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Farm-Nonfarm Linkages in Rural Sub-Saharan Africa

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The links between agricultural growth and the rural nonfarm economy, known to be strong in Asia, are weaker in Africa but still important to the rural poor. Crucial for strengthening these links are policies and investments that (1) promote smallholders, (2) improve rural infrastructure, (3) encourage commerce and services, (4) foster the development of rural towns, and (5) explicitly recognize women as key actors in rural development.

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FARM-NONFARM LINKAGES IN RURAL SUB-SAHARAN AFRICA ^{1/}

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I. INTRODUCTION

Based largely on evidence from Asia, Johnston and Kilby (1975), Mellor (1976), and Mellor and Johnston (1984) argue that a development strategy focused on small farms will generate rapid, equitable and geographically dispersed growth because of labor intensive linkages with the rural nonfarm economy. Using examples from India, Pakistan, and Taiwan, Johnston and Kilby (1975) highlight the potential importance of production linkages. They point to small farmer demand for fertilizer, construction inputs, and equipment and repair services provided by rural blacksmiths. But farmers also purchase consumer goods. Mellor (1976), Mellor and Lele (1973) and Hazell and Roell (1983), in particular, have called attention to the potential power of agricultural consumption linkages. They conclude that middle-sized peasant farmers--to a much greater extent than their large scale and urban counterparts--spend incremental income on labor-intensive rurally produced goods, thereby generating important second-round demand multipliers. Hirschman's (1958) early indictment of agriculture as a low-linkage, underpowered engine of growth erred, according to Mellor (1976), because it ignored these important agricultural consumption linkages.

Several empirical studies have documented the power of farm-non-farm linkages in Asia. Based on data from India, Rangarajan (1982) found that a one percent addition to the agricultural growth rate stimulated a 0.5 percent addition to the growth rate of industrial output, and a 0.7 percent addition to the growth rate of national income. Bell, Hazell and

Slade (1982), examining rural growth linkages in the Muda River Region of Malaysia, compute an agriculturally induced rural income multiplier of 0.8. Employment multipliers are also substantial. Evidence from the Philippines (Gibb, 1974) and India (Krishna, 1976; Mellor and Mudahar, 1974) places agriculture-to-nonfarm employment elasticities between 1.0 and 1.3. Although decomposition of the growth multipliers is rare, Bell, Hazell, and Slade (1985), in their Muda study, do provide a breakdown, estimating the contribution of the consumer demand generated by agricultural growth to be double the production linkages.

As attention turns increasingly to Sub-Saharan Africa, government leaders and donors alike view small farmer agriculture as the necessary centerpiece of development efforts. Equity, nutrition and ty considerations argue persuasively for such a focus. In addition, many believe that a small farmer strategy will generate maximum growth rates, Asia-style, through linkage multipliers with the rural economy.

But no one has yet marshalled the empirical evidence necessary for assessing the power of agricultural growth linkages in Africa. It may now be possible to do so given the accumulation, over the past 25 years, of a body of detailed survey work examining the structure of Africa's rural nonfarm economy. ^{2/} This paper examines that evidence. First, it systematically reviews empirical evidence on the nature and magnitude of the African rural nonfarm economy. It then explores differences across locality size, across countries and over time, in an effort to assess likely patterns of growth. A subsequent review of key production and consumption parameters allows an estimate of the magnitude of the agricultural growth multipliers in Africa. The paper concludes with a brief discussion of policies and programs that will be necessary if farm-nonfarm growth linkages are to achieve their full potential.

II. DEFINITIONS

Before embarking on a review of rural nonfarm activities, it is necessary to specify what we mean by both "rural" and "nonfarm". Concepts and definitions of "rural", in particular, vary dramatically, as Anderson and Leiserson (1980) and Chuta and Liedholm (1979) have emphasized. The progression from rural to urban traverses a continuum of settlement patterns, population and functional densities, making any attempt to partition the universe necessarily arbitrary. Conceptually, we prefer to think of rural as depending on the function more than the size of a locality. Like Gibb (1974) and Anderson and Leiserson (1980), we consider as rural any locality that exists primarily to service an agricultural hinterland. In contrast, urban economies are driven by manufacturing, government or some other motor independent of agriculture. Given this view, "rural" areas may include towns of substantial size, perhaps as large as several hundred thousand. Admittedly this definition is difficult to apply across a large number of countries, as it requires intimate knowledge of the regional economies of each. And in most cases, we remain prisoners of the rural-urban delineations made by those who have collected the economic data of interest in this review. In order to deal with this problem and also to emphasize the spatial features that are so important to the development of the rural nonfarm economy, we shall, wherever possible, provide analyses which highlight differences in nonfarm activities across locality size and region.

"Nonfarm" activities include all economic activity other than crop and livestock production, encompassing services, construction, mining, commerce and manufacturing. In this review, we follow convention and define nonfarm activities to also include agroindustrial activities which store, process and market agricultural commodities.

III. IMPORTANCE OF NON-AGRICULTURAL ACTIVITIES IN AFRICA RURAL ECONOMY

A. Employment

Respecting individual country definitions of "rural", Table 1 indicates that rural nonfarm enterprises provide the primary source of employment for between 3 percent and 63 percent of the labor force in rural Sub-Saharan Africa. ^{3/} Although highly variable, nonfarm shares of rural employment typically fall in the 10-20 percent range, in contrast to the 20-30 percent figures commonly reported for Asia (Table 3 and Chuta and Liedholm, 1979). Figures from both continents should be viewed as minimum estimates because they frequently exclude rural towns (see Note 3).

Different perceptions of female participation in the work force contribute to the wide range in African rural nonfarm employment shares. In Western Nigeria and Benin, shares of nonfarm activity in rural employment attain 63 percent and 41 percent, respectively, because of high female participation rates and because survey designers in those countries have classified 75 to 85 percent of active women as working primarily outside of agriculture. At the other extreme, women in Chad appear to participate at low overall rates and virtually exclusively in agriculture. Whether these apparently wide variations stem from reporting biases (Simmons, 1976a; Haggblade, Hazell and Brown, 1987), seasonal variation or actual differences in women's participation rates, there can be no doubt that the role of women significantly affects assessments of the magnitude of rural nonfarm employment.

Seasonal and part-time nonfarm activities also generate significant amounts of rural employment, occupying between 7 and 30 percent of the rural labor force (Table 1). Because the overall level of nonfarm activity runs countercyclically to the agricultural calendar, distinct seasonal rhythms characterize nonfarm employment, with nonagricultural activity reaching its peak in the dry season immediately after harvest

(Ancey, 1974; Anderson and Leiserson, 1980; Chernicovsky et al., 1985; Delgado, 1979; ILO, 1985b; Liedholm and Chuta, 1976; Matlon et al., 1979; Mueller and Zevering, 1970; Norman, Simmons and Hays, 1982; Okafor, 1983; Thoni and Yankson, 1983). Focusing exclusively on agricultural households, farm management surveys in numerous African countries have found 15 to 65 percent of farmers with secondary employment in nonfarm enterprises, and time allocation studies of farm households have found 15 to 40 percent of total family working hours devoted to income generating nonfarm activities (Anthony et al., 1979; Cleave, 1974; Hill, 1977; ILO, 1985b and 1985c; Luning, 1967; Norman, 1972; Okafor, 1983).

B. Income

Africa's rural inhabitants typically derive between 25 and 30 percent of their income from nonfarm sources (Table 2). And because nonfarm activities are monetized to a much larger extent than is agricultural production, nonfarm earnings constitute an even larger share of cash income. Panel B of Table 2 indicates that nonagricultural income regularly accounts for 30 to 50 percent of rural cash incomes.

C. Income Distribution

Available data on African rural nonfarm earnings do not show the clear pattern of equity enhancement that analysts have regularly reported in Asian studies (e.g., Bell, Hazell and Slade, 1982; Kilby and Liedholm, 1986). Researchers in Northern Nigeria (Matlon, 1979) and Lesotho (Van der Weil, cited in ILO 1982h) have found that high-income rural dwellers derive a greater share of their earnings from nonfarm sources than do the poor. Less detailed evidence from rural Tanzania (Collier, Radwan and Wangwe, 1986) and from farm families in Zambia (Ghai and Radwan, 1984), Uganda (ILO, 1985d) and Zimbabwe (Weinrich, 1975) suggest similarly inequitable trends. But support for the equity enhancing view of rural nonfarm incomes does emerge from some studies: from rural Botswana

(Botswana, 1976), Zaria Region, Northern Nigeria (Matlon, Simmons and Hays, 1982), and farm households in Gambia (ILO, 1985b). Moreover, some activities, such as female-dominated food preparation, do appear consistently to enhance income equality (see Simmons, 1976a; Norman, Simmons and Hays, 1982; Botswana, 1976; and Milimo and Fisseha, 1986). Ultimately, even if the impact of nonfarm earnings on relative income equality is uncertain or negative, access to nonfarm earnings does nonetheless improve the absolute income levels of the poor.

IV. CHARACTERISTICS OF RURAL NONFARM ENTERPRISES

A. Size

Whether they use employment or capital investment as the yardstick, studies of African rural nonfarm activity overwhelmingly conclude that nonfarm enterprises are small (see Page, 1979; Chuta and Liedholm, 1979; Anderson and Leiserson, 1980; Page and Steel, 1984; Liedholm and Mead, 1986). In countries such as Burkina Faso, Ghana, Kenya, Sierra Leone and Zambia, one-person enterprises constitute about half of all rural nonfarm enterprises; and well over 95 percent employ five people or less (Wilcock and Chuta, 1982; Thomi and Yankson, 1985; Freeman and Norcliffe, 1985; Williams and McClintock, 1981; Liedholm and Chuta, 1976; Milimo and Fisseha, 1986).

The large-scale firms that do operate in rural areas are frequently limited to trading establishments--either distributors or wholesalers of major agricultural commodities--and resource-based manufacturers who take advantage of weight-reducing production processes or specialize in the preliminary processing of perishable commodities. Studies in Ghana (Andrae, 1981), Kenya (Freeman and Norcliffe, 1985), and Zaire (Congo, 1968) clearly point to the concentration of large-scale rural industries in sawmilling, mining and food processing.

Average fixed capital per enterprise commonly ranges between \$500 and \$4,000 in African rural nonfarm activities. Enterprises such as grain mills, sawmills and wholesaling require on the order of \$1,000 to \$10,000 per enterprise; while traditional crafts, personal services and repairs require capital in the range of only \$50 to \$600 (see Haggblade, Hazell and Brown, 1987; Haggblade, 1982; Wilcock and Chuta, 1981; Freeman and Norcliffe, 1985; and Liedholm and Chuta, 1976).

B. Composition

Aggregate employment data for rural Africa remain in short supply because most studies have focused on limited portions of the rural economy, often on farm households; others, although interested in the nonfarm economy, rarely include commercial and service establishments, concentrating instead on manufacturing and repair enterprises. Nonetheless some available data, coming mainly from population censuses do allow a comprehensive view of the rural economy (Table 3, Panel A). Amid wide variation, these data indicate that commercial establishments typically predominate, employing 30-40 percent of the rural nonfarm workforce. Services and manufacturing comprise about 25 percent each, with construction and mining accounting for the remainder. The data in Table 4 indicate that, within manufacturing, food preparation, tailoring, carpentry and metal working activities predominate.

C. Employment Density

While a steady stream of micro research has greatly increased our understanding of the African rural nonfarm economy over the past 25 years, differences in survey coverage complicate cross-country comparisons. They make it difficult to meaningfully compare employment percentages across surveys, because activity shares are computed as percentages of different bases depending on the comprehensiveness of the survey coverage. One solution to this problem--a solution adopted by Steel (1979), Kilby (1987)

and World Bank (1983)--is to compute employment densities per 1,000 population. Because density measures all surveyed activities against a common yardstick, population, this procedure allows comparison of absolute intensity levels for all activities enumerated, even if a survey's coverage is only partial. This approach is taken throughout much of this paper, especially where we explore features of structural transformation using comparative data from studies with differing survey methodologies.

The nonfarm employment densities in Table 3 provide tantalizing initial insights into differences in the Asian and African rural nonfarm sectors. The data in Panel B suggest that Asian rural nonfarm employment densities commonly lie in the range of 80 to 140 per 1,000 population, while the African densities only reach this level in West Africa. Elsewhere they are much lower, more frequently on the order of 40 to 50 per 1,000. Thus, initially, it appears that the Asian rural economy supports about double the nonfarm activity found in East, Central and Southern Africa.

D. Female Participation

Women account for a substantial proportion of both management and employment in African rural nonfarm enterprises. In rural Zambia, they own 60 percent of the nonfarm enterprises (Milimo and Fisseha, 1985), while their share in nonfarm employment ranges between 25 and 54 percent in countries such as Benin, Ghana, Kenya, Nigeria and Zambia (Dahomey, 1964; Steel, 1977; Freeman and Norcliffe, 1985; Mueller and Zevering, 1970; Milimo and Fisseha, 1985).

