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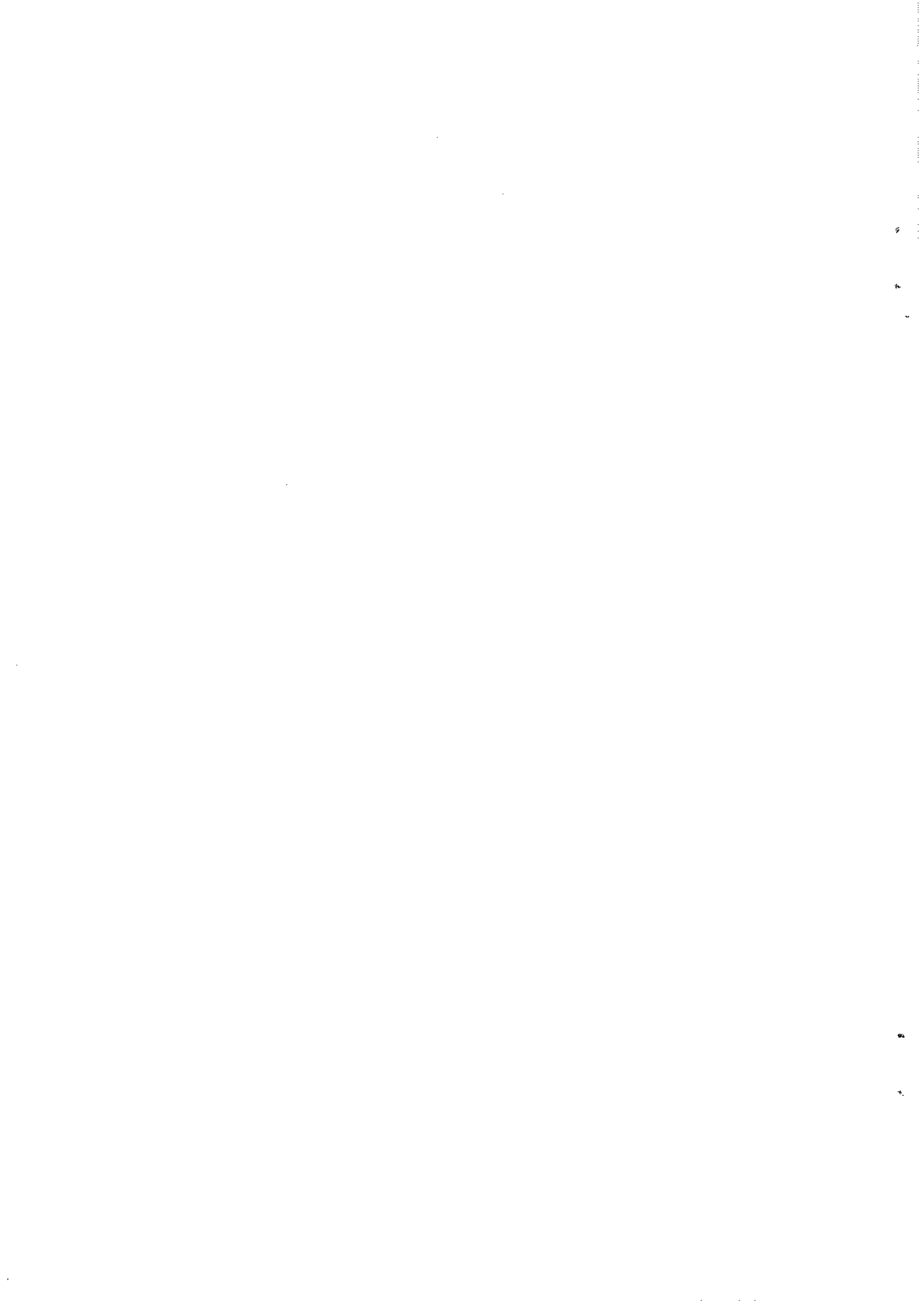
Serie Research Memoranda

Urban Bias of Rural Industry
Case Study of the Indonesian Provinces

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URBAN BIAS OF RURAL INDUSTRY

Case study of the Indonesian Provinces

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SUMMARY

Employment and earnings in rural industry commonly have been related to the local rural market. This paper argues that the wider regional and national markets are of more importance. Comparative analysis of the Indonesian provinces indicates that employment in rural industry is falling in regions with traditionally high poverty incidence, where involuntarily push factors such as landlessness and abundant labour led to overcrowding. Under certain conditions this trend is compensated by rising regional income and improving transport and trade networks. The study analyses the factors that cause the regional divergences and considers the policy implications.

1. The Undiscovered Territory of Rural Industry

In many developing countries the majority of industrial enterprises is still established in rural areas, where workers tend to combine industry with farming and other rural activities. Because of its various forward and backward linkages with agriculture, Rural Industry (RI) was supposed to have favourable effects on rural employment and productivity, and its promotion was therefore considered an important element in rural development planning [UNIDO 1978]. However, empirical studies of RI still are scarce and fragmented, and sometimes even inconsistent, so it has not yet become clear why or where RI can prosper and how it should be encouraged [Chuta and Sethurama 1984]. Surveys of studies point to the wide differences in RI structure and employment over countries and continents. Between countries with similar income levels RI employment can vary from 1 to 20 percent of rural active population [Haggblade et al. 1989: 1176-9]. Although this variation may be ascribed to diverging definitions of 'rural', most differences have been explained in terms of structural preconditions such as industrial tradition, population density, availability of raw materials, transport facilities, and agricultural system [UNDP et al. 1988; Haggblade et al. 1989: 1183]. However, very little is known about the specific role of these variables in RI development. Some studies suggest that they represent mostly exogenous preconditions with critical minimum levels [UNDP et al. 1988; Haggblade et al. 1989], while others emphasize that these conditions can be compensated by co-operate private action, public programmes, and industry and trade policy [Haggblade et al. 1990: 63].

This paper aims to shed some light on the preconditions for RI by analyzing the uneven distribution of RI employment and earnings over the rural areas of 25 Indonesian provinces. It contends that the economic conditions for RI development vary so much across provinces that no general aggregate trend of rural industrialization should be expected to emerge. Rejecting the common assumption that RI depends heavily on local markets, it shows that high RI employment rates stem more from commercialization and the supply of female cheap labour, and that low rates are caused mostly by rural isolation and lack of labour supply. The argument is presented in three sections: the first deals with the general factors that stimulate or inhibit rural industry as compared to its urban counterpart; the second gives an overview of the regional variation of these factors and the corresponding RI employment situation in Indonesia; and the third presents a cross-section regression analysis of the effects of the main factors on employment and earnings. A conclusion with policy recommendations is attached, concerning the promotion of marketing networks for RI.

