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INTERSECTORAL LINKAGES AND THEIR IMPACT ON RURAL POVERTY ALLEVIATION: A SOCIAL ACCOUNTING MATRIX APPROACH

by

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Paper prepared for and under the auspices of the United Nations Industrial Development Organization (UNIDO). The paper is to be presented at a meeting of the Task Force on Rural Development of the Administrative Committee on Coordination of the United Nations, Washington, DC, May 3-4, 1993.

11/10/93

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I. A BRIEF OVERVIEW OF RURAL AND URBAN POVERTY AND THEIR INTERRELATIONSHIP

In a major report on the state of poverty, the World Bank (1990) noted that the decade of the 1980s has often been called a "lost decade" for the poor. In fact, that decade did not reverse the overall trend towards progress. The incomes of most of the world's poor went on rising and most socioeconomic indicators continued to improve. Why then this reference to a "lost decade"? First, the setbacks of the 1980s affected certain regions much more unfavorably than others. In particular, incomes fell, on average, in Sub-Saharan Africa and in Latin America during that decade and the incidence of poverty rose; while for most parts of Asia, the process of poverty alleviation continued. Secondly, most developing countries had to adopt stabilization and structural adjustment (SSA) policies during this period. To the extent that the SSA process entails, among others, major budgetary cuts to restore internal and external equilibrium, it temporarily slowed down the trend towards poverty reduction in those countries able to overcome the crisis rapidly, while placing a disproportionate burden on the poor in many countries facing large initial disequilibria and a prolonged adjustment process.

The differentiated regional pattern of poverty reflects different initial conditions in terms of such elements as resource endowment, socioeconomic structure, institutions and political system. A wide variety of responses to SSA policies in the developing world has reinforced the fact that the Third World is not a homogeneous lot and no uniform strategies for poverty alleviation apply. In order to understand not only the underlying causes of poverty but the policies and sectoral and intersectoral mechanisms that are called for in specific situations, carefully disaggregated region-specific [illegible] frameworks and models capturing the socioeconomic interdependence and linkages suggest themselves.

The perspective on poverty has also changed over the decades from the preoccupation with growth in the 1950s and 1960s, to the realization in the 1970s that trickle down was not working and hence the need for specific basic needs poverty alleviation programs, to the 1980s when the debt crisis hit and forced national governments to curtail their public expenditures heavily and the major policy objective became stabilization rather than equitable growth. The present emphasis seems to be that the poor must be made partners in the process of development. As the recent IFAD report on "The State of World Rural Poverty" points out, that "the multi-dimensional contributions of the rural poor to the growth process are both interactive and mutually reinforcing. (Jazairy, Alamgir and Panuccio, 1992, p. 14) The report further emphasizes:

> "It is argued that agriculture cannot be dealt with in isolation from industry, nor can the problem of the rural poor be solved entirely within agriculture itself without reference to labor employment and mobility between sectors. Even rural employment

> outside agriculture is related to the industrialization process and the policies that may underlie it. Therefore, a clear understanding of intersectoral linkages is crucial to the evolution of the new development paradigm." (p. 19)

The events of the last decade have brought sharply to the forefront several issues and questions that need to be addressed if the war on poverty is ultimately to be won. Key among these questions are why have poverty trends differed so much across countries and regions; what policies and intra- and intersectoral linkages and mechanisms can be effective in integrating the poor--as partners--in the development process? To explore these issues empirically and to attempt to provide operationally useful answers, a conceptual framework is needed that captures in a comprehensive and disaggregated way the interdependence and intra- and intersectoral linkages that prevail in a given economy, in a given period of time. The Social Accounting Matrix (SAM)--presented in Chapter II--provides such a comprehensive framework. It reveals, in particular, the interrelationship among the structure of production, the factorial income distribution, and the income distribution by socioeconomic household groups. It helps answer the question of <u>who</u> (the different socioeconomic household groups) receive <u>what</u> (from what type of employment, or other source of income) from <u>where</u> (from which production activities).

A. Incidence of Poverty

According to the World Bank (1990, p. 28), 1.1 billion people, that is roughly one third of the total population of the developing world, were estimated to be below the poverty line of $370 per person in 1985. Nearly half of the Third World's poor live in South Asia. In most instances low incomes go, hand in hand, with other forms of deprivation. For example, in Mexico the life expectancy of the poorest decile of the population is 20 years less than that of the richest decile. In C te d'Ivoire the primary enrollment rate of the poorest quintile is half that of the richest. (World Bank, 1992, p. 2)

The incidence of poverty as manifested by low incomes tends to be more pronounced in rural areas, even allowing for the often substantial differences in the cost of living between rural and urban areas. Other manifestations of poverty such as malnutrition, lack of education, high infant mortality rates, low life expectancy are also generally speaking more severe in the countryside. Recent data (1988 and later) covering 114 developing countries show that rural poverty accounted for 80% of total poverty in these countries and that the rural poor constituted about 36% of the total rural population.

(Jazairy, Alamgir, and Panuccio, 1992) The share of the rural population whose income and consumption fall below nationally defined poverty lines was estimated at 31% in Asia (46% of China and India are excluded), 60% in Sub-Saharan Africa, 61% in Latin America, 61% in Latin America and the Caribbean, and 26% in the Near East and North Africa. (Jazairy, Alamgir, and Panuccio, p. 1) Although the evidence indicates that progress has been made during the last two or three decades in reducing the share of rural population below nationally defined poverty lines, in many developing countries, the absolute number of the rural poor has risen. IFAD estimated the absolute number of rural poor to have increased from 511 million in 1965 to 712 million in 1988. In any case, the contrast in the poverty alleviation performance among different countries during this period is remarkable as can be judged by one dramatic pairwise comparison. Between 1965 and 1988 poverty declined in Indonesia from 60 to 20% of the population while rural poverty rose from 13 to 46% in Sri Lanka.

Poverty appears to fall most heavily on certain groups. Women, in general, are disproportionately affected. In many parts of the Third World women carry a heavier work load burden than men, while possessing less education and having more restricted access to remunerative (wage) activities. The incidence and severity of poverty is often higher among ethnic and minority groups, such as the indigenous people in the Andean region of Central and Latin America, specific castes in India, and the Tamil landless households working on tea and rubber plantations in Sri Lanka. Within the classification frameworks of most existing SAMs, it is only possible to a limited extent to evaluate the impact of changes in the sectoral composition of output and the incomes of these specific groups. Since as is discussed in Chapter II, household groups are classified according to socioeconomic criteria, such as location, (rural or urban), resource endowment (land ownership and possession of educational skills) and occupation of head of the household, a typical taxonomy is normally not so fine and nuanced that it can distinguish between female headed households and male headed households within the category of small farmers' households or, for that matter, identify a specific ethnic group.

It will be seen subsequently that the majority of the poor are concentrated among three distinct socioeconomic household groups, the landless and the small farmers in the rural areas, and the urban uneducated households in the urban areas. Most of the SAMs underlying the case studies presented in Chapter III use classification schemes that include these three groups. However, some of the SAMs distinguish also different labor skills by gender which makes it possible to say something about the employment effects on women

and on men, separately, of the effects of increasing output in various agricultural production activities and industrial and service sectors.

B. A Multi-Sectoral Approach to Identify Broad Intra-and Intersectoral Linkages: the Dual-Dual Framework

1. Introduction to Dual-Dual Framework

The poor are not a homogeneous lot. The characteristics of the poor differ widely, not only across the developing world but also, within a given country The question of which categories to adopt to study the broad pattern and causes of poverty, thus becomes very crucial. This is particularly relevant since the same set of policies may often have differential effects on the various categories of the poor. For example, a devaluation tends to affect the rural and urban poor quite differently. Clearly, an operationally useful multisectoral framework is needed that ultimately explains the determination of incomes received by the different socioeconomic household groups constituting the bulk of the poor, if one is interested in suggesting measures conducive to poverty alleviation. This multisectoral framework should identify the types of production activities and sectors from which the different groups of poor derive their incomes.

In setting up this framework it is essential to begin with the recognition of the endemic nature of dualism in developing countries. Dualism is represented by differences between sectors that tend to persist and widen over time, creating sharp contrasts. These differences are apparent in the simultaneous emergence of dynamic growth enclaves surrounded by pockets of poverty. To understand the causes of poverty and formulate policies, it is necessary to learn more about the interdependency and linkages between these dual sectors. (Santiago & Thorbecke, 1988, p.127)

A key understanding of dualism and its various forms is crucial to an understanding of poverty. The two most important manifestations of dualism in large parts of the developing world, appear to be related, first, to the physical and locational environment, and, secondly, to the technology and form of organization adopted. The first manifestation captures the dichotomy between rural and urban areas and the second between traditional technologies and family farms or enterprises, on the one hand, and modern technologies adopted in more complex forms of organization, on the other. This yields a dual-dual framework as illustrated in Figure 1 which can be further modified by distinguishing between agricultural and non-agricultural activities in rural areas.

The resulting six-way classification identifies and delineates six broad

Figure 1
Dual-dual framework distinguishing according to
(a) technology and form of organization and
(b) physical environment (location) and type of production

			Technology and Form of Organization	
			Traditional and Informal	Modern and Formal
Physical and Locational Environment and Type of Production	R U R A L	Agri-culture	Subsistence Agriculture	Commercial, Large Scale Agriculture
		Non-Agri-culture	Informal, Rural Off-farm Activities	Rural, Modern Industry and Services
	URBAN		Informal Sector	Modern Industry and Services

sectors, i.e. i) subsistence (small-scale) agriculture applying traditional labor intensive technologies on family farms and producing mainly domestic food crops; ii) commercial, large-scale (e.g. plantation type) agriculture using more capital intensive technology and being oriented more towards export crops; iii) informal rural non-farm activities undertaken in very small, often one person, enterprises using highly labor intensive techniques; iv) rural modern industry and services relying on incorporated enterprises and modern vintage technologies; v) the informal urban sector; and vi) urban modern industry and services. The standard models of dualism such as that of Lewis, tend to highlight the difference between modern (formal) industry and traditional (informal) agriculture. In contrast the 'dual-dual' framework extends the standard dualistic model by incorporating regional dimensions. Such a framework thus allows one to analyze the distribution of modern and informal sector activities in both rural and urban areas. Through such a framework, therefore, one can incorporate the rural non-farm sector as well as the urban informal sector into the discussion of dualism. These two sectors have been largely ignored in standard discussions of dualism but are now widely recognized as being very important analytical categories to understand poverty.

The dual-dual framework is used first, to identify the major types of production activities and sectors in which the different categories of poor are employed. The emphasis in this part is to point out the characteristics of the poor in each of these sectors separately. The various linkages among these different sectors are discussed, next, in an attempt to understand the causes and pattern of poverty at a fairly general level. In particular, the impact of various development strategies on these intra and inter sectoral linkages and hence on poverty are analyzed. In the process some key issues are raised that are then analyzed with quantitative rigor in the country case studies based on the SAMs in Chapter III.

In general it is felt that the discussion of the dual-dual framework provides a necessary stepping stone before getting into the details of the country case studies using SAMs. This is because of the following two reasons. Firstly, it helps to introduce very broadly, some of the intra and inter-sectoral relationships which would then be analyzed in greater detail in Chapter III. Secondly it provides some hints as to the types of criteria that might be appropriate in classifying production activities, factors and socioeconomic household groups in a SAM. It thus serves as a useful introduction to Chapter II in this paper on 'Methodology'.

2. Characteristics of Poor within each Dualistic Sector

a. Locational Characteristics: Rural-Urban Dichotomy

The dichotomy between rural and urban areas determines to a large extent the types of production and other opportunities open to the poor in these areas. In this respect, a major difference between rural and urban areas is related to the much greater seasonal and annual periodicity and synchronicity characterizing agricultural production and income variables, as opposed to non-agricultural production and income variables in urban areas. Seasonality and uncertainty thus are important characteristic features of rural poverty in contrast to urban poverty. These characteristics point to the need for off-season (non-agricultural) employment provision and some form of counter-cyclical intervention by the government to dampen the uncertainty associated with fluctuating agricultural output, both seasonally and annually.

A second difference between rural and urban areas relates to the greater accessibility in urban areas to social services (education and health) and infra-structure (transport, information, technical services, and banking). However, in spite of better access to these facilities, poor town dwellers often suffer more than rural households from certain aspects of poverty. The urban poor are typically housed in slums or squatter settlements, and often have to contend with appalling overcrowding, poor sanitation and contaminated water.

A third difference between rural and urban areas is the greater administrative ease of enforcing rules in urban areas. However, this does not necessarily mean that there is a higher prevalence of official as opposed to unofficial transactions in urban markets. Indeed because of the size of these markets and the greater degree of policy intervention, unofficial and informal activities flourish in that environment. It is these informal (and often unofficial) activities that most of the urban poor are engaged in. In a number of the case studies, particularly those of Gambia (III.B) and Indonesia (III.A.1), the dependence of the urban poor on the informal sector is shown in some detail. The urban poor households who derive most of their incomes from working on informal activities constantly face the threat of forcible eviction and municipal regulations discriminating against them.

Still another way in which the regional dualism manifests itself is a tendency in many developing countries to concentrate public and private investment projects around central urban metropolitan areas (typically the capital city). Such policies reduce significantly employment opportunities in the periphery--particularly for the unskilled workers--and contribute thereby to high poverty levels. A relevant question, in this context, relates to the

magnitudes of the interregional multipliers from projects originating in the periphery on value added and incomes in the center region and vice versa. One of the case studies, based on a two region SAM for Indonesia (III.A.2), tackles this issue and concludes that injections in the periphery tend to have a greater total output and income effects (within the outer region and from that region to the center region) than similar injections originating in the center region. This raises interesting implications regarding the location of industries. While there are obvious external and agglomeration economies from clustering industries and firms in urban areas, a key question relates to the impact on rural poverty of a process of rural industrial decentralization particularly concentrated on those industries intensive in unskilled labor. This issue is explored at the more micro level with the help of two Indian village SAMs (III.D.1). One of these villages is located next to a factory in contrast with the other, hence, the impact of that factory on the village economy and poverty alleviation can be evaluated, by comparing the two sets of SAM linkages.

b. **Within Rural Sector: Agriculture-Non-agriculture Dichotomy**

The fate of the poor is intimately linked to agriculture in the developing world. The bulk of the poor is located in rural areas and depend either directly or indirectly on agriculture for much of their incomes. The direct agricultural production effects operate through the incomes accruing to farmers and agricultural workers--much of it in the form of food produced and consumed by the farm households. The indirect production effects of agriculture on poverty alleviation are channeled through forward linkages creating jobs for the self-employed and hired workers engaged in agro-processing, trade, services and other marketing activities, and, to a lesser extent, through backward linkages creating a demand for intermediate inputs (e.g. fertilizer, cement, etc.) required to produce food and cash crops. Other very important indirect effects of agricultural output are through the consumption linkages of farmers and agricultural workers who spend a significant share of their incremental incomes on non-agricultural commodities such as consumer goods (e.g. radios, bicycles, clothing, leather products) and services, in turn, benefiting the rural and urban poor engaged in these activities.

Within agriculture the poor are those who either own no land or very small plots of land that is often unproductive and frequently lies outside the irrigated areas. The poor are usually unable to improve their plots since they lack access to formal credit and technology. An important question is thus regarding which form of investment (say investment in dairy cattle vs.

investment in irrigation, integrated rural development projects) has the greatest impact on poverty alleviation at the least output cost. Such questions are best addressed within the context of village level SAMs. A detailed illustration based on two such exercises from three different village SAMs in India are presented in case studies III.D.1 and III.D.2.

Non-farm activities include all economic activities other than crop and livestock production, encompassing services, construction, mining, commerce and manufacturing. It also includes agro-industrial activities that store, process and market agricultural commodities. The non-farm economy is crucial to the rural poor. Although those activities already occupy an important place in many rural economies, they have an even more important potential role to play throughout the developing world, particularly in Africa. While non-farm activities account for only 14% of full-time employment in rural Africa, their share jumps to 26% in Asia and 28% in Latin America, respectively.

The rural non-farm economy plays a valuable equity-enhancing function across countries. Landless and near landless households everywhere depend on non-farm earnings; those with less than half a hectare typically earn over half their income from non-farm sources. Moreover, the seasonality of non-farm earnings runs countercyclically to agricultural income, so that the promotion of non-farm activities can help dampen seasonal income fluctuations. Women, relatively more active than males, in non-farm activities in Africa and Latin America, dominate many of the equity-enhancing non-farm activities such as food processing, beverage preparation, weaving, gathering, selling of prepared snack foods and personal services. A major reason why women form the majority on such activities is because most of these activities can be carried out within their home together with taking care of children and doing other household chores. A comprehensive analysis of the nature of linkages between agriculture and non-agriculture, based on a large body of empirical evidence drawn from Africa, Latin America and Asia, is summarized in III.D.5.

3. Technological and Organizational Characteristics: Modern-Traditional, Formal-Informal Dichotomy

Technological dualism is a characteristic feature of developing countries. Within the agricultural sector, this dualism manifests itself in the form of traditional, labor intensive technology being used in family farms in contrast with more or less pervasive mechanization relying on hired labor on modern estates and plantations. In many instances, the modern capital intensive technology is not appropriate given the underlying resource endowment that has been adopted because of the prevalence of distorted prices such as subsidized access to credit, minimum wage legislation and an

overvalued exchange rate. Two important questions arise in this respect. The first is regarding the aggregate output and employment effects of traditional technologies vs. the corresponding modern counterparts. The second is whether a tradeoff may, in fact, exist between output and efficiency objectives, on the one hand, and employment and poverty alleviation objectives, on the other. Some of these issues are addressed using a SAM of Indonesia that breaks down a number of production activities along dualistic lines (case study III.A.3).

In general it appears that the use of modern technology tends to be highly associated with corporate structure and the use of traditional technologies with family farms and enterprises. (Cornelisse and Thorbecke, 1991). The type of technology and the form of organization that are adopted have differential impact on product and labor markets. Thus, for example, in the labor market, it is observed that large firms generally hire more skilled, often organized and unionized workers, while small firms in the informal sector rely more on family, self-employed labor. As pointed out earlier, the urban poor are highly dependent on the urban informal sector. The informal sector in developing countries is thus emerging as a potentially dynamic and transitional sector providing important income and employment sources for the poor. The World Bank (1990) points out that in Brazil in 1985, an estimated 75% of heads of poor families worked in the informal sector, compared with 35% of the population as a whole. Similarly, in Pakistan about half the urban poor are self-employed, mostly in trade and manufacturing. They are generally less skilled than the people who work for wages.

C. Intersectoral Linkages Under Various Development Strategies

A key issue relates to the proper role of agriculture and other sectors (industry and services) and the interaction among them during the development process. In the 1950s and 1960s, the prevailing view, and the preferred development strategy, was that of "industrialization-first". This strategy considered industry to be the active, dynamic sector while agriculture was viewed as a passive sector. Industry was the engine of growth pulling behind it agriculture. The resources needed for building the social overhead capital and the buildings, machinery and equipment required for an industrial take-off were to be squeezed out of agriculture. The agricultural surplus was to be extracted largely through a form of taxation i.e. by turning the internal terms of trade (the relative prices of agricultural commodities vis-Ã-vis industrial commodities) against agriculture.

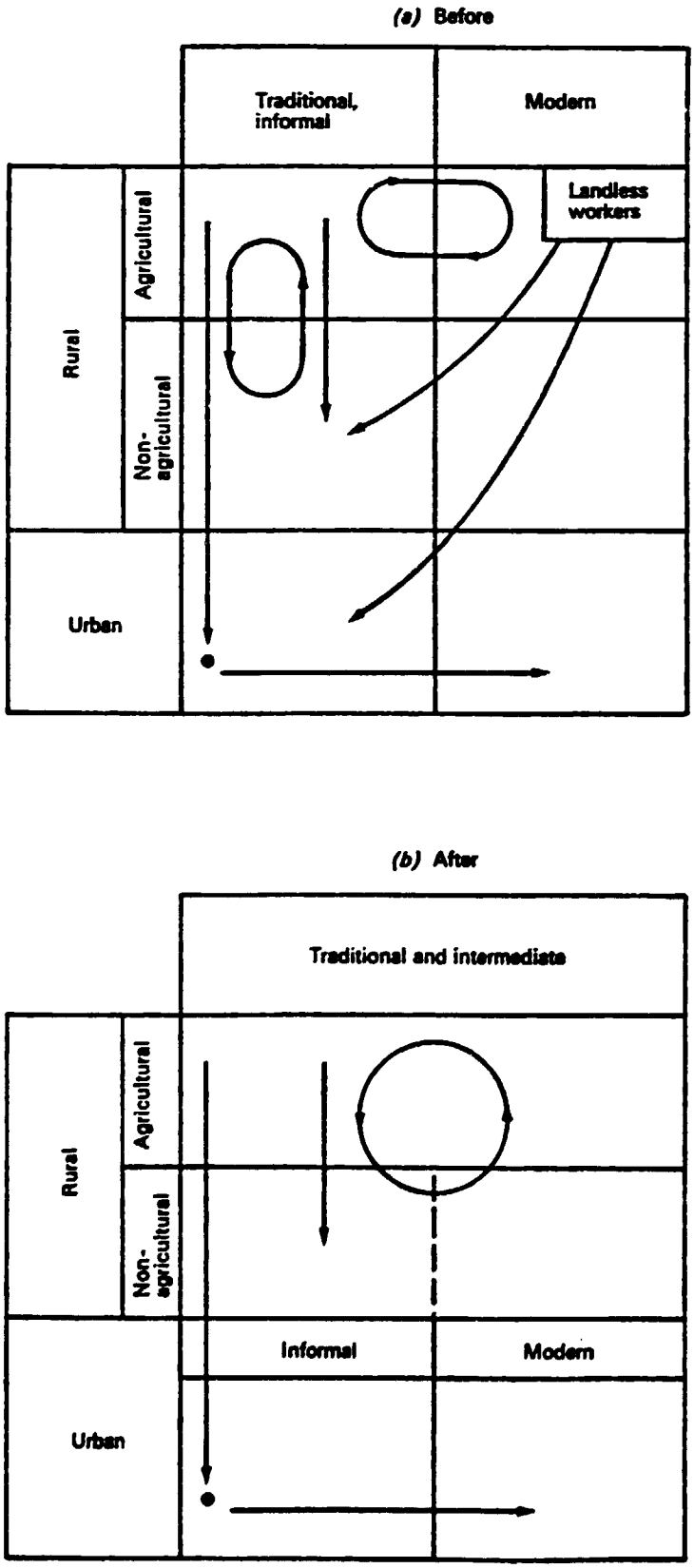
The experience of many developing countries during the 1950s and 1960s that adopted this industrialization first strategy (prime examples were India and much of Latin America) taught some important lessons. First, the

extraction of the agricultural surplus tended to be so large and so blunt that it led to agricultural output stagnation. Farmers lacked the incentives to adopt more productive technologies and supply response was extremely inelastic. The goose was killed before she could lay the golden egg. At the same time, much of the industrial growth occurred in heavily protected sectors through the process of import substitution. Production tended not only to be inefficient, but also overly capital intensive. Under those circumstances the rate at which agriculture was releasing labor was much higher than the very limited amount of labor that could be productively absorbed in the incipient modern industrial sector. This led to a massive rural-urban migration where most new migrants ended up almost residually looking for meager jobs in the urban informal sector. The incidence of poverty was increasing in both rural and urban areas. Squatter settlements started appearing around most of the large metropolitan centers.

The failure of the industrialization first strategy led to an almost complete reversal in the conception of the appropriate roles of agriculture and industry, within the development process. Many economists and development practitioners started assigning an active and dynamic role to small scale agriculture. The latter was envisaged to create gradually a derived demand and opportunity for industrial development through production linkages (backward and forward) and consumption linkages. It may only be a slight exaggeration to say that in some quarters small-scale agriculture was being viewed as the engine of growth pulling the development train behind it, while the industrial sector had become the caboose. In particular, starting in the 1970s, a unimodal strategy in agriculture was being promoted. This strategy emphasizes the growth of small-scale, subsistence agriculture. Under a unimodal strategy, resources and incentives are provided to small farmers. Development is to occur, as it were, from the bottom up. It contrasts with a bimodal strategy that favors the commercial, large-scale food sector, and plantations and large estates producing export crops. In the 1980s the pendulum swung even further with the advent of the so-called agricultural development led industrialization (ADLI) strategy that incorporated as an integral component the unimodal strategy. one of the case studies (III.C) tests this strategy and analyzes the agricultural growth linkages and their impact on non-agricultural production and rural and urban poverty alleviation with the help of a Mexican SAM.

From the standpoint of poverty, it is very important to note the implications of these various development strategies on the migration pattern. Figure 2. illustrates the changes in the migration pattern under a growth-oriented bimodal strategy and a unimodal strategy. The bimodal structure

Figure 2. Migration pattern under bimodal structure before and after structural changes



before the rural-based strategy is implemented, shows a clear compartmentalization between modern and traditional agriculture. After the unimodal strategy has taken hold , the distinction between the sectors may disappear gradually (hence the deletion of the line between these two sub-sectors in the lower part of Figure 2) and the number of landless farmers will be reduced through increased employment. Rural non-farm activities will also get a boost from the forward and backward linkages with agricultural development. Overall employment within the rural sector is thus expected to increase. As Pyatt and Thorbecke (1975: p.80) point out "a circular, balanced, essentially seasonal migration pattern can occur between rural agricultural and non-agricultural activities" . Thus in comparison to the industrialization first strategy, the rural and urban flow of migrants is expected to be lower under the unimodal strategy. Also the probability that these migrants will get jobs is expected to increase given the reduction in their numbers over time.

However, a number of problems that could arise in the implementation of the unimodal strategy need to be briefly mentioned here. The first problem is that of mounting a frontal attack in terms of a policy package consisting of a set of complementary measures such as land and structural reforms, institutional changes, price policies and research in a synchronized way. The political feasibility of such a policy package in many countries is questionable. The second problem is regarding the achievement of a mutually reinforcing relationship between agricultural and non-agricultural activities. This is a key element of a successful rural development policy particularly because of the limited potential that agricultural development alone may have in many developing countries. For example, a World Bank (1983) study on the employment problems of Bangladesh estimated that even a 3.7% rate of growth in crop production, which is ambitious considering past achievement[1], could absorb only a quarter of the increase to the labor force during the 1980s.

It is thus essential that the off-farm activities be designed in such a way as to be seasonally complementary from an effective employment standpoint with the calendar of agricultural activities. Given the very high level of seasonal underemployment in traditional agriculture, it means identifying productive activities that can be turned on and off according to the seasonal employment and production pattern in agriculture. Activities which might be consistent with those criteria appear to be small scale rural infrastructure projects, trade, transportation, personal services, small scale and cottage industries.

Thus the approach taken in this paper is that agriculture and non-agriculture can best be viewed as coequal partners in the development process. Each has an active role to play within the strongly interdependent and

interactive socioeconomic system prevailing in any given country at any point in time. Their roles will of course differ during, and evolve with the different phases of economic development a country passes through the structural transformation from an essentially agrarian economy to a mature industrial and service oriented state.

It is from this perspective that it becomes important to study poverty within a multi-sectoral framework focussing on the linkages among various economic sectors and sub-sectors. Take for example the case of rural industrialization, which as pointed out earlier, has great potential for poverty alleviation. However, one cannot talk about rural industrialization in isolation, it has to be contextualized within the overall socioeconomic structure of the economy. This means that one has to identify its linkages with both the agricultural sector and the urban industrial sector and analyze its development in relation to the stage of development in these two sectors.

This argument can be further elaborated and illustrated with the help of an empirical example. Papola (1987) did a study on the structure and performance of rural industries across different states in India and compared these with the performance of agriculture in the same states. Two fairly robust results were obtained. First it was found that those states which have experienced rapid agricultural growth have also undergone some change in their rural industrial structure in terms of addition of certain new activities like agroprocessing, repair of tools and machinery. These activities were essentially triggered off by the new technology. Second, a close positive correlation between agricultural growth and performance of rural industries across the different states was noticed. However, Papola (1987) concludes that the direct relationship between agriculture and the rural industrial sector, in terms of inputs supplying and output using linkages, explains only very partially these two observed results. Mostly the relationship seems to be rather indirect through a rise in income levels, purchasing power and investible surplus generated, and also through technological possibilities, infrastructure links and links with urban areas accompanying agricultural development. The linkage thus goes beyond the simple input-output linkage and calls for a SAM framework.

The link between the development of the urban industrial sector and rural industrialization is illustrated best by the experience of East Asian countries. In all these countries, the rural industrial demand benefitted from the export drive, through the role of subcontracting and the development of ancillaries. This type of linkage that has most strongly developed in Japan, broke the demand side contradiction between large and small scale (whether rural or urban) industries by structuring the two in a complementary mutually

beneficial relationship.

