is lower than among male-headed households. This is because female-headed households that are poor tend to be larger than poor male-headed households.

¹² A recent study of 25 villages in rural Java (Collier *et al.*, 1993) suggested that most remaining poor in rural Java could be characterized as older people with no children and female-headed households. These patterns are not observed in the SUSENAS data.

Table 6 Poverty in rural Java, 1987, by gender and age of household head

	Per cent Below Poverty Line	Head Count	Average Per Capita Monthly Expenditure (Rp.)	
			Poor	Total
By Gender				
Male	17.8	11,220,646	8,620	17,575
Female	19.0	1,329,771	8,399	17,320
By Age				
Below 30	12.8	1,254,391	8,651	18,878
31-40	18.0	3,442,145	8,690	17,112
41-50	21.0	3,851,700	8,532	17,094
51-60	17.8	2,612,426	8,587	17,529
over 60	16.7	1,389,755	8,667	18,034

Source SUSENAS 1987.

land productivity; productivity, and hence, returns to land tend to be higher in wetland than in dryland or upland regions. These differences across regions are a function not only of the agro-climatic features of each region, but have been augmented by recent technological breakthroughs in rice production as well as massive investments in irrigation and other economic infrastructure, highly supportive policies, and successful extension efforts in the rice sector (Pearson *et al.* 1991). Similar types of technological advances and investments have not been available equally to farmers in other agro-climatic regions, and, as a result, agricultural productivity and returns to land tend to be lower. Such differences in returns to land were reflected in land rental and sales prices recorded during the field research.

The data further indicate strong patterns of wealth and poverty associated with access to land. Wage-earning farm households are consistently among the poorest in rural Java, regardless of the agro-economic region in which they live. Such farm

labour households, almost by definition, own little or no land and commonly have limited access to productive assets other than their and their family's labour. In such cases, their earnings potential is largely a function of their accumulated stock of human capital. As was seen in Table 5, there is a strong relationship between income (and poverty) and schooling levels.

The SUSENAS/PODES data set contains no information on household borrowing or access to financial capital. However, available evidence suggests that the poor also have limited access to financial capital. This is true in spite of a fairly well-developed financial services sector in rural Java.¹³ While a recent study of rural Java's largest formal credit programme, KUPEDES, found that the percentage of borrowers below the poverty line at the time they borrowed was nearly the same as the percentage below the poverty line in the population at large, data on total lending suggest that less than 1.6 per cent of the poor in rural Java actually borrowed from KUPEDES (Bank Rakyat Indonesia 1990;

¹³ Formal institutions include the Indonesia-wide *Unit Desa* (Village Unit) programme of the state bank, *Bank Rakyat Indonesia*, and such province-level operations as *Badan Kredit Kecamatan* (Sub-District Credit Board) in Central Java and *Kredit Usaha Rakyat Kecil* (Credit for People's Small Enterprises) in East Java. Non-formal

sources of financial capital include private savings and loan societies, commonly known as *KOSIPA*, and village-level rotating savings and credit associations known as *arisans*. Relatives, friends, neighbors, as well as retailers and wholesalers, also are common sources of credit (Snodgrass and Patten 1991).

Patten and Rosengard 1991). If each borrower came from a separate household, this would still represent only 8.4 per cent of all poor households in rural Java. Field evidence suggested that household participation in all formal credit programmes was commonly no greater than 10 per cent in poor villages.¹⁴

Although additional borrowing and saving takes place through informal channels, its extent is difficult to determine. The field research suggested, however, that amounts borrowed and saved tend to be small. Further, poor families commonly view savings as a means to smooth consumption during difficult times or to fulfil social obligations, such as gifts for weddings or religious celebrations, and not as investment or working capital. In sum, although financial capital is available through numerous sources in rural Java, access to and use of this capital remains limited among the poor, as does their access to other forms of productive assets and resources.

4 Logit Estimates

The discussion above has relied largely on tabulated data, exploring relationships between variables without holding other factors constant. Although many of the relationships in the data seem clear, correlations among key variables potentially could obscure the relationship between poverty and a single factor of interest. Consequently, it is useful to analyse the impact of the relevant variables on poverty, holding all other factors constant.