2. Characteristics and Dynamism of Rural Industry

2.1 Rural Location

For the analysis of RI structure and growth, the definition of 'rural' is a crucial variable. In the survey of *Haggblade et al.* [1989], preference was given to a wide and functional definition, namely "places that exist primarily to service an agricultural hinterland" [p. 1174]. As the size of such places can vary between 1000 to 250,000 inhabitants, the above definition yielded such a heterogeneous RI population that a distinction had to be made between localities with more and with less than 20,000 inhabitants [p.1182]. The differences between the two size categories appeared to be structural; RI employment in the smaller category was low and decreasing, whereas in the larger one it was high and growing [p.1182]. The smaller localities were observed to have mostly simple processing activities, whereas the larger ones had more sophisticated manufacturing activities such as metal working, furniture, textiles and footwear [p.1186]. So merely the choice of size of location seemed to determine RI structure and prospects.

The Indonesian Central Bureau of Statistics (BPS) classifies enterprises as 'rural' if their location scores a low average for three characteristics: share of non-agricultural households, population density, and infrastructural facilities [*Rietveld 1988: 75*]. The greater part of the villages identified in this way as rural have less than 20,000 inhabitants, and therefore would belong to the category that tends to have declining RI. Nevertheless, they comprise 66 percent of the manufacturing workforce and 88 percent of Cottage Industry establishments in Indonesia, and the Censuses of 1971, 1980 and 1985 show that this rural work force has been growing fast in the seventies but was stabilizing in the eighties [*BPS 1987: 335, 338; 1989A: 30; World Bank 1985: 58-62*]. This trend has to be interpreted with caution as the statistical definitions of 'work' and 'rural' have been altered, but it may be worthwhile investigating whether RI did grow in the small rural villages in Indonesia, and if yes, which factors favoured this growth.

2.2. Enterprise Size and Technology

Diminishing RI in the small localities may be caused by diseconomies of small scale. Small and isolated RI can produce only simple goods for the local market. Simple in this sense means small size, little bulk, little foreign inputs, short production process, and low degree of complexity, precision and standardization. Many of these characteristics have to be dropped in the course of rural development, when RI integrates in a wider economy. As markets widen the scale of production must grow, and as demand diversifies production must become more sophisticated. Upgrading of RI technology requires certain discrete, indivisible investments which are attended with substantial economies of scale, so that production will tend to concentrate in larger localities [Haggblade *et al.* 1989: 1178-9]. This refers particularly to the processing of agricultural materials which was originally done by cottage industry in the small agrarian villages with easy access to large quantities of locally produced materials. Examples of traditional processing industries in Indonesia are salt and sugar boiling, rice milling, fruit and vegetable preservation, tobacco drying and fermenting, and the production of timber, charcoal, bricks and tiles. These industries still predominate in cottage industry in Indonesia, but as they tend to concentrate, cottage industry should decline accordingly.

2.3 Size of the Market; Urban Bias

All available studies of RI suggest that broadly based agricultural development has the most favourable effects on RI as it widens the local RI market for consumer and producer goods [Haggblade *et al.* 1989; Rietveld 1986]. In the small Indonesian villages, however, these local market effects may not be so important, as the local market is anyway too small for continuous production. Therefore, in order to ensure regular production and profitability, the majority of RI enterprises in Indonesia have found connections with the wider urban markets, and they are currently estimated to sell more to foreign markets than their urban counterparts do. Only the most isolated RI with prohibitive transportation cost are confined to their small local markets. This fact may come as a surprise, as the available RI studies suggest that RI sells predominantly to local customers [Haggblade *et al.* 1989]. This may indeed apply to the larger size category of RI in the provincial centres which have a genuine local market, but not to RI in the smaller villages. The smallest RI category in Indonesia, cottage industry (CI), sells less than 50 percent to local customers, and shows a clear tendency to sell increasingly to wider markets, whereas urban CI shows the opposite tendency and on average sells more than 75 percent to local customers [Weijland 1990: 19, Table 13]. These findings suggest that indeed a number of critical minimum scale barriers must be crossed before a wider spectrum of products can be produced profitably in the villages. Only beyond a certain size of locality, level of income and degree of accessibility the local market for RI can range from all kinds of non-tradable to foot-loose goods. With a large local market, small RI entrepreneurs generally prefer non-tradable RI goods as these yield a fair income and do not suffer from urban competition. Examples of such goods are industrial services and construction, which are usually fitted to individual tastes and personal

producer-client contacts. As demand for non-tradables depends on the income and number of households that can be served personally, prospering agriculture, high population density and good internal communication systems should contribute substantially to employment in this category, which therefore should grow continually in the larger village centres.

On the other hand, prospects for the tradable foot-loose goods would be quite different. With rising incomes and improving transport facilities the villagers get richer and more mobile, so they would prefer to buy the wider varieties of the competing urban goods offered in the local shops or in the provincial centres. Consequently, tradable RI production has to face increasing urban competition and therefore might decline if it cannot lean on other locational advantages such as cheap or skilled labour and easy access to raw materials. Many light RI activities such as dress-making, shoe-making, pottery, and beer-brewing, which once were started easily in the rural centres, may decline in the course of development. Such inverted U-shaped development patterns are shown in several empirical studies of RI subsectors [*Haggblade et al. 1989*].

2.4. Population Density, Urbanisation and Transport Facilities

In general, high population density should have substantial positive effects on RI employment because it widens the RI market [*Haggblade et al. 1989: 1183*]. Indonesian census statistics also show a strong positive effect, so this relationship appears to hold true also for RI in the smaller size localities. According to census and village data, proximity to cities also appears to favour RI [*Rietveld 1986*]. Yet it has not been proven conclusively that communication has favourable effects for all RI, both in small and large locations. It is plausible that in sparsely populated areas with small and isolated villages, improved communication may wipe out most traditional small village industries because RI workers and customers would prefer to work and buy in the larger centres. On the other hand, in densely populated areas with initially isolated but large villages, improved transport facilities may help overcome critical scale barriers and encourage rural integration through rural specialization. In the next section it will be shown that Indonesian RI statistics support this hypothesis.