Equitable and sustainable development requires a balanced and interactively reinforcing growth process between agriculture and industry. The IFAD report points out that

> "In the early stages of industrial development, then, agricultural development--be it based on small or large farmers--is an important contributing factor. Agricultural growth may not be as rapid as industrial growth, but it is essential to it. Sustainable development therefore requires a balance in the allocation of economic surpluses between industry and agriculture, allowing for a parallel expansion. Industrial growth itself must also be geared to agricultural development, if rural poverty is to be eradicated by making the poor a source of growth. Such a balance has been achieved in some successful programs for growth, for example, in Indonesia and Thailand." (Jazairy, Alamgir and Panuccio, 1992, p. 20)

Conversely, in those instances where development was unbalanced, i.e. where agriculture was not able to retain more than a modest portion of its surplus, overall growth has been much less impressive.

From this standpoint, the functions agriculture and non-agriculture have to perform to contribute to growth and poverty alleviation should be examined and evaluated within the specific context of the prevailing socioeconomic structure which, itself, reflects the underlying development stage of a given country, region or village. The advantage of a SAM approach, as is shown in Chapter II, is that it captures quantitatively the initial conditions, that is the underlying structure of the socioeconomic system and, in an operationally useful way, the interdependence linking production activities in agriculture, industry and services to employment and incomes accruing to different labor skills that are, subsequently, mapped onto incomes accruing to different socioeconomic groups. Case studies based on SAMs force one to address issues related to poverty alleviation within a highly concrete and articulated system.

II. THE SOCIAL ACCOUNTING MATRIX AND RELATED METHODOLOGIES TO EVALUATE THE IMPACT OF INTERSECTORAL, DIRECT AND INDIRECT EFFECTS OF POLICY MEASURES ON INCOME DISTRIBUTION AND POVERTY

Economic growth is a necessary condition for the process of socioeconomic development to occur and, in particular, for poverty alleviation. Without sustained economic growth and the creation of new productive employment opportunities, masses of households in the Third World will be unable to overcome poverty. Yet, economic growth is not a sufficient condition for any significant reduction in absolute poverty. If growth is largely concentrated in the more modern sectors (i.e. in modern industry and services in the urban areas and commercial, large-scale agriculture) it may have limited linkages to, and impact on the urban informal sector and traditional agriculture, respectively. To repeat a somewhat overused expression, in such instances, growth does not trickle down to the needy who depend very largely on work in these last two sectors for their meager incomes.

Different development strategies lead to different structures of production, employment patterns and income distributions. Total output (GDP) in an economy can grow under a variety of different sectoral production structures and technologies. In some instances potential conflicts may exist between certain strategies (i.e. a package of complementary policies) to maximize output growth and those that will do something, in the short and medium term, to ameliorate the lot of the poorest members of society. However, it is more likely that through the choice of an appropriate development strategy, those conflicts can be significantly reduced, if not eliminated altogether. If we are to understand the interrelationships between the pattern of economic growth, the structure of production, the distribution of income and ultimately poverty alleviation, we need a conceptual framework that embraces these concepts simultaneously and focuses on the links among them, both actual and potential. The Social Accounting Matrix (SAM) constitutes such a framework.

As a data framework, the SAM is a comprehensive and disaggregated snapshot of the socioeconomic system during a given year. It provides a classification and organizational scheme for the data useful to analysts and policymakers alike. It incorporates explicitly various crucial relationships among variables such as the mapping of the factorial income distribution from the structure of production and the mapping of the household income distribution from the factorial income distribution. Table 1 presents a basic SAM. It can readily be seen that it incorporates all major transactions

Table 1
A basic social accounting matrix (SAM)

Receipts				Expenditures: 1	2a	2b	3	4	5	6	
				Factors of production	Institutions: Current accounts: Households	Institutions: Current accounts: Companies	Institutions: Current accounts: Government	Combined capital account	Production activities	Rest of the world combined account	Totals
1	Factors of production								Value added payments to factors	Net factor income received from abroad	Incomes of the domestic factors of production
2a	Institutions: Current accounts		Households	Allocation of labour income to household	Current transfers between households	Profits distributed to domestic households	Current transfers to domestic households			Net non-factor incomes received from abroad	Incomes of the domestic institutions after transfers
2b	Institutions: Current accounts		Companies	Allocation of operating surplus to companies			Current transfers to domestic companies				
3	Institutions: Current accounts		Government		Direct taxes on income and indirect taxes on current expenditures	Direct taxes on companies plus operating surplus of state enterprises		Indirect taxes on capital goods	Indirect taxes on inputs	Net non-factor incomes received plus indirect taxes on exports	
4	Institutions	Combined capital account			Household savings	Undistributed profits after tax	Gov't current account surplus			Net capital rec'd from abroad	Aggregate savings
5	Production activities				Household consumption expend. on dom. goods		Government current expenditure	Investment expenditures on domestic goods	Raw material purchases of domestic goods	Exports	Aggregate demand — gross outputs
6	Rest of the world combined account				Household consumption expend on imp. goods			Imports of capital goods	Imports of raw materials		Imports
Totals				Incomes of the domestic factors of production	Total outlay of households	Total outlay of companies	Total outlay of government	Aggregate Investment	Total costs	Total foreign exchange receipts	

Source: Thorbecke (1988)

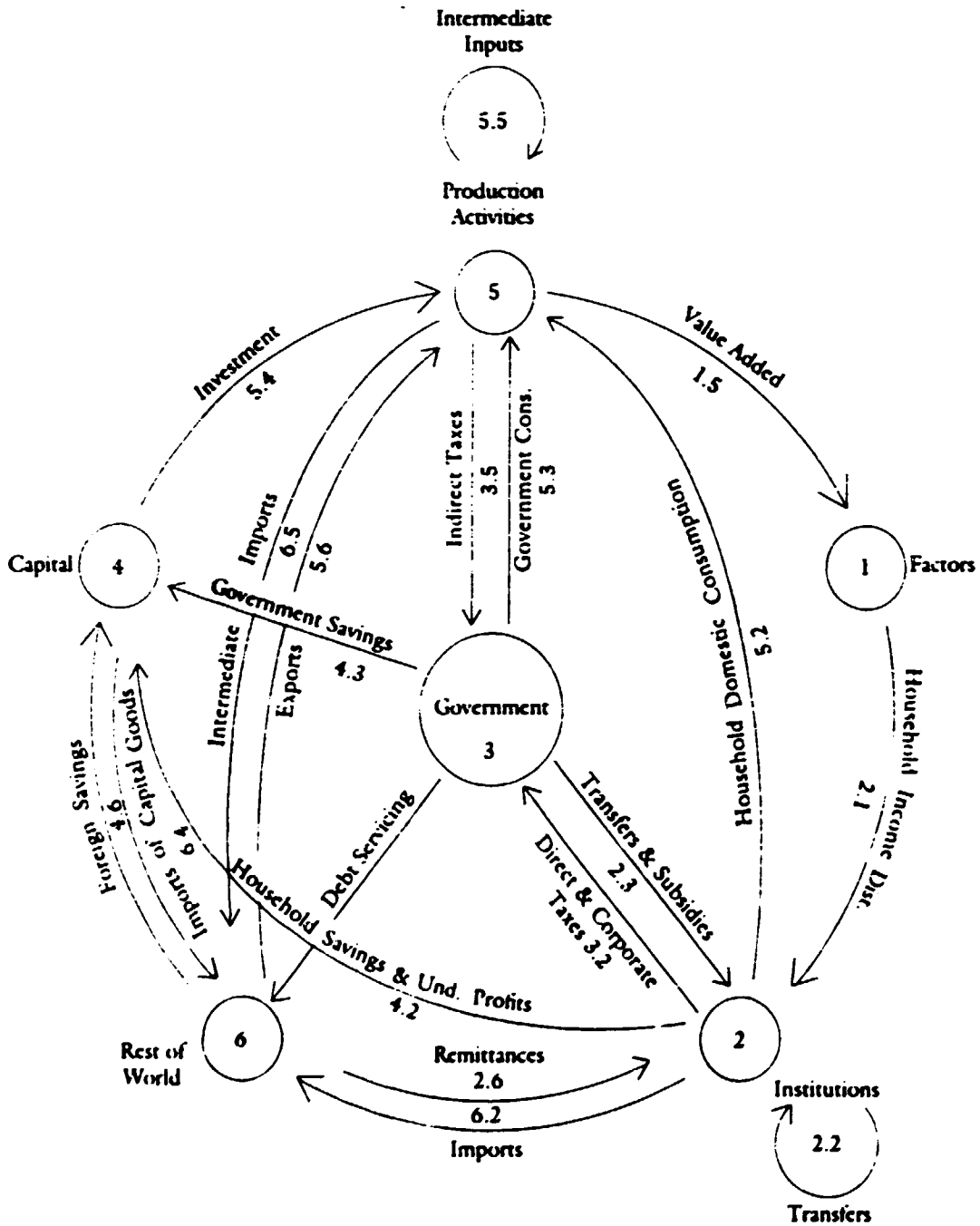
within a socioeconomic system. Whereas the SAM in Table 1 is a snapshot of the economy, Figure 3 which reproduces all of the transformations appearing in Table 1, can be interpreted more broadly as representing flows (over time) which, in turn, have to be explained by structural or behavioral relationships.

The first question to address in a SAM-based framework is which accounts should be considered exogenous and which endogenous. It has been customary, and it is certainly logical in the context of this specific study, to consider the government, the rest of the world and the capital account as exogenous and the factors, institutions, and production activities' accounts as endogenous. To illustrate how the SAM approach lends itself to deriving the ultimate income distribution and expenditure pattern by socioeconomic groups following, say, a change in the structure of production resulting from government actions or a change in exports, distinguishing between the determination of primary and secondary income distribution is useful. Thus, a distinction is drawn between <u>primary</u> claims on resources which arise directly out of the productive process of work and accumulation, and <u>secondary</u> claims that result from the transfer of primary claims. The former results from prevailing patterns of 1) production and 2) resource endowment (human capital, physical capital and land) among households.

The primary income distribution is determined through the triangular interrelationship linking production activities, factors and households. In Figure 3 this interrelationship appears as the value added flow (denoted by arrow 1.5) from production activities to factor incomes; from the latter to household income determination and distribution (2.1) which yields, ultimately, the household domestic consumption pattern (5.2). While the primary income distribution is by far the most important determinant of incomes received by the various socioeconomic groups, a secondary income distribution may work through the family, village, or, more important, through the state in the form of transfers and subsidies (2.3) and taxes (3.2). Figure 4 reproduces this same key <u>triangular</u> interrelationship among production activities, the factorial income distribution and the household income distribution that is emphasized throughout this paper.

If we are to understand and explain, in an operational way, the mechanisms through which these transformations occur, great care must be exercised in designing appropriate classification schemes for each of the three endogenous accounts. These transformations incorporate the mechanisms that translate the generation of value added by production into the incomes of different types of households and other institutions. The link is provided by factors of production. The level and structure of output by the different

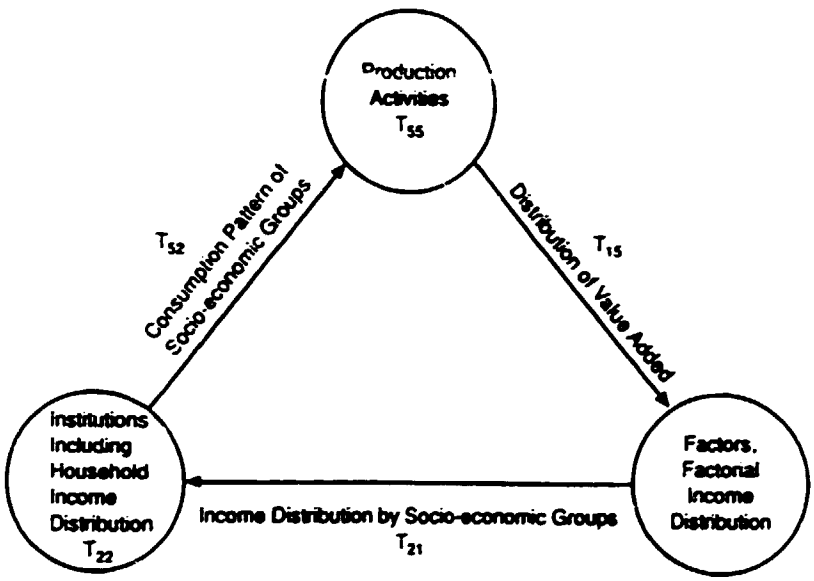
Figure 3
Flow Diagram of SAM Transactions[1]



[1]The flow diagram reflects exactly the transactions and transformations appearing in the SAM on Table 1. Note that transactions are numbered in a way consistent with the numbering of the Accounts in Table 1. For example, the allocation of value added is a receipt for the Factor Account (#1) and a payment by the Production Activities Account (#5); hence, the corresponding transformation (matrix) is denoted by 1.5.

Source: Thorbecke (1988)

Figure 4 **Simplified relationship among Principal SAM accounts (Productive activities, Factors and institutions)[a]**



a) T stands for the correspondence matrix and flow in the SAM which appears in Table 3.1 and Figure 3.1. Thus, for example, T_{15} refers to the Matrix which appears at the intersection of row 1 (account 1) i.e., "factors" and column 5 (account 5), i.e., "production activities."

Source: Thorbecke (1988), OECD.

activities generate the aggregate demand for labor of different types, natural resources and capital services. Hence, employment enters into the analysis. The stream of value added, from the production side, rewards the factors of production, with wages going to different types of labor, rent going to land and other resources, and profits to capital. In this way a picture is obtained of the factorial distribution of income which is captured in Table 1 by the interface between column 5 and row 1 and, analogously, by matrix T_{15} in Figure 4. With regard to production activities, four criteria suggest themselves in deriving an appropriate classification: 1) the nature of the item produced be it a good, service or commodity; 2) the type of technology used, in terms of labor and capital intensity, 3) the form of organization underlying the production process (i.e. farm or firm relying on family labor and self employment, as opposed to an incorporated, or even a state enterprise); and, 4) whether the commodities are tradeable or nontradeable.

In turn, the classification of factors and households should be consistent with our interest in employment and equity issues as they relate more particularly to rural areas. With the qualification that any ultimate taxonomy should be country specific, the following breakdown of factors may be suggested: 1) family labor (further broken down between unpaid and paid and self-employed and hired, and, if possible, distinguishing, as well, between male and female labor); 2) unskilled labor (with some of the same additional distinctions as in the above category; 3) skilled labor; and, 4) capital (which could be land or other forms of capital).

Translation from factorial distribution to the distribution of incomes across institutions, and particularly across different household groups, depends on which institutions own which factors. Thus, for example, wage payments to unskilled labor go to the households that provide semi-skilled labor; imputed labor income is received by small farmers from the services performed by self-employed family labor on their own farms, while rent income (whether imputed or not) accrues to the owners of land and other natural resources, and finally, profits accrue to owners of capital. This second transformation is shown in Table 1 by the interface between column 1 and row 2, as well as by matrix T_{21} in Figure 4. Three main criteria appear important in classifying households: a) location; b) resource endowment and wealth; and c) occupation of the head of the household. Location, particularly between rural and urban areas, is a crucial criterion largely on the grounds that policy often has a locational element and often an urban bias. Resource endowment is important at several levels. Access to land is a critical consideration in rural areas and the landless can be affected quite differently from the smallholder, or large farmers, by development policy.

Likewise, the better educated in both the urban and rural areas are able to land jobs in formal and organized activities, whereas the uneducated are limited to employment opportunities largely in traditional agriculture and informal urban activities. The endowment of land and human capital is a crucial determinant of the ultimate income distribution and standards of living of the various socioeconomic household groups.

A third transformation in Figure 4 yields the consumption pattern of the different socioeconomic groups (interface between column 2a and row 5 in Table 1 and matrix T_{52} in Figure 4). It reveals the value of the commodities (assumed here to be equivalent to production activities) consumed by these groups. This transformation provides crucial information on the living standards of the various groups and the extent to which they are able to satisfy their basic needs. Two final endogenous transformations appear in Figure 4 reflecting transfers occurring within, respectively, the production activities' account and the institutions account. T_{55} represents the matrix of intermediate demand by production activities and is nothing else than the conventional Input/Output table. T_{22} captures transfers among institutions and, in particular, transfers from some relatively better off socioeconomic groups to other poorer groups.

At this stage, one qualification needs to be made. Whereas the SAM approach explains the determination of total incomes accruing to the various socioeconomic groups, it does not generate the intra-group income distributions. To the extent that poverty tends to be concentrated in a few groups, such as the landless and small farmers in rural areas and the informal sector workers in urban areas, between-group variance is likely to explain a reasonably high proportion of total income variance in society. If one wants to approximate more exactly the impact on poverty of measures affecting the structure of production, knowledge of the income distributions within socioeconomic groups is necessary because poor households (those with incomes below a given normative poverty line) are likely to be found even in socioeconomic groups enjoying average income levels significantly higher than the poverty line.

If a certain number of conditions are met--in particular, the existence of excess capacity and unemployed or underemployed labor resources--the SAM framework can be used to estimate the effects of exogenous changes and injections, such as an increase in the output of a given production activity, government expenditures or exports on the whole system. As long as excess capacity and a labor slack prevail, any exogenous change in demand can be satisfied through a corresponding increase in output without having any effect on prices. Thus, for any given injection anywhere in the SAM influence (e.g.

an increase in the export demand for textiles, a government investment or private project leading to an increase in the production of food crops, or a subsidy or transfer accruing to a specific socioeconomic household group) is transmitted through the interdependent SAM system. The total, direct and indirect, effects of the injection on the endogenous accounts, i.e. the incomes of the various factors and socioeconomic groups, and the total outputs of the different production activities, are estimated through the multiplier process. For example, a public works program resulting in the construction of a new rural farm to market road would require, among others, a significant amount of unskilled labor that is typically provided by the landless and small farmers' household categories. In turn, a significant part of the incremental incomes earned by these two socioeconomic groups from their work on the road project is expanded on food demand. The subsequent increase in food production to satisfy that demand leads to still further employment and income increments for these groups, and so on, until the multiplier process dampens. Annex II.A should be consulted for a technical discussion and derivation of fixed price multipliers.

The assumption that supply is perfectly elastic in all sectors and that an increase in (exogenous) demand is sufficient to stimulate corresponding rises in output and incomes may not be too unrealistic in some settings, while quite unrealistic in others. In particular, many analysts believe that the assumption of excess capacity and unused resources is unrealistic when applied to the agricultural sector of many regions of developing countries. In such instances, it is posited that demand increases alone are inadequate in bringing forth more than a marginal agricultural output response. The fixed price multipliers described above will provide output and income multiplier estimates that are unrealistically high--owing to overly optimistic expectations regarding supply response. To address such concerns, a modified SAM multiplier methodology has been developed that allows for limited or even no supply response in output-constrained sectors while maintaining the assumption of excess capacity in all other non-supply constraint sectors. This has led to the formulation of constrained, or mixed, SAM multipliers and their application to regional, district and village settings (see Subramanian and Sadoulet, 1990 and Lewis and Thorbecke, 1992). The definition and specification of these constrained and mixed multipliers can be found in Annex II.A.

Of course, the magnitude of constrained multipliers is always less than the corresponding unconstrained fixed price multipliers. At the limit, all sectors are supply constrained and the multiplier values collapse to zero. Thus, it can be argued that fixed price multipliers represents the upper bound

estimates of the likely impact of an exogenous increase in demand on the incomes and outputs of the endogenous accounts in the SAM (the various factors, socioeconomic household groups and production activities).

Finally, in those settings for which no SAM is available, alternative techniques have been designed to estimate regional output, value added and income multipliers. These (non-SAM) multipliers provide a rough but useful approximation of the direct and indirect effects of such measures as a large scale irrigation project, other public works projects and technical progress in agriculture on the regional economy. Most of the case studies that are discussed in Chapter III rely on fixed price multipliers but some of the studies use, as well, constrained multipliers and non-SAM multipliers. Since the definitions of these three types of multipliers differ somewhat, comparisons across case studies using different multiplier types should be qualified accordingly.

The SAM framework represents an important addition to, and generalization of the input-output model since it captures the circular interdependence characteristic of any economic system among a) production activities, b) the factorial income distribution, and c) the income distribution among institutions (particularly among different socioeconomic household groups), which, in turn, determines the expenditure pattern of institutions. The global (direct and indirect) effects of injections from exogenous variables on the endogenous variables are captured, under certain conditions, by the fixed price and constrained multipliers. However, these multipliers do not clarify the "black box", i.e. the structural and behavioral mechanism responsible for these global effects. From a policy standpoint, knowledge of the magnitude of multipliers is important but becomes of even greater operational usefulness if it is complemented by structural path analysis that identifies the various paths along which a given injection travels. In particular, structural path analysis reveals, in contrast to multipliers per se which are scalar numbers, the specific individual sectors (activities, factors and household groups) through which influence is transmitted in a socioeconomic system represented by the SAM. Structural path analysis provides a detailed way of decomposing multipliers, and of identifying the whole network of paths through which influence is transmitted from one sector of origin to its ultimate destination thereby opening the black box (see Defourny and Thorbecke, 1984).

Hence, in this paper, structural path analysis is used in some of the case studies to describe the whole network of channels through which the impact of an injection in a given sector of the SAM (as pole of origin) is transmitted ultimately to a given pole of destination. An example can be

given to illustrate this concept. Assume that we are interested in explaining the main paths through which a new textile factory in a rural site affects directly and indirectly the incomes of small farmers. The increase in textile output will require unskilled labor that is to be provided by two different household groups, i.e. small farmers and the landless. Because these two groups are likely to be poor, a significant part of the incremental incomes accruing to them from earnings from work in the factory will be spent on food crops. The subsequent increase in food crop production, in turn, requires unskilled family labor from small farm households, thus, further raising their incomes. In this example, the following paths spanning textiles output, as the pole of origin, and incomes of small farmers, as the pole of destination can be identified: 1) a relatively direct path from larger textiles production to demand for unskilled labor supplied by small farmers, to incomes accruing to small farmers' households; and, 2) a more indirect path from increased output in the textiles sector, to increase demand for unskilled labor (as a factor of production), to increased expenditures on food, to increased demand for labor supplied by small farmers, to increased incomes accruing to small farmers' households. It will be seen, subsequently, in some of the case studies that the multiplier value, which is a scalar measure of global influence between a given pole of origin and destination, can be decomposed into the sum of total influence travelling along the different paths spanning these two poles. (See Annex II.B for a more technical discussion.)

A limitation of SAM-type multipliers is the underlying assumption of excess capacity and unused resources. This assumption allows one to ignore the effects of sectoral capacity and factorial bottlenecks on prices. Even constrained multipliers assume that prices remain fixed. The comparative static nature of the SAM multiplier analysis, as such, precludes capturing and estimating dynamic effects. For example, whereas investment demand, (i.e. the intermediate inputs, labor and capital required in the construction phase of a project) is explicitly incorporated in the SAM, the future effects of investment on productivity are ruled out by the fact that the SAM is only a one year snapshot of the economy. This limitation should be kept in mind when interpreting the SAM multiplier analysis reported in the various case studies. In order to incorporate different degrees of capacity and supply responsiveness in a socioeconomic system, the natural extension of the SAM framework is a computable general equilibrium (CGE) model. Such a model takes as its initial conditions a base-year SAM but, in contrast with the simple SAM multiplier framework, includes a number of behavioral and structural relationships to describe the behavior of the various actors over time. In

such models most prices are endogenously determined. CGE models are particularly useful in simulating the impact of policies and policy packages on the whole socioeconomic system. CGE and macroeconometric models can provide useful results concerning the trade-off between higher private and government consumption today (at the expense of relatively lower investment) and higher output, income and consumption growth tomorrow that would have resulted from lower consumption and more investment today.

The key issue facing the developing world in the 1980s was that of stabilization and structural adjustment (SSA). A great majority of the developing countries had to undertake a whole package of measures to attempt to restore both internal (budget) and external (balance of payments) equilibrium. Since many of these measures affected prices directly (e.g. a devaluation) the impact of SSA measures on poverty and other policy objectives can be estimated much better within a CGE than a SAM framework. Hence, the final case study in this paper (III.E) summarizes the findings of a comparative study of six developing countries using CGE models to explore the impact of SSA policies on equity.

III. CASE STUDIES AND THE ISSUES THAT THEY HIGHLIGHT

A. Indonesia

1. 1980 OECD SAM

The OECD SAM was built by E. Thorbecke and S. Keuning based on the 1980 SAM built by the Indonesian Central Bureau of Statistics (CBS). This SAM is given in E. Thorbecke (1992). It contains 75 sectors (see Table 3a for classification scheme). One relevant feature of this SAM is that it contains 13 different categories of government expenditures (4 types of current government expenditures and 9 types of public investment expenditures), in addition to a high level of disaggregation for factors (23 different factors) institutions (9 different institutions) and 24 different production activities. The underlying income distribution by socioeconomic groups is given in Table 2. It can be seen that three categories of households, i.e. the agricultural employees (the landless and near landless), the small farmers (owning less than half a hectare) and the rural non-agricultural low income group were significantly poorer, on average, than the other groups. The average income of the urban low income group appear to be three times that of the agricultural employees and small farmers. Of course, it has to be remembered that these are averages and that, undoubtedly, many urban poor received incomes significantly below this average figure.

The SAM multiplier analysis is used, next, to explore the direct and indirect impact of changes in sectoral output and government expenditures, by sector, on the incomes of the relatively poorest socioeconomic household groups listed above. The multiplier analysis given in Table 3a reveals that it is very difficult to benefit <u>agricultural employees</u>. Those activities yielding the highest multiplier values on incomes of agricultural employees are government investment in agriculture (a multiplier value of .196); food crops production (.138); and, fishery (.117). In other words, what these multiplier values reveal is that an increase in government investment of, say, 100 Rupiah would lead through a combination of direct and indirect effects, to an increase of 19.6 Rupiah in the incomes of agricultural employees. A similar 100 Rupiah rise in the value of the foodcrops output or that of fishery, would generate an incremental income of R 13.8 and R 11.7, respectively, for agricultural employees. In general, the values of these multipliers are very significantly lower than those applying to other socioeconomic groups.