A simple logit model is run to examine the importance of each of the major variables discussed above, controlling for other factors. In general, a logit model estimates the probability of the dependent variable being above a specified threshold value, given a set of explanatory variables. In this case, the logit model estimates the probability of household per capita expenditure being below the official poverty line, given the characteristics of the household and the region in which it resides. The estimating equation is not intended to be a structural model of the determinants of poverty at the household level.

Rather, it is intended to strengthen and clarify the descriptive analysis.

4.1 Empirical specification

The dependent variable is defined as 1 if average per capita household expenditure is below the poverty line and 0 if it is above the poverty line. The main explanatory variables were chosen to correspond with the variables discussed above. Several additional variables are included in the model either as control variables or to examine specific hypotheses about their relationship to poverty.

The household-level explanatory variables include the dependency ratio – the ratio of household members below age 14 to household members above 14 – as well as the household head's education level, main occupational grouping, gender, and age. Region-level explanatory variables include dummy variables for provinces and the major agro-economic regions discussed above. Regional variables also include the percentage of households in each village working primarily in agriculture and the population density relative to agricultural land in each village. The Per cent in Agriculture variable is included in the estimation to help distinguish between the influence of the agro-climatic conditions in a region and that of the economy's composition; wealthier regions, such as wetlands, tend also to have a smaller proportion of households working in agriculture than do poorer regions, such as upland or dryland areas. The Agricultural Density variable is included because the Government of Indonesia currently considers agricultural density an important indicator of poverty for programme-targeting purposes (Biro Pusat Statistik 1994); more densely populated regions are seen as relatively poor. Interaction terms between the major agro-economic regions and household occupational groupings are also included in the empirical specification to facilitate examination of how regional and household characteristics combine to influence poverty.

Variables measuring the distance of a village to the *kecamatan* centre and road quality are also included

¹⁴ See Timmer *et al.* (1992) for a discussion of the major obstacles faced by the rural poor to obtaining credit through formal channels (e.g., distances/transactions costs, collateral requirements, information deficiencies).

in the model. Road Quality, a measure of local infrastructural development, is included to help distinguish between the pure effects of distance and those associated with the transactions costs – in terms of time or money – of travelling any particular distance. Also included in the empirical specification are the number of factories present in a village, the number of rural financial institutions in a village, and whether a village has electricity. The presence of factories captures the extent to which small industry or manufacturing is present in a village. The presence of rural financial institutions represents capital market infrastructure and is a rough proxy for the availability of credit and financial savings opportunities. The presence of electricity, like road quality, is a measure of the level of infrastructural development in a village.

Descriptive statistics for the data are presented at Appendix Table 1. The 'latent' category of households in the logit is self-employed farm households living in villages with no electricity in wetland regions of Central Java. The impact of dummy variables, such as region or household head's occupation, is thus assessed relative to households in this category.

4.2 Logit results

The logit model predicts correctly 86 per cent of the time whether a household will be characterized as poor or non-poor. Nearly all of the major household and regional variables examined above have the expected signs and are statistically significant at the 5 per cent level. Hence, the logit results provide strong support for the earlier descriptive analysis. Several variables, included in the logit model but not discussed in the descriptive analysis, are also statistically significant at the 5 per cent level and provide additional insights into the nature of poverty in rural Java. Table 7 summarizes the key results of the logit estimations.¹⁵

Consistent with the earlier analysis, the logit estimations indicate that self-employed farm households in upland regions are 82 per cent more likely to live below the poverty line than households living in

wetland regions, while self-employed farm households living in dryland areas are 78 per cent more likely to live below the poverty line than ones living in wetland areas. The estimates also indicate that farm labour households in wetland regions face a significantly greater likelihood of being poor than self-employed farm households, who in turn face a higher probability of being poor than non-farm self-employed households.

Interaction terms between different regions and household heads' main occupations were included in the logit estimations to examine whether the probability of being poor differs significantly for farm-labour and non-farm households across different agro-economic regions. The coefficients on the region-farm labour interaction terms were not statistically significant (Appendix Table 2). This finding is consistent with the tabulated data presented above and indicates that the probability of farm labour households living in poverty does not differ significantly across agro-economic zones. Farm labour households are at relatively high risk of being poor regardless of the region in which they live. Except for non-farm self-employed households in coastal and mixed farming areas (which were significant only at the 10 per cent level), non-farm households also experience no significant differences in the likelihood of being poor across agro-economic regions. The lack of significance of the region-occupation interaction terms lends support to the idea that regional targeting alone is insufficient to eradicate poverty in rural Java.