2.5 Clustering of Enterprises

In a developing economy where the range of feasible RI products is widening, technical requirements are changing continually, and new options for RI are emerging while old ones grow less profitable. The stronger and larger rural entrepreneurs can take advantage of such changes, but the poor and isolated workers tend to give up because their resources do not allow for the introduction of better materials and designs, more machinery and equipment, and more specialized skills. Nevertheless, in the more densely populated rural areas Indonesian RI has found a remedy for its scale problem since time immemorial. Small cottage industry enterprises tend to group in clusters of some 10 to 100 more or less independent workers, producing mostly for subcontractors or middlemen. The clustered entrepreneurs hire each others' labour and equipment, they subcontract work to each other, and sell each others' products. Together they form an almost untractable, densely structured organization with frequent contacts and tight

social control. Through co-operative organization, cluster members may obtain capital, raw materials and services that otherwise would remain inaccessible. The 'collective efficiency' of the clusters overcomes indivisibility problems and offsets many diseconomies of scale and so raises survival potential [Best 1990: 105-8; Schmitz 1989]. Clustering occurs not only within branches, it can extend to all kinds of complementary activities. Craft clustering may lead to specialization of entire villages. Often such clusters give Indonesian villages distinct socio-economic characteristics [Smyth 1990].

2.6. Supply of Labour, Seasonality and Specialization

Depending on the choice of rural definition, RI is more or less located in areas with predominantly agrarian production conditions. The smaller and more rural villages have more RI activities that are linked to the agricultural production cycle, and their RI working patterns are more complementary to the seasonally and daily varying activities in farming, forestry and fishing. Not only labour but also equipment, housing and land may be shared with agrarian activities. This flexibility in allocation may ensure better utilization of resources, but it inhibits specialization of RI workers and capital, which may cause RI productivity to stagnate [Oshima 1983; Haggblade et al. 1989: 1179]. But precisely because of resource sharing with agriculture it is difficult to assess empirically whether RI productivity and manpower is rising or falling. Aggregate statistics of Indonesian Cottage Industry show dramatic increases in productivity [BPS 1987B: 52, 98], but the detailed estimates of provincial surveys suggest a rather complex pattern of rural specialization, which will be elaborated in the next section.

Although agricultural seasonality may have checked RI specialization, it obviously has had favourable effects on the supply of labour for RI, for rural areas traditionally served as the cheapest suppliers of unskilled labour for manufacturing [Oshima 1983]. Being dominated by fluctuating farming activities, RI was more sensitive to exploitation as its workers tended to accept below-subsistence earnings when other employment opportunities were lacking in the slack seasons. So RI would be hired by subcontracting middlemen to do piecework for large urban enterprises. This practice was continued in many densely populated rural areas in Asia where communication kept up with modern requirements. In Indonesia it has been introduced only recently, so that an increasing number of rural workers can be found producing light export goods such as woven, knitted or embroidered materials, garments, footwear and light household equipment.

2.7. Poverty and Female Participation

Empirical studies of RI show that high employment rates in RI are often caused by high female participation, and that women usually participate in the least gainful activities [Haggblade et al. 1989: 1177, 1179]. This could mean that high female participation rates should be associated with rural poverty. This hypothesis is corroborated by the Indonesian rural cottage industry statistics, which show that female participation varies from 30 percent in the richest provinces to 60

percent in the poorest ones [Table 4]. But cultural factors often seem to check female participation, for in some very poor provinces the statistics of female participation are surprisingly low. These statistics suffer from a downward bias in regions where convention dictates that women remain unseen and uncounted.

If female participation indeed would be induced largely by poverty, it should be the first category to decline with broadly based rural development, and as the remaining activities would be the more profitable ones, this female exodus from the least gainful subsectors should cause substantial growth of average productivity in RI

2.8. General Trends

Considering the above trends, it may be concluded that RI employment in the small rural locations tends to decline with broadly based rural development. Admittedly, rising agricultural productivity would raise supply of raw materials and encourage processing activities, and, in addition, it would widen the local market for non-tradable RI goods and services for producers and consumers. But on the other hand, increasing rural wealth would induce local consumers to shift their demand from local goods to non-basic and more sophisticated urban products. Moreover, income growth would reduce the poverty driven supply of labour for RI and undermine 'low-wage' activities. This trend would be particularly strong in regions with high female participation.

Where RI tends to be at least as dependent on urban as on local rural markets, it should react more favourably to urban development, particularly when transport facilities are developing accordingly. Nevertheless, improving rural-urban communication might have some negative effects as it encourages urban competition. Similar adverse effects may be expected from technological development, as it is often attended with scale economies that lead to concentration of production. On the other hand, gradual technological developments may encourage clustering and specialization of small-scale production, but this can take place only in densely populated areas with good communication.

In sum, growth of aggregate RI employment depends on a number of balancing forces and regionally defined variables, so that only particular subsectors may grow in certain localities with specific patterns of rural development.

3. Rural Industry in the Indonesian Provinces

The Indonesian Archipelago is estimated to cover almost 2,000,000 km² land and comprises more than 50 ethnic groups and typical cultures. For administrative purposes the country has been divided into 27 provinces, representing distinct regions with particular cultural and economic characteristics. Due to these differences, Rural Industry has developed in diverse ways, and the aim of this section is to relate these structural differences to the characteristics of the provinces.

The Indonesian provinces show great diversity in natural endowments and rural population density. The provinces of Irian Jaya, Kalimantan and Sulawesi have, on average, large territories and low population densities; Sumatra's provinces are also large but have medium population densities, while the provinces in Java and Bali are small and have extremely high population densities. The numerous small islands East of Bali have been grouped into 4 provinces: West and East Nusa Tenggara, Maluku and East Timor. These have, on average, little natural endowments and low population densities.

Tables 2-6 (Appendix) offer rural summary characteristics of 25 provinces¹ which have been divided into 4 groups: Densely Populated Centre provinces, Settled Outer Island provinces, Isolated provinces, and Resource-Rich provinces.² The ordering within the groups is according to GRP per capita. Table 2 shows that Java, with its large population of 100 millions and a rural work force of 30 millions, stands out clearly as the island with the most pressing population problem. Yogyakarta and Central Java have extremely high rural population densities coupled with high poverty incidences [*Hill 1989: 43*], and their average food intake is still very low [Table 4(4)]. But the isolated islands East of Bali and some parts of Sulawesi probably are suffering even higher poverty incidences.