<u>Small farmers</u> benefit most from food crops production (.478); livestock production (.313); fishery (.275); and, non-food crops (.253) (i.e. mainly

Table 2 **Income Distribution in OECD SAM, 1980**

Socio-economic Group	Group Total Income (in Rp billion)	Population (in million)	Per Capita Income (in Rp thousand)
Agricultural employees	1 575.98	15.6	101.02
Small farmers	4 192.47	40.7	103.01
Medium farmers	2 430.05	11.1	218.92
Large farmers	4 484.69	14.0	320.34
Rural non-agricultural low	5 277.06	27.9	189.14
Rural non-agricultural high	1 945.62	8.1	240.20
Urban low	6 099.31	19.9	306.50
Urban high	4 453.76	9.5	468.82
Total	30 458.94	146.8	207.49

[1] From SAM Table 3.1

Source: Thorbecke (1992)

Table 3a Fixed Price Multiplier Matrix [illegible]

	AgPcRu 1	AgPcUr 2	AgUnRu 3	AgUnUr 4	MaPcRu 5	MaPcUr 6	MaUnRu 7	MaUnUr 8	ClPcRu 9	ClPcUr 10	ClUnRu 11	ClUnUr 12	PrPcRu 13
1 AgPaidRur	1.078	0.075	0.062	0.064	0.052	0.034	0.052	0.033	0.046	0.028	0.052	0.034	0.043
2 AgPaidUrb	0.009	1.008	0.007	0.007	0.006	0.004	0.006	0.004	0.005	0.003	0.006	0.004	0.005
3 AgUnpaidRur	0.280	0.269	1.222	0.225	0.193	0.120	0.181	0.114	0.162	0.095	0.184	0.117	0.148
4 AgUnpaidUrb	0.009	0.009	0.007	1.007	0.006	0.004	0.006	0.004	0.005	0.003	0.006	0.004	0.005
5 ManPaidRur	0.038	0.038	0.036	0.037	1.036	0.033	0.035	0.032	0.034	0.030	0.036	0.033	0.033
6 ManPaidUrb	0.045	0.045	0.044	0.045	0.044	1.043	0.044	0.042	0.043	0.039	0.044	0.042	0.042
7 ManUnpaidRur	0.036	0.036	0.034	0.035	0.034	0.032	1.033	0.032	0.032	0.030	0.034	0.032	0.031
8 ManUnpaidUrb	0.023	0.023	0.022	0.023	0.022	0.023	0.022	1.023	0.022	0.021	0.022	0.023	0.021
9 ClerPaidRur	0.017	0.017	0.018	0.018	0.017	0.016	0.017	0.016	1.017	0.015	0.017	0.016	0.016
10 ClerPaidUrb	0.050	0.050	0.051	0.052	0.051	0.051	0.051	0.051	0.050	1.047	0.051	0.051	0.049
11 ClerUnpaidRur	0.075	0.074	0.067	0.069	0.064	0.056	0.063	0.054	0.060	0.050	1.064	0.055	0.058
12 ClerUnpaidUrb	0.072	0.071	0.065	0.066	0.062	0.056	0.062	0.055	0.059	0.050	0.062	1.055	0.057
13 ProfPaidRur	0.018	0.015	0.026	0.025	0.023	0.013	0.024	0.010	0.022	0.009	0.024	0.010	1.022
14 ProfPaidUrb	0.026	0.024	0.035	0.035	0.033	0.023	0.033	0.019	0.031	0.018	0.033	0.020	0.031
15 ProfUnpaidRur	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
16 ProfUnpaidUrb	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
17 UnincorpAgCap	0.349	0.336	0.282	0.287	0.238	0.161	0.237	0.156	0.215	0.133	0.239	0.158	0.203
18 UnincorpHouseCap	0.048	0.049	0.051	0.052	0.053	0.062	0.053	0.061	0.052	0.056	0.053	0.061	0.052
19 UnincorpOtherRurCap	0.096	0.094	0.089	0.091	0.086	0.077	0.086	0.076	0.081	0.069	0.086	0.076	0.078
20 UnincorpOtherUrbCap	0.076	0.076	0.073	0.075	0.074	0.073	0.074	0.072	0.071	0.067	0.074	0.073	0.070
21 PrivateCap	0.142	0.139	0.132	0.135	0.127	0.113	0.126	0.111	0.120	0.101	0.127	0.112	0.116
22 PublicCap	0.126	0.125	0.120	0.123	0.120	0.121	0.120	0.119	0.116	0.111	0.120	0.120	0.115
23 ForeignCap	0.071	0.070	0.067	0.069	0.066	0.061	0.066	0.060	0.063	0.055	0.066	0.060	0.062
24 AgEmployees	0.843	0.870	0.084	0.089	0.111	0.061	0.081	0.049	0.110	0.049	0.092	0.050	0.080
25 Small Farmers	0.393	0.318	0.824	0.945	0.250	0.143	0.316	0.144	0.223	0.114	0.313	0.148	0.194
26 Medium Farmers	0.172	0.146	0.288	0.212	0.127	0.080	0.134	0.078	0.112	0.067	0.135	0.079	0.105
27 Large Farmers	0.309	0.281	0.404	0.317	0.211	0.143	0.221	0.139	0.197	0.120	0.223	0.142	0.187
28 RuralNonAgLow	0.272	0.207	0.231	0.198	1.021	0.159	0.888	0.156	0.497	0.142	0.919	0.158	0.312
29 RuralNonAgHigh	0.062	0.051	0.065	0.057	0.078	0.038	0.147	0.038	0.585	0.034	0.113	0.038	0.504
30 UrbanLow	0.234	0.343	0.225	0.308	0.223	1.127	0.222	1.027	0.214	0.560	0.223	1.081	0.209
31 UrbanHigh	0.121	0.154	0.126	0.148	0.124	0.175	0.124	0.273	0.122	0.723	0.124	0.220	0.118
32 Companies	0.316	0.313	0.297	0.304	0.292	0.276	0.290	0.271	0.282	0.252	0.291	0.273	0.273
33 GovExpEdu&Health	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34 GovExpWages&Sal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35 GovExpGoods&Serv	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
36 GovExpHHTransfer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37 GovInvAgric	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38 GovInvInd&Mines	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39 GovInvEnergy	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40 GovInvTransp&Tour	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
41 GovInvEducation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
42 GovInvHealth	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43 GovInvHouse&Water	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44 GovInvGenService	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45 GovInvOther	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46 Trade&TransMarg	0.388	0.378	0.338	0.345	0.312	0.246	[illegible]	0.239	0.297	0.213	0.310	0.242	0.274
47 FoodCrops	0.648	0.623	0.509	0.521	0.412	0.266	0.410	0.253	0.362	0.207	0.415	0.259	0.329
48 OtherCrops	0.250	0.241	0.206	0.211	0.177	0.118	0.175	0.114	0.155	0.097	0.177	0.116	0.141
49 Livestock	0.180	0.174	0.155	0.156	0.136	0.105	0.136	0.103	0.131	0.094	0.137	0.104	0.127
50 Forest&Wood	0.072	0.070	0.058	0.059	0.047	0.033	0.047	0.032	0.042	0.027	0.047	0.032	0.039
51 Fishery	0.146	0.140	0.113	0.115	0.104	0.066	0.103	0.064	0.096	0.054	0.104	0.065	0.091
52 Mining	0.050	0.050	0.050	0.051	0.051	0.051	0.051	0.051	0.050	0.047	0.051	0.051	0.050
53 Food Process	0.629	0.604	0.511	0.524	0.451	0.291	0.445	0.280	0.390	0.235	0.451	0.285	0.355
54 Textiles	0.157	0.151	0.170	0.170	0.163	0.127	0.164	0.126	0.160	0.120	0.164	0.127	0.158
55 Paper&MetalProd	0.209	0.212	0.229	0.234	0.242	0.272	0.242	0.267	0.239	0.244	0.241	0.270	0.239
56 Chem&Minerals	0.224	0.226	0.228	0.233	0.241	0.252	0.240	0.250	0.239	0.237	0.240	0.251	0.239
57 Utilities	0.022	0.023	0.023	0.023	0.026	0.031	0.026	0.031	0.028	0.031	0.026	0.031	0.030
58 BuildConstruction	0.015	0.015	0.015	0.016	0.016	0.017	0.016	0.017	0.015	0.015	0.016	0.017	0.015
59 PublicWorksAg	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
60 PWTransp	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
61 PWUtil&Comm	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
62 PWOther	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
63 Trade&TransServ	0.338	0.329	0.295	0.301	0.272	0.221	0.271	0.216	0.254	0.194	0.272	0.219	0.242
64 Restaurant&Hotel	0.105	0.112	0.113	0.116	0.141	0.180	0.139	0.179	0.143	0.171	0.139	0.180	0.146
65 LandTransport	0.123	0.124	0.119	0.123	0.124	0.127	0.123	0.126	0.119	0.118	0.123	0.126	0.117
66 OtherTrans&Commun	0.047	0.050	0.045	0.048	0.050	0.071	0.050	0.071	0.053	0.069	0.050	0.071	0.055
67 FinanRE &BusServ	0.181	0.185	0.190	0.195	0.231	0.231	0.200	0.228	0.195	0.212	0.200	0.230	0.194
68 Educ&Health	0.063	0.053	0.095	0.093	0.085	0.033	0.087	0.033	0.083	0.028	0.087	0.033	0.078
69 Pers&HHServices	0.082	0.085	0.089	0.092	0.092	0.114	0.093	0.113	0.092	0.111	0.092	0.114	0.093
70 IndirectTaxes	0.077	0.075	0.070	0.072	0.067	0.060	0.067	0.058	0.063	0.053	0.067	0.059	0.061
71 Subsidies	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
72 GovCurrent	0.267	0.265	0.246	0.252	0.239	0.228	0.238	0.225	0.228	0.212	0.239	0.226	0.222
73 GovCapital	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74 PrivateCapital	0.419	0.421	0.443	0.433	0.445	0.453	0.448	0.461	0.467	0.498	0.446	0.457	0.478
75 Rest of World	0.314	0.314	0.311	0.318	0.315	0.319	0.314	0.314	0.305	0.290	0.315	0.317	0.303

Table 3a Fixed Price Multiplier Matrix for 1980 (Inverse(I-C))

PrPdUr 14	PrUnRu 15	PrUnUr 16	UnAgCa 17	UnHous 18	UnRuCa 19	UnUrCa 20	PrivCa 21	PubCa 22	ForCap 23	AgEmpl 24	SmFarm 25	MedFar 26	LrgFar 27	[illegible] 28
0.025	0.047	0.026	0.048	0.042	0.051	0.030	0.002	0.002	0.002	0.084	0.071	0.054	0.041	0.049
0.003	0.005	0.003	0.005	0.005	0.006	0.003	0.000	0.000	0.000	0.009	0.008	0.006	0.005	0.006
0.086	0.164	0.088	0.169	0.146	0.179	0.105	0.007	0.007	0.006	0.301	0.253	0.193	0.148	0.172
0.003	0.006	0.003	0.006	0.005	0.006	0.004	0.000	0.000	0.000	0.010	0.008	0.006	0.065	0.006
0.029	0.034	0.029	0.032	0.033	0.034	0.032	0.002	0.002	0.002	0.039	0.039	0.033	0.029	0.035
0.038	0.043	0.039	0.039	0.042	0.042	0.041	0.003	0.003	0.002	0.045	0.047	0.041	0.037	0.044
0.029	0.032	0.029	0.030	0.032	0.032	0.031	0.002	0.002	0.002	0.037	0.037	0.031	0.028	0.033
0.021	0.022	0.021	0.020	0.022	0.021	0.022	0.001	0.002	0.001	0.023	0.024	0.021	0.019	0.022
0.014	0.017	0.014	0.016	0.016	0.017	0.015	0.001	0.001	0.001	0.017	0.019	0.016	0.015	0.017
0.046	0.050	0.046	0.046	0.049	0.048	0.049	0.003	0.004	0.003	0.050	0.054	0.047	0.044	0.051
0.047	0.060	0.048	0.057	0.057	0.061	0.053	0.003	0.004	0.003	0.078	0.073	0.061	0.052	0.062
0.048	0.059	0.049	0.056	0.057	0.060	0.053	0.003	0.004	0.003	0.074	0.070	0.060	0.051	0.061
0.009	0.023	0.009	0.022	0.015	0.023	0.010	0.001	0.001	0.001	0.015	0.028	0.023	0.021	0.024
0.017	0.032	0.017	0.030	0.024	0.032	0.018	0.001	0.001	0.001	0.023	0.038	0.032	0.029	0.033
0.001	1.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001
0.002	0.002	1.002	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.002	0.003	0.002	0.002	0.002
0.122	0.218	0.125	1.222	0.193	0.233	0.145	0.009	0.010	0.008	0.374	0.318	0.247	0.196	0.226
0.055	0.052	0.055	0.050	1.056	0.051	0.060	0.004	0.004	0.003	0.047	0.052	0.047	0.049	0.054
0.066	0.081	0.067	0.076	0.078	1.082	0.073	0.005	0.005	0.004	0.098	0.096	0.081	0.070	0.086
0.064	0.071	0.065	0.066	0.071	0.071	1.070	0.005	0.005	0.004	0.077	0.077	0.069	0.061	0.074
0.097	0.120	0.098	0.115	0.115	0.121	0.107	1.007	0.008	0.006	0.145	0.143	0.120	0.106	0.125
0.107	0.116	0.108	0.108	0.116	0.114	0.118	0.008	1.008	0.007	0.127	0.127	0.110	0.101	0.120
0.053	0.063	0.054	0.059	0.061	0.063	0.058	0.004	0.004	1.003	0.073	0.072	0.062	0.055	0.065
0.043	0.074	0.036	0.079	0.103	0.063	0.041	0.003	0.003	0.002	1.096	0.083	0.064	0.051	0.060
0.105	0.306	0.111	0.275	0.260	0.259	0.119	0.008	0.008	0.007	0.281	1.247	0.188	0.150	0.175
0.063	0.127	0.063	0.283	0.138	0.400	0.072	0.005	0.005	0.004	0.154	0.135	1.107	0.088	0.102
0.111	0.218	0.113	0.787	0.253	0.371	0.129	0.008	0.009	0.007	0.307	0.265	0.206	1.186	0.192
0.136	0.436	0.138	0.233	0.275	0.574	0.151	0.015	0.016	0.013	0.218	0.211	0.174	0.151	1.181
0.032	0.569	0.033	0.076	0.071	0.096	0.036	0.009	0.010	0.008	0.053	0.062	0.051	0.045	0.052
0.357	0.214	0.428	0.207	0.587	0.213	0.905	0.024	0.026	0.021	0.236	0.241	0.208	0.188	0.222
0.920	0.121	0.856	0.118	0.308	0.120	0.412	0.056	0.061	0.049	0.119	0.134	0.116	0.108	0.124
0.241	0.280	0.243	0.263	0.273	0.278	0.284	0.542	1.031	0.823	0.322	0.319	0.272	0.246	0.290
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.201	0.289	0.204	0.281	0.266	0.297	0.228	0.015	0.016	0.013	0.407	0.374	0.302	0.254	0.302
0.186	0.368	0.190	0.382	0.328	0.404	0.231	0.014	0.016	0.013	0.700	0.585	0.441	0.326	0.386
0.089	0.157	0.090	0.157	0.141	0.168	0.106	0.007	0.007	0.006	0.287	0.237	0.174	0.136	0.169
0.090	0.132	0.091	0.136	0.119	0.137	0.099	0.007	0.007	0.006	0.189	0.167	0.144	0.128	0.131
0.026	0.043	0.026	0.044	0.039	0.046	0.029	0.002	0.002	0.002	0.078	0.066	0.048	0.039	0.044
0.050	0.096	0.051	0.093	0.080	0.098	0.059	0.004	0.004	0.003	0.157	0.126	0.099	0.083	0.100
0.046	0.050	0.047	0.046	0.049	0.049	0.050	0.003	0.004	0.003	0.050	0.052	0.047	0.044	0.051
0.215	0.394	0.219	0.386	0.348	0.423	0.259	0.016	0.018	0.014	0.671	0.587	0.436	0.328	0.433
0.117	0.161	0.118	0.153	0.139	0.159	0.123	0.009	0.009	0.008	0.153	0.180	0.158	0.146	0.162
0.234	0.238	0.238	0.220	0.246	0.232	0.261	0.017	0.018	0.014	0.201	0.234	0.223	0.213	0.246
0.232	0.238	0.234	0.216	0.238	0.229	0.247	0.016	0.018	0.014	0.221	0.235	0.216	0.207	0.244
0.031	0.028	0.031	0.022	0.028	0.024	0.031	0.002	0.002	0.002	0.022	0.023	0.022	0.021	0.026
0.015	0.015	0.015	0.015	0.016	0.015	0.016	0.001	0.001	0.001	0.015	0.016	0.015	0.014	0.018
0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.002	0.002	0.001	0.001	0.001
0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001
0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001
0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001
0.184	0.255	0.186	0.246	0.237	0.261	0.207	0.013	0.015	0.012	0.353	0.325	0.264	0.223	0.265
0.167	0.141	0.169	0.118	0.154	0.132	0.178	0.012	0.013	0.010	0.100	0.107	0.127	0.112	0.146
0.114	0.119	0.116	0.106	0.120	0.115	0.123	0.008	0.009	0.007	0.124	0.128	0.111	0.098	0.124
0.068	0.057	0.068	0.044	0.060	0.046	0.071	0.005	0.005	0.004	0.046	0.047	0.042	0.042	0.050
0.205	0.195	0.208	0.187	0.209	0.191	0.224	0.014	0.016	0.012	0.177	0.194	0.177	0.185	0.203
0.027	0.083	0.027	0.081	0.053	0.085	0.030	0.002	0.003	0.002	0.053	0.105	0.085	0.077	0.086
0.110	0.092	0.110	0.085	0.102	0.089	0.111	0.008	0.008	0.007	0.079	0.092	0.085	0.082	0.093
0.050	0.083	0.051	0.060	0.061	0.064	0.056	0.004	0.004	0.003	0.079	0.076	0.064	0.055	0.066
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.208	0.229	0.208	0.220	0.228	0.231	0.220	0.418	0.458	0.365	0.274	0.283	0.231	0.207	0.237
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.514	0.466	0.509	0.496	0.467	0.489	0.473	0.465	0.509	0.407	0.412	0.410	0.477	0.525	0.447
0.279	0.305	0.283	0.284	0.305	0.301	0.307	0.116	0.033	0.228	0.314	0.328	0.292	0.268	0.316

Table 3a Fixed Price Multiplier Matrix for 1983 (Inverse(I-C))

	RuNAn 29	UrbLow 30	UrbHi 31	Compos 32	GEx[illegible] 33	GEx[illegible] 34	GEx[illegible] 35	GExHT 36	GovAg 37	GovInv 38	GovEn 39	GovTr 40	GovEc 41
1 AgPaidRur	0.038	0.034	0.022	0.002	0.031	0.034	0.027	0.042	0.241	0.021	0.016	0.017	0.021
2 AgPaidUrb	0.004	0.004	0.003	0.000	0.004	0.004	0.003	0.005	0.003	0.002	0.002	0.002	0.002
3 AgUnpaidRur	0.132	0.118	0.077	0.007	0.110	0.118	0.090	0.147	0.085	0.073	0.055	0.058	0.072
4 AgUnpaidUrb	0.005	0.004	0.003	0.000	0.004	0.004	0.003	0.005	0.003	0.002	0.002	0.002	0.002
5 ManPaidRur	0.032	0.033	0.020	0.002	0.040	0.053	0.048	0.033	0.024	0.099	0.101	0.105	0.083
6 ManPaidUrb	0.041	0.043	0.027	0.003	0.051	0.067	0.058	0.042	0.029	0.091	0.108	0.111	0.058
7 ManUnpaidRur	0.030	0.032	0.020	0.002	0.029	0.030	0.053	0.032	0.048	0.046	0.023	0.028	0.051
8 ManUnpaidUrb	0.021	0.023	0.020	0.002	0.020	0.021	0.037	0.023	0.013	0.027	0.016	0.020	0.028
9 ClerPaidRur	0.016	0.016	0.014	0.001	0.047	0.181	0.022	0.016	0.014	0.012	0.011	0.011	0.012
10 ClerPaidUrb	0.049	0.052	0.044	0.004	0.103	0.349	0.067	0.050	0.033	0.040	0.038	0.039	0.038
11 ClerUnpaidRur	0.055	0.056	0.045	0.004	0.053	0.053	0.072	0.058	0.047	0.052	0.044	0.042	0.054
12 ClerUnpaidUrb	0.055	0.056	0.046	0.004	0.053	0.053	0.075	0.058	0.045	0.050	0.043	0.041	0.052
13 ProfPaidRur	0.027	0.010	0.008	0.001	0.264	0.245	0.010	0.012	0.011	0.009	0.008	0.008	0.009
14 ProfPaidUrb	0.030	0.020	0.016	0.001	0.292	0.277	0.022	0.021	0.015	0.021	0.021	0.021	0.019
15 ProfUnpaidRur	0.001	0.001	0.001	0.000	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
16 ProfUnpaidUrb	0.002	0.002	0.002	0.000	0.006	0.002	0.004	0.002	0.001	0.003	0.002	0.002	0.003
17 UnincorpAgCap	0.182	0.158	0.111	0.010	0.152	0.162	0.128	0.194	0.127	0.113	0.077	0.081	0.116
18 UnincorpHouseCap	0.051	0.062	0.053	0.004	0.047	0.054	0.055	0.058	0.032	0.031	0.028	0.032	0.029
19 UnincorpOtherRurCap	0.076	0.077	0.063	0.005	0.084	0.073	0.086	0.079	0.074	0.074	0.053	0.057	0.078
20 UnincorpOtherUrbCap	0.069	0.074	0.062	0.005	0.076	0.068	0.085	0.072	0.044	0.055	0.045	0.046	0.056
21 PrivateCap	0.112	0.113	0.093	0.008	0.146	0.107	0.131	0.116	0.108	0.203	0.135	0.176	0.197
22 PublicCap	0.113	0.122	0.104	0.008	0.128	0.112	0.139	0.118	0.259	0.134	0.202	0.171	0.118
23 ForeignCap	0.060	0.061	0.051	0.004	0.064	0.058	0.077	0.062	0.156	0.120	0.131	0.181	0.109
24 AgEmployee	0.048	0.045	0.032	0.003	0.053	0.066	0.039	0.199	0.196	0.034	0.028	0.029	0.033
25 Small Farmers	0.140	0.131	0.092	0.008	0.136	0.152	0.112	0.189	0.133	0.095	0.073	0.077	0.095
26 Medium Farmers	0.084	0.078	0.058	0.005	0.081	0.084	0.071	0.102	0.072	0.061	0.044	0.047	0.062
27 Large Farmers	0.156	0.142	0.101	0.009	0.140	0.149	0.118	0.185	0.117	0.101	0.072	0.076	0.103
28 RuralNonAgLow	0.158	0.160	0.130	0.016	0.209	0.258	0.197	0.198	0.159	0.208	0.175	0.184	0.201
29 RuralNonAgHigh	1.046	0.038	0.031	0.010	0.248	0.304	0.044	0.066	0.038	0.036	0.029	0.031	0.035
30 UrbanLow	0.205	1.219	0.184	0.026	0.277	0.378	0.264	0.806	0.144	0.228	0.218	0.224	0.205
31 UrbanHigh	0.116	0.114	1.097	0.061	0.371	0.506	0.135	0.255	0.089	0.106	0.100	0.104	0.100
32 Composites	0.267	0.277	0.232	1.034	0.316	0.259	0.325	0.278	0.489	0.421	0.436	0.482	0.390
33 GovExpEdu&Health	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34 GovExpWages&Sal	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35 GovExpGoods&Serv	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
36 GovExpHHTransfer	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
37 GovInvAgric	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
38 GovInvInd&Mines	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
39 GovInvEnergy	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000
40 GovInvTransp&Tour	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000
41 GovInvEducation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
42 GovInvHealth	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
43 GovInvHouse&Water	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44 GovInvGenService	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45 GovInvOther	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
46 Trade&TransMarg	0.258	0.245	0.189	0.016	0.248	0.238	0.267	0.268	0.245	0.269	0.229	0.216	0.285
47 FoodCrops	0.289	0.261	0.183	0.016	0.242	0.261	0.187	0.331	0.212	0.148	0.120	0.125	0.145
48 OtherCrops	0.126	0.117	0.080	0.007	0.103	0.117	0.095	0.141	0.088	0.065	0.055	0.058	0.063
49 Livestock	0.122	0.104	0.086	0.007	0.110	0.108	0.091	0.118	0.067	0.053	0.045	0.047	0.052
50 Forest&Wood	0.036	0.032	0.024	0.002	0.035	0.033	0.049	0.040	0.084	0.162	0.042	0.045	0.189
51 Fishery	0.086	0.065	0.046	0.004	0.062	0.070	0.047	0.080	0.050	0.036	0.030	0.031	0.035
52 Mining	0.049	0.052	0.045	0.004	0.057	0.048	0.071	0.050	0.214	0.144	0.154	0.244	0.121
53 Food Process	0.316	0.288	0.193	0.018	0.257	0.290	0.214	0.349	0.215	0.158	0.132	0.138	0.153
54 Texiles	0.157	0.127	0.115	0.010	0.130	0.136	0.127	0.133	0.069	0.067	0.056	0.059	0.065
55 Paper&MetalProd	0.240	0.277	0.225	0.018	0.306	0.240	0.430	0.253	0.188	0.368	0.425	0.190	0.463
56 Chem&Minerals	0.240	0.255	0.227	0.018	0.285	0.237	0.337	0.243	0.471	0.446	0.423	0.524	0.422
57 Utilities	0.031	0.031	0.031	0.002	0.036	0.030	0.046	0.029	0.015	0.017	0.015	0.016	0.016
58 Build&Construction	0.015	0.017	0.014	0.001	0.029	0.015	0.106	0.016	0.011	0.548	0.010	0.011	0.011
59 PublicWorks&Ag	0.001	0.001	0.001	0.000	0.001	0.001	0.005	0.001	1.001	0.001	0.000	0.000	0.001
60 PWTransp	0.001	0.001	0.001	0.000	0.001	0.001	0.006	0.001	0.001	0.001	0.001	0.919	0.002
61 PWUtil&Comm	0.001	0.001	0.001	0.000	0.001	0.001	0.004	0.001	0.001	0.001	1.001	0.061	0.001
62 PWOther	0.001	0.001	0.001	0.000	0.006	0.001	0.001	0.001	0.001	0.369	0.001	0.023	0.001
63 Trade&TransServ	0.230	0.221	0.174	0.015	0.220	0.215	0.249	0.240	0.213	0.234	0.199	0.188	0.246
64 Restaurant&Hotel	0.151	0.184	0.165	0.013	0.126	0.159	0.267	0.162	0.066	0.073	0.070	0.071	0.068
65 LandTranspen	0.115	0.128	0.112	0.009	0.103	0.117	0.102	0.124	0.067	0.073	0.063	0.063	0.073
66 OtherTrans&Commun	0.057	0.072	0.068	0.005	0.053	0.063	0.093	0.065	0.032	0.035	0.032	0.033	0.034
67 FinanRE.&BusServ	0.193	0.235	0.199	0.016	0.175	0.204	0.257	0.216	0.118	0.116	0.109	0.120	0.109
68 Educ&Health	0.076	0.032	0.025	0.003	1.043	0.049	0.030	0.041	0.028	0.027	0.022	0.023	0.027
69 Pers&HHServices	0.094	0.115	0.109	0.008	0.091	0.103	0.317	0.106	0.047	0.053	0.046	0.047	0.051
70 IndirectTaxes	0.058	0.060	0.048	0.004	0.057	0.056	0.072	0.067	0.070	0.062	0.064	0.063	0.070
71 Subsidies	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
72 GovCurrent	0.216	0.228	0.201	0.459	0.233	0.217	0.237	0.232	0.305	0.266	0.271	0.291	0.259
73 GovCapital	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
74 PrivateCapital	0.489	0.449	0.529	0.511	0.438	0.490	0.317	0.456	0.360	0.340	0.327	0.353	0.319
75 Rest of World	0.296	0.323	0.270	0.030	0.330	0.293	0.446	0.312	0.336	0.394	0.402	0.355	0.421

Table 3a Fixed Price Multiplier Matrix for 1980 (inverse(I-C))