The logit estimations also indicate that the composition of the local economy significantly influences the likelihood of a household living below the poverty line. The higher the percentage of households in agriculture in a village, the higher the probability a household will be poor – even if that household is not itself a farm household.¹⁶ Contrary to Government of Indonesia thinking, however, the probability of a household being poor is not significantly related to the agricultural density of a location.

¹⁵ Coefficient estimates and t-statistics for all the explanatory variables are presented in Appendix Table 2.

¹⁶ Tests of the data indicate that this result is robust across the major inland agro-climatic regions (Mason 1994).

Table 7 Summary of logit results

Key Explanatory Variables ¹	...the Probability of a Household Being Poor...
Household (HH) Variables	
If the HH Head is a Farm Labourer...	Increases ²
If the HH Head is Self-Employed (Non-Farm)...	Decreases ²
As the HH Head's Education (in years) Increases...	Decreases
If the HH Head is Female...	Decreases ²
As the HH Head's Age Increases...	Increases, then Decreases
As the Dependency Ratio Increases...	Increases
Regional Variables	
If the HH Resides in West Java...	Decreases ²
If the HH Resides in Yogyakarta...	Decreases ²
If the HH Resides in East Java...	Decreases ²
If the HH Resides in an Upland Region...	Increases ²
If the HH Resides in a Dryland Region...	Increases ²
As the Percentage of HHs in Agriculture Increases in a Village...	Increases
As Distance from a Village to the <i>Kecamatan</i> Centre Increases...	Increases
As Road Quality Improves...	Decreases
As the Number of Financial Institutions Increases in a Village...	Increases
If Electricity is Present in a Village...	Decreases ²

Notes ¹ Statistically significant at the 5% level or below.

² Because this effect was estimated using a dummy variable (1,0), it should be interpreted as relative to the latent category: self-employed farm households residing in villages with no electricity in wetland regions of Central Java.

The logit results lend support to the earlier analysis which indicated that proximity to economic and administrative centres influences the likelihood of a household being below the poverty line. Greater distances increase significantly the probability of a household being poor, other factors held constant. Road Quality also significantly affects the probability of a household being above or below the poverty line. By reducing transport and transaction costs per unit of distance, better road infrastructure decreases the likelihood of a household living below the poverty line. The presence of other village-level infrastructure, such as electricity, also significantly decreases the likelihood of a household living below the poverty line.

The estimations suggest that the greater the number of financial institutions present in a village, the

higher the probability of a household living below the poverty line. The interpretation of this result is not completely straightforward. It suggests, however, that the **presence** of financial institutions alone is not sufficient to reduce the probability of a household being poor. By itself, this finding does not prove that the poor have less access to rural financial services than the non-poor. However, a recent Bank Rakyat Indonesia study (1990) indicated that within three years of obtaining KUPEDES credit, less than one-third of the borrowers who were initially poor remained poor. Together with the logit analysis, this would imply that the poor have poorer access to financial capital than the non-poor. If access to rural credit is correlated with households moving out of poverty and if all households had access to credit, one would expect the number of rural financial institutions to be negatively

correlated to the probability of a household living below the poverty line.

Like the earlier descriptive analysis, the logit estimations also provide strong support for the idea that higher education levels substantially reduce the likelihood of a household being in poverty. For example, the probability of a household headed by a primary school graduate being poor is approximately half that of a household headed by someone with no schooling; the probability of a household headed by a lower secondary school graduate is 71 per cent less likely to be poor than one headed by someone with no schooling. Furthermore, tests run on sub-samples of the data showed that additional education significantly reduces the likelihood of a household being poor, regardless of whether it is situated in wealthy or poor regions (Mason 1994).¹⁷

Finally, although Table 6 did not show strong patterns of poverty with respect to the gender or age of household heads, the logit estimations indicate statistically significant relationships between household head's gender and age. Of particular note is that female-headed households are 9 per cent less likely to live below the poverty line than are male-headed households once other factors are controlled for.