Social and religious norms vary considerably among countries and in some cases tightly shape the economic options available to women. This is clearly the case in Islamic countries, as the Chad data in Table 1 indicate. Even in non-Islamic countries, convention frequently dictates that women participate in activities that can be done in the home, with low

capital requirements, and with skills they already have. This leads to their predominance in food preparation, food services, basket making, and in some regions, ceramics, weaving and tailoring. Across West Africa, and in many other regions as well, women also play a major role in retailing and trade. Because child-rearing, differential access to education, and other social expectations restrict female participation rates in formal sector employment, women participate much more actively in informal activities. In Ghana and Kenya, for example, women's share of formal sector employment reaches only 10 and 14 percent, respectively, compared to 54 and 25 percent shares in informal, small enterprises (Steel, 1977; ILO, 1972).

V. STRUCTURAL TRANSFORMATION OF THE RURAL NONFARM ECONOMY

A. Megatrends ^{4/}

In evaluating the present structure of Africa's rural nonfarm enterprises, as well as the potential for farm-nonfarm growth linkages, it is useful to step back and review the grand lines of the economic transformation that has been taking place over many centuries in the African countryside. Begin long ago, with a countryside populated by self-sufficient, primarily agricultural households. No market exchanges take place, but within each household family members engage in both farm and nonfarm activities. By fiat, the head of household allocates labor and capital among activities and commodities among consumers.

Specialization emerges very early on in response to differing resource endowments and skills, technical change, opportunities for trade with outside regions, introduction of new crops, population growth and a host of other factors. Increased agricultural productivity per worker and the shift of employment out of agriculture are key features of that specialization, which is fundamental to economic growth. With improved

farm productivity, households can begin to concentrate on selected activities beyond their own subsistence needs. As specialization becomes possible, commodity and resource exchanges develop among households, and the share of consumption from own production declines.

Initially, social protocols regulate exchanges among households. Families transfer capital through rotating credit societies (Bauman, 1977; DeLancey 1978; Miracle, Miracle and Cohen, 1980). They exchange labor through reciprocal cooperative work parties (Erasmus, 1956; Moore, 1975) and commodities through ethnic specialization (Dahomey, 1964 and Hill, 1977) or reciprocal giv'

Eventually markets develop--labor markets, rural financial markets and commodity markets. They operate alongside social allocation mechanisms and ultimately supplant them, but the time frame is very long. Even today across rural Africa, only about 20 percent of all labor flows pass through labor markets, including no more than five percent channeled through reciprocal work parties. ^{5/} The remaining 80 percent is allocated within families by household heads. Capital flows likewise remain predominantly intra-family, available evidence from rural nonfarm enterprises suggesting that today only in the order of ten percent of capital flows pass through formal financial markets. ^{6/}

As specialization continues, nonfarm activity increases its relative importance in the rural economy; some nonfarm enterprises split off from the farm household, giving rise to full-time nonfarm households. Evidence from Kenya suggests that transport, financial services and metal working are among the first activities to split off from the farm household, while weaving and tailoring, resource extraction and construction remain integrated longer (Freeman and Norcliffe, 1985).

The growing proportion of nonfarm economic activity and the emergence of independent nonfarm enterprises go hand in hand with spatial

concentration of population in village centers and rural towns. The concentration of people and activities generates a volume of demand sufficient to support specialized production units. Attesting to the importance of this link, all available evidence indicates dramatically higher proportions of nonfarm activity in rural towns than in dispersed rural settlements (Table 5; Matlon, 1977; Liedholm and Chuta, 1976; Anderson and Leiserson, 1980; Haggblade; Hazell and Brown, 1987).

Growth of rural towns and the consequent physical separation of farm and nonfarm activities accelerates the move to market exchanges of both inputs and outputs. In part, the difficulties of rural communications and transport prevent household heads from exerting control over input allocation and production decisions across distances. In addition, because they are specialized, nonfarm households must sell their wares to purchase food and other necessities. Today, available evidence shows a surprisingly consistent 60 percent cash share in total rural transactions in Africa (Collier, Radwan and Wangwe, 1986; Ghai and Radwan, 1983b; ILO, 1982a, 1982e, 1983 and 1985d; Cote d'Ivoire, 1967; King and Byerlee, 1977; Malawi, 1984; Massell and Parnes, 1969; and Oates, 1984). However, disaggregation reveals substantial differences between the rates of monetization of agricultural and nonagricultural commodities. Nonfarm entrepreneurs exchange the overwhelming majority of their goods and services for cash, while, continent wide, farmers sell only about 30 percent of all foodcrop production (FAO, 1986; Ancy, 1974; Cleave, 1974; Leunquin, 1960; Srivastava and Livingstone, 1983; Norman, Pryor and Gibb, 1979; Delgado, 1979; Hedlund and Landahl, 1983; Wilcock and Chuta, 1982; Anthony, et al., 1979). Although farmers market the bulk of their cash crops, these typically account for a small share of total farm production.

In some cases, rural nonfarm activities do not develop from the specialization of polyvalent rural households but instead are implanted by

outsiders. In fact, outsiders--Asians in East Africa, Lebanese and Greeks in West Africa, and white settlers in East and Southern Africa--have instigated much of the growth in African rural nonfarm activities. The source of growth in rural nonfarm activity--organic or implanted from outside--has strong implications for both the size structure and technology used in rural nonfarm enterprises.

As economies become more integrated, rural nonfarm enterprises must face competition from the outside, either from enterprises in growing nearby rural towns or from urban or imported goods. Manufacturers, especially those producing easily transportable items, face the stiffest competition. Yet rural services remain insulated; by their nature they are difficult to move across space. In the absence of intervention, the competitiveness of local enterprises and their raw material suppliers will determine the magnitude and composition of rural nonfarm enterprises.

When examining the pattern of rural economic development, it is essential to recognize the impact of resource endowments, location, population density, and income levels. These affect not only the composition and prevalence of rural nonfarm activity, but also the rate and nature of the transformation that takes place.

B. Changes by Size of Locality

Consistent with this view of structural transformation, the data in Table 5 document the increasing importance of nonfarm activities in rural towns and urban centers. Among nonfarm activities, commercial and service employment increases most rapidly with size of locality. Moving from dispersed rural settlements to rural towns, commercial and service employment densities frequently grow by multiples of 5 and 10. Although manufacturing densities also rise, they more commonly grow by a factor of 2 or 3.

Within sectors--especially within manufacturing--some activities fare better than others. Data from Zambia and Sierra Leone indicate that artisanal activities such as spinning, weaving and pottery decline dramatically in importance with increasing locality size, undoubtedly the victims of competition from lower-priced manufactured substitutes. At the other extreme, trading, restaurants, food preparation, and repair work flourish as town size increases. 7/

C. Effect of Distance from Urban Centers

Evidence from Ivory Coast identifies the types of rural nonfarm activities which are most likely to be bulldozed by competition from urban and imported manufacturers. Table 6 indicates that basket making and weaving diminish precipitously in importance with proximity to major urban centers. Pottery also declines, although to a lesser extent. Because these activities constitute the three largest rural industries in Bouake Region, it is not surprising that manufacturing in the aggregate may fare less well than commerce and services as rural structural transformation proceeds. Certainly it is necessary to distinguish between declining industries--such as pottery, weaving, basket making, mat making and wood carving--and ascendant manufacturing activities such as food processing and, to a lesser extent, tailoring, carpentry and metalwork.

D. Changes Over Time

Time series data tracing changes in Africa's rural nonfarm employment are limited and fragile. Using aggregate labor force data for major subregions of the world, both Anderson and Leiserson (1980) and ILO (1979) make cautious judgements about long-term trends in rural nonfarm employment. They conclude that, over the past 20 years, total rural employment has been growing more rapidly than agricultural employment in all regions of the world, including Africa. Therefore, they reason, the share of nonfarm activities in total rural employment has been growing as

well. Although both sets of authors acknowledge the frailty of the underlying data, their conclusions are consistent with the view of a rural structural transformation involving increasing specialization and diversification out of agriculture.

For individual countries, time series data on trends in rural nonfarm employment are available only for Sierra Leone and Rwanda. ^{8/} The Sierra Leone data are based on rigorous surveys of identical areas and firms, first in 1974 and subsequently in 1980 (Chuta and Liedholm, 1982). Unfortunately, sample sizes in the 1980 follow-up survey were not sufficiently large to permit inferences on trends in the most dispersed rural settlements, those below 2,000 in population. Nor do they include data for commercial, non-repair service firms, or for any enterprise employing over 50 workers. In practice the firm size cutoff should not pose a problem of incomplete coverage except in Freetown, which falls in the size category of cities over 250,000.

The results from Sierra Leone, displayed in Table 7, lead to several important conclusions. First, they indicate that repair services and food processing have grown most rapidly, both overall and in small and medium rural towns. Second, while manufacturing in general appears to have declined in the smallest localities (2,000-20,000 persons), tailoring and welding have held constant, and they, along with carpentry, have grown very rapidly in the medium sized towns (20,000-250,000). These observations are consistent with the previously cited spatial evidence suggesting that repair services and food processing grow most rapidly with the development of rural towns.

The Rwanda time series data (Vanvali, 1985), tracing changes in rural nonfarm employment between 1978 and 1983, are more conjectural than those from Sierra Leone, since they splice together two very different data sets, the 1978 population census and the results of a more recent

agricultural census. Nevertheless, they once again point to service, commerce and restaurants as the fastest growing nonfarm sectors. While overall manufacturing grew more slowly than services and commerce, the Rwanda data, like those from Sierra Leone, do point to woodworking, metal work and textiles as among most buoyant rural industrial activities.

E. Correlates of Growth in the Rural Nonfarm Economy

We hypothesize that several factors affect the growth of the rural nonfarm economy.

1. Development of rural towns. In part this may be due to the benefits of economies of scale as well as the prospects for centralized, cost-effective provision of key infrastructure and services.
2. Level of infrastructure. Decreases in the cost of information and transport flows improve the efficiency with which rural labor and financial markets channel inputs into activities yielding the highest returns. Moreover, decreased transport costs open up rural resources and markets to viable exploitation, facilitating movement to a more specialized, productive rural economy.
3. Per capita income. Engel's Law mandates this tandem movement for the overall economy, and if definitions of "rural" remain liberal enough to encompass the nonfarm growth in rural towns, increases in income will lead to an increase in the nonfarm share of total rural income.

4. Agricultural income per capita. Increased farm productivity is normally a precondition for rural specialization if labor is to be released to nonagricultural pursuits without lowering food production. Also, if rural growth multipliers exist, both the production and consumption linkages entrained by agricultural growth will stimulate the rural production of nonfarm goods and services.

5. Population density. Higher density makes possible more rapid attainment of minimum efficient scales for full-time specialization, and the emergence of a service sector depends on close physical proximity between purveyors and clients. Moreover, high population density may limit the number of households able to survive from agriculture alone, thus forcing some into nonfarm activities as income supplements.

Empirical evidence presented in the preceding sections has provided strong support for Hypothesis 1 concerning the importance of rural towns in the development of rural nonfarm enterprises. Table 7 furnishes particularly persuasive documentation. While data that would permit testing of Hypothesis 2 are not readily available, anecdotal evidence from Kenya and Ghana does stress the key role of rural towns and their infrastructure in the development of nonfarm enterprises (Kreamer, 1986; Child, 1976; ILO, 1985a).

We have assembled a sufficient number of cross section observations to permit at least a crude initial attempt at exploring the third, fourth and fifth hypothesized correlates of rural nonfarm activity--per capita income, agricultural income per person, and population density. The plots in Figures 1, 2 and 3 display these relationships for the 12 African

and 4 Asian countries for which comparable data are available. The 12 African countries include all those on Table 3 except Zimbabwe and Mozambique, for which it was not possible to break out employment in rural towns, and Ivory Coast where data from only one region was available. We have plotted nonfarm employment percentages rather than densities, because in cases such as these, where complete rural employment data are available, percentages are less susceptible than are densities to noise introduced through differences in working age classifications and measured female participation rates. The raw data come from the same sources reported in Table 3 adjusted to include rural towns up to 250,000 in size.

Figures 1 and 2 depict a positive relationship between rural nonfarm employment and both per capita GNP and agricultural income, thus supporting Hypotheses 3 and 4. Correlation coefficients for the African countries portrayed stand at .41 and .33, respectively. Extending the range of observation, the Asian data reinforce both of these conclusions. In addition, Figure 2 indicates that, for any given level of agricultural income, Asian countries generate higher levels of nonfarm employment than do their African counterparts, thus suggesting that agricultural multipliers may be higher in Asia.