GInvHe 42	GInvHo 43	GInvGS 44	GInvOt 45	Margin 46	FoodCr 47	NFCrop 48	Livest 49	Forest 50	Fish 51	Mining 52	FdProc 53	Textile 54	PapMaP 55	Chemic 56
0.019	0.020	0.024	0.019	0.027	0.132	0.133	0.079	0.047	0:098	0.005	0.077	0.034	0.010	0.011
0.002	0.002	0.003	0.002	0.003	0.011	0.014	0.012	0.006	0.022	0.001	0.007	0.004	0.001	0.001
0.065	0.067	0.081	0.066	0.096	0.585	0.233	0.289	0.157	0.258	0.017	0.278	0.096	0.033	0.037
0.002	0.002	0.003	0.002	0.003	0.016	0.007	0.015	0.005	0.018	0.001	0.008	0.003	0.001	0.001
0.071	0.100	0.099	0.107	0.037	0.035	0.033	0.034	0.057	0.033	0.012	0.046	0.068	0.021	0.023
0.062	0.093	0.078	0.107	0.052	0.043	0.040	0.042	0.052	0.043	0.012	0.049	0.099	0.036	0.030
0.044	0.040	0.058	0.036	0.039	0.034	0.030	0.033	0.070	0.033	0.009	0.042	0.050	0.017	0.019
0.025	0.023	0.031	0.024	0.030	0.022	0.020	0.022	0.027	0.023	0.005	0.023	0.034	0.012	0.011
0.011	0.012	0.013	0.012	0.026	0.018	0.019	0.018	0.019	0.019	0.005	0.017	0.016	0.008	0.009
0.036	0.039	0.040	0.040	0.084	0.052	0.051	0.054	0.053	0.059	0.015	0.048	0.052	0.030	0.031
0.054	0.049	0.055	0.048	0.210	0.082	0.085	0.090	0.095	0.113	0.013	0.080	0.078	0.051	0.054
0.051	0.047	0.052	0.046	0.186	0.078	0.081	0.085	0.089	0.106	0.013	0.076	0.074	0.048	0.051
0.008	0.009	0.010	0.009	0.012	0.021	0.016	0.019	0.014	0.016	0.003	0.014	0.011	0.005	0.005
0.018	0.021	0.020	0.022	0.022	0.029	0.024	0.028	0.021	0.025	0.007	0.022	0.022	0.014	0.012
0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.000	0.001	0.001	0.000	0.001
0.003	0.002	0.003	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.001	0.002	0.003	0.002	0.001
0.102	0.103	0.132	0.098	0.128	0.521	0.499	0.726	0.339	0.484	0.024	0.309	0.154	0.045	0.051
0.027	0.030	0.032	0.031	0.047	0.048	0.043	0.049	0.041	0.047	0.016	0.040	0.037	0.016	0.020
0.072	0.067	0.084	0.065	0.132	0.088	0.079	0.090	0.082	0.095	0.024	0.128	0.131	0.048	0.048
0.053	0.051	0.059	0.051	0.122	0.075	0.069	0.077	0.080	0.084	0.015	0.084	0.104	0.043	0.040
0.180	0.173	0.218	0.194	0.233	0.137	0.146	0.158	0.282	0.196	0.026	0.144	0.175	0.108	0.097
0.109	0.170	0.132	0.150	0.159	0.122	0.175	0.123	0.122	0.128	0.233	0.134	0.135	0.068	0.187
0.098	0.128	0.124	0.140	0.081	0.069	0.076	0.066	0.104	0.085	0.621	0.073	0.108	0.052	0.163
0.029	0.032	0.037	0.032	0.044	0.138	0.136	0.100	0.062	0.117	0.008	0.085	0.046	0.015	0.017
0.086	0.088	0.106	0.087	0 138	0.478	0.253	0.313	0.185	0.275	0.023	0.258	0.125	0.046	0.050
0.056	0.056	0.069	0.054	0.090	0.224	0.157	0.208	0.118	0.165	0.016	0.147	0.090	0.031	0.033
0.092	0.093	0.116	0.090	0.129	0.442	0.366	0.514	0.256	0.365	0.024	0.266	0.142	0.046	0.050
0.181	0.198	0.225	0.200	0.300	0.235	0.213	0.239	0.251	0.241	0.047	0.231	0.234	0.098	0.106
0.032	0.034	0.033	0.033	0.056	0.064	0.057	0.067	0.055	0.060	0.016	0.052	0.044	0.019	0.023
0.193	0.219	0.224	0.233	0.392	0.236	0.226	0.245	0.255	0.270	0.059	0.237	0.302	0.139	0.136
0.094	0.103	0.108	0.107	0.173	0.126	0.120	0.129	0.129	0.136	0.066	0.118	0.132	0.069	0.077
0.356	0.435	0.435	0.444	0.442	0.306	0.374	0.324	0.469	0.379	0.762	0.327	0.383	0.211	0.411
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	C.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	1.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0 000
0.000	0.000	0 000	1.000	0.000	0.000	0.000	0.000	0 000	0 000	0 000	0.000	0.000	0 000	0.000
0.284	0.255	0.283	0.245	1.194	0.429	0.453	0.469	0.504	0.612	0.065	0.421	0.415	0.281	0.297
0.132	0.140	0.162	0.139	0.213	1.578	0.306	0.388	0.237	0.320	0.038	0.682	0.190	0.074	0.080
0.058	0.062	0.071	0.062	0.094	0.168	1.314	0.163	0.101	0.133	0.017	0 287	0.193	0.033	0.042
0.047	0.051	0.057	0.051	0.080	0.136	0.104	1.461	0.083	0.107	0.016	0.099	0.098	0.028	0.031
0.156	0.128	0.225	0.104	0.028	0.049	0.043	0.044	1.161	0.055	0.006	0.035	0.030	0.014	0.013
0.032	0.034	0.039	0.034	0.053	0.095	0.072	0.085	0.058	1 152	0.010	0.071	0.046	0.018	0.020
0.104	0.150	0.146	0.180	0.043	0.052	0.047	0 045	0.041	0.049	1.040	0.043	0.063	0.028	0.217
0.140	0.150	0.171	0.151	0.233	0.416	0.311	0 420	0.250	0.333	0.042	1 333	0.204	0.080	0.089
0.060	0.063	0.072	0.064	0.099	0.145	0 115	0.136	0.100	0.127	0.022	0.107	1.560	0.037	0.042
0.619	0.348	0.257	0.315	0.192	0.211	0.190	0.209	0.184	0.213	0.062	0.182	0.173	1.296	0.089
0.370	0.454	0.490	0.464	0.210	0.250	0 226	0.213	0.194	0 219	0 053	0.203	0.325	0.145	1.194
0 015	0.016	0.018	0.016	0.027	0.022	0 021	0.023	0.021	0.023	0.005	0.021	0.025	0 010	0.015
0.660	0 464	0.959	0.198	0.019	0.016	0 015	0.015	0.014	0.015	0.004	0.014	0.013	0.008	0.007
0.001	0.001	0 001	0.001	0.001	0.002	0.005	0.004	0.003	0.002	0.000	0.002	0.001	0.000	0.000
0.001	0.001	0.002	0.271	0.002	0.001	0.001	0.001	0.005	0.001	0.002	0.001	0.001	0.001	0.001
0.001	0.547	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001
0.001	0.001	0.053	0.482	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.000	0.001
0.246	0.221	0.246	0.214	1.022	0.372	0.392	0.406	0.435	0.527	0.057	0.364	0.359	0.241	0.255
0.063	0.072	0.075	0.073	0.114	0.109	0.095	0 111	0.094	0.105	0.026	0.092	0.089	0.040	0.046
0.070	0.069	0.077	0.069	0.214	0.123	0.116	0.126	0 118	0 140	0.021	0.108	0 133	0.058	0 062
0.032	0.034	0.038	0.035	0.069	0.049	0.047	0.052	0 051	0 058	0.013	0.045	0.046	0.025	0.028
0.100	0.114	0.121	0.118	0.177	0.182	0.160	0.183	0.154	0.175	0.061	0 150	0.138	0.062	0.075
0.024	0.026	0.030	0.026	0.040	0.075	0.054	0.068	0.045	0.058	0.007	0.050	0.034	0.013	0.015
0 048	0.050	0 056	0 051	0.101	0 085	0 084	0.086	0.088	0 085	0 023	0 072	0 068	0 033	0 036
0.072	0.065	0 066	0.059	0 071	0 072	0 066	0 071	0 061	0 068	0.013	0 107	0 078	0 082	0.042
0.000	0.000	0.000	0.000	0 000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.246	0.274	0.278	0.272	0.295	0.248	0.263	0 253	0.295	0 270	0 352	0.281	0 271	0.185	0.233
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0 000	0 000	0.000	0 000
0.293	0.339	0.355	0.346	0.427	0.435	0 420	0.456	0.437	0.440	0.403	0.372	0.365	0 178	0.276
0.462	0.386	0.367	0.382	0.278	0.317	0.317	0.292	0.268	0.290	0.245	0 347	0.384	0.637	0 491

Source: Thorbecke (1992)

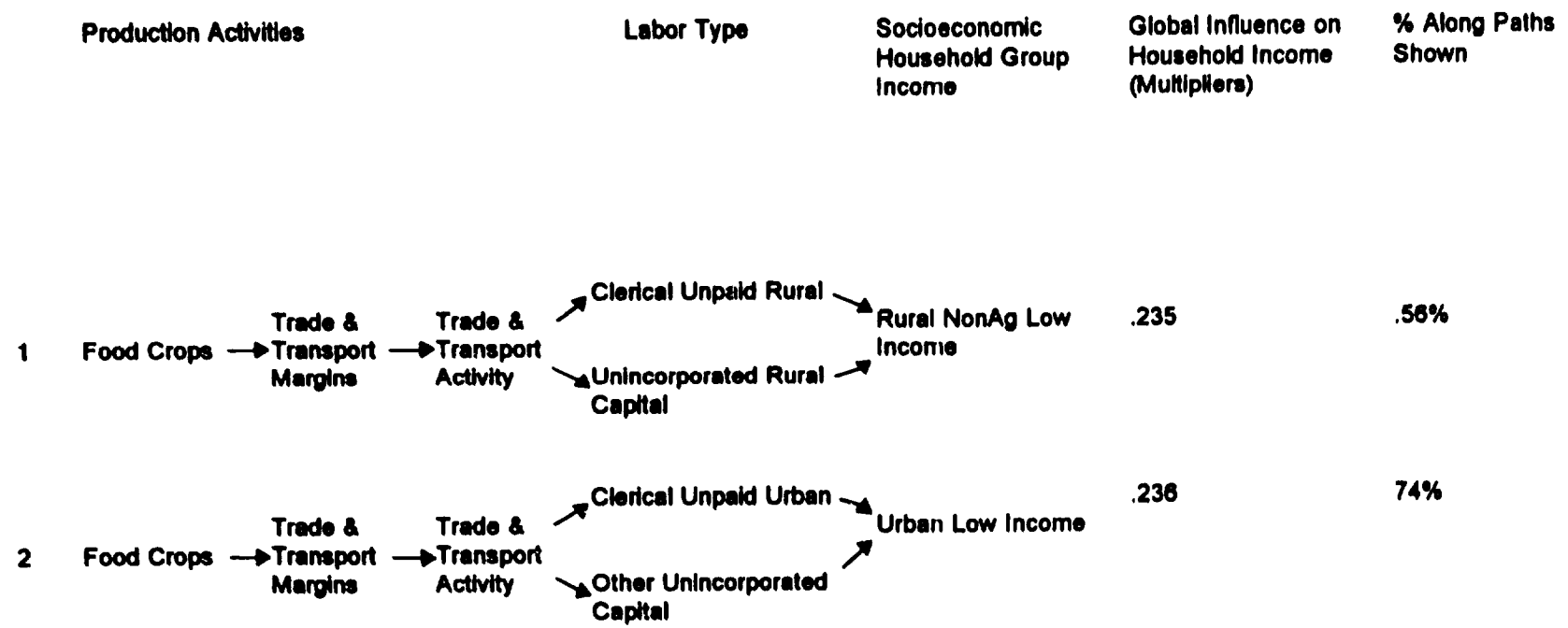
export crops). Interestingly, small farmers' households benefit also, to some extent, from non-agricultural activities such as food processing (.258); restaurants, mostly an informal activity in Indonesia (.194); land transportation (.140); public works in agriculture (.133); and, personal services (.116). Small farmers also benefit from government investment in agriculture (.133); government current expenditures on education and health (.136); and government expenditures on other wages (.152). In general, structural path analysis shows that these non-agricultural activities and government expenditure categories require a significant amount of unskilled labor that can be provided by small farmers' households--as is explicitly shown subsequently.

The next relatively poor socioeconomic household group, the rural non-agricultural low income group is most favorably affected by trade activities (mainly informal) (.305); land transportation (.309); personal services (.260) as well as textiles and food processing (both around .3). All these activities require unskilled labor that can be provided by this socioeconomic group. Perhaps somewhat surprisingly, this group also benefits indirectly from food crops (.235) through the trade and transportation services connected with food crop production that, in turn, require unskilled labor from rural non-agricultural lower income group (see the SPA Figure 5). This is a typical example of an important linkage from agriculture to the rural informal sector and its contribution to poverty alleviation. This household group is also positively affected by a variety of government expenditure programs such as government expenditure on wages other than education and health services (.258); government investment in industry (.208); and government investment in the energy sector (.17); and in trade (.184).

The final relatively poor socioeconomic groups, i.e. the urban low income group, benefits most from such activities as land transportation (.432); trade (.392); restaurants (.347); textiles (.302); personal services (.319); finance (.312). Also in a very indirect, but meaningful way, the urban low income group benefits from food crops activities (.236) and non-food crops (.226) via trade and transport margins, trade and transport services requiring clerical unpaid urban labor that ultimately represents income to the urban low household group. Figure 5 shows explicitly these paths. This is an important example of a rural activity that contributes indirectly but significantly to poverty alleviation in the urban areas.

An interesting question from the standpoint of poverty alleviation is to estimate the contribution that different production activities make, directly and indirectly; to the incomes accruing to the poor socioeconomic groups. The overall contribution of an increase in sectoral (production activity) output

Figure 5 Indonesia: Two Examples of Structural Path Analysis



Source: Author's calculations based on SAM in Table 2.

is measured by the fixed price multiplier originating with that particular production activity and destined to the specific poor socioeconomic group under scrutiny. This multiplier can be decomposed into two multiplicative effects, the distributional effects and the interdependency effects (see Annex II.C. for a technical presentation).

The distributional effects include the incomes received by a given (poor) household group from the factors (such as unskilled labor and land) provided by that group and used as primary inputs in the production of the commodity under consideration. It also includes a) the indirect factor incomes received by the same group from the intermediate inputs required in the production of that commodity; and b) the incomes accruing to that group from transfers and remittances from other socioeconomic groups.

The interdependency effects (sometimes called closed loop effects) capture the indirect spending and respending effects by that and other groups that benefitted, income-wise from, the initial increase in output. The interdependency effects reflect the extent of integration within an economy, on both the consumption and production sides. The more consumers spend on domestic goods and services, the more diversified their consumption patterns, the larger the interdependency effects.

Table 3b gives the decomposition of multipliers from production activities to incomes received by the poor socioeconomic groups (i.e. agricultural (landless) employees, small farmers, rural non-agricultural poor and urban poor) in the context of Indonesia. It can be verified that any given fixed price multiplier is equal to the product of the corresponding distributional and interdependency effects, e.g. the fixed price multiplier from textiles to poverty alleviation (additional incomes received by the four poor household groups) amounts to .707 in Table 3b, which is the product of distributional effects (.386) and interdependency effects (1.834). The following observations are suggested by Table 3b. Total multipliers originating from agricultural production activities are highest (.75-1.09), followed by services and informal activities (.43-.93) and manufacturing (.14-.81). Among manufactures, food processing and textiles made relatively high contributions to poverty alleviation (.81, and .71, respectively). On the other hand, other manufacturing sectors such as paper and metallic products and chemicals and minerals displayed relatively low overall multipliers of .14. The major reason for these low values in comparison with processed food, textiles and agricultural sectors appears to be the low magnitude of distributional effects, i.e. .17 for both paper and metal products and chemical and mineral products. One policy implication of this observation is that, in order to benefit from industrialization more directly, poor groups

Table 3.b : Indonesia, Decomposition of Multipliers from Production Activities to Poverty groups

Distributional Effects (PA_j^d)

	Trade&TransMarg	FoodCrops	OtherCrops	Livestock	Forest&Wood	Fishery	Mining	FoodProcess	Textiles
Poverty	0.4948	0.4996	0.3738	0.3654	0.3713	0.4222	0.0657	0.3977	0.3855
(Rural:24,25,28)	0.2421	0.4545	0.2994	0.2988	0.2496	0.3145	0.0334	0.3008	0.1990
(Urban:30)[2]	0.2527	0.0451	0.0744	0.0666	0.1217	0.1077	0.0323	0.0969	0.1866

Interdependency Effects (PA_j^r)

	Trade&TransMarg	FoodCrops	OtherCrops	Livestock	Forest&Wood	Fishery	Mining	FoodProcess	Textiles
Poverty	1.7664	2.1756	2.2150	2.4551	2.0280	2.1386	2.0846	2.0392	1.8339
(Rural:24,25,28)	1.9908	1.8724	2.0108	2.1822	1.9951	2.0125	2.3354	1.9085	2.0356
(Urban:30)	1.5514	5.2281	3.0361	3.6793	2.0954	2.5070	1.8254	2.4449	1.6187

Fixed Price Multipliers (PA_j^m)

	Trade&TransMarg	FoodCrops	OtherCrops	Livestock	Forest&Wood	Fishery	Mining	FoodProcess	Textiles
Poverty	0.874	1.087	0.828	0.897	0.753	0.903	0.137	0.811	0.707
(Rural:24,25,28)	0.482	0.851	0.602	0.652	0.498	0.633	0.078	0.574	0.405
(Urban:30)	0.392	0.236	0.226	0.245	0.255	0.27	0.059	0.237	0.302

Distributional Effects (PA_j^d)

	Paper&MetalProd	Chem&Minerals	Utilities	BuildConstruction	PublicWorksAg	PWTransp	PWUtil&Comm	PWOther
Poverty	0.1665	0.1697	0.2292	0.3241	0.3391	0.2922	0.2818	0.3358
(Rural:24,25,28)	0.0764	0.0850	0.0955	0.1980	0.2891	0.1492	0.1418	0.1741
(Urban:30)	0.0902	0.0847	0.1337	0.1261	0.0500	0.1430	0.1400	0.1617

Interdependency Effects (PA_j^r)

	Paper&MetalProd	Chem&Minerals	Utilities	BuildConstruction	PublicWorksAg	PWTransp	PWUtil&Comm	PWOther
Poverty	1.7895	1.8207	1.8675	1.8268	1.8637	1.7558	1.7533	1.7541
(Rural:24,25,28)	2.0824	2.0347	2.3031	1.8691	1.6880	1.9367	1.9468	1.9244
(Urban:30)	1.5414	1.6059	1.5561	1.7603	2.8792	1.5669	1.5574	1.5707

Fixed Price Multipliers (PA_j^m)

	Paper&MetalProd	Chem&Minerals	Utilities	BuildConstruction	PublicWorksAg	PWTransp	PWUtil&Comm	PWOther
Poverty	0.298	0.309	0.428	0.592	0.632	0.513	0.494	0.589
(Rural:24,25,28)	0.159	0.173	0.22	0.37	0.488	0.289	0.276	0.335
(Urban:30)	0.139	0.136	0.208	0.222	0.144	0.224	0.218	0.254

Distributional Effects (PA_j^d)

	Trade&TransServ	Restaurant&Hotel	LandTransport	OtherTrans&Commun	FinanRE.&BusServ	Educ&Health	Pers&HHServices
Poverty	0.4992	0.4253	0.5293	0.2605	0.3304	0.2571	0.4167
(Rural:24,25,28)	0.2472	0.2250	0.2434	0.1116	0.1332	0.1372	0.2137
(Urban:30)	0.2519	0.2003	0.2658	0.1489	0.1972	0.1199	0.2030

Interdependency Effects (PA_j^r)

	Trade&TransServ	Restaurant&Hotel	LandTransport	OtherTrans&Commun	FinanRE.&BusServ	Educ&Health	Pers&HHServices
Poverty	1.7649	1.9729	1.7534	1.8657	1.9401	2.6254	1.7613
(Rural:24,25,28)	1.9778	2.1871	2.0378	2.2680	2.4705	2.9006	1.9416
(Urban:30)	1.5560	1.7324	1.5113	1.5644	1.5820	2.3105	1.5714

Fixed Price Multipliers (PA_j^m)

	Trade&TransServ	Restaurant&Hotel	LandTransport	OtherTrans&Commun	FinanRE.&BusServ	Educ&Health	Pers&HHServices
Poverty	0.881	0.839	0.928	0.486	0.641	0.675	0.734
(Rural:24,25,28)	0.489	0.492	0.496	0.253	0.329	0.398	0.415
(Urban:30)	0.392	0.347	0.432	0.233	0.312	0.277	0.319

1) Based on 1980 Indonesia SAM.

2) The numbers in parentheses refer to the four respective poor household groups: agricultural(landless) employees(24), small farmers(25), rural non-agricultural low(28) and urban low(30).

3) See text for definition, or see Annex II.C for definition of concepts.

should be more engaged in the process of industrialization. To the extent that industrial sectors rely largely on skilled rather than unskilled labor, it is essential that the human capital of the poor be enhanced through education and vocational training so that they are not sealed off from modern production activities.

A final observation worth noting is that, in general, agricultural activities contribute most to the alleviation of rural poverty, while services and informal activities contribute relatively most to the reduction of urban poverty.

A key issue facing Indonesia starting in 1983 was the sharp drop in the price of oil (by far the largest source of government revenues) and the consequent need to undergo a budget retrenchment process, as part of a broader structural adjustment program. By using structural path analysis, the various direct and indirect paths can be identified through which given budget retrenchment policies--in the present context through varying 13 current and capital expenditure programs--ultimately influence the incomes of different socioeconomic groups. Clearly, the mechanisms through which a public works program in agriculture affects the income of the different households groups is likely to be very different from that of a reduction in, say, government current expenditures on education or the wages of public servants. An attempt is made in Figures 6 and 7 to identify the various paths through which alternative selective government current expenditure in investment programs ultimately affected the incomes of a specific socioeconomic group. Thus, it can be seen in Figure 6, Case 1 that government current expenditures on education and health influence the incomes of the urban high group through the production activity "education and health", which in turn requires clerical paid urban and professional paid urban labor, which then get mapped into incomes of this particular socioeconomic group. The main observations that are suggested by Figure 6 are, first, that government current expenditures on education and health benefit the urban high group significantly more than the urban low group (the corresponding multipliers being 0.371 and 0.277) and, likewise, government expenditures on "other wages and salaries" (cases 3 and 4 in Figure 6) the same relative impact. Secondly, government transfers to households tend to have a direct and very large impact on the incomes of the urban low group (a multiplier value of 0.806). This suggests that reductions in food subsidies, for example, have a very strong negative effect on the incomes of the urban poor.

Figure 7 shows that government investment programs operate indirectly through their effects on sectoral production, particularly through their impact on construction and public works activities in agriculture, industry

Figure 6 Impact of Different Government Current Expenditures Programs on Income and Food Consumption of Socio-economic Groups

1 Policy	2 Production Activity Income	3 Labor Type Income	4 Socio-economic Household Group Income	5 Global Influence on Household Income	6 Global Influence Food Consumption	7 % Along Path(s) Shown
1. Gov Current Exp. on Educ & Health →	Education & Health →	Clerical Paid Urban Prof. Paid Urban	Urban High	.371	.059	80%
2. Gov Current Exp. on Educ & Health →	Education & Health →	Prof. Paid Urban	Urban Low	.277	.074	21%
3. Gov Curren Exp. on Other Wages & Sal. →	→	Clerical Paid Urban Prof. Paid Urban	Urban High	.506	.080	87%
4. Gov Current Exp. on Other Wages & Sal. →	→	Clerical Paid Urban Prof. Paid Urban	Urban Low	.378	.101	51%
5. Gov Current Exp. on Household Transfers →	→		Urban Low	.806	.215	90%

Source: Thorbecke (1992)

Figure 7 **Impact of Different Government Programs on Income and Food Consumption of Selected Socioheconomic Household Groups**

1 Policy		2 Production Activity Income		3 Labor Type Income		4 Socio-economic Household Group Income	5 Global Influence on Household Income	6 Global * Influence Food Consumption	7 % Along Path(s) Shown
1. Gov. Inv. Agr.	→	Public Works in Agr.	→	Agr. Paid Rural	→	Agr. Employees	.196	.155	91%
2. Gov. Inv. Industry	→	Public Works Other	→	Manual Pd. Urban	→	Urban Low	.226	.060	18%
3. Gov Inv. Educ.	→	Bulding & Construct.	→	Manual Pd. Urban	→	Urban Low	.205	.055	19%
4. Gov. Inv. Educ.	→	Bulding & Construct.		Manual Pd. Urban	→	Rural Non Ag. Low	.201	.087	28%
5. Gov. Inv. Gen. Service	→	Bulding & Construct.	→	Manual Pd. Urban	→	Rural Non Ag. Low	.225	.097	29%

* Global influence on Household Income multiplied by marginal expenditure propensity on food of corresponding household group.

Thorbecke (1992)

and other activities. Case 1 shows that government investment in agriculture leads to public works project, such as irrigation schemes, which employ "agricultural paid" workers who typically originate in agricultural employees' (landless) households. Incidentally, the corresponding multiplier value of 0.196 for this group is the largest which can be obtained by any specific government program except for transfers. Cases 2 and 3 (Figure 7) reveal that government investment in industry and in education, e.g. school construction, is relatively labor intensive in terms of mainly unskilled workers, consequently benefitting the urban low group. Similarly, in cases 4 and 5, government investment programs in education and in general services, through their impact on construction, provide the job opportunities for manual labor, which in turn yields additional incomes to the rural non-agricultural low group.

2. The Two-Region Indonesian SAM for 1980

A two-region SAM for Indonesia (1980) was built by T. Hidayat (1992). This is an interregional SAM that divides Indonesia into the economically strong Center region (essentially Java) and the Outer Islands. The contrast between the two regions is dramatic. In 1987, some 61% of the population resided in the Center region that comprises only about 7% of Indonesia's land area, creating a considerable population density contrast between the two regions, 775 vs. 37 persons per square kilometer. The two-region SAM was used to examine the structure of interdependence among the two regions and to demonstrate the implications on the total economy, including the income distribution, of increasing production and particularly the exports of different sectors in the periphery as opposed to the Center region. This interregional SAM consists of 45 sectors, five of which are exogenous. Thus, the endogenous part of the SAM is a 40 X 40 matrix and the multiplier matrix includes the 20 X 20 intraregional transactions, within the Center and Outer Islands, respectively, and the 20 X 20 interregional flows originating respectively in the Center region to the Outer region and in the Outer region to the Center region. The multipliers generated by this interregional SAM are given in Table 4. Some interesting findings are suggested by Table 4. Comparing, first, the intra-regional multipliers of the Center vs. the Outer regions, it turns out that the intra-regional multipliers in the Center region are consistently stronger than the corresponding ones in the Outer region. This means that an injection of investment (for instance a large project) undertaken in the Center region would have greater direct and indirect total output effects within the Center region than a similar project would have had within the Outer region. The Outer region, on the other hand, shows stronger

Table 4

The Fixed Price Multipliers Matrix of the 45x45 SAM

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	1	Agriculture Labor	1.214	0.169	0.174	0.106	0.069	0.178	0.268	0.254	0.250	0.187	0.232	0.212	0.169	0.215	0.100	0.016	0.595	0.167	0.166	0.111	0.191	0.130	0.112
	2	Manual & Manufacturing Labor	0.061	1.104	0.084	0.099	0.029	0.068	0.076	0.083	0.090	0.078	0.095	0.097	0.084	0.111	0.101	0.018	0.046	0.047	0.102	0.167	0.045	0.230	0.053
	3	Clerical Labor	0.053	0.079	1.092	0.105	0.029	0.053	0.065	0.072	0.081	0.074	0.092	0.008	0.088	0.120	0.110	0.008	0.040	0.038	0.040	0.234	0.012	0.054	0.121
C	4	Professional Labor	0.024	0.028	0.029	1.023	0.009	0.022	0.019	0.018	0.019	0.025	0.021	0.022	0.030	0.026	0.024	0.002	0.015	0.011	0.011	0.047	0.028	0.033	0.015
E	5	Other Factors	0.381	0.384	0.394	0.428	1.166	0.366	0.413	0.413	0.433	0.391	0.438	0.433	0.396	0.475	0.428	0.076	0.489	0.920	0.434	0.592	0.300	0.316	0.306
N	6	Agricultural Workers	0.264	0.043	0.044	0.048	0.023	1.045	0.063	0.059	0.059	0.045	0.056	0.050	0.041	0.054	0.045	0.004	0.132	0.021	0.037	0.036	0.044	0.029	0.027
T	7	Small Farmers	0.391	0.081	0.081	0.091	0.084	0.081	1.127	0.105	0.111	0.086	0.107	0.093	0.080	0.114	0.088	0.007	0.209	0.075	0.072	0.078	0.078	0.058	0.051
E	8	Medium Farmers	0.083	0.027	0.025	0.023	0.028	0.026	0.029	1.028	0.029	0.027	0.031	0.025	0.024	0.029	0.023	0.002	0.047	0.025	0.019	0.024	0.065	0.038	0.031
R	9	Large Farmers	0.113	0.045	0.042	0.034	0.031	0.042	0.048	0.038	1.042	0.045	0.043	0.034	0.041	0.047	0.033	0.004	0.062	0.028	0.025	0.033	0.160	0.081	0.055
	10	Rural Low Group	0.049	0.418	0.284	0.089	0.048	0.051	0.062	0.062	0.071	1.066	0.078	0.071	0.065	0.095	0.077	0.008	0.041	0.052	0.058	0.128	0.036	0.104	0.057
	11	Non Labor Force Rural Group	0.024	0.019	0.018	0.017	0.032	0.017	0.021	0.019	0.020	0.018	1.054	0.017	0.017	0.028	0.017	0.005	0.020	0.027	0.014	0.020	0.030	0.029	0.024
R	12	Rural High Group	0.032	0.051	0.106	0.314	0.039	0.029	0.028	0.027	0.030	0.033	0.031	1.031	0.037	0.037	0.033	0.031	0.027	0.036	0.022	0.054	0.037	0.096	0.103
E	13	Urban Low Group	0.078	0.581	0.567	0.136	0.091	0.081	0.096	0.099	0.110	0.088	0.120	0.117	1.107	0.145	0.126	0.010	0.070	0.095	0.092	0.221	0.060	0.154	0.100
G	14	Non Labor Force Urban Group	0.023	0.028	0.026	0.021	0.041	0.021	0.024	0.024	0.023	0.024	0.026	0.020	0.023	1.043	0.021	0.009	0.022	0.036	0.018	0.026	0.023	0.057	0.036
I	15	Urban High Group	0.053	0.084	0.237	0.751	0.070	0.052	0.062	0.061	0.068	0.059	0.060	0.060	0.066	0.071	1.065	0.038	0.047	0.056	0.041	0.111	0.065	0.101	0.159
O	16	Companies	0.212	0.231	0.238	0.258	0.696	0.215	0.249	0.249	0.261	0.215	0.264	0.261	0.219	0.286	0.256	1.016	0.295	0.597	0.262	0.357	0.181	0.190	0.184
N	17	Agriculture	0.400	0.372	0.383	0.435	0.152	0.391	0.594	0.564	0.556	0.412	0.516	0.472	0.372	0.478	0.422	0.015	1.325	0.149	0.346	0.312	0.257	0.256	0.219
	18	Mining	0.048	0.045	0.041	0.028	0.013	0.041	0.033	0.027	0.029	0.043	0.029	0.028	0.043	0.031	0.027	0.003	0.028	1.018	0.015	0.033	0.063	0.030	0.029
	19	Manufacturing	0.536	0.599	0.621	0.736	0.229	0.663	0.716	0.765	0.806	0.640	0.792	0.795	0.609	0.794	0.714	0.057	0.408	0.241	1.457	0.653	0.724	0.363	0.343
	20	Other Sectors	0.290	0.451	0.498	0.624	0.166	0.291	0.368	0.415	0.469	0.421	0.538	0.563	0.510	0.713	0.667	0.047	0.318	0.205	0.183	1.446	0.222	0.233	0.291
	21	Agriculture Labor	0.595	0.119	0.114	0.105	0.042	0.123	0.156	0.130	0.129	0.125	0.131	0.112	0.114	0.118	0.101	0.010	0.284	0.041	0.082	0.084	1.176	0.126	0.120
	22	Manual & Manufacturing Labor	0.032	0.184	0.032	0.024	0.010	0.030	0.024	0.021	0.022	0.032	0.023	0.023	0.035	0.026	0.024	0.003	0.020	0.013	0.021	0.037	0.040	1.070	0.046
	23	Clerical Labor	0.050	0.055	0.143	0.029	0.015	0.047	0.030	0.024	0.026	0.047	0.028	0.027	0.056	0.033	0.029	0.004	0.029	0.016	0.017	0.050	0.058	0.079	1.091
	24	Professional Labor	0.088	0.029	0.026	0.013	0.007	0.025	0.015	0.011	0.011	0.025	0.012	0.011	0.029	0.013	0.011	0.002	0.016	0.007	0.008	0.017	0.019	0.045	0.048
O	25	Other Factors	0.239	0.210	0.184	0.104	0.129	0.194	0.142	0.101	0.106	0.194	0.107	0.102	0.196	0.115	0.101	0.015	0.152	0.117	0.084	0.136	0.342	0.319	0.314
U	26	Agricultural Workers	0.084	0.028	0.021	0.017	0.009	0.314	0.022	0.020	0.021	0.018	0.020	0.018	0.018	0.020	0.017	0.002	0.042	0.018	0.013	0.015	0.020	0.014	0.015
T	27	Small Farmers	0.245	0.087	0.087	0.052	0.028	0.062	0.167	0.060	0.061	0.063	0.058	0.054	0.060	0.058	0.060	0.005	0.125	0.027	0.041	0.049	0.408	0.236	0.153
E	28	Medium Farmers	0.142	0.060	0.042	0.031	0.019	0.042	0.043	0.036	0.036	0.042	0.034	0.032	0.040	0.034	0.030	0.003	0.073	0.018	0.024	0.030	0.269	0.102	0.078
R	29	Large Farmers	0.236	0.092	0.082	0.057	0.044	0.085	0.080	0.084	0.085	0.095	0.083	0.059	0.083	0.083	0.016	0.007	0.124	0.041	0.048	0.080	0.432	0.149	0.174
	30	Rural Low Group	0.041	0.135	0.087	0.031	0.017	0.024	0.026	0.024	0.027	0.303	0.028	0.028	0.027	0.033	0.027	0.002	0.026	0.018	0.021	0.042	0.062	0.042	0.029
	31	Non Labor Force Rural Group	0.035	0.020	0.016	0.009	0.007	0.013	0.012	0.010	0.010	0.014	0.010	0.010	0.013	0.010	0.009	0.003	0.019	0.008	0.007	0.011	0.064	0.019	0.047
R	32	Rural High Group	0.042	0.065	0.052	0.020	0.016	0.030	0.023	0.019	0.020	0.031	0.020	0.020	0.034	0.022	0.020	0.010	0.025	0.016	0.015	0.030	0.063	0.258	0.270
E	33	Urban Low Group	0.039	0.176	0.169	0.044	0.031	0.034	0.035	0.034	0.037	0.040	0.040	0.039	0.319	0.047	0.041	0.004	0.029	0.032	0.030	0.089	0.044	0.063	0.048
G	34	Non Labor Force Urban Group	0.021	0.033	0.026	0.011	0.010	0.017	0.013	0.010	0.011	0.018	0.011	0.010	0.018	0.012	0.011	0.006	0.013	0.009	0.008	0.016	0.030	0.121	0.119
I	35	Urban High Group	0.048	0.076	0.084	0.028	0.026	0.042	0.031	0.026	0.026	0.043	0.027	0.027	0.048	0.031	0.027	0.018	0.031	0.025	0.020	0.043	0.065	0.259	0.509
O	36	Companies	0.088	0.083	0.077	0.059	0.119	0.077	0.087	0.087	0.080	0.079	0.080	0.080	0.085	0.085	0.058	0.131	0.076	0.100	0.084	0.079	0.111	0.106	0.104
N	37	Agriculture	0.315	0.233	0.196	0.086	0.062	0.234	0.165	0.098	0.101	0.219	0.101	0.094	0.203	0.106	0.092	0.015	0.189	0.080	0.072	0.114	0.479	0.398	0.368
	38	Mining	0.078	0.089	0.059	0.027	0.018	0.060	0.041	0.027	0.028	0.064	0.028	0.026	0.053	0.030	0.026	0.005	0.043	0.017	0.020	0.034	0.119	0.110	0.110
	39	Manufacturing	0.354	0.304	0.259	0.119	0.077	0.281	0.186	0.117	0.122	0.286	0.122	0.115	0.275	0.131	0.113	0.020	0.193	0.076	0.068	0.147	0.519	0.488	0.477
	40	Other Sectors	0.213	0.231	0.206	0.095	0.058	0.203	0.115	0.085	0.090	0.194	0.093	0.089	0.231	0.105	0.092	0.017	0.120	0.058	0.062	0.139	0.297	0.364	0.368