A great advantage of the Centre provinces is their relatively dense communication network. Road density is high and transportation facilities are relatively cheap. Other public services are also spread widely over the countryside. Coupled with a large and diversified local market, and an almost unlimited supply of cheap labour, these infrastructural advantages have made the Centre provinces the ideal seedbed for clusters of rural enterprises which represent the greater part (75 percent) of all Indonesian RI workers [Table 3(1)]. In this Centre the greater part of RI is established as Cottage Industry (CI) with almost 50 percent female participation and earnings below one US\$ a day [Table 3(3),4(3),4(6)].

CI poverty is related to the agrarian environment. Particularly in poor provinces such as Yogyakarta, where agricultural productivity is very low, the enterprise holders appear to be mostly poor illiterate women, working more or less regularly in some small public village place or in their own huts [Table 3(4)-(5);4(2)-(5)]. The work is usually interrupted during the rainy season as the roofs leak and the materials and products get wet [*Sandee & Weijland 1989; Weijland 1989*]. As most CI activities are clustered and produce more than the local market can absorb, the bulk (appr. 75 percent) must be sold at distant places and an increasing part even abroad [Table 5(3)]. For the poor female workers it is very hard to keep up with the rising

¹ DKI Jakarta has been excluded because of its city characteristics, and East Timor because of data problems.

² These criteria were used also in the leading economic study on "Unity and Diversity" in Indonesia [*Hill 1989*].

standards of the growing Indonesian markets, for quality improvements require better and more varied materials and equipment for which money is not available. The poorer the workers, the less materials they purchase, and the lower their productivity. Average monthly intermediate inputs vary from Rp 62,000 in Yogyakarta to Rp 175,000 in West Java, while productivity is 60 percent higher in the latter province [Table 5(1-2)]. At places with good transport systems, middlemen networks have developed which take care of the marketing and solve part of the financing problems. Thus in rural Bali, where RI has developed favourably with the help of a booming tourist market, middlemen buy almost half of the CI products, and finance 13 percent of the raw materials [Table 5(4)-(5)]. Rural East and West Java are moving in the same direction, while in rural poor Yogyakarta and Central Java most CI workers are still struggling with traditional activities such as sugar boiling and basket weaving, which are overcrowded with poor illiterate female workers with very low productivity [Table 4(6)].

Studying Tables 2-6 for the next group - the Settled Outer Island provinces - it appears that these are less densely populated and have higher agricultural productivity than the Centre provinces. They have inherited good craftsmanship and their internal marketing systems are relatively well developed. Like in the Centre, they tend to sell more to traders than to local consumers. However, their CIs are on average slightly less specialized, having more seasonal work and more primary incomes in agriculture. But their average expenditures on material inputs tend to be higher than in the centre, which partly explains their higher productivity. Higher agricultural productivity and consequently higher income opportunities also contribute to higher RI productivity. But apart from a few striking exceptions, participation rates for all RI subsectors in the settled outer provinces show declining cross-section trends as incomes rise, and CI productivity seems to lag behind in the provinces with higher regional and agricultural productivities [Table 4, (5) compared with (6)]. But this tendency can be partly explained by the higher participation of illiterate women, which indicates that rural industry is marginalizing and becomes an exclusive activity for the poor in these provinces.

In the Isolated provinces, which are on average still very poor, rural industry should be expected to hold well against the tide of modernization, for long distances are prohibitive for foreign competitors. It indeed appears that direct selling in the local market remains predominant [Table 5(3)]. Employment, however, is falling fast across these provinces, changing from mostly illiterate women to predominantly literate men, who work only seasonally. Cross-section-wise, the subsector structure of CI changes as textiles disappear with rising incomes and falling female participation [Table 6]. Productivity then rises rapidly with rising aggregate income, and tends to reach the agricultural level [Table 4 (6/5)]. Expenditures on inputs rise accordingly, but the use of middlemen remains restricted [5]. The male workers seem to be able to finance their CI businesses and strike a balance between their various economic activities so that RI and agrarian productivities do not differ substantially.

The Resource-Rich provinces should offer few but rather profitable opportunities for rural industry, for although they are sparsely populated they have relatively high rural income levels and therefore small but attractive local markets. This indeed turns out to be the case, for in these provinces CI productivity even surpasses agricultural productivity. But here CI does not depend on local markets only. Unlike CI in the small Isolated provinces it tends to produce for wider markets and sells a substantial part of its products to middlemen. However, due to small market size, employment remains far below average and predominantly male, which is a sign of prosperity. As the CI category scores relatively low against larger RI categories, it can be inferred that these rich provinces also offer some good opportunities for the establishment of larger rural enterprises. In CI, food industry seems to thrive together with the resource-oriented wood products subsector. Textiles production is virtually absent in the villages of Irian Jaya and Kalimantan, but can be found in Sumatra, where sophisticated crafts are still nurtured but female participation is kept low [Tables 6,4].

From the above description of the various regions, some general features for RI are emerging. First of all, the local market for RI appears to be small. Even in the most isolated and/or sparsely populated rural areas, RI non-tradables require only a tiny part of the local work force. Blacksmith work, a traditional and basic village craft, takes less than one per thousand in most isolated regions, and employment in basic textiles and footwear is equally small [Table 6]. Employment in food, wood and clay products is higher, and together requires minimally some 15 per thousand of the local work force. Construction, a typical non-tradable industry, but not counted as manufacturing, requires another 5 per thousand. So the most basic RI employment rate can be counted to take less than 2.5 percent.

In the more prosperous, resource-rich but sparsely populated provinces, where rural industry can serve larger isolated local markets, resource-oriented RI employment can rise to some 4 percent. In such wealthier isolated areas a rapidly increasing part of RI production is transported to distant markets. This shows that a precondition for employment creation in rural industry in these areas is to improve rural communication networks for the trading of their resource-based products.

Developing RI in sparsely populated but resource-rich areas contrasts surprisingly with stagnating and declining RI in the more settled and denser populated areas which were famous for their crafts. Surveying cross-section trends, RI participation appears to show a downward trend with rising incomes. Even in the most populous provinces this trend can be observed if one excludes touristic Bali. The decline can be ascribed to withdrawal of poor, illiterate women from marginalized crafts, and the statistics suggest that it is largely compensated by employment creation in larger rural enterprises.