5 Conclusion

This article has examined both the regional and household characteristics of poverty in rural Java. Linking the 1987 SUSENAS and the 1986/87 PODES data sets has allowed for a more complete anatomy of poverty for rural Java than has been available previously. Consistent with recent accounts, remaining poverty in rural Java has important geographic and spatial dimensions. Incidences of poverty are substantially higher in upland and dryland regions than in wetland or mixed farming areas. In addition, incidences of poverty increase significantly as distances from economic and administrative centres increase. However, geographic and spatial descriptions of poverty tell only part

of the story. Forty-three per cent of the remaining poor live in relatively prosperous regions. Moreover, in absolute numbers, the poor are fairly uniformly distributed across the range of distances from *kecamatan* centres.

Remaining poverty in rural Java is probably better characterized in terms of households' access to a range of productive assets and resources. This includes a location's agro-economic features and distance from centres of economic activity, as these characteristics reflect productivity of local land and agricultural profitability. However, remaining poverty is also characterized by households' poor access to land of any sort and by access to financial and human capital. Farm labour households are consistently among the poorest households in rural Java, regardless of the region in which they live (nearly two-thirds of poor farm labour households live in relatively prosperous regions), and whether or not they have access to land, the poor in rural Java tend to have limited access to both credit and formal education.

What do these findings imply for effective targeting of the poor in rural Java? First, given that remaining poverty does have important spatial dimensions, geographic targeting can play an important role in government anti-poverty efforts. Moreover, geographically targeted programmes are attractive because they are simpler to administer than programmes that target individuals or households and more cost-effective than untargeted programmes (Baker and Grosh 1994). Thus, by making financial capital available in poor villages, the *INPRES Desa Tertinggal* programme referred to above makes a potentially important contribution to the Government of Indonesia's efforts to reduce poverty in rural Java.

At the same time, the fact that patterns of poverty in rural Java conform only partially to the concept of 'pockets of poverty,' implies that basing an anti-poverty strategy on regional targeting alone will be insufficient to eradicate rural poverty in Java. A more

¹⁷ The only exception was in coastal areas. However, in general, the coastal sub-sample performed poorly. This poor performance may be the result of its relatively small sample size or lack of sufficient variability in the data.

effective anti-poverty strategy for rural Java would include efforts to enhance access by the poor to a range of productive assets, regardless of where they are located. This suggests the need to devise methods of improving access to financial capital among the poor living in non-poor areas (e.g., landless labourers in wetland rice regions). Practical approaches to this might include providing alternatives to standard collateral requirements (e.g., 'character-based' or 'group-based' lending) under existing credit programmes and providing more information to the poor about availability of financial services, eligibility for credit, and application procedures. Efforts should also be made to improve access to education among the poor in both prosperous and poor regions. The Government recently has waived lower secondary school tuition in an attempt to do just this; however, there is some uncertainty about how successful the current approach actually has been in reducing household costs.¹⁸

Second, efforts to target anti-poverty programmes could benefit from more analysis that links income poverty to easily observable household and regional characteristics. The analysis presented in this paper provides a starting point. However, the Indonesian Central Bureau of Statistics regularly generates high quality data on household expenditure (and income) and on regional socioeconomic characteristics. These data can be linked at the village level, and should be. There are clear limitations to using non-income 'proxies' to identify poverty or the poor. Linking measures of income poverty with broader socioeconomic indicators would serve to enhance the Government's ability to identify and effectively target the poor.

Finally, Indonesia's success in reducing poverty has been built on a foundation of sustained economic growth. While growth alone will not be sufficient to eliminate poverty, it will remain the basis for continuing to reduce poverty in the future. A key challenge in designing targeted anti-poverty programmes, therefore, is to minimize economic

distortions that could dampen future growth prospects. Special care must be taken, for example, to ensure that programmes that make financial capital more accessible to the poor do not compromise the integrity of the rural banking system. The right kind of anti-poverty programmes actually can contribute to economic growth. For instance, increasing access to education among the poor will also improve long-run growth prospects for Indonesia. Preference should thus be given to anti-poverty programmes (targeted or otherwise) that are likely to foster, not hinder, long-term growth.