Table 4 (cont.)

			24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
	1	Agriculture Labor	0.156	0.078	0.093	0.098	0.126	0.135	0.089	0.128	0.113	0.090	0.134	0.098	0.025	0.145	0.071	0.068	0.100
	2	Manual & Manufacturing Labor	0.077	0.032	0.040	0.035	0.045	0.051	0.039	0.054	0.052	0.044	0.068	0.050	0.012	0.030	0.043	0.030	0.069
	3	Clerical Labor	0.090	0.031	0.040	0.033	0.041	0.047	0.038	0.053	0.051	0.044	0.072	0.053	0.013	0.028	0.037	0.024	0.076
C	4	Professional Labor	0.583	0.017	0.041	0.031	0.025	0.025	0.039	0.031	0.031	0.047	0.039	0.038	0.008	0.017	0.025	0.021	0.091
E	5	Other Factors	0.373	0.416	0.291	0.291	0.289	0.303	0.294	0.320	0.300	0.303	0.357	0.290	0.070	0.100	0.664	0.302	0.362
N	6	Agricultural Workers	0.038	0.020	0.023	0.023	0.030	0.032	0.022	0.031	0.027	0.022	0.033	0.024	0.006	0.014	0.020	0.017	0.025
T	7	Small Farmers	0.074	0.048	0.046	0.047	0.057	0.062	0.045	0.062	0.053	0.046	0.070	0.048	0.012	0.062	0.059	0.038	0.053
E	8	Medium Farmers	0.026	0.037	0.027	0.028	0.294	0.024	0.026	0.026	0.023	0.026	0.026	0.022	0.005	0.019	0.028	0.022	0.028
R	9	Large Farmers	0.045	0.115	0.060	0.064	0.048	0.383	0.059	0.050	0.045	0.059	0.052	0.048	0.011	0.068	0.059	0.053	0.062
	10	Rural Low Group	0.067	0.031	0.033	0.029	0.035	0.041	0.032	0.045	0.040	0.035	0.057	0.040	0.010	0.027	0.042	0.028	0.054
	11	Non Labor Force Rural Group	0.022	0.021	0.016	0.016	0.015	0.015	0.016	0.336	0.014	0.016	0.020	0.014	0.008	0.018	0.023	0.014	0.020
R	12	Rural High Group	0.230	0.036	0.040	0.034	0.029	0.030	0.039	0.034	0.316	0.045	0.041	0.038	0.025	0.027	0.040	0.027	0.074
E	13	Urban Low Group	0.104	0.054	0.055	0.056	0.058	0.066	0.054	0.072	0.067	0.060	0.090	0.066	0.016	0.045	0.075	0.043	0.090
G	14	Non Labor Force Urban Group	0.040	0.029	0.024	0.023	0.021	0.020	0.025	0.025	0.020	0.028	0.403	0.022	0.019	0.020	0.032	0.019	0.034
I	15	Urban High Group	0.454	0.056	0.067	0.056	0.050	0.052	0.065	0.060	0.058	0.075	0.073	0.260	0.038	0.043	0.068	0.044	0.128
O	16	Companies	0.226	0.351	0.176	0.176	0.174	0.183	0.177	0.193	0.181	0.183	0.215	0.175	0.042	0.180	0.401	0.182	0.218
N	17	Agriculture	0.342	0.168	0.191	0.198	0.289	0.291	0.184	0.276	0.243	0.186	0.289	0.209	0.054	0.283	0.155	0.141	0.214
	18	Mining	0.046	0.033	0.074	0.078	0.056	0.053	0.082	0.059	0.057	0.081	0.058	0.059	0.013	0.040	0.520	0.134	0.072
	19	Manufacturing	0.546	0.231	0.223	0.212	0.336	0.392	0.220	0.385	0.259	0.235	0.437	0.302	0.079	0.220	0.234	0.186	0.725
	20	Other Sectors	0.462	0.168	0.197	0.188	0.218	0.257	0.190	0.289	0.278	0.216	0.398	0.280	0.068	0.149	0.191	0.123	0.360
	21	Agriculture Labor	0.114	0.078	0.154	0.177	0.135	0.126	0.143	0.128	0.114	0.134	0.121	0.109	0.026	0.325	0.058	0.100	0.102
	22	Manual & Manufacturing Labor	0.035	0.023	0.058	0.046	0.036	0.035	0.055	0.042	0.042	0.064	0.049	0.050	0.011	0.027	0.038	0.043	0.110
	23	Clerical Labor	0.058	0.040	0.108	0.079	0.059	0.058	0.103	0.075	0.075	0.126	0.091	0.097	0.020	0.042	0.052	0.047	0.255
	24	Professional Labor	1.031	0.023	0.064	0.047	0.034	0.033	0.060	0.043	0.043	0.074	0.051	0.056	0.012	0.024	0.034	0.031	0.147
O	25	Other Factors	0.216	1.186	0.438	0.455	0.299	0.288	0.436	0.306	0.289	0.439	0.302	0.317	0.070	0.558	0.506	0.428	0.481
U	26	Agricultural Workers	0.026	0.014	1.019	0.016	0.015	0.016	0.017	0.018	0.015	0.018	0.020	0.016	0.004	0.016	0.013	0.011	0.026
T	27	Small Farmers	0.079	0.065	0.084	1.088	0.068	0.064	0.080	0.089	0.063	0.081	0.070	0.065	0.015	0.133	0.048	0.058	0.092
E	28	Medium Farmers	0.051	0.089	0.068	0.072	1.052	0.048	0.065	0.052	0.048	0.065	0.051	0.050	0.011	0.108	0.050	0.054	0.067
R	29	Large Farmers	0.098	0.307	0.155	0.165	0.114	1.104	0.151	0.114	0.106	0.150	0.112	0.112	0.025	0.231	0.140	0.134	0.155
	30	Rural Low Group	0.084	0.030	0.026	0.026	0.022	0.023	1.030	0.027	0.023	0.028	0.031	0.024	0.006	0.029	0.023	0.019	0.034
	31	Non Labor Force Rural Group	0.032	0.030	0.024	0.024	0.017	0.016	0.024	1.027	0.016	0.024	0.020	0.018	0.019	0.029	0.017	0.017	0.029
R	32	Rural High Group	0.176	0.058	0.063	0.053	0.039	0.037	0.061	0.045	1.044	0.070	0.051	0.053	0.069	0.043	0.044	0.040	0.118
E	33	Urban Low Group	0.133	0.055	0.042	0.041	0.032	0.034	0.046	0.044	0.035	1.048	0.053	0.039	0.009	0.036	0.041	0.030	0.056
G	34	Non Labor Force Urban Group	0.069	0.041	0.037	0.034	0.024	0.022	0.040	0.031	0.025	0.041	1.051	0.030	0.044	0.028	0.028	0.023	0.057
I	35	Urban High Group	0.099	0.086	0.090	0.076	0.064	0.054	0.087	0.085	0.063	0.100	0.074	1.078	0.136	0.060	0.068	0.057	0.170
O	36	Companies	0.083	0.340	0.136	0.140	0.099	0.092	0.135	0.103	0.097	0.137	0.106	0.104	1.060	0.168	0.181	0.134	0.152
N	37	Agriculture	0.230	0.211	0.586	0.697	0.412	0.346	0.540	0.372	0.332	0.491	0.324	0.340	0.077	1.359	0.138	0.386	0.300
	38	Mining	0.071	0.059	0.146	0.155	0.104	0.094	0.163	0.108	0.105	0.160	0.103	0.111	0.025	0.074	1.083	0.273	0.137
	39	Manufacturing	0.313	0.263	0.636	0.713	0.478	0.435	0.732	0.479	0.465	0.692	0.441	0.471	0.106	0.317	0.198	1.346	0.460
	40	Other Sectors	0.243	0.178	0.507	0.346	0.258	0.252	0.470	0.334	0.337	0.598	0.415	0.455	0.094	0.172	0.161	0.137	1.288

Source: Hidayat (1991)

interregional multipliers than does the Center region. The implication of this is that a project undertaken in the Outer region would trigger greater output and employment effects in the Center region than vice versa. (In Table 4 the respective interregional multipliers from the Outer region to the Center are given in the quadrant cols. 21-40 and rows 1-20 and from the Center to the Outer region in Cols 1-20 and rows 21-40.) A pairwise comparison of these interregional multipliers indicate that the Outer region has greater interregional multipliers in 289 of 400 possible cases.

Another important finding is that the total multipliers (intra plus interregional multipliers) tend to be greater when the origin is in the Outer region than when it is in the Center region (again a pairwise comparison of the 400 possible total multipliers reveals that 260 are larger in the Outer region). This means that an injection of investment in the Outer region transmits greater total impact on the whole economy of Indonesia than a corresponding injection in the Center region.

The policy implications of these observations are potentially very important, particularly if these findings can be confirmed on the basis of more sectoral and micro evidence. It suggests that a process of regional decentralization with a somewhat greater concentration on the development of the Outer Islands could be rationalized not only on equity grounds but also in terms of its impact on total output and economic growth for the country as a whole. This point is taken up in more detail in the policy Chapter IV.

The Indonesia government undertook a strong effort--particularly starting in the 1980s--to encourage the development of the Outer Islands. One important set of measures consists of the Central-regional transfers comprising two major types: INPRES and DIP. The first reflects a "regionally oriented allocation", while the second reflects a more "sectoral approach", for the size and usage of DIP funds are basically determined by sectoral ministries. INPRES projects are typically relatively small scale, labor intensive projects in such infrastructural activities as the building of elementary schools, clinics, roads, erosion control and regreening. In a recent study it was demonstrated that INPRES has been effectively benefiting the poor, especially in the low income regions (Azis, 1992a). It should be noted that a recent interregional input-output table developed at the University of Indonesia agreed with the above finding except that it found that the total multipliers originating in Java (the Center region) were still greater than those originating outside Java. Since the above I/O table is based only on production data, and, in particular, does not capture the interregional flows of income transfers, the above observation tends to suggest that there are considerable numbers of industries outside Java

employing workers from Java who induce income transfers back to Java. This conjecture is supported by some field observations and micro evidence. (Azis, 1992b)

This is a very good example of an interregional process of poverty alleviation whereby increased output in the periphery provides jobs mainly for unskilled workers thereby reducing poverty in the periphery but, simultaneously alleviating poverty in the urban areas through remittances destined for extended family members residing in urban areas. The experience of Indonesia suggest that the government has made major investment in industries in an effort to disperse industries. Recently a very important new idea has surfaced that is in the process of being implemented through an extensive program. The idea is to facilitate the establishment of industrial estates in something like 300 different locations by providing the required industrial infrastructure and other facilities. At least some of these industrial estates may be combined with free trade zones. One of the major goals in Indonesian development is to promote regional equity as it has been stated in Development "Trilogi" (development equities, economic growth and political stability). This goal is assumed to address the problem of spatial disparities, mainly between Java and Outer islands. Several policies have been initiated to support regional development in Outer islands. The policies can be classified into 3 major categories: fiscal, deregulation, sectoral and spatial. These policies are discussed in Chapter IV since they might be potentially transferable to other development countries.

3. 1975 SAM-TECH

H.A. Khan and E. Thorbecke (1988, 1989) built a SAM of Indonesia to analyze empirically the macroeconomic effects of technology choice on output, employment and income distribution. Specifically, six sectors were disaggregated dualistically, i.e. for those sectors' alternative technologies were specified for "traditional" and "modern" techniques. These sectors were rice processing subdivided between handpounded rice and milled rice; tea processing broken down in two techniques, farm processed tea and off-farm processing; sugar, brown sugar and refined sugar; canning and preserving of fruits and vegetables, traditional small-scale vs. modern large scale; fish processing, dried and salted fish vs. canned fish; and cigarettes, clove cigarettes vs. white cigarettes. The starting point in distinguishing sectors according to dualistic technological criteria was on the basis of firm sizes. In addition, the following technological indicators were constructed from the available data and used to verify that the traditional alternative could indeed be distinguished from the modern one for the twelve dualistic sectors:

1) value added per worker; 2) average expenditure propensity for energy (6 different types); 3) the capital (i.e., non-labor income) share of value added; and, 4) the ratio of paid to unpaid workers. This information is provided in Table 5.

SAM multiplier analysis was applied in each instance to the traditional and to the modern technique, and it appeared that the traditional technology generated greater aggregate output and employment effects than the corresponding modern counterpart. The impact of changes in the output of three pairs of dualistic activities on the household income distribution is presented in Table 6a. A quick perusal of the multipliers appearing in the table reveals that for each pair of dual product-cum-technology, the traditional alternative yielded greater total (combined) household income than the corresponding modern activity. Also, in each case, the traditional alternative showed higher multiplier values than the corresponding more capital intensive alternative for the poorest household groups, i.e. the agricultural employees (the landless and near landless) and the three different groups of farmers defined according to the amount of land owned or operated. (Farm size 1 owns between 0 and half an hectare, Farm size 2, between one half and one hectare and Farm size 3 above one hectare). Likewise, the rural (non-agricultural) household group enjoyed higher multiplier effects for brown sugar vs. refined sugar and cloved cigarettes vs. white cigarettes.

The favorable income effects of traditional technologies on most categories of poor households result largely because of the greater direct and indirect employment linkages generated by those technologies. Structural path analysis clearly demonstrate this phenomenon by showing these linkages in explicit quantitative terms. In Table 6b two selected examples are presented where the pole of origin of the structural path analysis is one of the dualistic product-cum-technology activities. (Annex II.B provides a detailed technical explanation of structural path analysis.) It can be seen from Table 6b that the global influence (i.e. the multiplier value) in each of the pair-wise comparisons is higher when the injection occurs in the traditional technology. The two prototype cases analyzed in detail below explore the effects of a change in the output of 1) handpounded vs. milled rice, respectively, on the income of the household group consisting of agricultural employees; and 2) brown sugar vs. refined sugar, respectively, on the income of the household group headed by small farmers. The most important paths through which influence is transmitted are shown explicitly in Table 6b. Furthermore, the corresponding networks of paths are presented graphically for the two selected cases in Figures 8 and 9. These diagrams illustrate clearly

Table 5: Technological Indicators of Dualistic Sectors, 1975

Sectors	Value Added per Worker (000 Rupiahs) (1)	Average Expenditure Propensity for All Energy Sources (2)	Capital Share of Value Added (%) (3)	Ratio of Number of Paid to Number of Unpaid Workers (4)	Share of Output of Traditional and Modern Technology (%) (5)
A. Rice Processing					
Handpounded Rice	183	0	0	2.71	35
Milled Rice	1495	.022	54.1	45.2	65
B. Tea Processing					
Farm Processed Tea	115	.033	30.1	4.0	83
Off-farm Processing	136	.042	46.7	55.1	17
C. Sugar					
Brown Sugar	54	.005	78.4	1.7	26
Refined Sugar	1127	.059	71.3	No unpaid workers	74
D. Canning and Preserving of Fruits & Vegetables					
Traditional Small Scale	598	.010	30.7	5	32
Modern Large Scale	129	.016	51.0	No unpaid workers	68
E. Fish Processing					
Dried and Salted Fish	97	.002	62.1	4.3	85
Canned Fish	97	.022	96.7	213.1	15
F. Cigarettes					
Clove Cigarettes	967	.009	76.2	134.5	74
White Cigarettes	7441	.011	91.2	No unpaid workers	26

Source: Authors' calculations.

Source: Khan-Thorbecke (1989)

Table 6a Fixed Price Multipliers Giving Effects of Selected Dualistic Production Activities on Household Income Distribution

SAM Code	Households and Companies	Production Activities: Handpounded Rice (42)	Milled Rice (43)	Brown Sugar (48)	Refined Sugar (49)	Clove Cigarettes (52)	White Cigarette (53)
24	Ag Employees	.220	.176	.192	.110	.097	.058
25	Farm Size 1	.466	.386	.342	.205	.178	.109
26	Farm Size 2	.340	.284	.235	.148	.136	.077
27	Farm Size 3	.575	.489	.391	.239	.248	.133
28	Rural Lower	.209	.250	.405	.246	.155	.121
29	Rural Middle	.056	.054	.065	.042	.033	.024
30	Rural Higher	.094	.101	.138	.094	.070	.055
31	Urban Lower	.235	.243	.239	.301	.206	.162
32	Urban Middle	.037	.037	.038	.042	.032	.027
33	Urban Higher	.222	.220	.229	.244	.194	.166
Total Household Income		2.455	2.240	2.275	1.666	1.347	.932
34	Companies	.354	.351	.404	.457	.426	.465
Total Income of Institutions		2.809	2.591	2.679	2.123	1.773	1.397

Source: Author's calculations.

Source: Khan-Thorbecke (1989)

Table 6b

Structural Path Analysis: Global Influence. Direct Influence and total influence for Selected Paths Involving Dualistic Activities Indonesian SAM–TECH.

	(1) Path Origin $(i) \rightarrow$	(2) Path Destination (j)	(3) Global Influence $I^G_{(i \rightarrow j)} = m$	(4) Elementary Paths $(i \rightarrow j)_p$	(5) Direct Influence $I^D_{(i \rightarrow j)_p}$ ×	(6) Path Multiplier M_p =	(7) Total Influence $I^T_{(i \rightarrow j)_p}$	(8) $\frac{I^T_{(i \rightarrow j)_p}}{I^G_{(i \rightarrow j)}}$ (percent)
				Effects of Production Activities on Household Groups				
Ia	Hand pounded rice (HPR)	Agricultural employees (AE)	0:220	HPR-Farm Food Crops-Agr paid Rural-AE	.062	1.565	.097	44.1
				HPR-Agr Paid Rural-AE	.041	1.256	.052	23.6
				HPR-Farm Food Crops-Land-AE	.006	1.695	.010	4.5
				HPR-Farm Food Crops-Agr Unpaid Rural-AE	.004	1.582	.007	3.2
Ib	Rice milling (RM)	Agricultural employees (AE)	0.176	RM-Farm Food Crops-Agr Paid Rural-AE	.054	1.601	.087	49.4
				RM-Uninc Rural Cap-AE	.011	1.338	.015	8.5
				RM-Farm Food Crops-Land-AE	.005	1.731	.009	5.1
				RM-Farm Food Crops-Agr Unpaid Rural-AE	.004	1.635	.006	3.4
IIa	Brown sugar (BS)	Farm size I (FI)	0.342	BS-Uninc Rural Cap-FI	.067	1.352	.091	26.6
				BS-Farm Non-Food Crops-Land-FI	025	1.807	.045	13.2
				BS-Farm Non-Food Crops-Agr Unpaid Rural-FI	.011	1.685	.018	5.3
				BS-Prod Unpaid Rural-FI	.012	1.306	.016	4.7
				BS-Farm Non-Food Crops-Agr Paid Rural-FI	.009	1.640	.014	4.1
				BS-Prod Paid Rural-FI	.007	1.321	.010	2.9
IIb	Refined sugar (RS)	Farm size I (FI)	0.205	RS-Uninc Rural Cap-FI	.024	1.364	.033	16.1
				RS-Farm Non-Food Crops-Land-FI	.012	1.821	.021	10.2
				RS-Farm Non-Food Crops-Agr Unpaid Rural-FI	.005	1.699	.009	4.4
				RS-Prod Paid Rural-FI	.006	1.333	.008	3.9
				RS-Prod Unpaid Rural-FI	.006	1.319	.008	3.9
				RS-Farm Non-Food Crops-Agr Paid Rural-FI	.004	1.654	.007	3.4

Sources: Authors' calculations.

Khan & Thorbecke (1989)

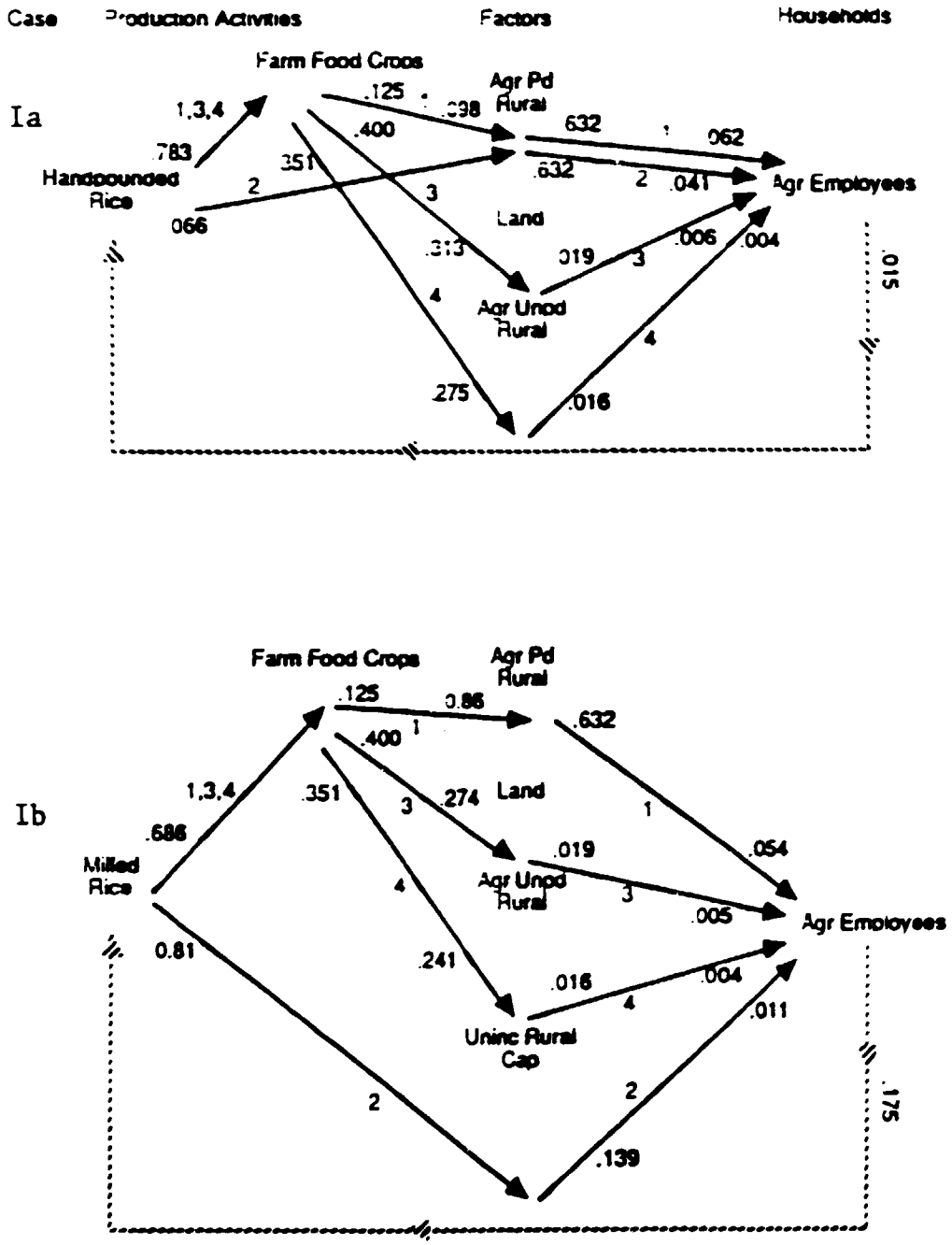
the nature of path analysis and should be consulted in the analysis which follows.

The following fairly detailed examples are meant to convey the implications of employment and poverty of alternative choices of food processing techniques. Case Ia in Table 6b explores the structural path analysis from an injection into the handpounded rice activity (as pole of origin) to its ultimate effects on the income of the household group of agricultural employees (the pole of destination). From the matrix of fixed price multipliers, the global influence can be obtained--i.e., an increment of 100 rupiahs into that activity yields an increase of 22 rupiah in the income of agricultural employees (see col. 3 of Table 6b). The path analysis in column 8 reveals that 44.1% of the additional income accruing to agricultural employees follows a path consisting of three consecutive arcs from handpounded rice to farm food crops (reflecting mainly the intermediate demand for paddy), to income accruing to the labor group "agricultural paid rural workers" involved in paddy production, through its ultimate destination, i.e., income of household group headed by agricultural employees.