4. Cross-Province Regression Analysis

According to the above survey of RI employment, its major determinants in Indonesia would be, on the one hand, the pull effect of demand for RI products, and on the other hand, the push effect of the abundant supply of RI labour stemming from agricultural systems that are unable to provide sufficient rural employment and incomes. It has been argued that the size of the RI market is not confined to local demand; particularly for RI in small localities urban demand is at least equally important. So the RI market would grow not only with rural population and agrarian income, but also with urban population and urban income. The urban market for RI would widen with improving rural-urban communication, and for small rural cottage industry middlemen might be important marketing agents.

The labour supply push has been related to agricultural seasonality and inadequate agricultural earnings. Low agricultural productivity was associated with high rural poverty incidence and high female participation in RI.

So agricultural development is assumed to have two counterbalancing effects on RI employment: it raises employment through increasing demand for RI products, but it lowers employment through decreasing rural poverty and consequently decreasing supply of labour. In small localities, where the RI market would be predominantly urban, the positive employment effect of agricultural development would be relatively small and could be more than offset by its negative effect on the supply of RI labour. So in the case of Indonesia, with a narrowly defined RI, the overall effect of agricultural development on RI employment could turn out to be negative. This hypothesis is rather unorthodox, and should be verified carefully.

The urban bias of RI should refer only to the RI product market, as labour supply and working conditions for RI would be still determined by the agrarian RI environment. This agrarian orientation of labour would be felt particularly in the small rural localities. So the market for RI may be led by urban development while earnings are still following agricultural productivity. Earnings may be further depressed by seasonality as this checks specialization, and by female participation as this points to part-time operation and even lower degrees of specialization.

The data in the Tables 2-6 have been used to verify the above hypotheses with the help of cross-section multiple regression analysis. RI employment was divided into two subcategories: small CI and larger NonCI. Total RI employment and its two subcategories were to be explained by the above mentioned variables expressing market pull and labour push forces. Unfortunately, the available statistics did not allow to analyse earnings in all three RI categories; only rural CI earnings could be explained.

Table 7. Regression Analysis Results *

Dependent Variable	Explanatory Variables							R^2
	AGR	GRP	ROAD	URB	MID	FEM	SEAS	
RIE	----	----	+0.6175 (4.63)	+0.1895 (1.68)	+0.1687 (1.35)	+0.1893 (1.49)	----	0.74
RCIE	----	-0.4102 (-2.56)	+0.2735 (1.51)	----	+0.3273 (1.96)	+0.2202 (1.34)	----	0.59
RNCIE	----	+0.5793 (3.38)	+0.6445 (4.15)	----	-----	-----	----	0.49
RCIP	----	+0.2603 (1.88)	----	----	+0.3074 (2.03)	-0.6539 (-4.26)	-0.2332 (-1.46)	0.65
GRP	0.6349 (8.83)	----	----	+0.3406 (4.86)	-----	-----	-----	0.91
ROAD =	0.8876 RPD (9.46)							0.79
FEM =	0.5707 SMALL (3.40)				+0.3538 MID (2.94)			0.65
* Normalized variables: mean = 0, Stand.dev.= 1 T ratios between brackets								

Dependent Variables

RIE Total RI Employment share in Rural Active Population (RAP)
 RCIE Rural Cottage Industry Employment share in RAP
 RNCIE Non-Cottage Employment share in RAP
 RCIP Rural Cottage Industry Productivity

Explanatory Variables

AGP Agricultural Productivity (product/workers)
 GRP Gross Regional (provincial) Productivity (without oil)
 RPD Rural Population Density
 ROAD Rural Road Density (km per km²)
 URB Urbanisation rate
 FEM Female participation
 MID Percentage of enterprises using marketing middlemen
 SEAS Seasonality of RI work (percentage of workers employed less than 10 months a year)
 SMALL Percentage of Smallholders in farmers' population

The regression results are presented in Table 7. They indicate that both gross regional productivity (GRP) and agricultural productivity (AGP) fail to have an effect on total RI employment. This result is shown to be due to the opposing effects of GRP on small traditional RCIE as opposed to the larger RNCIE enterprises. With growing GRP, the smaller and less profitable enterprises decline while the larger and more profitable ones are growing. However, the remaining cottage enterprises appear to become more productive with rising GRP, which indicates that the marginal cottage enterprises are dropping out.

Although the regression results suggest that agricultural productivity (AGP) does not seem to have any effect on RI employment and productivity, this conclusion cannot be maintained in the light of further analysis. AGP still might have strong indirect effects as it is still a main determinant of non-oil GRP in most provinces. Therefore it may be considered to generate urban development and thus also demand for rural industry.

Rural population density (RPD) and road density (ROAD) are almost equally important determinants of RI employment, but they are strongly intercorrelated; almost 80 percent of the variance of road density can be explained by population density. So road density had to be used as a proxy for both.

Urbanisation (URB) was found to raise total RIE, but its contributions to the subcategories RCIE and RNCIE turned out to be insignificant. Nevertheless it has a genuine indirect effect, as it is an important determinant for GRP. So it would indirectly raise employment and productivity in RI.

Female participation (FEM) gave the expected positive employment sign for cottage industry employment, and caused a dramatic negative effect on productivity (RCIP). Further analysis of female participation showed that it can be largely explained by poverty indicators such as smallholdership and poverty incidence. Another variable that had a significant and genuine positive effect was middlemen marketing (MID), which implies that women would be more dependent on middlemen than men are, which is plausible in an environment where men are supposed to take the role of economic communicators. It was therefore also acceptable that MID had a positive effect on RCIE, but it came as a surprise that it appeared even to have a genuinely positive effect on cottage industry productivity (RCIP).

As was expected, seasonality (SEAS) was found to depress RCIP, which shows that cottage industry indeed suffers from lack of specialization.

As the regression results refer to normalized variables, the magnitude of the obtained coefficients express their relative importance in determining the variance of the dependent variables. So they show clearly that road density (and implicitly population density) is a powerful variable for the creation of gainful employment in both subcategories of RI, while regional income has an almost equal impact on employment in the larger RI subcategory. In the small RCI category, regional income (GRP) dominates in employment, affecting it negatively, while

female participation (FEM) dominates in productivity.