Only in testing the effect of population density do the African cross-section data appear ambiguous. Except for Rwanda, the outlier in the lower right, the African data imply essentially no correlation between population density and rural nonfarm employment. Yet extrapolation to population density levels common in Asian countries does suggest a positive relationship. Perhaps 50-100 people per square kilometer represents a threshold level necessary for population density to play a discernible role in stimulating rural nonfarm activity. Lending credence to this notion, the Nigerian data in Figure 4 indicate a strong .87 correlation between population density and adult rural nonfarm employment (.78 for children) in

a heavily populated African setting. Including data from districts across one Nigerian state, Figure 4 avoids the difficulties inherent in cross-section comparisons of countries with varying resource endowments, labor force definitions and policy environments.

VI. MAGNITUDE OF THE FARM-NONFARM LINKAGES

As a prerequisite for estimating the magnitude of agricultural growth multipliers, as well as an aid in gaining a fuller understanding of the nature of farm-nonfarm linkages, it is useful to examine in some detail available evidence on the strength of intersectoral linkages in rural Africa. Five different linkages are important, two in factor markets and three in product markets. The factor market linkages involve capital and labor flows between agriculture and nonfarm enterprises. Product markets include backward production linkages from agriculture to rural input suppliers, forward production linkages from agriculture to processors and distributors, and consumer demand linkages generated as a result of increasing farm incomes.

A. Capital Flows

Most observers believe the outflow of capital from agriculture to be larger than the reverse flow from nonfarm activity to agriculture. Certainly at an aggregate level, a large accumulation of evidence suggests that surpluses have been consistently transferred out of agriculture through fiscal, crop pricing and trade policies (World Bank, 1981; Lee, 1983; ILO, 1982b; Sharpley, 1981). Marketing boards and export levies, for example, typically tax away 30 to 50 percent of farmers' cash crop prices (World Bank, 1981). Given the structure of government expenditures in most African countries, it is very likely that these agricultural surpluses have been transferred primarily to urban areas and into nonagricultural activities. Private investors have also channelled investment funds from

agriculture to nonfarm activities (Freeman and Norcliffe, 1985; Okelo, 1973; and Williams and McClintock, 1981). Evidence from Kenya and Sierra Leone suggests that agricultural surpluses account for between 15 and 40 percent of nonfarm investment funds (Child, 1977; Liedholm and Chuta 1976).

Surpluses generated in nonfarm activities likewise furnish funds for productivity enhancing investments in agriculture. Kitching (1977), in a review of sixteen farm management surveys from East Africa, finds repeated evidence of nonfarm earnings playing a crucial role in farmer acquisition of productive agricultural assets, especially land. The positive impact of off-farm earnings on agricultural investment has also been observed in Kenya (Collier and Lal, 1986; Haugerud, 1984), Malawi (Cleave, 1974), Nigeria (Berry, 1975) Tanzania (Cleave, 1971) and Uganda (Massel and Parnes, 1969).

B. Labor Flows

Nonfarm labor usage moves contracyclically to demands of the agricultural calendar resulting in substantial seasonal labor flows between the rural farm and nonfarm sectors. We estimate that 20 to 40 percent of the rural labor force works in both farm and nonfarm activities, this range representing the sizeable magnitude of the labor flows moving back and forth between the rural farm and nonfarm sectors. ^{10/}

C. Backward Linkages from Agriculture to Rural Input Suppliers

Rural enterprises can supply some of the agricultural inputs required by farmers. For example, seasonal data from Sierra Leone indicate that blacksmithing activity reaches its peak during the height of the agricultural season because of the demand for repair services (Liedholm and Chuta, 1976). Of course, the type and magnitude of backward linkages varies depending on agricultural technology, size of holding, type of crop, and whether production is irrigated or rainfed.

In general, the backward linkages in Africa appear to be weaker than those measured in Asia. To see why, recall that Johnston and Kilby (1975), in evaluating the magnitude of backward linkages in Asia, identify fertilizer, followed by equipment and finally cement and building materials as the three key production inputs to agriculture. In Africa, probably only Nigeria, with its petroleum and large market can aspire to viable fertilizer production. Furthermore, topography and hydrology severely limit irrigation potential in Africa (Delgado, 1984) and therefore the demand for pumps and other irrigation equipment, cement and building materials.

But the potential for production linkages lies not necessarily in today's technology, it lies rather in what will be required to generate the first round of future agriculturally-propelled growth. It is increasingly clear that peak season labor bottlenecks constrain output in most areas, so some form of biological or mechanical solution will have to address that problem (Eicher and Baker, 1982; Mellor, Delgado and Blackie, 1987). If the most economic solutions turn out to be mechanical, backward nonfarm linkage multipliers may grow. The multipliers computed below use a range of estimates of equipment inputs to generate a sense of the magnitude of the growth linkages that can be reasonably expected from this quarter.

D. Forward Linkages from Agriculture to Processors and Distributors

Table 8 attempts to break out from total rural nonfarm employment only activities related to agriculture, either supplying inputs or processing outputs. Because many firms service a multiplicity of clients, this is not possible to do with great precision, although three tentative conclusions do emerge. First, backward linkages appear far smaller than the forward processing linkages from agriculture. Even if all metal working, blacksmithing and metal repair were related to agriculture, the

forward processing and distribution links would be at least double the backward linkages in Kenya and over 15 times as great in Zambia.

Second, food processing clearly achieves prominent stature among forward linkages. Although bread baking requires imported wheat flour, virtually all other processing activities involve transformation of local agricultural production. Furthermore, oil extraction, sugar production, tea drying and packaging, coffee and cocoa dehulling and drying are often performed in rural areas by large scale enterprises. While we know these large scale activities take place predominantly in rural areas, the small scale orientation of much of the past research causes those activities to elude the statistical net. Hence even the substantial figures in Table 8 understate the magnitude of rural agroprocessing.

Finally, distribution of agricultural products generates, after food processing, the second largest of the forward linkages from agriculture. If retailing of local agricultural produce is approximately proportional to the share of marketed farm production in total rural consumer cash expenditure, then about 50 percent of rural retailing represents a forward distribution link from agriculture. ^{11/} Applying this proportion to data from Zambia, Table 8 indicates that distribution furnishes between 15 and 50 percent of total agricultural linkages, the higher proportion prevailing in rural towns.

E. Consumption Links

As per capita farm incomes rise, the demand for local services, housing, durables, and higher quality foods typically increases more rapidly than the demand for foodgrains. The Asian experience suggests that the production of these commodities and services is labor intensive, hence rural employment in the non-foodgrain sector increases quite rapidly with per capita farm incomes (Mellor, 1976; Gibb, 1974; Bell, Hazell and Slade, 1982). But these patterns of growth may depend on a combination of high

population density and adequate transport facilities to make rural services accessible to the villages and so may be less applicable to large parts of Sub-Saharan Africa. We hypothesize that the absence of relatively cheap, labor-intensive goods and services in rural areas will result in a slower shift of demand from foods to services in Sub-Saharan Africa than in Asia, with consequent weaker demand linkages to the rural nonfarm economy.

Of the few household expenditure studies which allow assessment of African rural consumption linkages, the most comparable were undertaken for farm households in Gusau, Northern Nigeria (Hazell and Roell, 1983), rural households in Sierra Leone (King and Byerlee, 1977), and households in three villages in Zaria Province, Northern Nigeria (Simmons, 1976b). These are summarized in Table 9 together with comparable results for farm households from two Asian studies: the Muda region of Malaysia (Hazell and Roell, 1983) and North Arcot district, South India (Hazell and Ramasamy, forthcoming).

As the data in Table 9 indicate, African spending patterns support far less rural nonfarm activity than do those in Asia. Average expenditure on rurally produced nonfoods averages about 18 percent in Muda and North Arcot, double the roughly nine percent prevailing in Gusau and Sierra Leone. And with the marginal budget shares, crucial predictors of the linkages to be anticipated from growing incomes, the gap widens. African consumers in Gusau and Sierra Leone spend only 11 to 12 percent of incremental income on rurally-produced nonfoods, while the comparable Asian figures from Muda and Gusau stand at 31 to 26 percent, triple those in Africa. In part, this difference arises because African consumers spend far more of their average and marginal income on rurally-produced foods. While total rural consumption linkages (on foods plus non-foods) are approximately equal in the cases reviewed, the Asia data indicate greater diversity into nonfoods.

Transportation networks and proximity to rural towns appears to contribute to the much higher Asian incremental consumption on rurally-produced goods and services. A comparison of the African consumption studies reveals that households in Zaria Region, Nigeria spend a significantly greater portion of their income on nonfoods, especially services, than do consumers in Sierra Leone and in Gusau. This difference arises, at least in part, because Simmons (1976b) deliberately selected her three Zaria study villages for their proximity to the urban center of Zaria. Consequently consumers in the study villages had easy access to a wider range of consumer goods and services than are available in most rural African villages. Contrasting the Gusau and Muda studies reinforces this conclusion. In Muda, with its dense population and excellent transportation system, consumers spend larger income increments on rurally-produced nonfarm goods and services than do households in Gusau where villages are typically much more removed from market centers and are faced with very limited means of transport.

The Sierra Leone study (King and Byerlee, 1977 and 1978) also supports two themes that emerged from the time-series and locality-size employment data. First, it indicates that consumption linkages are much stronger for rural services than for rurally-manufactured goods. Marginal budget shares for rural services stand at 11.2 percent while those for rurally-manufactured goods reach only 1.1 percent. Second, King and Byerlee's results underline the importance of rural towns. Their data indicate that consumers allocate 5.5 percent of incremental expenditure on goods and services produced in rural towns, almost triple the rate of spending on products made in large urban areas.

F. Caution

The available evidence examined thus far has suggested that African farm-nonfarm linkages may be lower than those found in Asia.

However, it is important to bear in mind that available measures may bias the African rural linkage estimates downward because of a key feature of the African rural economy--the high share of nonmarketed goods and services in total consumption. Because they are not marketed, many rural African goods and services are not measured. The Gusau consumption study, for example, does not impute a value for consumption of home produced nonfood commodities. And none of the studies values nontraded household services--cooking, cleaning, laundry and child care. Furthermore, major agricultural improvements take the form of labor time invested in tree crop planting, land clearing, leveling or ridging. A recent study in Nigeria estimated that 80 percent of total agricultural investment took this form, while only the remaining 20 percent represented cash expenditure on equipment (Adesimi, 1983). Performed primarily with unremunerated family workers, labor-based investments are normally excluded from calculations of the value of agricultural investment. Because the Asian economies are more highly monetized, more of these services enter the measured consumption accounts. Thus, in the same way GNP comparisons exaggerate income gaps between rich and poor countries--because the development of labor markets monetize what were previously intra-household labor flows and because high female workforce participation leads to booming restaurant, laundry, house cleaning and childcare businesses--the Asia-Africa comparisons are likely to overstate the apparent linkage gap between the two regions. The differences may well diminish in the future as rural Africa becomes increasingly monetized.

VII. PROBABLE MAGNITUDE OF THE AGRICULTURAL GROWTH MULTIPLIERS

A. Direct Cross-Regional Estimation

Available regional data from Togo and Sierra Leone (ILO, 1982d, Matlon et al., 1979), enable us to relate regional differences in rural

nonfarm earnings to differences in agricultural income. These data reproduced and plotted in Haggblade, Hazell and Brown (1987), show a clear positive relationship between per capita agricultural income and per capita rural nonfarm earnings, reinforcing results from our earlier cross-country analysis reported in Figures 1-3.

By regressing rural nonfarm income on agricultural earnings, we can use these data to generate crude estimates of the agricultural growth multipliers. Equations (1) and (2) display the results of two ordinary least square regressions of per capita nonfarm income (RNFY) on per capita farm income (AGY). The figures in parentheses are standard errors. Note that the Sierra Leone regression includes all regions except Scarries, which is an atypical rural region, one with a high proportion of fishing income which is clearly unrelated to agriculture.

(1) Togo	$RNFY = 5.8 + .43AGY$	$R^2 = .56$
	(.22)	
(2) Sierra Leone	$RNFY = 4.2 + .14AGY$	$R^2 = .31$
	(.09)	

It would be improper to infer strict causality from these relationships, because there may be other exogenous sources of growth in rural nonfarm income. Yet given the overwhelmingly agricultural character of rural Togo, the results in equation (1) suggest that in rural Togo a \$1 increase in agricultural income leads to a \$.43 increase in regional nonfarm earnings. But the Sierra Leone estimate, even after removing the outlier region, is far lower. It implies that a \$1 increase in farm income generates only an additional \$.14 in nonfarm earnings. Closer inspection of the survey methodology reveals the reason for this low figure. The Sierra Leone data exclude income from households primarily engaged in trad-

ing. Because commerce generates consistently the highest share of African rural nonfarm income, the Sierra Leone data likely seriously underestimate total rural nonfarm earnings. For present purposes, one advantage of this omission is that it reduces the coverage of the nonfarm multiplier to principally production linkages. Supporting the notions advanced previously, this interpretation suggests that rural production linkages from agriculture are in fact very low, at least in the predominantly hand hoe agriculture of Sierra Leone.