The second path (consisting of two consecutive arcs) through which 23.6% of the global influence is transmitted goes from handpounded rice to payments to "agricultural paid rural workers" to agricultural employees. The other two elementary paths shown in case Ia reveal that a small part of the global influence travels from handpounded rice to farm food crops (paddy), to land rent, to agricultural employees. The above four paths appear in Figure 8, where they are numbered from 1-4, respectively.[3]

Case Ib takes milled rice as a pole of origin and agricultural employees as a pole of destination. It can be seen from both Table 6b and Figure 8, Case Ib, that the transmission of influence follows many of the same paths as in the case of the traditional technology (handpounded rice). The main difference consists of the higher intensity of the first common arc of these paths linking handpounded rice and farm food crops. This indicates, of course, that the traditional technology requires relatively more paddy inputs per unit of output than the corresponding modern technology. In other words, the linkage of the former product-cum-activity to paddy production is greater than the latter, which, in contrast, requires more non-agricultural intermediate inputs per unit of output. In summary, the higher global influence of handpounded rice vis-a-vis agricultural employees compared to rice milling vis-a-vis agricultural employees is to a large extent attributable to the greater backward linkages between handpounded rice and farm food crops as compared to milled rice and farm food crops. Hence, the greater derived demand for agricultural paid and agricultural unpaid labor in

Figure 8



Structural network illustrating effects of handpounded rice and milled rice, respectively, on income of agricultural employees.

Source: Authors' calculations. The number at the beginning of each arc is the direct influence along that arc (of length 1).

Khan & Thorbecke (1989)

the former case.

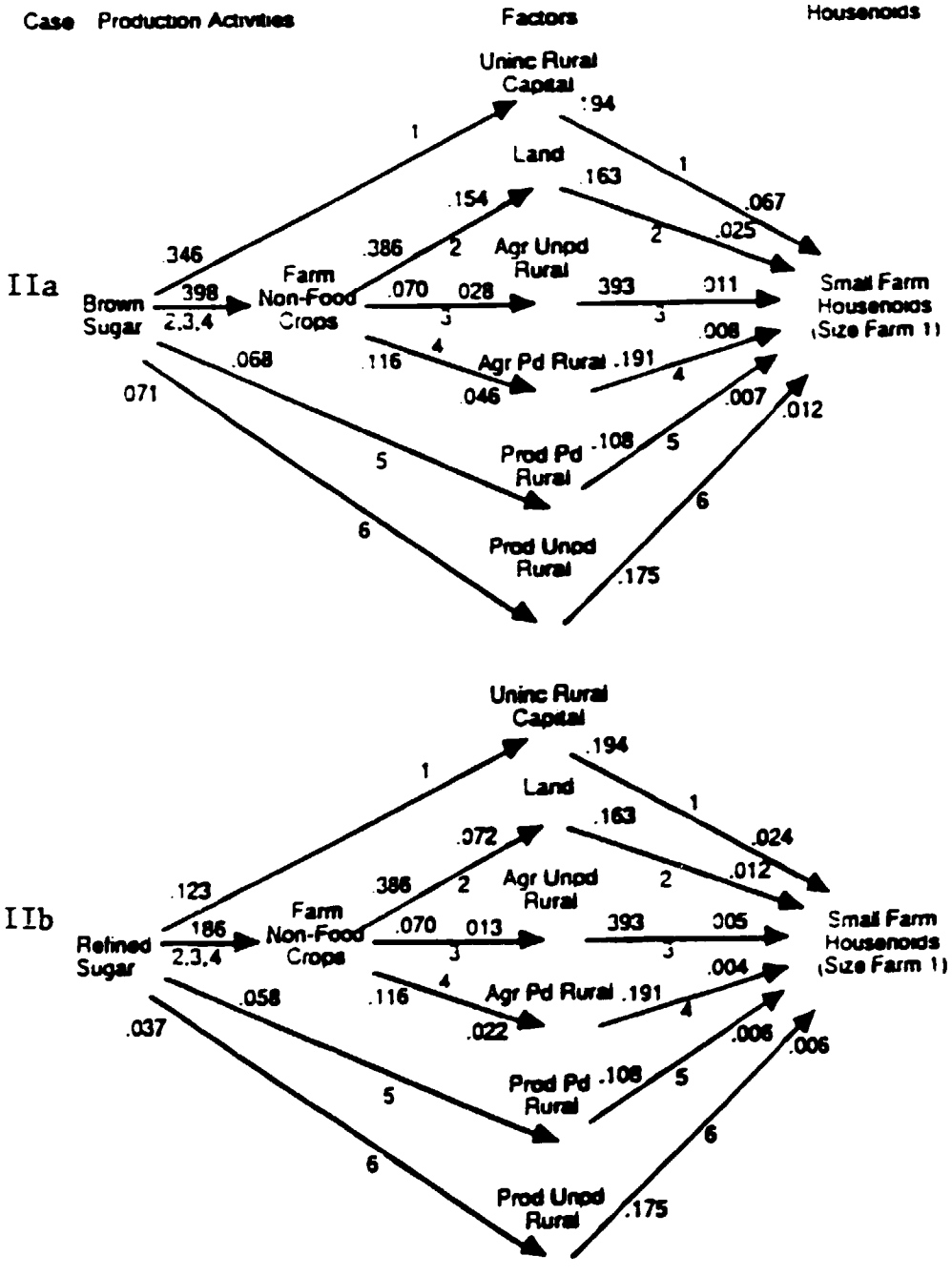
The last prototype example entails a comparison between the effects of a change in the production of brown sugar and refined sugar, respectively, on the incomes of the household groups consisting of small farmers (farmers owning or operating less than half a hectare). Here again the network through which influence is transmitted can be seen clearly by looking at Figure 9 and Table 6b. The major difference between the two influence graphs (see Figure 9) consists of the considerably smaller backward linkages to sugarcane (which in the SAM classification comes under "farm non-food crops") of the modern technological alternative (refined sugar) compared to the traditional one (brown sugar) which is made out of palm sugar. It can be seen that the linkages to the factors of production (i.e. unincorporated rural capital) and the two labor groups of paid and unpaid production workers, in the rural areas, were significantly higher for brown than for refined sugar.

The main conclusion that can be drawn from the above study is that in the rural areas, the poorest socioeconomic household groups (i.e. agricultural employees, small and medium size farm households and to some extent the rural non-agricultural lower income group) benefitted most income-wise from the traditional technology. On the other hand, most of the modern technologies display higher income multipliers for companies than do the corresponding traditional alternatives.

The above rather technical discussion needs to be put in a proper and broader perspective. First, it is clear that throughout the process of development a gradual substitution of more efficient (and often more capital intensive and labor saving) technologies replacing traditional technologies will take place. However, this "modernization process" can be speeded up through government measures leading to artificial distortions in factor prices (e.g. through minimum wage legislation, subsidized credit to large firms, and an overvalued exchange rate). In such instances, the more capital intensive technological alternative that will be adopted by entrepreneurs is not the socially appropriate one since it does not correspond to the underlying resource endowment, and results in greater unemployment and poverty alleviation. Incidentally, there is evidence that until the early, mid 1980s such artificial distortions were common in Indonesia.

Secondly, a major limitation of the SAM multiplier analysis is that it cannot capture productivity and dynamic effects. Thus, even when factor prices are not distorted, a dynamic tradeoff could exist over time. The adoption of a more capital-intensive and productive technique, today, could yield greater profits, and a greater potential for investment, tomorrow, but at the expense of greater unemployment and poverty today. In fact, the

Figure 9



Structural network illustrating effects of brown sugar and refined sugar, respectively, on small farmers' income.

Source: Authors' calculations. The number at the beginning of each arc is the direct influence along that arc (of length 1).

Khan & Thorbecke (1989)

observed findings that most modern technologies in the above example display higher income multipliers for companies than do the corresponding traditional alternatives suggest that such a tradeoff was ongoing in Indonesia at that time. This raises important issues that are returned to in the policy Chapter IV.

B. Gambia SAM (1989-1990)

Gambia is a poor country with a per capita income of $260 US in 1990. In 1989/90 nearly 30% of total GDP originated in agriculture, 6% in industry, and 64% in the services sectors.[4] About 60% of foreign exchange earnings come from re-export trade to nearby countries such as Senegal and Guinea. The remainder of export earnings originates with the tourism industry and exports of groundnut products. Small farms using labor intensive technology dominate the agricultural sector, with groundnuts making up about half of all cultivated area. The remainder of agricultural production consists of coarse grain and rice.

Gambia possesses a very small industrial base in both scale and scope. The principal industries are groundnut processing (run by a parastatal organization), large private soft drinks and brewing industries, medium and large scale production of some intermediate inputs, and a myriad small scale informal activities, such as tailoring, furniture making and blacksmithing. The informal sector activities are in total larger than the few formal sector activities and this is reflected in the relatively larger share of returns to informal entrepreneurial capital than to formal capital in the SAM discussed subsequently.

The services sectors provide the bulk of GDP. Most of these activities are non-traded but the single largest activity is the re-export trade. This activity owes its existence to price distortions in neighboring countries (primarily Senegal) and the essentially open border between Senegal and Gambia. Re-export trade is also the largest of the informal services activities. Other informal activities consist primarily of the sale of food and food products in urban areas.

Table 7 provides information on the income distribution and sources of incomes accruing to four different socioeconomic groups in Gambia. The definition of these four groups is relatively arbitrary. In both the urban and the rural areas, the poor households in contrast with the rich households are defined as the bottom 70% of the income pyramid. Table 7 shows (last row) that per capita incomes of the urban rich are 6.7 times those of the rural poor but, perhaps, more importantly, the per capita incomes of the urban poor

Table 7 - Income Shares in The Gambia, 1989/90

	Urban Poor	Urban Rich	Urban Total	Rural Poor	Rural Rich	Rural Total	Gambia Total
Labor Income							
Skilled	41.6	40.8	41.2	2.5	5.7	4.0	24.0
Unskilled	42.1	24.5	32.7	66.6	44.3	56.2	43.6
Entrepreneurial Income	5.5	24.4	15.6	3.7	4.8	4.2	10.3
Housing	7.2	6.7	6.9	12.1	9.5	10.9	8.8
Land Rents	0.9	0.2	0.5	6.7	15.1	10.6	5.2
Interest Received	0.5	0.6	0.5	0.4	0.1	0.2	0.4
Transfers	2.2	2.9	2.6	8.0	20.5	13.8	7.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Population ('000)	172.9	74.1	247.0	430.5	184.5	615.0	862.0
Per Capita Income ('000 dalasis/person)	2.55	6.80	3.83	1.01	2.06	1.33	2.04

Source: Gambia SAM adapted from Jabara, Lundberg and Sireh Jallow, 1992.

are higher than that of the rural rich. However, in terms of standard of living, because of higher basic needs and higher prices prevailing in the urban areas, it is likely that the urban poor may still be worse off than the rural rich.

Jabara, Lundberg and Jallow (1992) built a SAM for Gambia that was subsequently slightly modified by Dorosh and Lundberg (1993). This last SAM is the one used in the present study. The classification scheme used by this SAM is particularly useful in looking at intersectoral issues and their impact on urban and rural poverty. The SAM distinguishes between four types of rural labor (self-employed in agriculture, unskilled labor, skilled labor, and self-employed in non-agriculture) and three labor types in the urban area (unskilled, skilled, and self-employed). It also distinguishes household groups into four categories (urban wealthiest, urban poorest, rural wealthiest, and rural poorest).

The SAM multiplier analysis in Table 8a shows that the rural poor households benefit mainly from agricultural activities (i.e. rice, .92; coarse grains, .99; fruits and vegetables, .94; livestock and groundnut processing, both .67). They also benefit to some extent from informal trade activities (.35) and formal trade activities (.34). On the other hand, the impact of industrial production, carpentry and construction activities, private services and public services on the incomes of this group tends to be lower (multiplier values between .21 and .25).

Those activities that generate the most income for the urban poor households are informal trade activities (.52), formal trade (.46), and public services (.47). This same group benefits to a lesser extent from groundnut processing, industry, carpentry and construction, and private services (multiplier values between .23 and .25). They also derive some income from agricultural activities (.19-.24).

Table 8b provides the same type of multiplier decomposition that was used in the Indonesia case to analyze the impact of different production sectors on poverty alleviation. Table 8b reveals, analogously with the previous Indonesian case study, that those sectors contributing most to poverty alleviation are in agriculture (.87-1.18), groundnut processing (.90), and informal activities (.88). Again, the main reason why groundnut processing contributes significantly more to poverty reduction than other industrial activities, such as "manufacture and industry," is the much greater distributional effects. The poor who rely mainly on their endowment of unskilled labor as a source of income, typically, do not possess the qualifications to be employed in technologically advanced sectors. Table 8b, also, points out the importance of agricultural activities in alleviating

TABLE 8a
MULTIPLIER MATRIX FOR GAMBIA

	Gnuts 1	Rice 2	C Grains 3	Frt,veg 4	livestock 5	gnut.Prc 6	Industry 7	Carp,con 8	tran,commu 9	dom trade 10	Tra form 11	Re-export 12	Trade 13	Pvt Ser 14	Pub Ser 15	U Housing 16	R Housing 17	Gnuts 18	Rice 19	C Grains 20	Frt/veg
1 Groundnuts	1 25	0 08	0 09	0 08	0 07	0 84	0 03	0 03	0 03	0 06	0 05		0 02	0 03	0 05	0 05	0 09	1 19	0 03	0 07	0 07
2 Rice	0 07	1 10	0 07	0 07	0 05	0 05	0 03	0 02	0 02	0 04	0 04		0 02	0 02	0 04	0 04	0 08	0 07	0 31	0 06	0 05
3 Coarse Grains	0 16	0 15	1 24	0 16	0 12	0 12	0 08	0 06	0 05	0 11	0 10		0 04	0 06	0 09	0 09	0 17	0 15	0 06	0 91	0 12
4 Fruit/Veg/Roots	0 09	0 08	0 09	1 17	0 07	0 07	0 04	0 04	0 04	0 08	0 07		0 03	0 04	0 06	0 06	0 09	0 09	0 04	0 07	0 84
5 Livestock/Fish/Forest	0 21	0 20	0 21	0 21	1 18	0 17	0 08	0 13	0 08	0 17	0 15		0 07	0 13	0 13	0 14	0 22	0 20	0 09	0 16	0 16
6 Groundnut Processing	0 05	0 05	0 05	0 05	0 04	1 04	0 02	0 02	0 02	0 04	0 04		0 02	0 02	0 03	0 03	0 05	0 05	0 02	0 04	0 04
7 Manufacture and Ind	0 24	0 20	0 21	0 21	0 20	0 19	1 13	0 15	0 12	0 18	0 17		0 08	0 15	0 17	0 15	0 21	0 23	0 09	0 16	0 17
8 Construction	0 06	0 06	0 06	0 06	0 06	0 06	0 05	1 07	0 06	0 09	0 09		0 04	0 06	0 07	0 12	0 06	0 06	0 04	0 05	0 05
9 Transport, Comms, Utils	0 13	0 12	0 13	0 13	0 12	0 17	0 14	0 12	1 10	0 21	0 25		0 15	0 20	0 15	0 12	0 13	0 13	0 09	0 10	0 11
10 Domestic Informal Trad	0 07	0 07	0 07	0 08	0 05	0 09	0 03	0 03	0 02	1 05	0 05		0 02	0 03	0 04	0 04	0 07	0 12	0 08	0 10	0 15
11 Domestic Formal Trade	0 15	0 16	0 15	0 15	0 14	0 14	0 13	0 18	0 12	0 14	1 16		0 14	0 13	0 14	0 11	0 15	0 15	0 24	0 12	0 12
12 Re-export Trade	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00		1 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
13 Private Services	0 18	0 18	0 18	0 18	0 15	0 18	0 14	0 12	0 10	0 19	0 20		0 08	1 11	0 16	0 15	0 19	0 18	0 08	0 14	0 15
14 Public Services	0 01	0 01	0 01	0 01	0 01	0 01	0 00	0 00	0 00	0 01	0 01		0 00	0 00	1 01	0 01	0 01	0 01	0 00	0 01	0 01
15 Urban Housing	0 04	0 04	0 04	0 05	0 04	0 05	0 05	0 05	0 05	0 11	0 10		0 05	0 05	0 10	1 10	0 04	0 04	0 03	0 03	0 04
16 Rural Housing	0 18	0 17	0 18	0 17	0 13	0 13	0 04	0 04	0 04	0 07	0 07		0 03	0 04	0 05	0 05	1 19	0 17	0 06	0 14	0 13
17 Groundnuts	0 26	0 08	0 08	0 08	0 07	0 88	0 03	0 03	0 03	0 06	0 06		0 03	0 03	0 05	0 05	0 08	1 25	0 04	0 07	0 07
18 Rice	0 28	0 36	0 27	0 26	0 20	0 20	0 09	0 08	0 08	0 17	0 15		0 07	0 09	0 13	0 13	0 28	0 26	1 13	0 20	0 20
19 Coarse Grains	0 21	0 21	0 33	0 21	0 16	0 17	0 11	0 08	0 07	0 15	0 14		0 06	0 08	0 12	0 12	0 23	0 21	0 08	1 25	0 17
20 Fruit/Veg/Roots	0 12	0 12	0 12	0 24	0 08	0 10	0 06	0 05	0 05	0 11	0 10		0 04	0 06	0 08	0 09	0 13	0 12	0 05	0 10	1 16
21 Livestock/Fish/Forest	0 25	0 24	0 25	0 25	0 18	0 20	0 11	0 15	0 10	0 20	0 18		0 08	0 15	0 16	0 16	0 26	0 24	0 11	0 19	0 19
22 Groundnut Processing	0 05	0 05	0 05	0 05	0 04	0 04	0 02	0 02	0 02	0 04	0 04		0 02	0 02	0 04	0 04	0 06	0 05	0 02	0 04	0 04
23 Manufacture and Ind	0 26	0 22	0 23	0 24	0 22	0 21	0 15	0 17	0 14	0 20	0 19		0 08	0 16	0 18	0 16	0 23	0 26	0 10	0 18	0 19
24 Construction	0 06	0 06	0 06	0 06	0 06	0 06	0 05	0 07	0 06	0 09	0 09		0 04	0 06	0 07	0 12	0 06	0 06	0 04	0 05	0 05
25 Transport, Comms,Utils	0 13	0 12	0 13	0 13	0 12	0 17	0 14	0 12	0 10	0 21	0 25		0 15	0 20	0 15	0 12	0 13	0 13	0 09	0 10	0 11
26 Domestic Informal Trad	0 07	0 07	0 07	0 08	0 05	0 09	0 03	0 03	0 02	0 05	0 05		0 02	0 03	0 04	0 04	0 07	0 12	0 08	0 10	0 15
27 Domestic Formal Trade	0 15	0 16	0 15	0 15	0 14	0 14	0 13	0 18	0 12	0 14	0 16		0 14	0 13	0 14	0 11	0 15	0 15	0 24	0 12	0 12
28 Re-export Trade	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00		0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
29 Non-competitive Impor	0 73	0 68	0 70	0 69	0 71	0 69	0 85	0 81	0 75	0 66	0 65		0 94	0 83	0 78	0 60	0 72	0 72	0 33	0 54	0 56
30 Private Services	0 18	0 18	0 18	0 18	0 15	0 17	0 14	0 13	0 11	0 20	0 20		0 08	0 11	0 17	0 15	0 19	0 19	0 09	0 15	0 15
31 Public Services	0 01	0 01	0 01	0 01	0 01	0 01	0 00	0 00	0 00	0 01	0 01		0 00	0 00	0 01	0 01	0 01	0 01	0 00	0 01	0 01
32 Urban Housing Services	0 04	0 04	0 04	0 05	0 04	0 05	0 05	0 05	0 05	0 11	0 10		0 05	0 05	0 10	0 10	0 04	0 04	0 03	0 03	0 04
33 Rural Housing Services	0 18	0 17	0 18	0 17	0 13	0 13	0 04	0 04	0 04	0 07	0 07		0 03	0 04	0 05	0 05	0 19	0 17	0 06	0 14	0 13
34 Urban Skilled Labour	0 13	0 12	0 12	0 13	0 12	0 18	0 19	0 19	0 21	0 40	0 31		0 15	0 24	0 66	0 10	0 13	0 14	0 11	0 11	0 13
35 Rural Skilled Labour	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 07	0 01	0 01	0 05		0 01	0 03	0 04	0 01	0 01	0 01	0 01	0 01	0 01
36 Urban Unskilled Labour	0 15	0 16	0 17	0 24	0 18	0 18	0 16	0 16	0 19	0 42	0 40		0 20	0 18	0 18	0 10	0 14	0 17	0 13	0 14	0 21
37 Rural Unskilled Labour	1 09	1 09	1 24	1 15	0 85	0 79	0 22	0 20	0 19	0 38	0 35		0 14	0 22	0 26	0 25	0 44	1 08	0 37	0 93	0 86
38 Urban Entrepreneurial K	0 06	0 06	0 06	0 06	0 05	0 06	0 14	0 08	0 07	0 23	0 17		0 12	0 07	0 05	0 05	0 06	0 07	0 06	0 06	0 06
39 Rural Nonagric Entrep K	0 02	0 02	0 02	0 02	0 02	0 02	0 06	0 03	0 03	0 04	0 05		0 01	0 04	0 02	0 02	0 02	0 02	0 02	0 02	0 02
40 Urban Housing	0 04	0 04	0 04	0 05	0 04	0 05	0 05	0 05	0 05	0 11	0 10		0 05	0 05	0 10	1 10	0 04	0 04	0 03	0 03	0 04
41 Rural Housing	0 18	0 17	0 18	0 17	0 13	0 13	0 04	0 04	0 04	0 07	0 07		0 03	0 04	0 05	0 05	1 19	0 17	0 06	0 14	0 13
42 Land - Poor	0 11	0 12	0 08	0 09	0 04	0 08	0 01	0 01	0 01	0 02	0 02		0 01	0 01	0 02	0 02	0 03	0 11	0 04	0 06	0 07
43 Land - Wealthy	0 20	0 16	0 11	0 09	0 12	0 14	0 02	0 02	0 02	0 04	0 03		0 01	0 02	0 03	0 03	0 05	0 19	0 05	0 08	0 07
44 Corporate Capital, surp	0 06	0 06	0 06	0 06	0 09	0 13	0 09	0 09	0 22	0 09	0 16		0 05	0 09	0 06	0 05	0 06	0 06	0 05	0 05	0 05
45 Corporate Capital, Int	0 03	0 03	0 03	0 03	0 02	0 08	0 03	0 15	0 07	0 04	0 05		0 02	0 06	0 03	0 03	0 03	0 03	0 02	0 02	0 02
46 Urban HH, Poor	0 18	0 20	0 18	0 24	0 20	0 23	0 23	0 23	0 25	0 52	0 48		0 23	0 25	0 47	0 49	0 17	0 21	0 16	0 17	0 22
47 Urban HH, Wealthy	0 20	0 20	0 20	0 23	0 20	0 24	0 30	0 26	0 27	0 62	0 51		0 28	0 27	0 50	0 53	0 19	0 22	0 17	0 18	0 22
48 Rural HH, Poor	0 92	0 92	0 89	0 84	0 67	0 67	0 22	0 21	0 18	0 35	0 34		0 13	0 22	0 25	0 24	1 03	0 88	0 32	0 74	0 70
49 Rural HH, Wealthy	0 71	0 67	0 67	0 63	0 52	0 52	0 19	0 20	0 15	0 29	0 30		0 11	0 18	0 22	0 20	0 73	0 69	0 24	0 51	0 47
50 Private Enterprises	0 10	0 10	0 10	0 10	0 12	0 21	0 13	0 23	0 30	0 16	0 23		0 08	0 16	0 11	0 42	0 10	0 10	0 07	0 08	0 08
51 Urban Households	0 04	0 04	0 04	0 04	0 04	0 04	0 05	0 05	0 05	0 11	0 09		0 05	0 05	0 09	0 10	0 03	0 04	0 03	0 03	0 04
52 Rural Households	0 08	0 08	0 08	0 08	0 06	0 06	0 02	0 02	0 02	0 03	0 03		0 01	0 02	0 03	0 02	0 09	0 08	0 03	0 06	0 06
53 Private Enterprises	0 04	0 04	0 04	0 04	0 05	0 10	0 06	0 10	0 13	0 07	0 10		0 04	0 07	0 05	0 19	0 04	0 04	0 03	0 03	0 04

TABLE 8a (cont.)