According to the adjusted correlation coefficients, the above variables can explain up to 74 percent of the variation in RI employment in Indonesia, and 65 percent in RCI productivity.

5. Conclusions and Policy Recommendations

The above analysis shows that gainful RI employment in Indonesia depends strongly on the size of the regional market and urban-rural communication. High poverty incidence also raises employment, but depresses earnings. As these variables differ substantially across the provinces, RI's function and structure varies accordingly. Nevertheless, some general rules are emerging. For one, in provinces with broad regional development, where communication facilities are improving, the larger NonCI category of RI tends to grow while the CI category tends to decline. The obvious precondition for attaining higher levels of RI employment is that wider markets must be accessible. World-wide surveys of small and rural industry have already shown unambiguously that broad demand supporting policies such as trade and production deregulation and infrastructural improvements should be given high priority [*Haggblade et al. 1990, Stewart 1989*]. Given the fact that small RI has an even wider market orientation than was expected, it follows that such demand policies should be of even more importance for RI in the smaller rural locations than for RI in the larger rural centres.

However, the same international studies report that small RI usually is unable to catch up with growing markets and diversifying demand, as it lacks both knowledge and finance. Where private intermediaries or middlemen to convey improvements are lacking, public intervention is needed, but this is so costly that RI development seems infeasible. In that case cluster-wise organisation of RI may be a precondition for its survival. Case studies of cluster development in rural Java yield very promising results [*Smyth 1990, Sandee and Weijland 1989, Spence and Weijland 1990*], but more general information on cluster potentiality in rural areas of developing countries has not yet become available.

The government of Indonesia is supporting some 6000 urban and rural clusters, and has made various attempts to establish co-operatives for these clusters through extension programmes by the Ministry of Industry [*Spence and Weijland 1990*]. The programmes include technical services, product design and marketing services, concessional credit, and product reservation through licensing. The concessional credit schemes hardly ever reached small RI in the countryside [*UNDP 1988*], and they were dropped in 1990 because of their rationing effect. Another controversial measure is the 'foster parent' scheme, which subsidizes the linking of clusters to large firms [*Thee 1990*]. This scheme would seem promising as it should create production linkages, but in practice this is hardly the case.³ In fact, only extension services would remain unchallenged, but for small enterprises in Indonesia such services are so expensive that they have

³ Many selected foster enterprises in Indonesia lack linkage potential as they do not belong to the same branches of production as their foster children.

been concentrated in urban areas and offered mostly to co-operatives only. So very little has been achieved in rural areas, for in 1987 less than 3 percent of rural CI establishments were co-op members, and less than half of them received some assistance. Moreover, the assistance given was very unequally distributed over the provinces. Proximity to Jakarta turned out to be decisive for the establishments of co-operatives, and the longer the distance from the government centre the more the services remained limited to finance, and finally were lacking altogether [*BPS 1989A*, 76; *Weijland 1990*: 9].

Like co-operative support, non-coop services were concentrated around the government centre, except for some traditionally attractive places such as West Sumatra. The services rendered to the non-coop establishments were more of an advisory nature [*Weijland 1990a*: 9]. As for the effect of the services, the literature offers nothing but skepticism about adequacy and targeting. If some direct services are to be continued, formulation and implementation would need to be decentralised, for each location has distinct potentialities and constraints which need to be attended [*Hagblade et al. 1989*: 1191; *UNDP 1988*; *Weijland 1990b*].

The results of this study shown in section 4 suggest that yet another instrument might be taken into consideration. Small RIs seem to benefit more from private middlemen than from formal intermediaries. Compared to the latter, middlemen appear to reach already three times more CI enterprises [5(5)/(6)]. So it is plausible that an indirect policy that addresses intermediary subcontracting and trading middlemen systems for RI at regional and local levels could be more effective than a direct target group approach.

Finally, it has to be noted that this empirical study indicate that the least paid workers' categories will abandon RI as soon as better earnings or more leisure is offered elsewhere. So it might prove to be bad policy in a developing rural economy to spend much attention to the marginal RI categories that the workers themselves have identified with poverty.

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APPENDIX

Table 1. Employment Growth in Manufacturing, 1974/75 - 1986

	(1) 1974/75	(2) 1979	(3) 1982	(4) 1986	annual growth 1974-86 %
All Sizes	4.904.800	4.491.887	6.396.174	5.286.536	0.50
Large and Medium	661.704	870.019	1.067.017	1.684.035	8.86
Small	343.240	827.035	782.072	750.311	8.13
Home Industry	3.899.856	2.794.833	4.547.085	2.852.190	-2.10

- (1) Sensus Industri
 (2) Survei Industri, and SUSENAS
 (3) Survei Industri Besar dan Sedang
 Survei Industri Kerajinan Rumah tangga
 (4) Sensus Ekonomi

Table 2. Rural Active Population, Density and Productivity 1985-86

Province	Productivity		Density			RactPop 1985 (000)
	GRP non-oil (000 Rp)	Agr. prod. (000 Rp)	rur. pop. /km ²	roads m/km ²	urb. rate %	
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Densely Popul. Centre</u>						
Yogyakarta	846	460	482	684	22.1	1111
Central Java	963	632	300	376	18.8	8609
East Java	1206	625	251	354	19.6	10699
West Java	1432	709	182	243*	34.9*	7769
Bali	1453	1257	189	660	14.7	989
<u>Settled Outer Island Prov.</u>						
North Sulawesi	1110	613	37	191	16.8	665
South Kalimantan	1302	604	21	87	21.4	781
South Sulawesi	1309	950	23	136	18.1	1656
West Sumatra	1528	804	22	124	12.7	1077
North Sumatra	1606	880	34	144	25.5	2346
South Sumatra	1751	751	14	59	27.4	1450
<u>Isolated Provinces</u>						
East Nusa Tenggara	584	375	26	133	7.5	1187
West Nusa Tenggara	716	592	47	141	14.1	932
Central Sulawesi	993	549	7	60	9.0	512
South-East Sulawesi	995	576	14	122	9.1	385
Maluku	1535	900	6	29	10.9	431
<u>Resource-rich Provinces</u>						
Irian Jaya	1337	676	1	5	21.4	402
West Kalimantan	1294	534	6	14	16.8	853
Central Kalimantan	1663	741	3	8	10.3	397
East Kalimantan	2872	1902	17	7	40.0	280
<u>(Sumatra)</u>						
Lampung	865	545	53	136	12.5	1673
Bengkulu	1202	770	15	106	9.4	306
Jambi	1379	817	10	80	12.7	445
Riau	1870	824	6	40	27.2	574
Aceh	1935	1288	17	96	8.9	896

*) Jakarta excluded

Sources: Calculated from BPS Provincial Income in Indonesia 1983-1986;
 Statistical Yearbook of Indonesia 1988; 5, 399;
 Supas 1985: 335;
 BPS 1989A: 48, 156.