B. A Model of Regional Agricultural Multipliers

In view of the limited opportunities for direct estimation of growth multipliers, much of what we can learn must come from modeling. Hazell (1984) has developed a particularly useful model that allows estimation of regional growth multipliers based on three basic parameters, two production and one consumption. Values for each can be obtained from farm management, rural nonfarm enterprise, and consumption surveys. Although small, the model allows us to assess three important features of farm-nonfarm linkages: (a) differences in African and Asian growth multipliers; (b) the implications of alternative types of agricultural growth on the ensuing nonfarm linkages; and (c) breakdown of the total multiplier into its production- and consumption-based components.

Described in detail in Hazell (1984) and in Haggblade, Hazell and Brown (1987), the model characterizes the supply structure of rural regions as follows. ^{12/} The supply of their major tradable output--foodgrains or export crops--is typically fixed by technology and, in Asia by land, in Africa by labor. In contrast, output of nontradables--primarily rural services, but including some income-elastic agricultural products such as fruits, vegetables and meat, and some rural manufactures--is elastic. Assuming the prices of all traded commodities are fixed outside the region, Hazell derives a model which estimates the increase in regional value added

that would occur if, through development of new technology or investment in agriculture, government were able to relax the supply constraint limiting output of major agricultural tradables. Given a one-unit increase in value added from the region's major tradable agricultural output, the model estimates the resulting total increase in regional value added as a function of three parameters: consumers' marginal budget share spent on nontradables, producers' demand for nontradable intermediate inputs as a ratio of gross regional output, and the ratio of value added to gross regional output.

Three studies have used Hazell's model to estimate the magnitude of agricultural growth linkages. Hazell (1984) has applied the model to estimate Asian growth multipliers, Rogers (1986), using data from Mauritania, has computed multipliers for Sahelian West Africa, and Haggblade, Hazell and Brown (1987) have used the model to compare growth multipliers in Africa and Asia as well as to contrast growth linkages resulting from alternative agricultural growth strategies.

Several important conclusions emerge from these modeling efforts. The first concern the accuracy of the model and the magnitude of Asian growth linkages. Hazell (1984) in his initial formulation, used the model to estimate regional agricultural growth multipliers for the Muda River Region of Malaysia, a moderately prosperous rice growing region that had been studied in great detail by Bell, Hazell and Slade (1982). The small, three-parameter model generated a regional agricultural growth multiplier of 1.82, indicating that a \$1 increase in value added from tradable agricultural output would result in an additional \$0.82 increase in regional income. This result lies very close to the 1.83 value added multiplier reported by Bell, Hazell and Slade (1982) after a much more careful analysis, lending credibility to the smaller model's projections. A second detailed study, undertaken by Hazell, Ramasamy and Rajagopalan

(forthcoming) in the North Arcot region of South India, also computes an agricultural growth multiplier of 1.83. In this case too, the small three-parameter model generated virtually identical results.

Applying the model to African agriculture, Rogers (1986) computes much lower multipliers. Using a slight variant of the Hazell model along with data from Mauritania, Rogers estimates agricultural growth multipliers under a range of conditions. Most estimates clump around 1.27. Given the harsh rural economy of Mauritania, this estimate very likely paints an unduly pessimistic picture of agricultural growth multipliers throughout the rest of Sub-Saharan Africa.

Using what are probably more representative African data-- consumption parameters from Sierra Leone and Nigeria along with production parameters from farm and nonfarm budget studies across the continent-- Haggblade, Hazell and Brown (1987) estimate agricultural growth multipliers on the order of 1.5. This estimate places the African growth multipliers at about 60 percent of the magnitude of those estimated in Asia; a \$1 increase in value added from agricultural tradables produces an additional 0.50 of rural income in Africa compared to about \$0.83 in the Asian countries for which we have evidence. These Africa multipliers of about 1.5 are also strikingly close to the 1.43 direct cross-regional estimate reported earlier for Togo (Section VII A).

The model can also shed light on potential differences in rural linkages generated by alternative agricultural growth strategies. Haggblade, Hazell and Brown (1987) use African farm management data to compare rural income multipliers likely to emanate from small farmer growth strategies with strategies based on promotion of estate agriculture. Under a range of probable production parameters, the model predicts regional multipliers in the range of 1.45 and 1.55 for both small and large farmer strategies. The surprising similarity between estate and smallholder

multipliers occurs because while large farmers are more dependent on purchased inputs (as reflected in their lower value added to gross output ratios) and hence have potentially stronger links to the nonfarm economy, the potential does not materialize because many of those inputs are produced in urban areas or overseas. But this result assumes identical consumption patterns among small farmers and estateholders. If estate families are found to have more urbanized expenditure patterns--and unfortunately consumption data are simply unavailable indicating whether or not this is so--the estate-dominated regions would generate regional growth multipliers of only about 1.31, substantially below those of smallholders.

Finally, the model has been used to separate out the contribution of consumption and production linkages in overall regional multipliers (Haggblade, Hazell and Brown, 1987). Under conditions prevailing in Sub-Saharan Africa, that work indicates that consumption linkages account for about 80 percent of total agricultural growth multipliers. In Asia, on the other hand, the relative importance of consumption linkages appears much smaller. In the Muda region of Malaysia, consumption linkages account for about 60 percent of the total multiplier, while in North Arcot the consumption share drops to 50 percent (Bell, Hazell and Slade 1982; Hazell, Ramasamy and Rajagopalan, forthcoming). This does not arise because the consumption linkages are more powerful in Africa than in Asia; the marginal budget share for nontradables is smaller in Africa. Rather, the different relative importance of consumption and production in overall growth multipliers reflects the much weaker inter-industry linkages in Africa. The weak African production linkages likely stem, as discussed earlier, from the much lower level of mechanical input use in Africa along with the absence of important construction and maintenance associated with Asian irrigated agriculture. Reiterating inferences drawn from the Togo and Sierra Leone direct multiplier estimates above, the modeling efforts

project weak African agricultural production linkages with the rest of the rural economy.

C. Macroeconomic Consequences and Simulations

The foregoing analysis presumes that regional growth is an end in itself, and it gives no regard to spillover effects that might be induced elsewhere in the national economy. For example, imports into a rural region are leakages as far as regional growth is concerned. But if these goods are produced in other rural areas, or if they create jobs for the urban poor, they will still be desirable from the national viewpoint. Similarly, savings that are invested outside the region represent a loss to regional growth, but they are nevertheless valuable in furthering national economic growth. Conversely, regional growth may incur costs elsewhere in the economy. For example, labor and capital will be less likely to move from rural to urban areas if rural regions are growing successfully, and this will act to dampen the growth of the urban economy.

To measure the full indirect impact of agricultural growth in the national economy requires a general equilibrium modeling approach. Byerlee has undertaken such work for Nigeria (Byerlee, 1973) and Sierra Leone (Byerlee, et al., 1977). Using a macroeconomic simulation model, he analyzes the impact of government policies for expanding, alternatively, the production of export and food crops. For Nigeria, his results show that policies which expand food crop production increase value added in nonagriculture by Naira 0.23 for each Naira 1.00 increase in value added in agriculture. ^{13/} In contrast, policies to increase export crop production lead to between 0.73 and 0.96 Naira of additional value added in nonagriculture for each Naira 1.00 increase in agricultural value added.

The results for Sierra Leone are more modest, probably reflecting the much weaker industrial base of that country. Increases in food crop production have a similar impact on the national economy as in Nigeria:

each Leone 1.00 of additional value added in agriculture generates Leone 0.29 of nonagricultural value added. But the linkages emanating from increased export crop production are weaker than in Nigeria--Leone 0.42 of value added in nonagriculture for each Leone 1.00 of additional value added in agriculture.

These results are generally consistent with the size of our regional multipliers. This would seem to suggest that any positive spillover effects arising beyond a region's boundaries are largely offset by negative spillover effects.

There are no directly comparable studies for Asia, but modeling studies of India (Rangarajan, 1982) and South Korea (Adelman, 1984) suggest stronger linkage effects from agricultural growth on the national economy than in Sub-Saharan Africa.

VIII. CONCLUSIONS

A. Implications for Policy

Several themes have recurred throughout this review. Together, they point in clear directions for policy makers and practitioners interested in balanced rural growth and in maximizing the rural nonfarm spinoffs of agricultural progress.

- Agricultural growth will be essential in launching successive rounds of growth in rural areas. Consumption linkages appear particularly important. Raising farm labor productivity is therefore important, not only because it permits the release of labor from agriculture to nonagricultural pursuits, but because it boosts per capita income to levels that enable consumer diversification from food into nonfood items.

- Government policies affect not only the magnitude of agricultural growth but also the ability of rural nonfarm enterprises to respond to the increased demand. Investment codes and related legislation which have

discriminated against small, rural nonfarm firms (Haggblade, Liedholm and Mead, 1986; Page, 1979; World Bank, 1982, 1987), together with historic urban policy biases (World Bank 1981), will need to be redressed if rural nonfarm enterprises are to achieve their potential for income generation and economic decentralization.

• The historical focus on manufacturing, by both policy makers and researchers (Haggblade, Hazell and Brown, 1987) seems now worthy of redirection. Spatial, time series and consumption data uniformly point, not to manufacturing, but rather to commerce and services as key growth sectors over the course of Africa's rural structural transformation. Services, in particular, are the activities best insulated from urban competition; hence consumption leakages are smallest in this sector. Service and commercial enterprise should not be excluded from assistance programs as has frequently been the practice in the past.

• Rural towns emerge as focal points in the development of the rural nonfarm economy. Cross-section data systematically identify much higher densities of nonfarm activity in rural towns than in dispersed rural settlements. By providing nonfarm enterprises with larger markets, rural towns offer firms the potential to exploit economies of scale. Prospects for sharing equipment as well as the emergence of repair and support facilities induce enterprise establishment in rural towns. Moreover, the emergence of rural towns enables policy makers to provide necessary productive infrastructure at lower cost than would be possible under widely dispersed settlement patterns.

• For rural towns to play their role in a balanced rural development process, it will be essential to assure adequate economic and social infrastructure to support nascent modern nonfarm activities. Physical infrastructure will undoubtedly play a key role. Anecdotal evidence on the rise of secondary cities in developing countries identifies ground

transportation--roads or railroads--as necessary first infrastructural investments (Rondinelli and Ruddle, 1978; Rondinelli, 1983). The consumption data from Africa and Asia reinforce this notion, highlighting the importance of road access to rural towns in stimulating agricultural consumption linkages. Beyond that, the spotty record of rural electrification programs alone in fostering industrialization (Fluitman, 1983; Okelo, 1973) suggests a need to review evidence on complementarities, sequencing and necessary additional conditions for generating productive impact from infrastructural investments. Institutional infrastructure will also be essential in fostering the transition to a more specialized, productive rural economy. Efficient rural financial markets will be particularly important. It appears that improvements on this front will require integration of the existing informal credit markets with the formal banking system. Labor markets are also essential, and their increased efficiency will follow in the wake of improved communication and transport infrastructure.

° Because much current writing emphasizes the need for investments in infrastructure, policy makers can all too easily overlook the collateral need for investments in people. Since services will be among the most rapidly growing rural nonfarm activities, investment in human capital will likely be essential for realizing those potential gains. Services depend more on skilled people than on equipment and infrastructure.

° Many programs of direct assistance to rural nonfarm enterprises, although by no means all, have been cost effective. ^{14/} The record of technical assistance and projects providing modern workshop facilities have been most checkered; two-thirds of 17 recent project evaluations have found benefit/cost (B/C) ratios below one (Haggblade, 1982; Kilby, 1979). On the other hand, credit projects, especially those supplying working capital, have enjoyed greater success. A recent evaluation of seven small

enterprise credit projects found that all have B/C ratios in excess of one (Kinly and d'Zmura, 1985). Overall it appears, as Kilby (1979) originally suggested and subsequent appraisals have confirmed, that programs which aim to provide a complete package of financial, technical and management assistance--nursery industrial estates, for example--are generally less effective than programs that identify and provide a single missing ingredient necessary for enterprise success.

• Women dominate many of the nonfarm activities that will grow most rapidly during structural transformation--activities such as food processing and preparation, tailoring, trading and many services. They likewise hold major interest in many of the declining rural nonfarm occupations--basket making, mat making, ceramics and weaving. Consequently, women will be key actors in the economic transition of Africa's rural economy. ^{15/} To facilitate their contribution to an accelerated rural transformation will require assistance agencies and governments explicitly recognizing the key role to be played by women.

B. Implications for Research

This review, in sorting through the delicate and spotty available evidence, has identified several key priorities for future research.