¹⁸ Reports from the field suggest that in many locations tuition costs have just been replaced by higher registration fees or Parent-Teacher Association contributions that, while technically voluntary, are generally considered mandatory.

References

- Baker, J. L. and Grosh, M. E., 1994, 'Measuring the effects of geographic targeting on poverty reduction', **Living Standards Measurement Study Working Paper**. No 99, Washington: The World Bank
- Bank Rakyat Indonesia, 1990, 'Briefing booklet: KUPEDES development impact study', Bank Rakyat Indonesia, Planning, Research and Development Department, Jakarta
- Bidani, B. and Ravallion, M., 1993, 'A regional poverty profile for Indonesia', **Bulletin of Indonesian Economic Studies** Vol 29 No 3: 37-68
- Biro Pusat Statistik, 1994, 'Penduduk miskin dan desa tertinggal 1993: metodologi dan analisis', Jakarta
- Booth, A. and Damanik, K., 1989, 'Central Java and Yogyakarta: Malthus overcome?' in Hal Hill (ed.), **Unity and Diversity: Regional Economic Development in Indonesia Since 1970**, Singapore: Oxford University Press
- Business News**, 1992, 'Poverty and equitable income distribution in Indonesia 1976-1990 (part 1)', Jakarta, May 14: 1-6
- Collier, W.L., Santoso, K., Soentoro, and Wibowo, R., 1993, 'A new approach to rural development in Java: twenty five years of village studies', PT. INTERSYS Kelola Maju, Submitted to International Labour Organization, Sectoral Employment and Planning Project, Jakarta
- Guest, P., 1989, **Labor Allocation and Rural Development: Migration in Four Javanese Villages**, Boulder, Colorado: Westview Press
- Hardjono, J., and Hill, H., 1989, 'West Java: population pressure and regional diversity', in Hal Hill (ed.), **Unity and Diversity: Regional Economic Development in Indonesia Since 1970**, Singapore: Oxford University Press
- Huppi, M., and Ravallion, M., 1991, 'The sectoral structure of poverty during an adjustment period: evidence for Indonesia in the mid-1980s', **World Development** Vol 19 No 12: 1,653-1,678
- Mackie, J.A.C. and Zain, D., 1989, 'East Java: balanced growth and diversification', in Hal Hill (ed), **Unity and Diversity: Regional Economic Development in Indonesia Since 1970**, Singapore: Oxford University Press
- Mason, A.D., 1994, 'Schooling decisions, basic education, and the poor in rural Java', Doctoral dissertation, Food Research Institute, Stanford University
- Naylor, R.L., 1989, 'Rice and the rural labour market in Indonesia', Doctoral dissertation, Food Research Institute, Stanford University
- Patten, R.H. and Rosengard J.K., 1991, **Progress with Profits: The Development of Rural Banking in Indonesia**, San Francisco: ICS Press
- Pearson, S., Falcon, W.P., Heytens, P., Monke, E., and Naylor, R., 1991, **Rice Policy in Indonesia**, Ithaca, New York: Cornell University Press
- Snodgrass, D.R. and Patten, R.H., 1991, 'Reform of rural credit in Indonesia: inducing bureaucracies to behave competitively', in D.H. Perkins and M. Roemer (eds), **Reforming Economic Systems in Developing Countries**, Cambridge, MA: Harvard Institute for International Development
- Timmer, C.P., Falcon, W.P., Mason, A.D., Wiebe, F., and Morduch J., 1992, 'Approaches to poverty alleviation in Indonesia', Stanford/Harvard Joint Study of Rural Poverty in Indonesia, Jakarta
- van de Walle, D., 1988, 'On the use of the SUSENAS for modelling consumer behaviour', **Bulletin of Indonesian Economic Studies** Vol 24 No 2: 107-122
- Wiebe, F., 1993, 'Poverty in Indonesia: official poverty estimates and poverty measurement issues', Asian Development Bank, Manila
- _____, 1994, 'Measuring poverty in Indonesia: identifying the poor under heterogeneous conditions', Doctoral dissertation, Food Research Institute, Stanford University
- World Bank, 1990, **Indonesia: Strategy for a Sustained Reduction in Poverty**, Washington: World Bank
- _____, 1993, **Indonesia: Public Expenditures, Prices and the Poor**, Jakarta: World Bank