	Livestock 21	GrossPro 22	Industry 23	Carp/constr 24	Wsn/commu 25	ml Trad 26	l Trade 27	Re export Trad 28	Imports 29	Pvt Ser 30	Pub Ser 31	U Hous 32	R Hous 33	U Skilled 34	R Skilled 35	U Unskilled 36	R Unskilled 37	U Entp 38	R nonEntre 39	U Hous 40	R Hous 41
1	0 06	0 76	0 03	0 03	0 03	0 06	0 05	0 0	0 01	0 03	0 05	0 05	0 09	0 06	0 08	0 06	0 09	0 06	0 09	0 05	0 09
2	0 05	0 05	0 02	0 02	0 02	0 04	0 04	0 0	0 01	0 02	0 04	0 04	0 08	0 05	0 07	0 05	0 08	0 04	0 07	0 04	0 08
3	0 11	0 12	0 08	0 08	0 05	0 11	0 10	0 01	0 01	0 06	0 09	0 09	0 17	0 12	0 16	0 12	0 17	0 11	0 16	0 09	0 17
4	0 06	0 07	0 04	0 04	0 04	0 08	0 07	0 01	0 01	0 04	0 06	0 06	0 09	0 08	0 09	0 09	0 09	0 08	0 09	0 06	0 09
5	0 09	0 17	0 09	0 13	0 08	0 17	0 15	0 0	0 02	0 12	0 13	0 14	0 22	0 18	0 21	0 19	0 22	0 18	0 22	0 14	0 22
6	0 04	0 04	0 02	0 02	0 02	0 04	0 04	0 02	0 00	0 02	0 03	0 03	0 05	0 04	0 05	0 05	0 05	0 04	0 05	0 03	0 05
7	0 18	0 19	1 03	0 15	0 12	0 18	0 17	0 08	0 02	0 14	0 17	0 15	0 21	0 19	0 20	0 19	0 21	0 19	0 20	0 15	0 21
8	0 06	0 08	0 05	1 07	0 08	0 09	0 09	0 04	0 01	0 05	0 07	0 12	0 06	0 10	0 07	0 10	0 06	0 10	0 06	0 12	0 06
9	0 12	0 18	0 13	0 12	1 10	0 21	0 25	0 1	0 03	0 19	0 15	0 12	0 13	0 18	0 12	0 16	0 13	0 16	0 13	0 12	0 13
10	0 14	0 15	0 03	0 03	0 02	1 05	0 05	0 0	0 01	0 03	0 04	0 04	0 07	0 05	0 07	0 06	0 07	0 05	0 07	0 04	0 07
11	0 13	0 18	0 16	0 18	0 12	0 14	1 16	0 1	0 15	0 13	0 14	0 11	0 15	0 13	0 15	0 13	0 15	0 13	0 15	0 11	0 15
12	0 00	0 00	0 00	0 00	0 00	0 00	0 00	1 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
13	0 14	0 17	0 13	0 12	0 10	0 19	0 20	0 0	0 02	1 07	0 18	0 15	0 19	0 20	0 18	0 20	0 19	0 20	0 19	0 15	0 19
14	0 01	0 01	0 00	0 00	0 00	0 01	0 01	0 00	0 00	0 00	1 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01
15	0 04	0 05	0 05	0 05	0 05	0 11	0 10	0 0	0 01	0 05	0 10	1 10	0 04	0 14	0 04	0 14	0 04	0 14	0 04	0 10	0 04
16	0 11	0 12	0 04	0 04	0 04	0 07	0 07	0 0	0 01	0 04	0 05	0 05	1 16	0 06	0 18	0 06	0 19	0 06	0 19	0 05	0 19
17	0 06	0 06	0 03	0 03	0 03	0 06	0 06	0 0	0 01	0 03	0 05	0 05	0 09	0 07	0 09	0 07	0 10	0 06	0 09	0 05	0 09
18	0 18	0 20	0 09	0 09	0 06	0 17	0 15	0 0	0 02	0 09	0 13	0 13	0 28	0 18	0 28	0 19	0 28	0 16	0 27	0 13	0 28
19	0 15	0 17	0 10	0 08	0 07	0 15	0 14	0 0	0 02	0 08	0 12	0 12	0 23	0 16	0 22	0 16	0 23	0 15	0 22	0 12	0 23
20	0 09	0 10	0 05	0 05	0 05	0 11	0 10	0 0	0 01	0 06	0 09	0 09	0 13	0 12	0 12	0 12	0 13	0 12	0 13	0 09	0 13
21	1 18	0 20	0 10	0 15	0 10	0 20	0 18	0 0	0 02	0 14	0 16	0 16	0 26	0 22	0 26	0 22	0 26	0 21	0 26	0 16	0 26
22	0 04	1 04	0 02	0 02	0 02	0 04	0 04	0 0	0 01	0 02	0 04	0 04	0 06	0 05	0 05	0 05	0 06	0 04	0 05	0 04	0 06
23	0 20	0 21	1 14	0 17	0 14	0 20	0 19	0 0	0 02	0 16	0 19	0 16	0 23	0 21	0 22	0 21	0 23	0 21	0 23	0 16	0 23
24	0 06	0 06	0 05	1 07	0 08	0 08	0 08	0 0	0 01	0 05	0 07	0 12	0 06	0 10	0 07	0 10	0 06	0 10	0 06	0 12	0 06
25	0 12	0 18	0 13	0 12	1 10	0 21	0 25	0 1	0 03	0 18	0 15	0 13	0 13	0 16	0 12	0 16	0 13	0 16	0 13	0 12	0 13
26	0 14	0 15	0 03	0 03	0 02	1 05	0 05	0 0	0 01	0 03	0 04	0 04	0 07	0 05	0 07	0 06	0 07	0 05	0 07	0 04	0 07
27	0 13	0 18	0 16	0 18	0 12	0 14	1 16	0 1	0 15	0 13	0 14	0 11	0 15	0 13	0 15	0 13	0 15	0 13	0 15	0 11	0 15
28	0 00	0 00	0 00	0 00	0 00	0 00	0 00	1 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
29	0 66	0 69	0 79	0 81	0 75	0 68	0 65	0 94	1 08	0 80	0 78	0 80	0 72	0 66	0 73	0 68	0 71	0 67	0 72	0 60	0 72
30	0 14	0 17	0 13	0 13	0 11	0 20	0 20	0 08	0 03	1 11	0 17	0 15	0 19	0 21	0 19	0 20	0 19	0 21	0 19	0 15	0 19
31	0 01	0 01	0 00	0 00	0 00	0 01	0 01	0 00	0 00	0 00	1 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01
32	0 04	0 05	0 05	0 05	0 05	0 11	0 10	0 0	0 01	0 05	0 10	1 10	0 04	0 14	0 04	0 14	0 04	0 14	0 04	0 10	0 04
33	0 11	0 12	0 04	0 04	0 04	0 07	0 07	0 0	0 01	0 04	0 05	0 05	1 16	0 06	0 19	0 06	0 19	0 06	0 19	0 05	0 19
34	0 14	0 19	0 16	0 19	0 21	0 40	0 31	0 1	0 04	0 23	0 68	0 10	0 13	1 12	0 12	0 12	0 13	0 12	0 13	0 10	0 13
35	0 01	0 01	0 01	0 07	0 01	0 01	0 05	0 0	0 01	0 02	0 04	0 01	0 01	1 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01
36	0 20	0 20	0 15	0 16	0 18	0 42	0 40	0 2	0 05	0 17	0 18	0 10	0 14	0 13	0 14	1 13	0 14	0 13	0 14	0 10	0 14
37	0 74	0 74	0 21	0 20	0 19	0 38	0 35	0 1	0 04	0 22	0 28	0 25	0 44	0 34	0 42	0 35	1 44	0 32	0 43	0 25	0 44
38	0 07	0 08	0 13	0 08	0 07	0 23	0 17	0 1	0 02	0 08	0 05	0 05	0 06	0 06	0 08	0 06	0 06	1 06	0 06	0 05	0 06
39	0 02	0 02	0 06	0 03	0 03	0 04	0 05	0 0	0 01	0 04	0 02	0 02	0 02	0 02	0 02	0 02	0 02	0 02	1 02	0 02	0 02
40	0 04	0 05	0 05	0 05	0 05	0 11	0 10	0 0	0 01	0 05	0 10	1 10	0 04	0 14	0 04	0 14	0 04	0 14	0 04	1 10	0 04
41	0 11	0 12	0 04	0 04	0 04	0 07	0 07	0 0	0 01	0 04	0 05	0 05	1 16	0 06	0 19	0 06	0 19	0 06	0 19	0 05	1 19
42	0 03	0 07	0 01	0 01	0 01	0 02	0 02	0 0	0 01	0 01	0 02	0 02	0 03	0 02	0 03	0 02	0 03	0 02	0 03	0 02	0 03
43	0 10	0 13	0 02	0 02	0 02	0 04	0 03	0 0	0 01	0 00	0 02	0 03	0 05	0 04	0 05	0 04	0 05	0 04	0 05	0 03	0 05
44	0 06	0 13	0 09	0 09	0 22	0 08	0 16	0 0	0 02	0 09	0 06	0 05	0 08	0 06	0 06	0 06	0 06	0 06	0 06	0 05	0 06
45	0 02	0 08	0 03	0 15	0 07	0 04	0 05	0 0	0 01	0 06	0 03	0 03	0 03	0 03	0 03	0 03	0 03	0 03	0 03	0 03	0 03
46	0 21	0 26	0 22	0 23	0 25	0 52	0 46	0 2	0 08	0 24	0 47	0 49	0 17	0 67	0 17	0 80	0 17	0 38	0 17	0 49	0 17
47	0 23	0 28	0 29	0 26	0 27	0 62	0 51	0 2	0 08	0 27	0 50	0 53	0 18	0 75	0 18	0 82	0 19	1 05	0 18	0 53	0 18
48	0 58	0 64	0 21	0 21	0 18	0 35	0 34	0 1	0 04	0 21	0 25	0 24	1 03	0 31	0 76	0 32	1 07	0 30	0 90	0 24	1 03
49	0 48	0 49	0 18	0 20	0 15	0 29	0 30	0 1	0 04	0 18	0 22	0 20	0 73	0 27	0 88	0 27	0 68	0 27	0 85	0 20	0 73
50	0 12	0 21	0 13	0 23	0 30	0 16	0 23	0 0	0 03	0 08	0 03	0 18	0 11	0 42	0 10	0 14	0 10	0 14	0 10	0 42	0 10
51	0 04	0 05	0 05	0 05	0 05	0 11	0 09	0 0	0 01	0 05	0 09	0 10	0 03	0 13	0 03	0 13	0 03	0 14	0 03	0 10	0 03
52	0 05	0 06	0 02	0 02	0 02	0 03	0 03	0 0	0 00	0 02	0 03	0 02	0 08	0 03	0 10	0 03	0 09	0 03	0 10	0 02	0 09
53	0 05	0 09	0 06	0 10	0 13	0 07	0 10	0 0	0 01	0 07	0 05	0 19	0 04	0 08	0 04	0 06	0 04	0 05	0 04	0 18	0 04

Table 8a (cont.)

	L Poor 42	L Wealthy 43	CapK 44	Interest 45	U Poor 46	U Wealthy 47	R Poor 48	R Wealthy 49	Pvt Ent 50	UHHK 51	RHHK 52	Pvt ent k 53
1	0.10	0.06	0.01	0.02	0.07	0.06	0.10	0.06	0.01	0.02	0.02	0.02
2	0.06	0.07	0.01	0.01	0.06	0.04	0.06	0.07	0.01	0.01	0.02	0.01
3	0.17	0.15	0.02	0.03	0.12	0.11	0.18	0.15	0.02	0.03	0.05	0.03
4	0.06	0.06	0.01	0.02	0.06	0.06	0.18	0.06	0.01	0.02	0.03	0.02
5	0.22	0.21	0.03	0.05	0.20	0.17	0.22	0.21	0.03	0.07	0.20	0.06
6	0.05	0.04	0.01	0.01	0.05	0.04	0.05	0.04	0.01	0.01	0.02	0.01
7	0.21	0.20	0.05	0.07	0.19	0.19	0.21	0.20	0.05	0.11	0.15	0.06
8	0.06	0.07	0.17	0.16	0.06	0.11	0.06	0.07	0.17	0.54	0.38	0.37
9	0.13	0.12	0.03	0.05	0.15	0.16	0.13	0.12	0.03	0.07	0.08	0.06
10	0.07	0.06	0.01	0.01	0.06	0.05	0.07	0.06	0.01	0.02	0.03	0.02
11	0.15	0.15	0.06	0.08	0.14	0.13	0.15	0.15	0.06	0.12	0.16	0.16
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.19	0.18	0.03	0.05	0.19	0.20	0.19	0.18	0.03	0.07	0.08	0.06
14	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
15	0.05	0.04	0.02	0.03	0.14	0.14	0.04	0.03	0.02	0.03	0.03	0.03
16	0.18	0.19	0.01	0.02	0.07	0.06	0.18	0.18	0.01	0.03	0.04	0.02
17	0.10	0.06	0.01	0.02	0.07	0.06	0.10	0.06	0.01	0.02	0.03	0.02
18	0.28	0.24	0.03	0.05	0.21	0.14	0.30	0.25	0.03	0.05	0.07	0.04
19	0.23	0.20	0.02	0.04	0.17	0.15	0.24	0.20	0.02	0.05	0.06	0.04
20	0.13	0.12	0.02	0.03	0.12	0.11	0.13	0.12	0.02	0.03	0.04	0.03
21	0.26	0.25	0.04	0.06	0.23	0.21	0.27	0.25	0.04	0.08	0.24	0.07
22	0.06	0.05	0.01	0.01	0.06	0.04	0.06	0.05	0.01	0.01	0.02	0.01
23	0.23	0.22	0.05	0.07	0.21	0.21	0.24	0.22	0.05	0.12	0.18	0.18
24	0.06	0.07	0.17	0.16	0.06	0.11	0.06	0.07	0.17	0.54	0.38	0.37
25	0.13	0.12	0.03	0.05	0.15	0.16	0.13	0.12	0.03	0.07	0.08	0.06
26	0.07	0.06	0.01	0.01	0.06	0.05	0.07	0.06	0.01	0.02	0.03	0.02
27	0.15	0.15	0.06	0.08	0.14	0.13	0.15	0.15	0.06	0.12	0.16	0.16
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.68	0.75	0.46	0.48	0.65	0.67	0.69	0.75	0.46	0.58	0.81	0.68
30	0.20	0.18	0.04	0.05	0.20	0.21	0.20	0.18	0.04	0.07	0.08	0.06
31	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
32	0.05	0.04	0.02	0.03	0.14	0.14	0.04	0.03	0.02	0.03	0.03	0.03
33	0.18	0.19	0.01	0.02	0.07	0.06	0.19	0.18	0.01	0.03	0.04	0.02
34	0.13	0.12	0.05	0.06	0.12	0.12	0.13	0.12	0.05	0.11	0.11	0.06
35	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03	0.03
36	0.14	0.13	0.05	0.06	0.13	0.12	0.14	0.13	0.05	0.09	0.12	0.09
37	0.45	0.48	0.08	0.09	0.37	0.31	0.46	0.49	0.06	0.11	0.21	0.10
38	0.06	0.06	0.02	0.03	0.06	0.06	0.06	0.06	0.02	0.05	0.05	0.04
39	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02
40	0.05	0.04	0.02	0.03	0.14	0.14	0.04	0.03	0.02	0.03	0.03	0.03
41	0.18	0.19	0.01	0.02	0.07	0.06	0.19	0.19	0.01	0.03	0.04	0.02
42	1.03	0.03	0.00	0.01	0.02	0.02	0.03	0.03	0.00	0.01	0.01	0.71
43	0.05	1.05	0.01	0.01	0.04	0.04	0.05	0.05	0.01	0.01	0.03	0.01
44	0.06	0.06	1.02	0.03	0.06	0.06	0.06	0.06	0.02	0.05	0.06	0.04
45	0.03	0.03	0.03	1.03	0.03	0.03	0.03	0.03	0.03	0.06	0.06	0.05
46	0.30	0.17	0.07	0.12	1.20	0.19	0.18	0.16	0.07	0.13	0.15	0.12
47	0.20	0.20	0.09	0.15	0.22	1.22	0.19	0.18	0.09	0.15	0.17	0.14
48	1.32	0.41	0.07	0.13	0.33	0.30	1.46	0.41	0.07	0.12	0.19	0.10
49	0.33	1.29	0.05	0.08	0.27	0.27	0.34	1.30	0.05	0.11	0.18	0.09
50	0.10	0.08	1.05	0.04	0.14	0.14	0.10	0.08	1.05	0.12	0.12	0.10
51	0.04	0.03	0.02	0.03	0.11	0.15	0.03	0.03	0.02	1.03	0.03	0.02
52	0.06	0.12	0.01	0.01	0.03	0.03	0.07	0.12	0.01	0.01	1.02	0.01
53	0.05	0.04	0.47	0.42	0.06	0.06	0.04	0.04	0.47	0.06	0.05	1.04

Source: Dorosh-Lundberg (1993) and Jabara, Lundberg and Jallow (1992)

Table 8.b : Gambia, Decomposition of Multipliers from Production Activities to Poverty Groups [1]

Distributional Effects (PA_j^d)

	Groundnuts	Rice	CoarseGrains	Fruit/Veg/Roots	Livestock/Fish/Forest	GroundnutsProcess	Manufacture&Industry
Poverty	0.529	0.550	0.595	0.597	0.413	0.430	0.211
(Rural:48) [2]	0.502	0.518	0.566	0.525	0.351	0.344	0.072
(Urban:46) [2]	0.027	0.032	0.029	0.072	0.062	0.086	0.139

Interdependency Effects (PA_j^r)

	Groundnuts	Rice	CoarseGrains	Fruit/Veg/Roots	Livestock/Fish/Forest	GroundnutsProcess	Manufacture&Industry
Poverty	2.099	2.032	1.984	1.975	2.100	2.097	2.150
(Rural:48)	1.829	1.779	1.743	1.783	1.899	1.946	3.114
(Urban:46)	7.107	6.131	6.642	3.382	3.250	2.697	1.651

Fixed Price Multipliers (PA_j^m)

	Groundnuts	Rice	CoarseGrains	Fruit/Veg/Roots	Livestock/Fish/Forest	GroundnutsProcess	Manufacture&Industry
Poverty	1.111	1.118	1.18	1.178	0.867	0.901	0.454
(Rural:48)	0.919	0.922	0.986	0.936	0.667	0.669	0.224
(Urban:46)	0.192	0.196	0.194	0.242	0.2	0.232	0.23

Distributional Effects (PA_j^d)

	Construction	TransportComms	DomesticInformal	DomesticFormal	Re-exportTrade	PrivateServices	PublicServices
Poverty	0.201	0.199	0.421	0.332	0.177	0.216	0.356
(Rural:48)	0.060	0.039	0.076	0.086	0.015	0.059	0.027
(Urban:46)	0.140	0.160	0.346	0.305	0.162	0.158	0.329

Interdependency Effects (PA_j^r)

	Construction	TransportComms	DomesticInformal	DomesticFormal	Re-exportTrade	PrivateServices	PublicServices
Poverty	2.199	2.161	2.077	2.045	2.033	2.150	2.021
(Rural:48)	3.534	4.585	4.632	3.968	8.631	3.665	9.186
(Urban:46)	1.625	1.561	1.518	1.500	1.428	1.586	1.433

Fixed Price Multipliers (PA_j^m)

	Construction	TransportComms	DomesticInformal	DomesticFormal	Re-exportTrade	PrivateServices	PublicServices
Poverty	0.441	0.43	0.875	0.801	0.359	0.465	0.719
(Rural:48)	0.213	0.181	0.35	0.343	0.128	0.215	0.248
(Urban:46)	0.228	0.249	0.525	0.458	0.231	0.25	0.471

Distributional Effects (PA_j^d)

	UrbanHousing	RuralHousing
Poverty	0.347	0.590
(Rural:48)	0.014	0.590
(Urban:46)	0.333	0.000

Interdependency Effects (PA_j^r)

	UrbanHousing	RuralHousing
Poverty	2.102	2.037
(Rural:48)	17.230	1.749
(Urban:46)	1.477	N/A

Fixed Price Multipliers (PA_j^m)

	UrbanHousing	RuralHousing
Poverty	0.729	1.202
(Rural:48)	0.237	1.032
(Urban:46)	0.492	0.17

1) Based on 1989/90 Gambia SAM.

2) The numbers in parentheses refer to the two respective poor household groups: rural household poor(48) and urban household poor(46).

3) See text for definition, or see Annex II.C for definition of concepts.

rural poverty and that of informal activities and services in alleviating urban poverty.

An attempt is made in Figure 10 (Panel A) to identify the various paths through which enhancing some industries' output ultimately affects the income of specific socio-economic groups.

The paths follow the conventional transformation from production activities to factors of production to socioeconomic groups (see Figure 4 in Chapter II). For example, the first path shows that an increase in the output of groundnuts requires both unskilled labor and land owned by the wealthy farmers. The resulting labor and rental incomes accrue to the "rural wealthy" socioeconomic group. The fourth column of Figure 10 (Panel A) shows the global influence (equal to the value of the fixed price multiplier) which, in the above case, amounts to .707 with 85.2% of the global influence between groundnuts and the rural wealthy group travelling along this first path (the other paths spanning groundnuts as a pole of origin to "rural wealthy" as a pole of destination are not shown.

An interesting point that is highlighted through structural path analysis shown in Figure 10 (Panel B) is that some benefits from informal trade activities accruing to the rural poor household group come, indirectly, from transfers from the urban wealthy group and to a lesser extent from the urban poor groups. In other words, as urban households become employed in informal activities their incomes go up and they transfer a part of this income to relatives in the countryside belonging to the rural poor household group. Likewise, some benefits from formal trade activities to the rural poor come from similar transfers from the urban wealthy and the urban poor. In Figure 10 (Panel B), structural paths originating from informal and formal trade activities destined to rural poor are depicted. It can be observed that some paths are through urban wealthy and urban poor. It is yet another example of the indirect impact of non-agricultural activities on rural poverty alleviation.

Two interesting analyses have attempted to formulate poverty alleviation strategies for Gambia on the basis of the 1989-90 SAM. The first one by Akinboade (1992) was undertaken under the auspices of the UNDP. The main recommendations that flow from this study are: 1) economic growth, given the present economic conditions and structure of Gambia, is a necessary but not sufficient condition for poverty alleviation; 2) literacy improvement is required to provide functional education and skills to the poor who are typically illiterate; 3) improved access to credit for essentially self-employed individuals working on informal activities in both urban and rural areas is crucial; 4) certain types of rural based development projects such as

Figure 10. Gambia: Structural Path Analysis

A. Major Paths Linking Specific Production Activities and Socioeconomic Groups

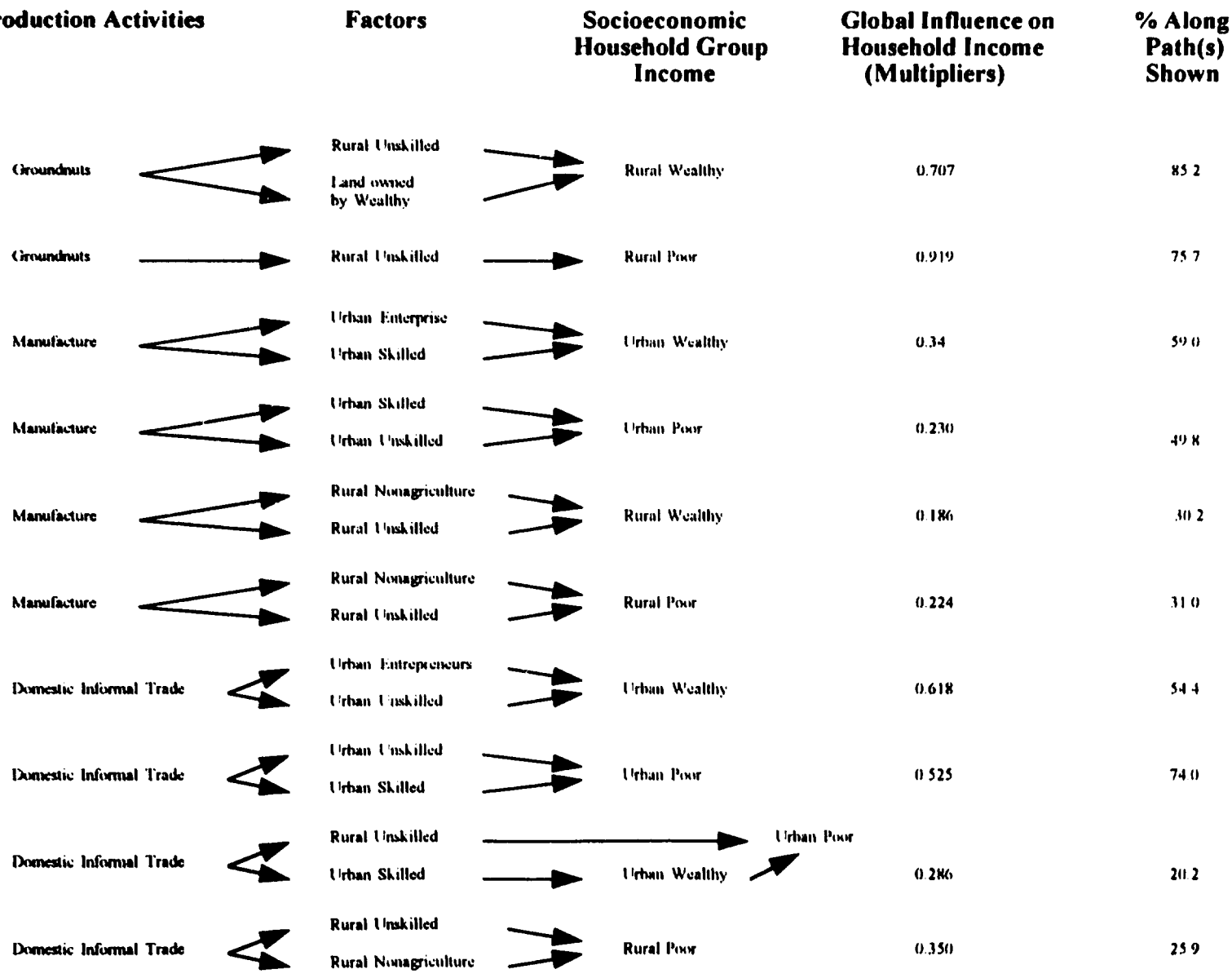
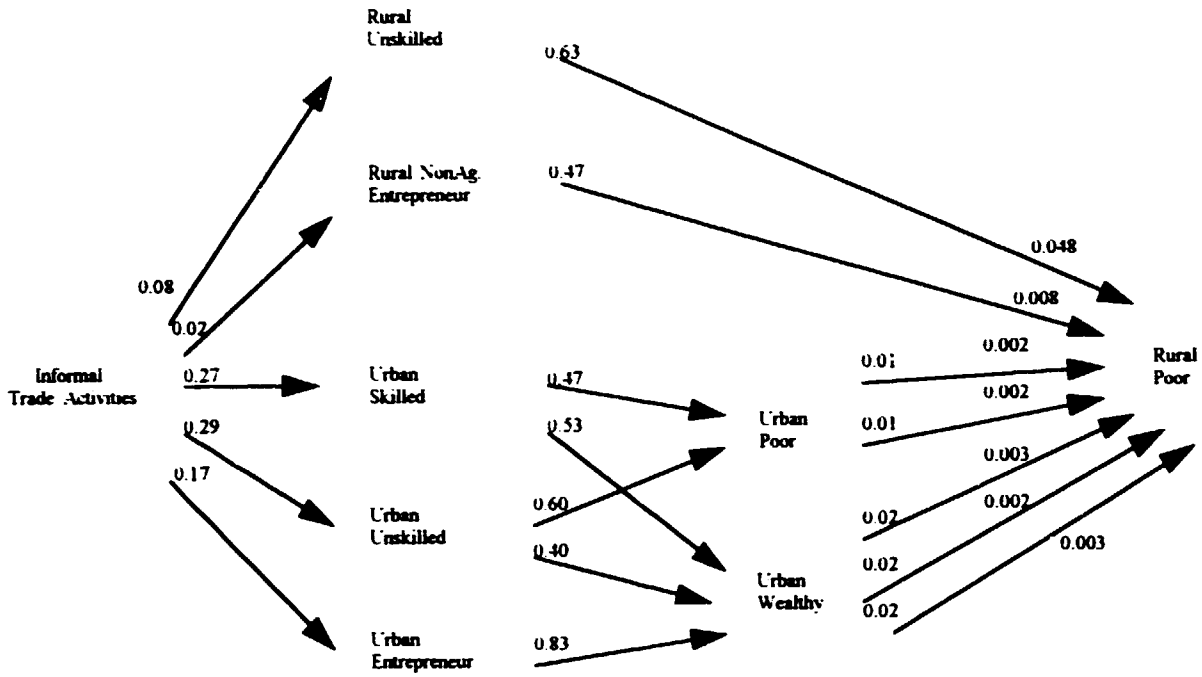
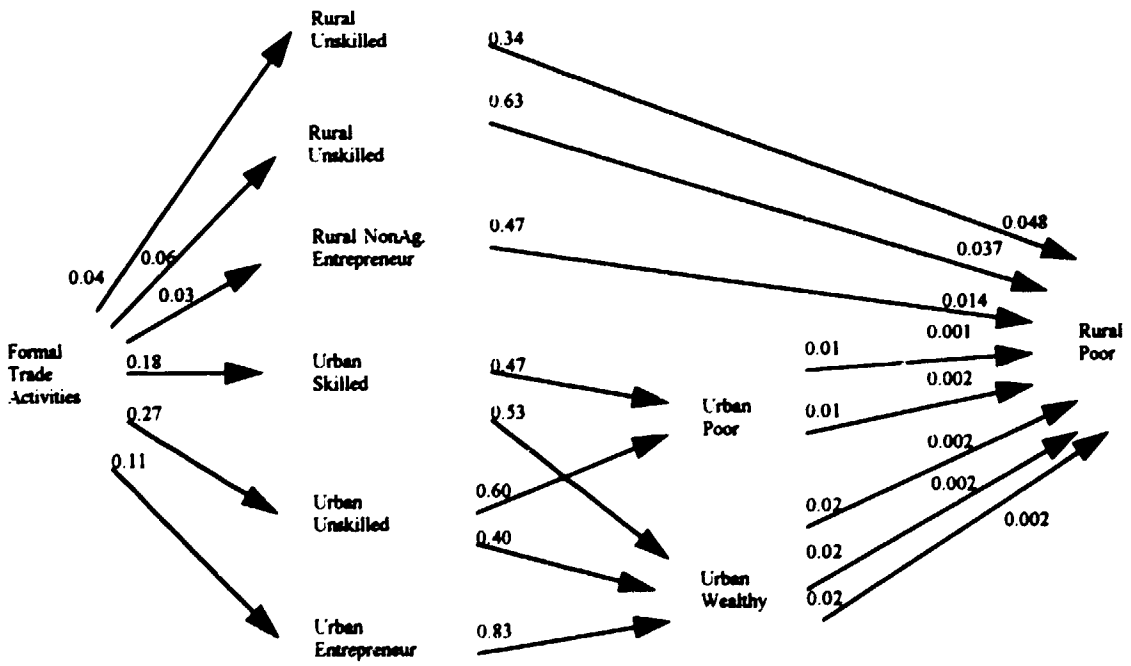


Figure 10. (cont.)
B. Structural Paths Linking Informal and Formal Trade Activities, Respectively, to Rural Poor.





the range lands and water development project could be effective in generating employment and reducing poverty. The second study by Dorosh and Lundberg (1993) shows that foreign aid inflows can provide a significant cushion to mitigate the negative effects of adjustment on the urban poor. This aid makes it possible to continue a program of public investment in urban and rural infrastructure that can play a very important role in raising the incomes of the rural poor. We will come back to some of these issues in the policy Chapter IV.

C. A SAM of Mexico to Explore the Impacts of Alternative Adjustment Strategies

A SAM of Mexico was built by Adelman and Taylor (1990) to explore the impacts of different adjustment strategies. The income distribution by household group is given in Table 9. It reveals that there are 3 very poor groups, small farmers, agricultural workers, and urban marginals. Each of these groups has a per capita income between 11.0 and 15.6 thousand pesos in 1986. By way of comparison, the next poorest group, the urban workers, enjoy an income 4-5 times as high, per capita. The SAM multiplier matrix, given in Table 10 distinguishes nine production sectors; seven household groups (campesinos i.e. small farmers; agricultural workers; commercial farmers; urban workers; urban capitalists; merchants; and urban marginals). The SAM shows that, on the agricultural side, there are relatively weak backward income linkages but relatively strong forward linkages between basic grains and the rest of the Mexican economy. The demand for domestically produced inputs by this sector equals just over 10% of the value of total basic grains output. Forward linkages, by contrast, are relatively strong: 42% of basic grain output is absorbed by intermediate demand. (p. 392)

Fixed price multipliers are derived and they reveal that campesinos benefit mostly from basic grains production (1.02), livestock production (.39) and other agriculture (.34) and, finally, agricultural processing (.20). The other activities have only a marginal impact on the incomes of the campesinos with none of them larger than .1. In turn, agricultural workers benefit most from other agriculture (.27), livestock (.23) followed by basic grains (.16) and agricultural processing (.10). Finally, the multiplier table shows how incredibly difficult it is to affect favorably the incomes of the urban marginalists. The highest multiplier comes from services (.15) with next industry, agricultural processing, other agriculture, livestock, and basic grains (all around .12).