• To improve our confidence in estimates of growth multipliers, the key parameters to be measured are the marginal budget shares and expenditure elasticities for rurally-produced nontradables. Those who analyze, and especially those who collect, rural consumption data can perform a vital service by tagging and highlighting the locational features of rural consumption decisions.

• On the supply side of the rural nonfarm economy, it will be particularly important to start filling in descriptive and analytical profiles of the service and commercial sectors of the rural economy as a complement to the important, detailed work already undertaken on rural manufacturing

and repair. Research in the future should also include both large and small, formal and informal firms within its purview. Subsector research offers is a promising means of doing this (Boongard et al., 1986). By looking at key final product markets one at a time and reviewing the entire network of resource flows from raw materials to consumer, the subsector approach integrates analysis of the relevant manufacturing, commercial and service segments of the economy. And by including large and small firms together, it provides useful indications of their competitive or complementary relationships in alternative channels thereby providing insights into future dynamics in each commodity subsystem.

Finally, we need a detailed review of the links between rural infrastructure and the stimulation of rural nonfarm activity. Questions of sequencing, complementarities, substitutability, necessary collateral inputs, and effective methods of financing and maintenance remain obscured.

C. Magnitude of Multipliers

Based on the limited evidence available to date, we estimate Africa's rural agricultural growth multipliers to be in the order of 1.5. That is, a \$1 increase in agricultural incomes will generate about 50 cents of additional rural income, primarily among suppliers of rural nonfarm goods and services. This initial estimate places the African multipliers at about 60 percent of what they appear to be in a few Asian countries for which we have estimates.

Different types of agricultural growth--smallholder as opposed to estates, cash as opposed to food crops, tree crops as opposed annuals, mechanized as opposed to animal traction or hand hoe agriculture--may generate different multipliers. But initial estimates, based on simple modeling calculations, suggest surprisingly little variation. Contrasting small farmers and estates, and tree crops as opposed to annuals, we have found that the multipliers vary little within the range tested. We must

caution that farm management and especially consumption profiles of the very wealthiest farms remain elusive. As data from these very high income farmers become available, the range of agricultural growth multipliers may well widen. But it remains to be seen whether presumably lower rural consumption linkages will be offset by potentially greater production links.

We hypothesize that African multipliers are lower than those found in Asia because of a combination of different policies and different natural environments. The nature of African rainfall patterns and geology of river basins preclude cost effective irrigation on a scale as large as in Asia. Hence backward linkages into pump supply, canal construction and maintenance, all currently important in Asian countries, will simply be unavailable in Africa. Population density also remains much lower in Africa, requiring larger geographic market areas than in Asia to support minimum viable scales of business activity. This diminishes the competitiveness of rural nonfarm producers contesting markets with large urban suppliers. In addition, African consumption patterns seem less diversified into nonfoods than in Asia. But at this stage it is not possible to say whether these differences arise from different income levels, differing preferences for urban and imported goods, measurement error stemming from the large share of nonmonetized goods and service transfers in Africa, or simply result from an array of existing fiscal, trade and pricing policies which couple with lower levels of productive infrastructure to induce lower second-round supply responses in rural Africa. We have much still to learn.

FOOTNOTES

- 1/ We would like to thank Dennis Anderson, Arthur Gibb, Peter Kilby, Carl Liedholm and Vijay Vyas for helpful comments on an earlier draft. We are likewise grateful to Yacob Fisseha and Chris Windheuser for help in locating elusive data and to Kwesi Amisshah and Nandinee Kutty for research assistance. The views expressed herein are the authors' and should not be attributed to the World Bank or its affiliated organizations.
- 2/ See, among others, Kilby, 1962; Liedholm, 1973; Liedholm and Chuta, 1976; Steel, 1977; Chuta and Liedholm, 1979; Page, 1979; Anderson and Leiserson, 1980; Page and Steel, 1984; Liedholm and Mead, 1986; Kilby and Liedholm, 1986; Milimo and Fisseha, 1986; Liedholm and Mead, 1987.
- 3/ Definitional differences may account for some of the apparent variation in rural nonfarm employment across countries. Individual country definitions of rural, age of economic participation and female participation rates follow:

Benin:	Rural = not explicitly defined. Implicitly includes population in localities of less than 9,500 persons. Economically active = all people over 15 years of age. Women's participation rate = 73 percent versus 95 percent for men.
Cameroon:	Rural = all areas outside of provincial, departmental, arrondissement and district headquarters and outside selected settlements over 5,000 with high schools, hospitals or train stations. Economically active = population 6 and over. Women's participation = 38 percent versus 62 percent for men.
Chad:	Rural = all population living outside of prefecture headquarters or in localities of less than 5,000 in the South and less than 3,000 in the North. Economically active = all people over 15 years of age. Women's participation rate = 28 percent versus 94 percent for men.
Ghana:	Rural = localities under 5,000 according to official definition. But economic activity breakdown only available for towns under 10,000. Data in table refer to towns under 10,000 as rural. Economically active = all people over 15 years of age. Women's participation rate = not given explicitly but is evidently 33 percent lower than men's.
Ivory Coast, Bouake Region:	Rural = entire Bouake region including rural towns. Economically active = population aged 15-59. Women's participation rate = not specified.
Malawi:	Rural = undefined. Rural towns taken as all urban areas outside of Lilongwe, Blantyre and Zomba. Economically active = all persons over 10 years of age. Women's

participation rate = 44 percent versus 52 percent for men.

- Mali:** Rural = areas outside of legally designated "communes". Implicitly settlements over 3,000. Economically active - not defined. Women's participation rate = not given.
- Mauritania:** Rural = not defined. Taken as all regions except three except with over 85 percent population designated as urban. Essentially all localities under 10,000. Economically active = all persons over 12 years of age. Women's participation rate = 25 percent versus 82 percent for men.
- Mozambique:** Rural = all areas outside 12 major cities. Twelve city sizes not cited. Economically active = all persons over 12 years of age. Women's participation rate = 81 percent versus 78 percent for men.
- Rwanda:** Rural = areas outside prefecture headquarters and two other localities designated as urban. Economically active = all persons over seven years of age. Women's participation rate = not given.
- Senegal:** Rural = localities less than 1,000. Economically active = all persons over six years of age. Women's participation rate = 23 percent versus 60 percent for men.
- Sierra Leone:** Rural = census definition, all towns under 5,000. Since employment not broken down by town, rural defined here as all districts with at least 75 percent of their population in localities of under 2,000. Economically active = all persons over 12 years of age. Women's participation rate = equal to that of men. Each accounts for 50 percent of labor force.
- Tanzania:** Rural = regional and district headquarters plus towns over 5,000. Economically active = all persons over five years of age. Women's participation rate = 55 percent versus 54 percent for men.
- Togo:** Rural = all areas outside Lome and six legally designated "communes". Economically active = population over 12 years of age. Women's participation rate = not given.
- Zimbabwe:** Rural = population living in towns under 2,500. During 1969 census urban = any locality over 150 if majority of males employed in non-agricultural occupations. Economically active = population over 15. Women's participation rate = 48 percent versus 80 percent for men.

- India:** Rural - localities with population 5,000 or less. Economically active - no age cutoff; apparently includes workers of all ages who worked the major part of the previous year. Women's participation - 15 percent versus 51 percent for men. Unlike other countries, this is calculated as a percentage of total rather than working age population.
- South Korea:** Rural - unincorporated rural areas (myeons). Implicitly includes settlements under 20,000. Economically active - all persons over 14. Women's participation rate - 33 percent versus 79 percent for men.
- Taiwan:** Rural - undefined. Breakdown here follows Shih (1983) who defines rural as total population minus the five largest cities and three metropolitan countries. Effectively excludes all cities over 250,000 as well as two suburban counties surrounding Taipei. Economically active - all persons over 15. Women's participation - 33 percent versus 79 percent for men.
- Thailand:** Rural - sanitary districts and non-municipal areas i.e., all non-urban areas. Urban - cities over 50,000; towns over 10,000 and density over 3,000 per square kilometer or which contain an administrative seat; and communes established as appropriate and without regard to size. Economically active - all persons over 11. Women's participation - 65 percent versus 77 percent for men.

- 4/** This conception of the rural economic transformation draws on a wealth of antecedent views, most explicitly expressed by Johnston and Kilby (1975), but also drawing on Anderson and Leiserson (1980), Anthony et al. (1979) and Binswanger (1983), Byerlee and Eicher (1974), Liedholm (1973), and Vyas and Mathai (1978).
- 5/** African rural nonfarm entrepreneurs commonly hire or apprentice 50 to 70 percent of their workers from outside the family (Aluko, 1972 and 1973; Malawi, 1980; Milimo and Fisseha, 1986; Mozambique, 1983; Rwanda, 1978; Tanzania, 1982; Wilcock and Chuta, 1982; Williams and McClintock, 1981; all data reported in Haggblade, Hazell and Brown, 1987, Table 13). In agriculture, nonfamily labor usage averages closer to 15-20 percent of total farm employment (Eicher and Baker, 1982; Byerlee, 1980; Anthony et al., 1979; Cleave, 1974; Collier and Lal, 1986; Collier, Radwan and Wargwe, 1986; Ghai and Radwan, 1983b; Matlon et al., 1979; Norman, 1972; Norman, Pryor and Gibbs, 1979; Oates, 1984; Robertson and Hughs, 1978; Spencer and Byerlee, 1976; and Weinrich, 1975). Combining these estimates with the labor force data in Table 1, we estimate that about 20 percent of Africa's rural labor force is channeled through labor markets (60 percent of nonfarm workers x a 15 percent employment share + 15 percent of agricultural labor x an 85 percent rural employment share = 22 percent of rural employment). Further evidence indicates that exchange labor rarely exceeds five percent of labor flows (Hill, 1977; ILO 1985b and 1985c; Norman, Pryor and Gibbs, 1979; Oates, 1984; Weinrich, 1975).

- 6/ See Adayemo, 1985; Aluko et.al., 1972 and 1973; Child, 1977; Liedholm and Chuta, 1976; Olufokunbi, 1981; Schadler, 1968 and Thomi and Yankson, 1985. Their data are reproduced in Haggblade, Hazell and Brown, 1987.
- 7/ See Haggblade, Hazell and Brown's (1987) analysis of data from Zambia, (Milimo and Fisseha, 1986) and Sierra Leone (Liedholm and Chuta, 1976).
- 8/ Kilby (1987) has also begun looking at time series data on nonfarm employment in Kenya. However, his analysis is not readily comparable with the others cited here, because his data track only "informal sector" firms, essentially those employing between one and nine workers. While important on employment and equity grounds, trends in informal nonfarm activity may not be representative of the entire rural nonfarm economy given that the "informal sector" accounts for only about 20 percent of nonfarm activity (Ndua and Ng'ethe, 1984).
- 9/ Vanvali's data are reproduced in Haggblade, Hazell and Brown (1987).
- 10/ Table 1 indicates that between 7 and 30 percent of the African rural labor force engages in nonfarm activity as a secondary source of employment, with agriculture presumably their primary occupation. Farm management data indicate this secondary employment may be even higher. The data cited earlier (Section III.A) indicate that 15 to 65 percent of farmers engage in nonfarm activities at certain seasons of the year. Given that farm employment typically accounts for 85 percent of rural employment, this leads to an estimated 13 ($15 \times .85$) to 42 percent ($65 \times .85$) of the rural labor force with secondary nonfarm employment. We must add to that the flip side of the coin, the primarily nonfarm workers who work seasonally in agriculture, to arrive at the total share of the rural labor force moving seasonally between farm and nonfarm activities. Given that as much as 75 percent of rural nonfarm workers may participate in agriculture (Mbithi and Chege, 1973), this results in an additional 7.5 to 15 percent of the rural laborforce ($.75 \times 10$ to 20 percent primarily engaged in nonfarm activity). Thus the total flow lies between about 15 ($7.5 + 7.5$) and 57 percent ($42 + 15$). Within this interval, we believe that 20 to 40 percent represents the most likely norm.
- 11/ Considerable evidence indicates that 60 percent of rural consumption involves cash purchases, while the remaining 40 percent derives from own consumption of home-produced food (see Section V.A). Combining this with rural consumption data from Sierra Leone (King and Byerlee, 1977) and Nigeria (Hazell and Roell, 1983) results in the following stylized disaggregation of rural consumption: 40 percent non-marketed, home-produced food; 30 percent purchases of locally produced food; 5 percent imported foods; and 25 percent nonfood goods and services. Given these parameters, the share of locally produced food in total rural cash expenditure stands at 50 percent [$30, (30 + 5 + 25)$]. Specific computation for Sierra Leone results in a 40 percent estimate, while use of the Gusau, Nigeria data leads to an estimate of 58

percent. Thus 50 percent probably represents a reasonable average.