Table 3 Rural Industry Participation 1985-1986, Seasonality and Working Place

Province	Rural Manuf. Work Force Supes 1985	Rural Manuf. Partic.Rates Workers/Activ.		Working more than 9 months	Special Work Place
	Number (000)	Total Ind. Supes (%)	Cott. Ind. Cens. (%)		
	(1)	(2)	(3)	(4)	(5)
<u>Densely Pop. Centre</u>					
Yogyakarta	128	11.5	9.7	86	27
Central Java	912	10.6	8.3	79	34
East Java	814	7.6	4.1	75	41
West Java	620	8.0	5.0	62	60
Bali	120	12.1	5.3	80	65
<u>Settled Outer Island Prov.</u>					
North Sulawesi	47	7.0	4.5	44	58
South Kalimantan	49	6.2	6.0	54	63
South Sulawesi	141	8.6	6.4	49	56
West Sumatra	44	4.1	4.6	79	50
North Sumatra	82	3.5	1.5	64	65
South Sumatra	60	4.1	2.1	57	59
<u>Isolated provinces</u>					
East Nusa Tenggara	63	5.3	3.2	32	53
West Nusa Tenggara	62	6.7	7.6	67	47
Central Sulawesi	22	4.4	4.1	35	57
South-East Sulawesi	14	3.6	4.9	38	75
Maluku	15	3.5	2.9	32	53
<u>Resource-rich Provinces</u>					
Irian Jaya	5	1.3	0.7	41	39
West Kalimantan	32	3.8	2.1	45	59
Central Kalimantan	16	4.0	2.4	46	66
East Kalimantan	21	7.5	2.0	72	56
Lampung	53	3.2	3.1	62	58
Bengkulu	4	1.4	2.8	50	60
Jambi	19	4.3	2.1	53	64
Riau	21	3.7	3.2	56	59
Aceh	33	3.7	3.4	59	57
All Rural Indonesia	3455	7.4	5.0	69	46

Sources: Supas 1985: 333-38;
BPS 1989A: 43, 48
BPS 1989B: 41

Table 4. Background and Productivity of Rural Cottage Industry Workers

Province	Cott.Ind workers/ act.pop. 1986 (%)	No Prim. School in CI 1987 (%)	Female partic. in CI 1986 (%)	Rural Food Cons. 1987 Rp000	Productivity	
					Agric. 1986 Rp000	Cott.Ind 1986 Rp000
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Densely popul. Centre</u>						
Yogyakarta	9.7	73	59	11.2	460	245
Central Java	8.3	68	48	10.2	632	276
East Java	4.1	65	46	10.0	625	476
West Java	5.0	57	36	13.3	709	390
Bali	5.3	57	50	11.5	1257	434
<u>Settled Outer Island Prov.</u>						
North Sulawesi	4.5	33	38	14.5	613	492
South Kalimantan	6.0	59	58	15.5	604	369
South Sulawesi	6.4	54	47	10.6	950	439
West Sumatra	4.6	38	39	16.6	804	467
North Sumatra	1.5	34	41	14.2	880	551
South Sumatra	2.1	37	40	15.3	751	450
<u>Isolated Provinces</u>						
East Nusa Tenggara	3.2	59	60	10.7	375	159
West Nusa Tenggara	7.6	79	51	10.4	375	246
Central Sulawesi	4.1	41	19	12.8	549	499
South-East Sulawesi	3.6	45	15	9.5	576	524
Maluku	3.5	37	29	11.1	900	614
<u>Resource-rich prov.</u>						
Irian Jaya	0.7	61	22	11.8	437	620
West Kalimantan	2.1	71	21	13.2	534	668
Central Kalimantan	2.4	38	15	14.5	741	1013
East Kalimantan	2.0	40	30	17.1	1241	513
Lampung	3.1	52	33	12.1	545	363
Bengkulu	2.8	38	25	15.2	770	534
Jambi	4.3	39	27	16.0	508	429
Riau	3.7	49	28	15.1	657	529
Aceh	3.4	50	45	15.9	983	547
<u>All Rural Indonesia</u>	4.1	61	47			460

Sources: BPS 1989B: Table 3.2, p. 29
 BPS 1989A: Table 12B, p. 111; 149
 BPS 1989C: 8-115

Table 5. Intermediate Inputs, Marketing and Credit for Rural CI

Province	Cott.ind productiv. p.year (000 Rp)	Input of Intermed. per est. per month (000 Rp)	Direct local selling (%)	Middlemen function		Formal Credit (%)
				Buying products (%)	Input credit (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Densely popul. Centre</u>						
Yogyakarta	245	62	26	39	8	6
Central Java	276	110	19	47	11	3
East Java	476	121	32	34	8	3
West Java	390	175	22	47	10	4
Bali	434	118	20	43	13	5
<u>Settled Outer Island Prov.</u>						
North Sulawesi	492	72	25	27	5	2
South Kalimantan	369	116	11	46	9	1
South Sulawesi	439	225	24	32	9	2
West Sumatra	467	167	23	34	5	4
North Sumatra	551	245	24	27	4	1
South Sumatra	450	103	36	31	10	3
<u>Isolated Provinces</u>						
East Nusa Tenggara	159	25	68	7	8	1
West Nusa Tenggara	246	56	43	17	4	1
Central Sulawesi	499	96	54	16	5	3
South-East Sulawesi	524	302	66	17	7	1
Maluku	614	126	42	30	9	2
<u>Resource-rich prov.</u>						
Irian Jaya	620	112	60	12	1	1
West Kalimantan	668	180	35	28	11	1
Central Kalimantan	1013	220	22	39	6	1
East Kalimantan	513	173	38	26	5	0
Lampung	363	125	50	28	6	6
Bengkulu	534	68	53	7	1	9
Jambi	429	171	46	24	6	3
Riau	529	155	31	34	5	2
Aceh	547	204	23	39	4	2
<u>All Rural Indonesia</u>	460	130	27	38	9	3