Appendix Table 1 Descriptive statistics for simple logit model

Explanatory Variable	Mean	Standard Deviation	Minimum	Maximum
Household (HH) Variables				
Dependency Ratio	0.633	0.623	0.000	6.000
HH Head's Education	3.522	3.215	0.000	16.000
HH Head, Farm Labourer	0.153	0.360	0.000	1.000
HH Head, Non-Farm Labourer	0.221	0.415	0.000	1.000
HH Head, Non-Farm Self-Employed	0.184	0.388	0.000	1.000
HH Head, Female	0.156	0.363	0.000	1.000
HH Head's Age	45.602	13.903	16.000	95.000
Regional Variables				
West Java Province	0.229	0.420	0.000	1.000
Yogyakarta Province	0.115	0.319	0.000	1.000
East Java Province	0.332	0.471	0.000	1.000
Coastal Regions	0.053	0.225	0.000	1.000
Upland Regions	0.070	0.256	0.000	1.000
Mixed Farming Regions	0.292	0.455	0.000	1.000
Dryland Regions	0.321	0.467	0.000	1.000
Per cent of Village Households in Agriculture	0.777	0.216	0.009	1.000
Agricultural Density	4,203.001	43,262.911	90.504	722,330.000
Distance from Village to Kecamatan (km.)	5.051	4.369	0.000	25.000
Road Quality	2.144	0.715	1.000	3.000
Number of Factories in Villages	1.305	2.378	0.000	19.000
Number of Rural Financial Institutions in Village	1.543	3.391	0.000	74.000
Electricity in Village	0.693	0.461	0.000	1.000

Appendix Table 2 Logit model results

Explanatory Variable	Coefficient	t-statistic	
Household (HH) Variables			
HH Head, Farm Labourer	0.601	3.63	**
HH Head, Non-Farm Labourer	-0.167	-0.88	
HH Head, Non-Farm Self-Employed	-0.840	-3.69	**
HH Head's Education	-0.177	-12.53	**
HH Head, Female	-0.438	-4.74	**
HH Head's Age	0.057	3.74	**
Age Squared	-0.001	-3.49	**
Dependency Ratio	0.985	19.80	**
Regional Variables			
West Java Province	-1.438	-12.88	**
Yogyakarta Province	-0.783	-6.21	**
East Java Province	-0.233	-3.29	**
Coastal Regions	-0.224	-1.02	
Upland Regions	0.590	3.42	**
Mixed Farming Regions	0.053	0.37	
Dryland Regions	0.477	3.61	**
Per cent of Village Households in Agriculture	1.010	5.62	**
Agricultural Density	-0.000	-0.48	
Distance from Village to Kecamatan Centre	0.026	3.63	**
Road Quality	-0.136	-3.05	**
Number of Factories in Village	0.024	1.52	
Number of Rural Financial Institutions in Village	0.040	4.06	**
Electricity in Village	-0.198	-2.81	**
Region-Occupation Interactions			
Coast x Farm Labour HH	-0.380	-0.92	
Coast x Non-Farm Labour HH	-1.345	-1.27	
Coast x Non-Farm Self-Employed HH	0.854	1.82	*
Upland x Farm Labour HH	-0.279	-0.78	
Upland x Non-Farm Labour HH	-0.630	-1.51	
Upland x Non-Farm Self-employed HH	0.315	0.75	
Mixed Farming x Farm Labour HH	0.154	0.71	
Mixed Farming x Non-Farm Labour HH	-0.031	-0.12	
Mixed Farming x Non-Farm Self-employed HH	0.537	1.88	*
Dryland x Farm Labour HH	-0.241	-1.11	
Dryland x Non-Farm Labour HH	-0.349	-1.40	
Dryland x Non-Farm Self-Employed HH	0.052	0.18	
Constant	-3.673	-8.56	**
Sample Size	10,270		
Log Likelihood		-3,573.67	

Notes * Significant at the 10% level. ** Significant at the 5% level.