- 12/ The model is a two-sector, semi-input-output model in which the output of tradables is given exogenously, and the output of nontradables is elastic and is determined by the region's demand for nontradables. The demand for nontradables consists of household demand, which is assumed to be a linear function of regional value added (or income), and nontradable production intermediates, which are assumed to be proportional to regional gross output. Within this model, the regional value added multiplier for a one unit increase in value added from tradables is $1/(1 - \alpha - \beta\nu)$, where β is consumers' marginal budget share for nontradables, α is producers' nontradable intermediate inputs as a ratio of gross regional output, and ν is the ratio of value added to gross regional output.
- 13/ These results are not strictly Keynesian multipliers (as in Section VII B). Rather they are derived as ratios of the changes in farm and nonfarm income arising from policy-induced movements along the production frontier.
- 14/ See Ashe, 1985; Blayney and Otero, 1985; Deures, 1981; Farbman, 1981; Goldmark, Rosengard and Mooney, 1982; Goldmark et al., 1982; Goldmark and Rosengard, 1983 and 1985; Haggblade, 1982; Hunter, 1980; Kilby, 1979, 1982 and 1987; Kilby and Bangasser, 1978; Kilby and d'Zmura, 1985; Lassen, Traore, Brown and Walton, 1985; Levitsky, 1985; Liedholm, 1985; and Livingstone, 1977 and 1980. Liedholm and Mead (1987) provide a particularly succinct recent distillation of the findings of the small enterprise evaluation literature.
- 15/ Lele (1986) reaches this same conclusion through a different chain of reasoning.

**Table 1: Primary Employment in African Rural
Nonfarm Enterprises
(percent)**

C o u n t r y	Rural Labor Force Employed in Nonfarm Enterprises ^{a/}		
	Total	Male	Female
A. <u>Primary Employment</u>			
Benin (1961)	41	10	77
Cameroon (1976)	10	--	--
Chad (1964)	3	4	.1
Ghana (1960)	27	13	89
Ivory Coast, Bouake Region (1963)	10	--	--
Kenya (1970)	28	--	--
Malawi (1977)	11	17	4
Mali (1976)	8	--	--
Mauritania (1977)	21	--	--
Mozambique (1963)	9	19	1
Nigeria, 3-District W. State (1966)	63	19	87
Rwanda (1978)	5	--	--
Senegal (1970-71)	18	--	--
Sierra Leone (1974, Males 1976)	14	19	--
Tanzania (1978)	6	10	2
Togo (1970)	26	--	--
Uganda, 4 villages (1967)	20	--	--
Zimbabwe (1982)	20	--	--
B. <u>Secondary Employment</u>			
Benin (1961)	7	--	--
Chad (1964)	--	4	--
Western Nigeria, 3 states (1966)	--	20	-
Sierra Leone (1976)	--	11	--
Tanzania (1980)	17	--	--
Zambia, 2 regions	30	--	--

a/ See Note 3 for individual country definitions of rural.

Sources: Benin: Republique du Dahomey (1964)	Nigeria: Mueller and Zevering (1970)
Cameroon: Republique Unie du Cameroun (1976)	Rwanda: Rwanda (1978)
Chad: Republique du Tchad (1966)	Senegal: Republique du Senegal (1973)
Ghana: Ghana (1964)	Sierra Leone: Male (1976) from Eyerlee, et al. (1977)
Ivory Coast: Republique de Cote d'Ivoire (1965)	Aggregate from Thomas (1983)
Kenya: ILO. (1972), cited in Chuta and Liedholm (1979)	Tanzania, 1978: United Republic of Tanzania (1982)
Malawi: Malawi Government (1980)	Tanzania, 1980: Collier et al. (1986)
Mali: Republique du Mali (1980)	Uganda: F-randt, et al. (1972)
Mauritania: Republique de Mauritanie (1979)	Zambia: Hedlund and Landahl (1983)
Mozambique: Republica Popular de Mozambique (1983)	Zimbabwe: Zimbabwe (1985)

Table 2: Share of Nonfarm Earnings in Total Rural Income in Sub-Saharan Africa (percent)

Country	Agricultural Income	Nonfarm Income
A. Total Rural Income		
Botswana (1974-75)	56-75	24-44
Ghana, Akwapim (1965-66)	58-72	14-28
Ghana, Eastern Region (1967-68)	58-82	18-42
Ghana, Heads of Household in E. Region	25-50	50-75
Ghana, Five Villages	70-84	16-30
Ivory Coast, South East Region (1963)	71	29
Kenya (1969)	69	31
Kenya (1976)	72	28
Lesotho (1977-78)	23	77 ^{a/}
Northern Nigeria, Kano Region	72	28
Northern Nigeria, Zaria Region	78	22
Sierra Leone (1974)	64	36
Sierra Leone (1975-76)	81	19
Tanzania (1969)	79	21
Tanzania (1975)	77	23
B. Rural Cash Income		
Ghana, Akwapim (1965-66)	55-78	22-45
Ghana, Cocoa Farmers (1968-70)	77	23
Ghana, Eastern Region (1967-68)	45-68	32-55
Ghana, Heads of Household in E. Region	17-45	55-83
Ivory Coast, Bouake Region (1970)	58-76	24-42
Liberia, Western Region (1973)	69	31
Tanzania (1969)	64	36
Tanzania (1975)	57	43
Zambia, Luapuala Province (1977)	79	21
Zambia, Three Provinces (1982)	76	24

a/ Remittances account for 2/3 of rural income. Domestic nonfarm income is 12 percent of total, or 34 percent of domestic rural value added.

Source: Botswana: Chernichovsky et al. (1985) p.51
 Ghana: ILO (1982f), pp. 51, 53, 54, 57; ILO (1985e)
 Ivory Coast: Ivory Coast (1987)
 Kenya: ILO (1982g)
 Lesotho: National Accounts, cited in ILO (1982h) p.16
 Liberia: Ministry of Planning and Economic Affairs (Liberia), cited in ILO (1982i) p.58
 Nigeria, Kano Region: Matlon (1979); Zaria Region: Norman, Fryor and Gibbs (1979)
 Sierra Leone: Chuta and Liedholm (1979)
 Tanzania: ILO (1982a)
 Uganda: Massell and Farnes (1969) p.315
 Zambia, Luapuala: Maimbo (Zambia), cited in ILO (1982i)
 Zambia, Three Provinces: Due and Mindenda (1985)

**Table 3: Magnitude and Composition of
African Rural Nonfarm Employment ^{a/}**

	Total Employment		Composition of Nonfarm Employment						
	Farm	Nonfarm	Mining	Manufacturing	Construction	Commerce ^{b/}	Services	Other	
A. Employment Percentages									
AFRICA									
Benin, 1961	38.6	41.4	0.0	17.2	1.2	78.2	3.3	0.0	
Cameroon, 1976	88.6	10.4	0.2	23.8	8.8	18.1	31.4	19.9	
Chad, 1964	96.9	3.1	0.0	12.7	8.1	20.8	56.4	0.0	
Ghana, 1960	73.2	26.8	5.7	28.8	9.1	44.4	12.0	0.0	
Ivory Coast, Bouake Region, 1963	90.0	10.0	0.0	34.1	0.0	50.7	15.2	0.0	
Malawi, 1977	89.0	11.0	0.8	24.9	14.9	23.5	19.4	16.4	
Mali, 1976	91.7	8.3	0.8	39.8	0.8	9.0	14.9	34.7	
Mauritania, 1977	78.2	20.8	1.9	17.3	5.8	34.1	40.9	0.0	
Mozambique, 1980	91.0	9.0	0.0	50.9	5.6	17.6	25.9	0.0	
Rwanda, 1978	85.1	4.9	9.5	23.4	13.2	11.0	40.2	2.7	
Senegal, 1970/71	82.3	17.7	2.4	34.3	4.3	36.3	20.5	0.2	
Sierra Leone, 1974	86.2	13.8	5.4	20.3	7.9	44.9	21.4	0.0	
Tanzania, 1978	93.9	6.1	0.0	19.6	0.0	8.6	23.1	47.7	
Togo, 1970	74.5	25.5	0.1	18.6	4.2	28.7	7.9	42.4	
Zimbabwe, 1982	80.0	20.0	0.0	48.8	0.0	8.1	27.4	17.9	
ASIA									
India, 1980	81.1	18.9							
South Korea, 1980	81.8	18.4							
Taiwan, 1980	33.1	66.9							
Thailand, 1980	69.3	30.7							
B. Employment per 1000 Population									
AFRICA									
Benin, 1961	265.6	188.0	0.0	32.4	2.2	147.1	6.3	0.0	
Cameroon, 1976	359.3	41.7	0.1	9.9	3.6	6.7	13.1	8.3	
Chad, 1964	302.1	9.5	0.0	1.2	0.8	2.0	5.8	0.0	
Ghana, 1960	277.8	101.8	5.8	29.4	9.3	45.2	12.2	0.0	
Ivory Coast, Bouake Region, 1963	424.4	47.0	0.0	16.0	0.0	23.8	7.1	0.0	
Malawi, 1977	374.0	46.3	0.4	11.5	6.9	10.9	9.0	7.6	
Mali, 1976	333.9	30.3	0.3	12.1	0.2	2.7	4.5	10.5	
Mauritania, 1977	249.6	65.6	1.3	11.3	3.8	22.4	26.8	0.0	
Mozambique, 1980	450.6	44.5	0.0	22.6	2.5	7.8	11.5	0.0	
Rwanda, 1978	544.0	27.8	2.6	6.5	3.7	3.1	11.2	0.8	
Senegal, 1970/71	121.3	26.1	0.6	9.0	1.1	10.0	5.4	0.1	
Sierra Leone, 1974	530.4	85.0	4.6	17.3	6.7	38.2	18.2	0.0	
Tanzania, 1978	425.0	27.6	0.0	5.4	0.0	2.7	6.4	13.2	
Togo, 1970	268.5	91.9	0.1	17.1	3.9	24.5	7.3	38.9	
Zimbabwe, 1982	233.0	58.2	0.0	27.1	0.0	4.7	15.9	10.4	
ASIA									
India, 1980	282.0	81.0							
South Korea, 1980	339.0	75.0							
Taiwan, 1980	151.0	257.0							
Thailand, 1985	312.0	137.0							

^{a/} See Note 3 for individual country definitions of rural and of the workforce.

^{b/} Includes transport.

Sources: Benin: Republique du Dahomey (1964)
 Cameroon: Republique du Cameroun (1976)
 Chad: Republique du Tchad (1966)
 Ghana: Ghana (1964)
 Ivory Coast: Republique de Cote d'Ivoire (1965)
 Malawi: Malawi Government (1980)
 Mali: Mali (1980)
 Mauritania: Republique Islamique de Mauritanie (1979)
 Mozambique: Republica Popular de Mocambique (1983)
 Rwanda: Rwanda (1978)
 Senegal: Republique du Senegal (1973)
 Sierra Leone: Thomas (1983)
 Tanzania: United Republic of Tanzania (1982)
 Togo: Togo (1974)
 Zimbabwe: Zimbabwe (1985)

India: India (1981)
 South Korea: Korea (1980a and 1980b)
 Taiwan: Shih (1983) and China (1982)
 Thailand: Thailand (1985)

**Table 4: Activity Breakdown of
Rural Manufacturing Employment
(percent)**

Item	Burkina Faso ^{a/} 1980	Zambia ^{b/} 1986	Kenya ^{c/} 1977	Nigeria ^{d/} 1972/73	Sierra Leone ^{e/} 1976
Food/Agricultural Processing	55	55	22	2	5 ^{f/}
Clothing Products	25	6	22	56	53
Wood Products	1	32	43	11	19
Metal Products	8	4	6	4	19
Other	21	3	7	27	4

- ^{a/} Eastern ORD, 1980.
^{b/} Six Rural Provinces, 1986.
^{c/} Central Province Village Centers, 1977.
^{d/} Four States, 1972/73; enterprise, not employment percentages.
^{e/} All Rural, 1976.
^{f/} Includes only bakeries.

Source: Burkina Faso: Wilcock and Chuta (1982); firms below 50 persons.
Kenya: Norcliffe, Freeman, and Miles (1984), cited in Liedholm and Mead (1986); firms below 50 persons.
Nigeria: Aluko et al. (1972 and 1973); firms below 50 persons.
enterprise, not employment percentages.
Sierra Leone: Liedholm and Chuta (1976); firms below 50 persons.
Zambia: Milimo and Fisseha (1986).