Sources: BPS 1989A: 142, 149, 111
 BPS 1989A: Table 12B, p. 111
 BPS 1989B: Table 18.1 p. 89, 113

Table 6. Rural Cottage Industry and Branches 1987, per 1000 of rural active population 1985

Province	Cott.Ind workers/ act.pop. 1987	Branches of activity (per 1000 act.)					
		Food	Text.	Wood.	Ceram.	Metal	Oth.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Densely Pop. Centre							
Yogyakarta	109	33	10	40	16	2	18
Central Java	91	37	6	27	7	1	13
East Java	47	14	2	14	6	2	9
West Java	55	20	3	20	6	2	4
Bali	54	15	7	15	6	2	9
Settled Outer Island Prov.							
North Sulawesi	52	20	7	13	4	1	7
South Kalimantan	79	16	4	38	2	1	18
South Sulawesi	66	21	19	15	3	1	7
West Sumatra	46	20	5	11	2	1	7
North Sumatra	18	8	2	2	2	0	4
South Sumatra	26	8	1	5	2	2	8
Isolated Provinces							
East Nusa Tenggara	31	7	13	5	1	0	5
West Nusa Tenggara	76	10	9	36	9	2	10
Central Sulawesi	43	14	2	15	2	1	9
South East Sulawesi	42	6	2	15	2	1	16
Maluku	29	11	0	10	2	1	6
Resource Rich Provinces							
Irian Jaya	7	2	0	4	0	0.5	0.5
West Kalimantan	23	9	0	10	0	1	3
Central Kalimantan	22	7	0	7	0	0	8
East Kalimantan	19	5	1	6	0	0	7
Lampung	34	16	1	6	6	0	5
Bengkulu	24	7	0	5	5	1	6
Jambi	24	9	0	7	2	1	5
Riau	34	12	1	15	1	1	4
Aceh	35	12	2	12	1	1	7
All Rural Indonesia	54	18	4	17	5	1	9

Source: derived from BPS 1989b, Table 2.2, p. 23, Supas 1985, p. 335

1989-1	O.J.C. Cornielje	A time-series of Total Accounts for the Netherlands 1978-1984	1989-20	P.H.F.M. van Casteren A.H.Q.M. Merckies	Micro Labour Demand Functions with Heterogeneous Output for Dutch Housing-Construction
1989-2	J.C. van Ours	Self-Service Activities and Legal or Illegal Market Services	1989-21	J.C. van Ours	An empirical Analysis of Employers' Search
1989-3	H. Visser	The Monetary Order	1989-22	R.J. Boucherie N.M. van Dijk	Product Forms for Queuing Networks with State Dependent Multiple Job Transitions
1989-4	G. van der Laan A.J.J. Talman	Price Rigidities and Rationing	1989-23	N.M. van Dijk	On "stop - repeat" Servicing for Non-Exponential Queuing Networks with Blocking
1989-5	N.M. van Dijk	A Simple Throughput Bound For Large Closed Queuing Networks With Finite Capacities	1989-24	A.F. de Vos J.A. Bikker	An Empirical General Equilibrium Model for the Spatial Interactions of Supply, Demand and Choice
1989-6	N.M. van Dijk	Analytic Error Bounds For Approximations of Queuing Networks with an Application to Alternate Routing	1989-25	A.F. de Vos	Kansen en risico's - Over de fundamente van statistische uitspraken door accountants
1989-7	F. Spreij	Selfexciting Counting Process Systems with Finite State Space	1989-26	N.M. van Dijk	A Note on Extended Uniformization for Non-Exponential Stochastic Networks
1989-8	H. Visser	Rational Expectations and New Classical Macroeconomics	1989-27	H. Clemens	Cortadores de Cafe en Tres Regiones Cafetaleras en Nicaragua (1980-81)
1989-9	J.C. van Ours	De Nederlandse Boekenmarkt tussen Stabiliteit en Verandering	1989-28	N.M. van Dijk F.J.J. Trapman	Exact Solutions For Central Service Systems With Breakdowns
1989-10	H. Tieleman A. Leliveld	Traditional "Social Security Systems" and Socio-economic Processes of Change: The Case of Swaziland; opportunities for research	1989-29	N.M. van Dijk	Product Forms For Queuing With Limited Clusters
1989-11	N.M. van Dijk	"Stop - Recirculate" for Exponential Product Form Queuing Networks with Departure Blocking	1989-30	A. Ferrels	Tijdsindeling van huishoudelijke activiteiten in relatie tot kenmerken van huishoudens
1989-12	F.A.G. den Butter	Modelbouw en matigingsbeleid in Nederland	1989-31	J.C. van Ours G. Ridder	An Empirical Analysis of Vacancy Durations and Vacancy Flows: Cyclical Variation and Job Requirements
1989-13	N.M. van Dijk	Simple performance estimates and error bounds for slotted ALOHA loss systems	1989-32	N.M. van Dijk	A Simple Performability Estimate for Jackson Networks with an Unreliable Output Channel
1989-14	H. Clemens J.P. de Groot	Sugar Crisis, a Comparison of two Small Peripheral Economies	1989-33	A. v.d. Elzen G. v.d. Laan	Price Adjustment in a Two-Country Model
1989-15	I.J. Steyn	Consistent Diffuse Initial Conditions in the Kalman Filter	1989-34	N.M. van Dijk	An Equivalence of Communication Protocols for Interconnection Networks
1989-16	I.J. Steyn	Als Estimation of Parameters in a State Space Model	1989-35	H. Visser	Micro-Foundations of Money and Finance
1989-17	B. Vogelvang	Dynamic Interrrelationships between Spot Prices of some Agricultural Commodities on Related Markets	1989-36	N.M. van Dijk	The Importance of Bias-Terms for Error Bounds and Comparison Results
1989-18	J.C. van Ours	Zoeken naar nieuwe medewerkers	1989-37	A.F. de Vos	On Regression Sampling in Statistical Auditing: Bad Answers to the Wrong Questions ?
1989-19	H. Kox	Integration of Environmental Externalities in International Commodity Agreements	1989-38	R.J. Huiskamp	Company Strategy and the (Re)Design of Industrial Relations, some case studies in the Netherlands