**Table 3: Density and Composition of African Rural NonFarm Employment
by Size of Locality
(Employment per 1,000 population)**

	Agriculture	Total	Non-Agriculture					
			Mining	Manu- facturing	Constr- uction	Commer- ce ^{a/}	Services	Other
Benin, 1981								
Rural	266	188	0	32	2	147	6	0
Urban	37	313	0	59	13	199	33	0
Cameroon, 1976								
Rural	359	42	0	10	4	7	13	8
Rural towns	142	152	0	27	11	41	60	12
Urban	8	270	1	52	24	81	83	18
Chad, 1984								
Rural	302	10	0	1	1	2	5	0
Rural towns	132	131	0	20	15	34	62	0
Ghana, 1980								
Rural	278	102	8	29	9	45	12	0
Rural towns	55	239	14	45	25	112	43	0
Urban	38	473	13	77	65	207	112	0
Malawi, 1977								
Rural	374	46	0	12	0	3	9	8
Rural towns	152	177	0	19	27	58	60	14
Urban	42	287	0	62	38	69	68	18
Mali, 1976								
Rural	334	30	0	12	0	3	5	10
Rural towns	112	128	4	25	5	32	53	9
Urban	29	207	9	23	11	53	101	11
Mauritania, 1977								
Rural	154	40	1	7	2	14	17	0
Urban	14	371	43	35	48	85	149	0
Mozambique, 1980								
Rural	451	44	0	23	2	8	12	0
Urban	122	241	0	78	11	71	82	0
Nigeria, Three Western States 1988								
Rural	227	355	0	188	0	147	8	10
Rural towns	124	349	0	119	0	177	40	12
Rwanda, 1978								
Rural	344	28	3	7	4	3	11	1
Rural towns	324	185	0	20	14	37	110	3
Urban	149	364	3	39	70	68	174	8
Senegal, 1970/71								
Rural	121	26	1	9	1	10	5	0
Rural towns	111	69	0	15	3	27	24	0
Urban	16	170	1	28	10	53	76	0
Sierra Leone, 1974								
Rural	530	85	5	17	7	38	18	0
Rural towns	691	309	34	70	19	115	31	0
Urban	123	877	4	90	70	450	263	0
Togo, 1970								
Rural	312	107	0	20	5	28	8	45
Rural towns	71	268	1	51	17	94	42	63
Urban	10	384	0	64	23	118	83	86

^{a/} Includes transport.

Source: As in Table 3 plus Mueller and Zevering (1970). See Note 3 for definitions of rural by country.

**Table 6: Spatial Distribution of Rural Manufacturing
Bouake Region, Ivory Coast, 1970
(Employment per 1,000 Population)**

Type of Manufacturer	Kilometers from Bouake ^{a/}					Region
	0-10	10-15	15-20	20-25	25+	
Basketmakers	6.24	8.75	16.42	19.46	40.74	11.71
Weavers	9.73	11.70	13.76	15.72	17.75	10.14
Potters	2.65	4.62	3.83	3.38	4.22	2.97
Builders (cement)	2.75	2.86	1.89	1.77	1.90	1.79
Builders (banco)	1.68	1.76	2.21	1.25	1.06	1.33
Dyers	0.00	0.53	2.30	6.79	1.90	1.58
Tailors	1.56	1.19	2.30	1.53	1.48	1.24
Wood carving	0.59	1.35	0.86	0.64	1.06	0.74
Carpentry	0.59	0.33	0.54	0.88	0.84	0.43
Shoemakers	0.00	1.47	0.09	0.00	0.84	0.43
Mechanics	0.25	0.20	0.90	0.76	0.42	0.40
Blacksmiths	0.25	0.25	0.63	0.64	0.23	0.31
Jewelers	0.00	0.08	0.00	0.12	2.74	0.25
Hairdressers	0.00	0.00	0.14	0.00	0.00	0.03
Total	26.21	35.17	46.00	53.06	75.24	33.37

^{a/} Bouake had a population of 110,000 in 1970.

Source: Ancy (1974), p.116

**Table 7: Rates of Growth in Nonfar Employment
by Locality Size
Sierra Leone, 1974-1980
(percent compound growth)**

Activity	Locality Size		
	2,000-20,000	20,000-250,000	250,000+
Repairs	15.0	5.2	15.0
Radio	22.0	19.2	b/
Motor vehicle	17.0	2.4	20.0
Watch	a/	a/	13.0
Food Processing	14.0	33.0	21.0
Bakery	3.4	14.0	32.0
Other	39.0	b/	a/
Woodwork	0.5	8.8	7.6
Carving	0.0	b/	24.0
Carpentry	-0.6	8.6	3.6
Other	b/	a/	0.0
Clothing	0.7	1.8	5.0
Tailoring	0.0	3.8	4.9
Tie Dyeing	-3.0	-8.5	a/
Shoemaking	-4.3	16.0	6.2
Other	a/	a/	0.0
Metalwork	-5.8	9.4	10.0
Welding	0.0	23.0	6.6
Blacksmithing	-5.5	1.8	22.0
Goldsmithing	a/	a/	a/
Other	0.0	0.0	0.0
Other Manufacturing	a/	7.2	b/

a/ Greater than zero but less than one percent.

b/ Value for 1974 is zero.

Source: Chuta and Liedholm (1982), pp. 104-105.

**Table 8: Relative Magnitude of Backward and Forward
Agricultural Linkages in Rural Africa**

	Backward Linkages from Agriculture				Forward Linkages from Agriculture					Ratio of Forward to Backward Linkages	
	Implement Manufacture	Implement Repair	Distribution of Imported Inputs	Total	Food Processing	Restaurants	Butchers	Leather- work	Distribution and Storage		Total
(Employment per 1,000 Population)											
Zambia (1965)											
Dispersed Settlements	--	3.2	--	3.2	44.0	0.0	--	0.4	4.7 ^{a/}	49.1	15
Rural Towns under 12,000	--	1.2	--	1.2	35.3	1.8	--	0.8	28.6 ^{a/}	66.5	55
Rural Towns, 12,000-50,000	--	1.4	--	1.4	19.9	1.3	--	0.6	26.7 ^{a/}	50.5	36
Total Rural	--	2.7	--	2.7	38.0	0.2	--	0.4	7.4 ^{a/}	46.0	17
Sierra Leone (1974)											
Settlements under 2,000	--	5.5	--	5.5	0.0 ^{b/}	--	--	--	--	--	--
Rural Towns, 5,000-20,000	--	0.7	--	0.7	0.0 ^{b/}	--	--	--	--	--	--
(Percent of Rural Nonfarm Enterprises)											
Kenya (1977)											
Central Province	0.2	5.5	2.1	7.8	3.9	--	4.3	3.8 ^{c/}	5.1 ^{d/}	19.1	2.5

^{a/} Calculated as 50 percent of total rural distribution and storage. This assumes that distribution of rurally produced agricultural goods is proportional to their share of total rural cash expenditures. See Note 11 for details.

^{b/} Only baking enumerated among food-processing activities. Baking is based on imported wheat flour.

^{c/} Also includes processing of agricultural fibers.

^{d/} Includes only fruits and vegetables.

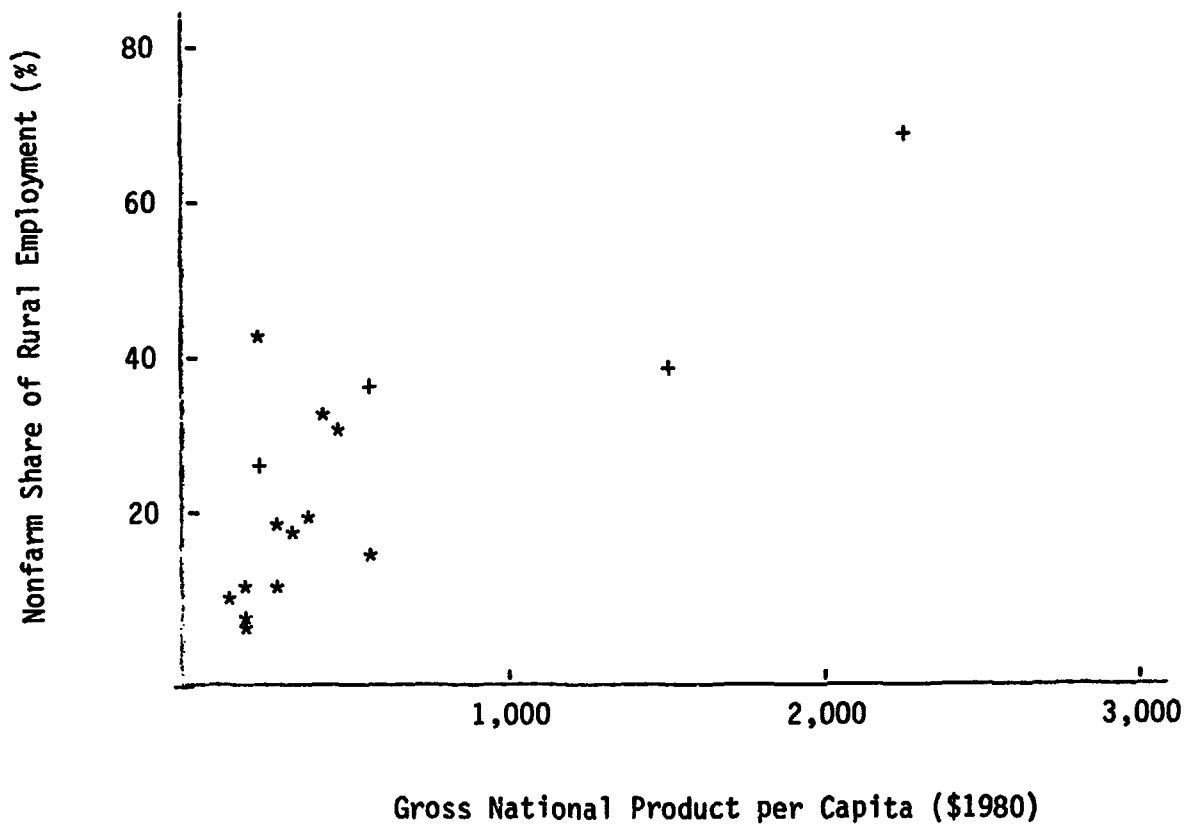
Sources: Zambia: Millar and Fischeha (1986); Sierra Leone: Liedholm and Chata (1976); Kenya: Freeman and Morcliffe (1985).

Table 2: Rural Household Expenditure Behavior in Selected Countries

Commodity Group	Average Budget Share					Marginal Budget Share					Expenditure Elasticities				
	Rural		Zaire	North		Rural		Zaire	North		Rural		Zaire	North	
	Quesu	Sierra Leone	Province	Muda	Arcoot	Quesu	Sierra Leone	Province	Muda	Arcoot	Quesu	Sierra Leone	Province	Muda	Arcoot
N.Nigeria	Laone	N.Nigeria	Malaysia	S. India	N.Nigeria	Laone	N.Nigeria	Malaysia	S. India	N.Nigeria	Laone	N.Nigeria	Malaysia	S. India	
Commodity Group															
Food Alcohol and Tobacco	80.7	78.7	86.5	66.7	76.2	76.1	67.9	--	37.7	68.0	0.94	0.92	--	0.57	0.61
Clothing and Footwear	7.2	7.0	11.4	5.8	4.2	8.9	7.4	--	6.1	7.7	1.24	1.06	--	1.89	1.65
Consumer Expendables	4.8	.	.	3.4	3.1	4.4	.	--	3.7	2.4	1.02	.	--	1.09	0.77
Housing	0.8	.	2.6	4.1	n.a.	0.4	.	--	12.4	n.a.	1.40	.	--	3.02	n.a.
Transport	1.9	2.2	1.3	1.8	2.8	2.7	3.0	--	3.1	3.4	1.41	1.36	--	1.67	1.22
Durables	1.1	.	2.1	0.6	1.4	.	7.1	--	1.9	1.25	3.25	3.43	--	.	.
Education and Health	1.1	1.4	.	2.9	1.9	1.6	0.8	--	5.2	2.4	1.42	0.57	--	1.79	1.26
Services and Social and Religious Obligations	3.3	4.3	13.5	13.1	9.1	4.4	6.1	--	22.7	19.3	1.33	1.66	--	1.73	2.12
Locational Group															
Locally Produced															
Food	75.3	69.0	.	46.4	68.0	70.3	66.1	--	24.6	46.5	0.98	0.96	--	0.53	0.77
Nonfood	6.4	12.6	.	18.1	17.4	11.3	17.6	--	36.9	30.6	1.34	1.41	--	2.06	1.77
Regional Imports															
Food	5.4	5.0	.	30.3	12.3	5.6	1.6	--	18.1	12.0	1.07	0.86	--	0.65	0.96
Nonfood	10.9	13.4	.	15.3	7.4	12.6	14.3	--	25.4	8.6	1.16	1.07	--	1.66	1.17

Sources: Quesu, Northern Nigeria, 1975-77 (Osball and Reell, 1988)
 Sierra Leone, Rural (King and Nyerie, 1977)
 Zaire Province, Northern Nigeria, 1970-71 (Siemens, 1976)
 Muda, Malaysia, 1972-73 (Osball and Reell, 1988)
 North Arcoot, South India, 1962-66 (Osball and Ramsey, 1986)

Figure 1
Rural¹ Nonfarm Employment
as a Function of GNP/Capita



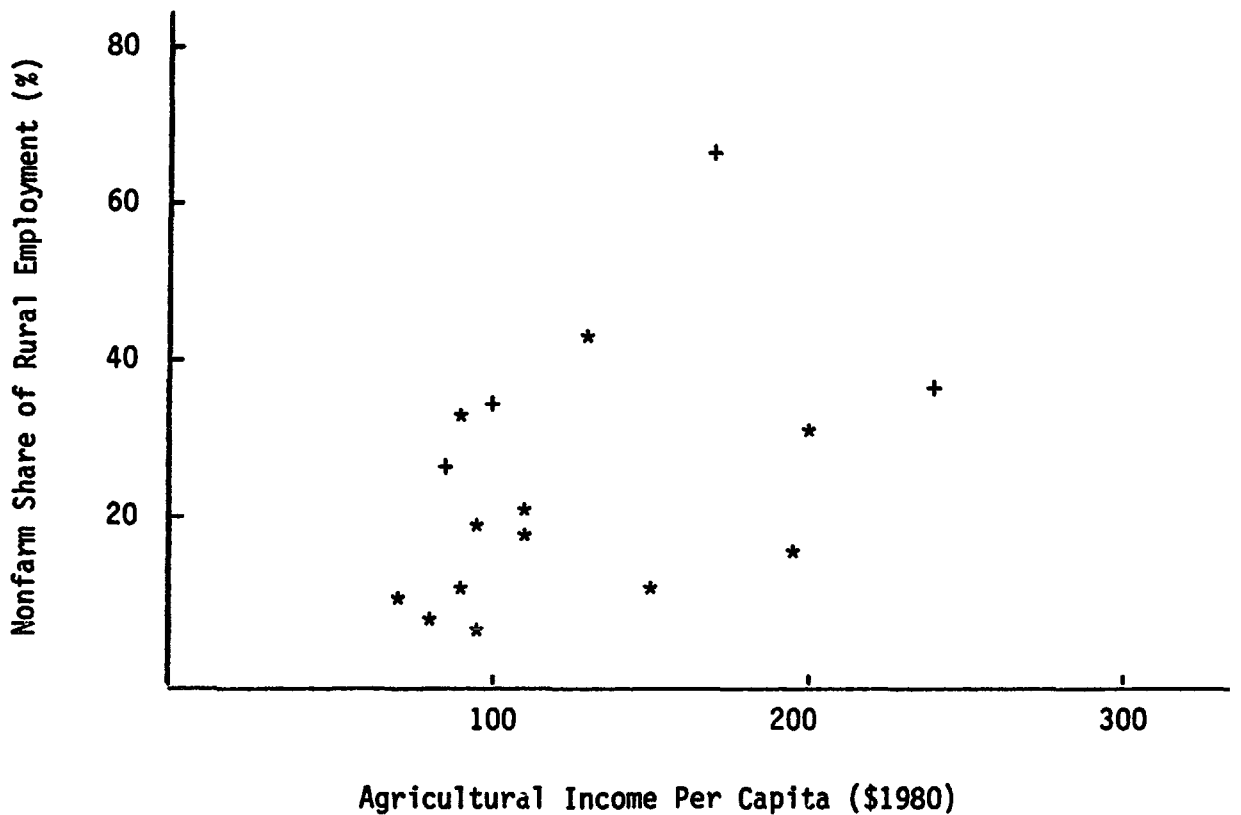
Note 1: Rural includes rural towns up to 250,000 in size.

* Africa.

+ Asia.

Source: See Table 3.

Figure 2
Rural¹ Nonfarm Employment
as a Function of Agricultural Income



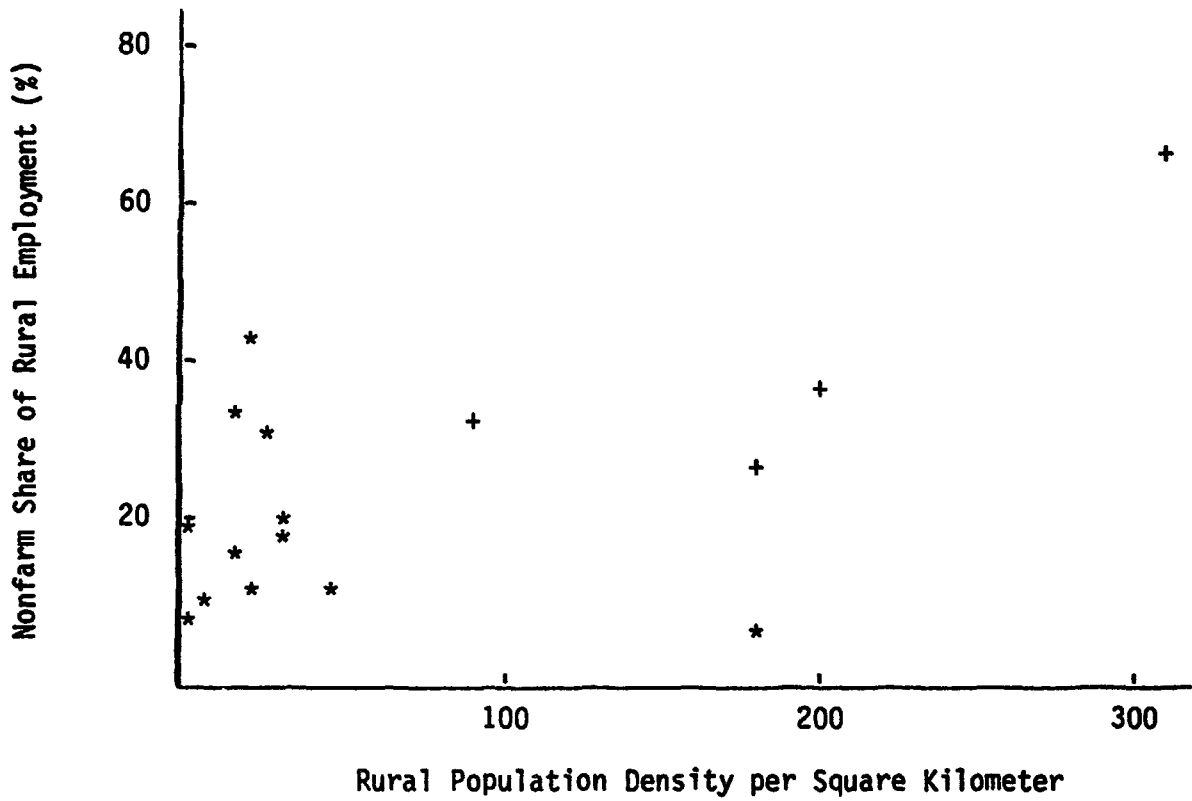
* Africa.

+ Asia.

Note 1 Rural includes rural towns up to 250,000 in size.

Source: As in Table 3.

Figure 3
Rural¹ Nonfarm Employment
as a Function of Rural Population Density



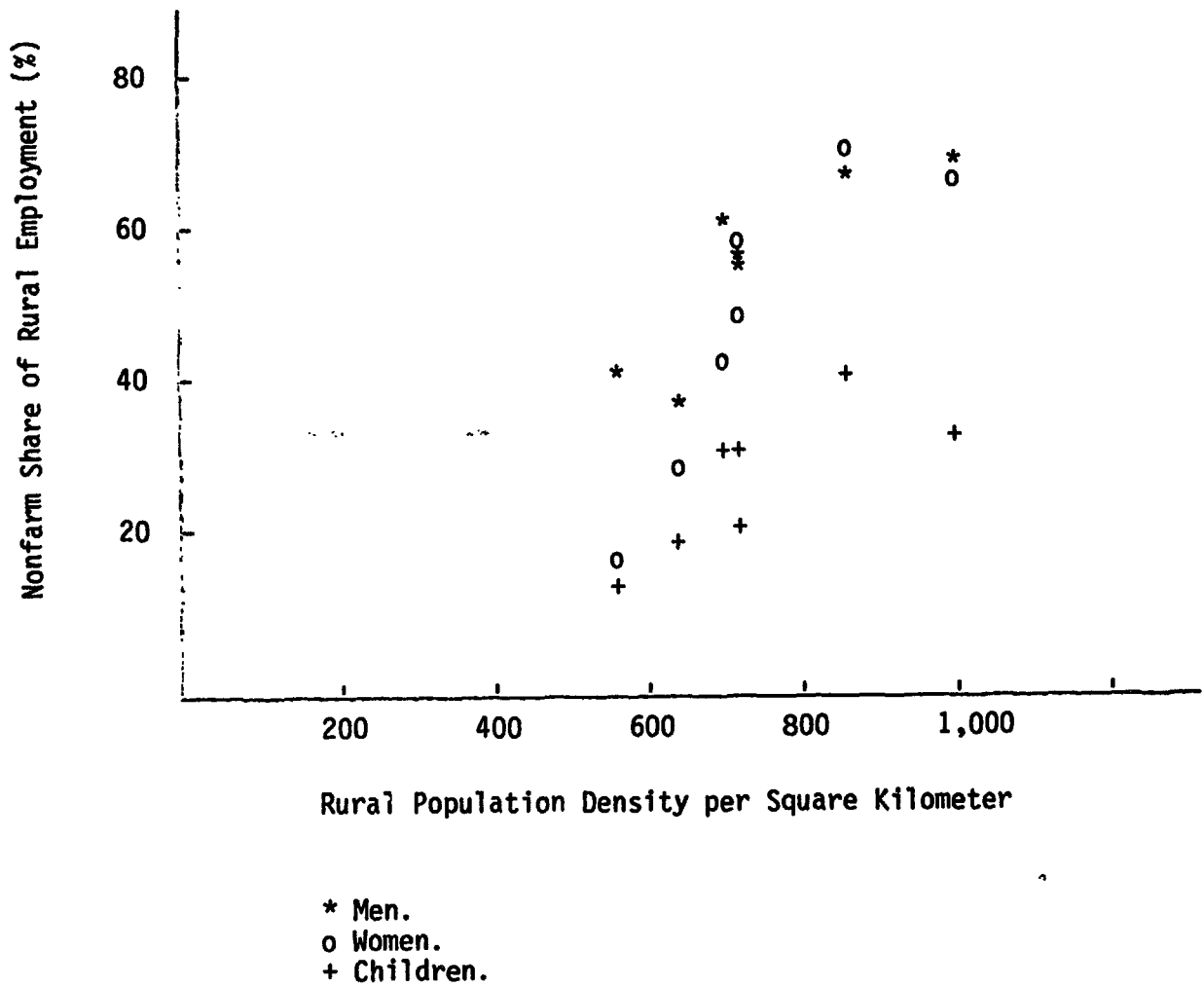
* Africa.

+ Asia.

Note 1: Rural includes rural towns up to 250,000 in size.

Source: As in Table 3.

Figure 4
Population Density and Nonfarm Employment
in Seven Districts,
Anambra State, Nigeria



Source: Okafor (1983).

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Agricultural growth stimulates the rural nonfarm economy through a variety of links — some operating through production relations, others through consumer spending patterns. In Asia these links are strong: a \$1 increase in agricultural incomes will generate about 80 cents in additional rural income, mainly among suppliers of rural nonfarm goods and services. In Sub-Saharan Africa, however, these links are much weaker: a \$1 increase in agricultural income will generate only about 50 cents of additional rural income.

One reason for these weaker links in Sub-Saharan Africa is that there is less irrigation, which creates jobs in construction and maintenance. Another is the lower population density, increasing the distances to markets and diminishing the competitiveness of remote producers. A third is the pattern of household consumption, with less diversity in both food and nonfood consumption. Government policies and poor infrastructure also put brakes on the nonfarm economy.

Demand clearly is the main constraint on the rural nonfarm economy. So the first task is to get agriculture going — in short, to bring faster agricultural growth to Sub-Saharan Africa. The focus should be on small-scale farming, because of its many links to the rural nonfarm economy. The second task is to be ready when growth comes. Here are some key considerations for policy formulation and future research:

- Investment codes and related laws that discriminate against small, rural firms have to be redressed.

- The focus on small-scale, rural manufacturing has to be redirected to include services, which are among the fastest growing rural nonfarm activities.

- Rural towns, crucial for the development of the rural nonfarm economy, have to be assured of adequate economic and institutional infrastructure, especially ground transport, communications, and efficient credit and labor markets.

- Investments in rural roads and transport systems have to be adequate to ensure that villagers have easy access to rural towns.

- Investments in people's skills have to accompany the investments in infrastructure to develop all types of rural businesses.

- Direct assistance to rural nonfarm enterprises — such as credit projects, especially those for working capital — can be much more cost-effective than technical assistance and projects providing modern workshop facilities.

- Because women will be key actors in the transformation of Africa's rural economy — in trading, in processing and preparing food, and in many other services — governments and assistance agencies must explicitly recognize this role and ensure that credit schemes are open to women as well as men.

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