Despite weak backward linkages between basic grains and other production sectors in the SAM, strong forward linkages are apparent in the multiplier

Table 9

Mexico: Household Incomes (1980 Pesos per capita)

Sector	Model Base 1986
Rural	
Small Farmer	11,544
Ag. Workers	13,939
Large Farmers	80,060
Urban	
Marginals	15,648
Workers	69,722
Capitalists	120,087
Merchants	98,522

Source: Adelman & Taylor (1990), Table 5

TABLE 10

1990 MEXICO SAM INCOME MULTIPLIER MATRIX

	1. Basic Grains	2. Livestock	3. Other Ag	4. Petroleum	5. Fertilizer	6. Ag Processing	7. Industry	8. Services	9. Commerce	10. Campesinos
1. Basic Grains	1.1841	0.1263	0 0780	0 0116	0 0308	0.1058	0 0346	0 0386	0 0317	0 1402
2. Livestock	0.1715	1.1755	0.1414	0 0311	0 0784	0.3474	0 0915	0 1023	0 0834	0 1760
3. Other Agriculture	0.1430	0 2736	1.1380	0 0270	0 0773	0 1918	0 0318	0 0876	0 0709	0 1520
4. Petroleum	0 0587	0 0595	0.0725	1.3322	0 0599	0 0500	0 0665	0 0585	0 0349	0 0519
5. Fertilizer	0.0154	0 0100	0.0369	0 0010	1 0199	0.0072	0 0036	0 0033	0 0027	0 0063
6. Ag Processing	0.5593	0 6203	0.4654	0.1034	0 2609	1 5117	0 3039	0 3388	0 2770	0 5721
7. Industry	0.8743	0 8315	0.8585	0.2482	1.1607	0 8911	1.9404	0 8756	0 5201	0 8506
8. Services	0.9493	0.9348	0.9442	0 3153	0 6791	0.7947	0 7623	1 8966	0 7197	0 9338
9. Commerce	0.6954	0.6478	0.6486	0.1833	0.4469	0 5605	0 5105	0 5018	1 3956	0 6912
10. Campesinos	1.0191	0.3878	0 3360	0 0235	0 0620	0 1971	0 0711	0 0764	0 0617	1 1837
11. Rural workers	0.1550	0.2348	0 2710	0 0133	0 0351	0 1020	0 0408	0 0425	0 0340	0 0728
12. Agribusiness	0.1298	0.3984	0.4869	0 0182	0 0493	0.1609	0 0582	0 0593	0 0482	0 1045
13. Urban workers	0.6340	0 6189	0 6193	0 3278	0.7382	0 6173	0 7511	0 8338	0 5523	0 6224
14. Urban Cap.	0.6708	0 6687	0.6463	0 1973	0 5616	0.7661	0.7640	0 9607	0 4491	0 6623
15. Merchant Cap	0.3201	0 2982	0 2988	0 0844	0 2057	0 2580	0 2350	0 2310	0 6424	0 3182
16. Urban Marg.	0 1209	0 1171	0.1146	0 0342	0 0940	0.1234	0.1230	0 1457	0 1298	0 1187

	11. Ag Workers	12. Agribusiness	13. Urban Workers	14. Urban Capital	15. Merchants	16. Urban Marginal
1. Basic Grains	0.1102	0.0473	0.0445	0 0323	0.0339	0.0843
2. Livestock	0.1749	0.1297	0.1208	0 0893	0 0946	0.1638
3. Other Agriculture	0.1465	0.1108	0.1024	0.0754	0 0793	0.1381
4. Petroleum	0.0538	0.0498	0.0433	0.0339	0.0338	0.0469
5. Fertilizer	0.0058	0.0041	0.0038	0.0028	0 0029	0 0053
6. Ag Processing	0.5861	0.4249	0.4028	0.2958	0.3145	0.5418
7. Industry	0 8458	0.7037	0.6844	0 5095	0 5108	0.7495
8. Services	1.0672	0.9403	0.8895	0.7088	0.7059	0.9163
9. Commerce	0.7270	0.5913	0 5825	0.4307	0.4370	0.6429
10. Campesinos	0.1587	0.0911	0.0915	0.0628	0.0658	0.1485
11. Ag. workers	1.0634	0.0497	0.0521	0.0343	0.0360	0 0773
12. Agribusiness	0.1014	1.0750	0.0698	0.0514	0.0542	0.0948
13. Urban workers	0.6687	0.5652	1.5387	0.4168	0.4188	0.5855
14. Urban Cap.	0 7171	0.6047	0.5760	1.4465	0.4494	0 6284
15. Merchant Cap	0.3348	0.2722	0.2589	0.1982	1.2012	0.2959
16. Urban Marg	0.1274	0.1063	0.1013	0 0782	0 0789	1.1119

table. The SAM linkages are due mostly to the large positive effects of increased demand for basic grains on household incomes--especially campesino incomes--which in turn generate new consumer demand for domestically produced goods. This provides an impetus and effective demand for rural small scale and urban industries producing consumer goods. From the above mentioned multipliers it can be seen that increased demand for basic food grains has a relatively weak effect on rural worker incomes reflecting the comparatively small contribution of hired labor value added to food grain production on small peasant farms, and it suggests that the familiar policy tradeoff between increasing small farmer incomes and increasing agricultural-worker incomes is particularly relevant to Mexico. (p. 394) Again, this reinforces the case for appropriate rural industrial decentralization to provide jobs for these landless workers.

The income multiplier matrix also reflects strong rural-urban income linkages, indicated by a large positive effect of increased demand for agricultural commodities on urban incomes. This phenomenon operates through the strong positive effect that an increase in rural incomes has on the demand for urban produced goods, and it suggests the relevance of rural income-led industrialization policies in the Mexican context. (p. 395) For example, whereas services, industry and fertilizer production generate the highest income multipliers for urban workers (ranging between .74 and .83) basic grains, livestock and other agriculture generates income multipliers only slightly lower (of the order of .62-.63). In contrast campesinos and rural workers appear to benefit relatively much less from increases in essentially non-farm activities largely in the urban areas; e.g. agricultural processing yields, income multipliers of .20 and .10, respectively for campesinos and rural workers and both services and industry yield corresponding multipliers of only .08 and .04! The above analysis suggests strongly that rural small scale industrialization can be much more effective in alleviating poverty than urban-based industrialization. The one poor group largely left out of this process, the urban marginalists have to rely on obtaining work in the informal subsector.

Two types of counterfactual policy experiments were run: 1) an abandonment of the wage-repression strategy pursued since the debt crisis and fall in oil prices hit the Mexican economy, and a return to the higher wage policy of 1980, and 2) a unimodal agricultural strategy, that emphasizes the growth of the productive peasant agriculture. The results suggest that agricultural policies have a significant role to play in economic adjustment strategies. Unimodal agricultural development leads to a higher rate of economic growth, reduces the percentage of the population in poverty

significantly and results in a smaller public deficit than in the base wage-repression strategy. Moreover, for every household group at least one of the two unimodal strategies (i.e. focusing on small-scale agriculture) leads to a higher rate of income growth than the bimodal strategy entailing research, input subsidies, and infrastructural investment directed at the commercial farming sector producing food for middle income urban Mexicans and for export, combined with neglect of the ejido reform sector. The authors argue that their policy experiments suggest that adjustment with a more human face is possible, and they highlight the role of agricultural policies in this process. (p. 406)

The above Mexican case study is a good example of the so-called agricultural development led industrialization strategy (ADLI) promoted by Adelman (1984). That strategy consists of building a domestic mass-consumption market by improving the productivity of agriculture and letting farmers share in the fruits of improved productivity--particularly the productivity of small and medium scale agriculture rather than large scale agriculture. This strategy requires improving the physical and institutional infrastructure of agriculture. To be successful this strategy requires as part of the productivity-improving package, a terms of trade policy that allows farmers to improve their incomes while improving output. In particular, price policies should not discriminate too strongly against agriculture in order to capture the agricultural surplus for capital formation and industrialization outside of agriculture. The ADLI strategy may be more appropriate for certain countries than others and for certain time periods than others. It may be most promising for countries with potentially large domestic markets, in which there already exists an industrial base with an established supply responsiveness. This strategy, as compared to an industrialization first strategy, would be likely to lead to significant changes in the income distribution favoring farmers, agricultural capitalists and marginal labor at the expense of industrial capitalists and to some extent service labor and organized labor.

What the authors do not sufficiently analyze and emphasize is the crucial complementary role that rural industrialization needs to play for effective growth and poverty alleviation to occur. Rural industrialization is essential in two senses, i) to absorb productively the unskilled landless who have limited opportunities within agriculture; and ii) to provide the simple consumer goods and services demanded by farmers and rural dwellers. These goods have been called incentive goods to higher agricultural output.

D. Case Studies Based on Village and District SAMs

By now, there are a number of village and district SAMs that are very useful in showing the intersectoral relationships within agricultural activities and between the latter and a number of service, construction, processing and rural industrialization activities within the village or located near the village. To illustrate some of the intersectoral relationships at the more micro village or district level, the following SAMs will be used: a) Parikh (1993) SAMs of two villages in India; b) a village SAM for Kanzara (India) by Subramanian and Sadoulet (1990); c) a Kenyan district SAM by Lewis and Thorbecke (1992); d) a Mexican village SAM by Adelman, Taylor and Vogel (1989); and, e) exhaustive multiplier analysis of rural-urban linkages in different developing countries by Haggblade, Hazell and Brown (1989) and Hazell and Haggblade (1989).

1. Parikh Village SAMs

Two villages are studied: Boriya (an Indian village located near a factory 45 km north of Ahmedabad) and Aurepalle, a more remote village in Andhra Pradesh. These are very small villages with a total population of respectively, 1599 inhabitants in Aurepalle and 1191 in Boriya. The existence of a factory nearby has changed the village scene for Boriya. The social barriers (especially the caste system) has started to weaken. More children are sent to school because it has become realized that educated people stand a better chance of getting employment in the organized sector. The job opportunities created by the factory have affected negatively the exploitation of agricultural laborers. There are no bonded laborers in Boriya, in contrast with Aurepalle. As the factory does not distinguish between castes, the poor have been able to get jobs in the factory. Their economic position is improving and, in general, income inequalities among the landholding classes have also declined.

Aurepalle, on the other hand, still remains very traditional. Caste is an important factor in determining the occupation open to an individual. The poor are not as aware of the benefits that education can bring, hence fewer children are sent to school. In the labor markets, bonded laborers, who have no freedom at all, are an important presence. Some occupations, depending on the patron-client relationship, whose remuneration is decided by tradition, still exist in the village. Most of the people engaged in such occupations continue to live below the poverty line. Income inequalities among classes are higher than in Boriya.

In both instances four distinctive household groups are identified, i.e.

the landless laborers (1h1), small farmers (1h2), medium farmers (1h3), and large farmers (1h4). A methodological novelty is that the multipliers that are derived in the study under consideration are constrained multipliers. In other words, it is assumed that output in agriculture is relatively inelastic and can only increase by not more than 10%. This, of course, is a more realistic assumption than presuming that any increase in demand can be satisfied by an equivalent increase in output as in the derivation of fixed price multipliers. A SAM multiplier analysis of these villages given in Table 11 & 12, respectively, reveals some interesting results. The multipliers for Boriya show how difficult it is to have an impact on raising the incomes of the landless laborers (category 1h1). The highest income multiplier comes from salaries from outside village activities (i.e. salaries from a factory) (.28) and next from services (.24), and from livestock (.14) and dairy products (.11), respectively. In contrast, small farmers' incomes are much more responsive to output changes in activities such as services (.56), salaries (.50), dry agriculture (.39) and livestock (.26). In turn, medium-sized farmers benefit most income-wise from non-agricultural village production (1.11), salaries (.33), wet agriculture (.32), and dry agriculture (.29).

Because Aurepalle has only very limited access to wage opportunities outside the village, the landless must rely more on employment opportunities within the village. This is reflected by the larger magnitude of the income multipliers generated by intra-village activities for landless households, i.e. services (.55), compared to Boriya. Small farmers' incomes are most favorably affected by increases in output of the following activities: non-agricultural village production (.77), services (.64), salaries (.60), livestock (.52), and wet agriculture (.47). It is important to note the predominance of non-agricultural village production activities in providing incomes to small farmers' households. Aurepalle, with its varied caste mix and traditional economy has a variety of artisans. Goldsmiths, basket makers, carpenters, pig rearers, porters, owners of saw mill, and weavers offer the products of their occupation to the villagers and the outsiders. Many of these artisans belong to small farmers' households. In turn, services are also important in generating incomes for small farmers in Aurepalle. This service sector consists of electricians, doctors, midwives, barbers, tailors and other servicemen.

Those activities that have the greatest total output multipliers in Boriya are dry agriculture, wet agriculture and dairy products (multipliers between 2.45 and 2.55). A number of activities yield multipliers just above 2.00, namely livestock, services and household industries. In Aurepalle, the

Table 11
MULTIPLIER MATRIX FOR BORIYA

		dry ag	wet ag	livest	agser	vprod	services	trade	dairy	cereals	pulses	ofood	nonfood
		1	2	3	4	5	6	7	8	9	10	11	12
1	dry ag	1.0148	0.01386	0.0149	0.01489	0.0167	0.01575	0.00321	0.0182	0.0209	0.041	0.0187	0.0133
2	wet ag	0.257807	1.25135	0.2584	0.2468	0.258	0.2844	0.05795	0.2992	0.8781	0.0172	0.306	0.2187
3	livest	0.253294	0.27103	1.1438	0.18176	0.2327	0.20106	0.0432	0.3489	0.1933	0.0152	0.3611	0.0799
4	agser	0.491038	0.56212	0.1205	1.13204	0.121	0.13242	0.02698	0.1399	0.3986	0.0228	0.1431	0.1023
5	vprod	0.002534	0.00261	0.0009	0.00388	1.0008	0.00253	0.00016	0.0008	0.0019	0.0001	0.0008	0.0009
6	services	0.138553	0.1476	0.2094	0.16786	0.143	1.15411	0.0285	0.0894	0.1055	0.0089	0.0892	0.257
7	trade	0.154102	0.15487	0.1635	0.17019	0.1942	0.17816	1.03676	0.2473	0.143	0.1285	0.2554	0.1416
8	Dairy	0.142365	0.14423	0.12	0.15726	0.2091	0.17613	0.03847	1.3378	0.1035	0.0102	0.3513	0.058
9	cereals	0.121666	0.103	0.0815	0.0673	0.0579	0.11599	0.02385	0.0486	1.074	0.0077	0.0466	0.0393
10	pulses	0.057698	0.02871	0.0237	0.03123	0.051	0.03384	0.00716	0.0147	0.0209	1.0032	0.0137	0.0115
11	ofood	0.635558	0.64388	0.5357	0.70204	0.9336	0.7863	0.17173	1.508	0.4619	0.0457	1.5682	0.2588
12	nonfood	0.679184	0.72354	1.0263	0.82285	0.7011	0.75542	0.1397	0.438	0.517	0.0437	0.4373	1.26
13	ag inp	0.718943	0.82301	0.1765	0.19332	0.1772	0.19389	0.03951	0.2048	0.5836	0.0334	0.2096	0.1498
14	durables	0.036711	0.03217	0.0276	0.03257	0.0669	0.0434	0.00791	0.023	0.0231	0.0024	0.0168	0.0138
15	hiredm	0.0517	0.03826	0.0084	0.00807	0.0085	0.00924	0.00188	0.0098	0.0273	0.0023	0.01	0.0072
16	hiredf	0.00161	0.00389	0.0008	0.00078	0.0008	0.00089	0.00018	0.0009	0.0027	9E-05	0.001	0.0007
17	salary	0.007754	0.00419	0.0022	0.00269	0.0034	0.00303	0.00065	0.0193	0.003	0.0004	0.0055	0.0012
18	rent	0.17519	0.05954	0.0142	0.0137	0.0145	0.01556	0.00317	0.0166	0.0436	0.0074	0.017	0.0122
19	lh0	0.096121	0.09047	0.1425	0.06574	0.0691	0.23694	0.08543	0.1117	0.0669	0.0139	0.0798	0.0672
20	lh1	0.38876	0.19762	0.2644	0.1748	0.1279	0.56093	0.10134	0.1318	0.1455	0.0275	0.1294	0.1502
21	lh2	0.294892	0.31551	0.2267	0.28215	1.1115	0.27695	0.05109	0.1297	0.2251	0.0178	0.1299	0.1019
22	lh3	0.391142	0.59498	0.3482	0.88275	0.1805	0.38152	0.05204	0.2112	0.4213	0.0218	0.2134	0.1584
23	vgovt	0.027432	0.01036	0.0024	0.00235	0.0025	0.00267	0.00054	0.0028	0.0075	0.0012	0.0029	0.0021
24	maint	0.050688	0.05227	0.0184	0.0776	0.0153	0.05057	0.00328	0.0151	0.0371	0.0024	0.0154	0.0174
25	stock	0.000997	0.00101	0.0008	0.0011	0.0015	0.00123	0.00027	0.0094	0.0007	7E-05	0.0025	0.0004
26	capital	0.03687	0.03211	0.0277	0.03236	0.0672	0.04364	0.00795	0.0241	0.0231	0.0024	0.0171	0.0138
27	govtser	0.009519	0.00359	0.0008	0.00081	0.0009	0.00093	0.00019	0.001	0.0026	0.0004	0.001	0.0007
28	raton	0.073157	0.07152	0.0823	0.06971	0.0636	0.07795	0.01527	0.0536	0.2772	0.0047	0.0538	0.0825
29	row	0.917324	0.92488	0.9168	0.92947	0.9356	0.92112	0.98454	0.9454	0.7202	0.9949	0.9452	0.9167

Table 11 (cont.)

aginput	durable	hiredm	hiredf	salary	rent	lh=0	lh=1	lh=2	lh=3	vgovt	maint	stock	capital
13	14	15	16	17	18	19	20	21	22	23	24	25	26
0.0126	0.0026	0.0176	0.0174	0.0165	0.0164	0.01823	0.016	0.0167	0.0157	0.0039	0.0009	0.00224	0.00224
0.2102	0.0546	0.3145	0.3147	0.2933	0.268	0.31682	0.3192	0.258	0.261	0.0691	0.0133	0.04775	0.04775
0.3083	0.1892	0.2501	0.2435	0.2146	0.2179	0.27523	0.1889	0.2327	0.1794	0.051	0.0118	0.16532	0.16532
0.7926	0.0253	0.1465	0.1465	0.1367	0.1254	0.14778	0.148	0.121	0.122	0.0322	0.0063	0.02208	0.02208
0.0028	0.0002	0.0009	0.0009	0.0009	0.0008	0.00085	0.0009	0.0008	0.0008	0.0002	0.05	0.00015	0.00015
0.1484	0.0356	0.138	0.1415	0.1583	0.1539	0.1253	0.1689	0.143	0.1885	0.0366	0.0077	0.03112	0.03112
0.1426	0.0282	0.2046	0.2013	0.1883	0.1887	0.21731	0.1733	0.1942	0.1791	0.0444	0.01	0.02464	0.02464
0.1267	0.021	0.2278	0.2203	0.1895	0.1934	0.25667	0.1567	0.2091	0.1585	0.0452	0.0106	0.01836	0.01836
0.0591	0.0143	0.127	0.131	0.1131	0.0771	0.11555	0.1703	0.0579	0.0689	0.0269	0.003	0.01252	0.01252
0.0251	0.0042	0.0398	0.0385	0.0308	0.0443	0.04336	0.0289	0.051	0.0293	0.0087	0.0026	0.00363	0.00363
0.5657	0.0938	1.017	0.9835	0.8461	0.8633	1.14586	0.6998	0.9336	0.7077	0.2017	0.0472	0.08194	0.08194
0.7272	0.1745	0.6763	0.6935	0.7758	0.7543	0.6142	0.8279	0.7011	0.9238	0.1794	0.0376	0.15253	0.15253
1.1605	0.037	0.2145	0.2145	0.2001	0.1836	0.21636	0.2167	0.1772	0.1786	0.0472	0.0092	0.03233	0.03233
0.0267	1.0048	0.0311	0.0332	0.0442	0.059	0.01968	0.0561	0.0669	0.0255	0.0101	0.0034	0.87822	0.87822
0.0069	0.0018	1.0102	0.0102	0.0095	0.0088	0.01032	0.0103	0.0085	0.0085	0.0142	0.0004	0.00153	0.00153
0.0007	0.0002	0.001	1.001	0.0009	0.0008	0.001	0.001	0.0008	0.0008	0.0122	4E-05	0.00015	0.00015
0.0022	0.0004	0.0038	0.0037	1.0032	0.0032	0.00422	0.0028	0.0034	0.0027	0.2108	0.0002	0.00035	0.00035
0.0116	0.0029	0.0172	0 0172	0.0161	1.0149	0.01745	0.0172	0.0145	0.0145	0.0038	0.0007	0.00255	0.00255
0.0678	0.0241	0.7622	0.6919	0.2821	0.0691	1.07391	0.0683	0.0691	0.0701	0.0767	0.0036	0.02109	0.02109
0.162	0.0451	0.3927	0.4631	0.496	0.2868	0.13177	1.1358	0.1279	0.1395	0.1144	0.0067	0.0394	0.0394
0.2292	0.0401	0.1646	0.1543	0.3328	0.8073	0.12651	0.1221	1.1115	0.1126	0.0737	0.0558	0.03505	0.03505
0.659	0.0627	0.2161	0.2256	0.4066	0.334	0.20925	0.2025	0.1805	1.1808	0.0907	0.0093	0.05481	0.05481
0.002	0.0005	0.003	0.003	0.0028	0.0026	0.00299	0.003	0.0025	0.0025	1.0007	0.0001	0.00044	0.00044
0.056	0.0035	0.0173	0.0174	0.0171	0.016	0.01695	0.0184	0.0153	0.0168	0.004	1.0008	0.00308	0.00308
0.0009	0.0001	0.0016	0.0015	0.0013	0.0014	0.0018	0.0011	0.0015	0.0011	0.0003	7E-05	1.00013	0.00013
0.0266	0.0048	0.0311	0.0333	0.0444	0.0592	0.01946	0.0568	0.0672	0.0251	0.0101	0.0034	1.00423	1.00423
0.0007	0.0002	0.001	0.001	0.001	0.0009	0.00104	0.001	0.0009	0.0009	0.3472	4E-05	0.00015	0.00015
0.0609	0.0141	0.0788	0.0802	0.0792	0.07	0.07426	0.0932	0.0636	0.0758	0.0185	0.0033	0.01235	0.01235
0.9384	0.9857	0.9202	0.9187	0.9199	0.9291	0.9247	0.9057	0.9356	0.9234	0.6342	0.9966	0.98749	0.98749

Source: Parikh (1993)

Table 12 : Multiplier Matrix for Aurepalle

		dry ag 1	wet ag 2	live st 3	ag ser 4	trade 5	dairy 6	vill prod 7	services 8	cereals 9	pulses 10	oilseed 11	nonfood 12	agrinput 13
1	dry ag	1.0853	0.09839	0.11279	0.10098	0.0335	0.1118	0.105209	0.110346	0.15113	0.13313	0.10983	0.1218606	0.0715473
2	wet ag	0.2224	1.30481	0.32445	0.24874	0.1009	0.158	0.352845	0.381546	0.9897	0.06564	0.15027	0.3350826	0.1991775
3	live st	0.4783	0.38472	1.23662	0.23844	0.095	0.3938	0.243356	0.25831	0.32918	0.06888	0.36017	0.2052939	0.6455185
4	ag ser	0.1113	0.08385	0.02888	1.02344	0.0088	0.0182	0.029805	0.031919	0.07063	0.01587	0.0186	0.030297	0.1769283
5	trade	0.4032	0.41881	0.50811	0.48727	1.1541	0.883	0.445328	0.480978	0.34268	0.06099	0.67606	0.5529951	0.3279597
6	dairy	0.0513	0.0532	0.05744	0.06391	0.0229	1.1218	0.059801	0.063139	0.04343	0.00778	0.12087	0.0440867	0.0384224
7	vill.prod	0.2501	0.26491	0.38411	0.2782	0.0988	0.1517	1.246129	0.245597	0.21588	0.03798	0.14597	0.5289139	0.2235374
8	services	0.1125	0.11808	0.16874	0.12911	0.0311	0.0852	0.112978	1.112387	0.0983	0.01704	0.06253	0.2486796	0.10355
9	cereals	0.2126	0.3188	0.30988	0.23438	0.1104	0.1507	0.38555	0.423898	1.25341	0.03508	0.14232	0.2708828	0.1898185
10	pulses	0.043	0.04778	0.05118	0.05327	0.0149	0.0238	0.056093	0.059575	0.03877	1.00858	0.02238	0.0393178	0.033655
11	oilseed	0.8038	0.82884	0.87578	0.78184	0.2884	1.4302	0.703539	0.742807	0.51098	0.09124	1.42206	0.5186674	0.4520287
12	nonfood	0.6697	0.70288	1.00441	0.76854	0.1954	0.388	0.672491	0.669031	0.57324	0.10145	0.37221	1.4855922	0.6183688
13	agrinput	0.7	0.52811	0.18153	0.14744	0.0555	0.1209	0.187451	0.200746	0.44358	0.09978	0.11696	0.1905472	1.1127566
14	durable	0.0572	0.06383	0.06095	0.06965	0.0108	0.0181	0.039593	0.04137	0.0518	0.00878	0.02305	0.0317447	0.0442429
15	hiredm	0.07	0.03082	0.01382	0.01128	0.0051	0.0105	0.013429	0.014293	0.02798	0.00932	0.01022	0.0141933	0.008593
16	hiredl	0.0844	0.20235	0.0528	0.04068	0.0184	0.0273	0.056931	0.061466	0.15568	0.0138	0.02607	0.0546797	0.0324775
17	rm(f.ser)	0.049	0.06538	0.02833	0.01855	0.0084	0.014	0.021435	0.023025	0.05234	0.00784	0.01352	0.0208259	0.0170622
18	salary	0.0078	0.00883	0.00848	0.00702	0.002	0.032	0.006587	0.006729	0.00714	0.00117	0.0059	0.0110415	0.0052793
19	rent	0.1078	0.02361	0.02317	0.01909	0.0067	0.0157	0.049968	0.019583	0.02539	0.01362	0.01527	0.0291611	0.0144364
20	lh-0	0.2493	0.29883	0.30508	0.20119	0.2244	0.2044	0.296396	0.591005	0.21882	0.03798	0.19419	0.2913488	0.1820878
21	lh-1	0.3158	0.52601	0.56888	0.40012	0.1328	0.2406	0.532885	0.715585	0.41644	0.06385	0.22569	0.5055735	0.3435628
22	lh-2	0.4388	0.32608	0.38349	0.67318	0.0884	0.161	0.322157	0.259342	0.27513	0.06217	0.14965	0.2208966	0.2957112
23	lh-3	0.328	0.42885	0.97188	0.53881	0.0607	0.1417	0.196269	0.206514	0.34387	0.05222	0.1355	0.1680839	0.2681929
24	v.govt	0.0028	0.00411	0.0012	0.00086	0.0004	0.0007	0.001269	0.001365	0.00327	0.00048	0.00087	0.001249	0.0007406
25	capital	0.1232	0.13782	0.13091	0.18382	0.0233	0.0349	0.082748	0.087718	0.11188	0.01882	0.04918	0.0872418	0.095198
26	maint	0.027	0.03483	0.01703	0.00804	0.0035	0.0079	0.011814	0.01247	0.02795	0.00428	0.00782	0.0112563	0.0098164
27	stock	-0.0018	-0.0022	-0.0013	-0.00138	-0.0005	-0.0193	-0.00141	-0.001497	-0.0018	-0.0003	-0.00226	-0.001137	-0.0006828
28	geer	0	0	0	0	0	0	0	0	0	0	0	0	0
29	rationshop	0.1338	0.15828	0.17424	0.15818	0.0581	0.1906	0.178351	0.189889	0.32185	0.02082	0.19645	0.1694378	0.1108762
30	row	1.0493	1.10948	1.08162	1.03458	1.0321	0.9257	1.139544	1.158325	1.70982	1.00848	0.92188	1.0540049	1.0466584

Table 12 (cont.)

durable	hiredm	hiredf	rm(f ser)	salary	rent	lh-0	lh-1	lh-2	lh-3	v.govt	capital	maint	stock
14	15	16	17	18	19	20	21	22	23	24	25	26	27
0.00583	0.1256	0.1253	0.124859	0.11484	0.09753	0.122	0.128	0.104	0.091	0.1443	0.0021	0.075	0.0021
0.01883	0.4571	0.4522	0.449894	0.35362	0.284508	0.421	0.479	0.206	0.253	0.4325	0.0069	0.237	0.0069
0.08267	0.2936	0.2936	0.291589	0.27082	0.21613	0.284	0.299	0.258	0.196	0.3038	0.023	0.157	0.023
0.00161	0.0376	0.0373	0.037148	0.03072	0.025185	0.035	0.039	0.021	0.023	0.0379	0.0006	0.02	0.0006
0.0263	0.508	0.51	0.509492	0.50857	0.437747	0.512	0.507	0.543	0.412	0.6418	0.0097	0.323	0.0097
0.00298	0.0702	0.0706	0.070006	0.06921	0.053175	0.069	0.071	0.076	0.048	0.0758	0.0011	0.037	0.0011
0.01874	0.2679	0.2666	0.270246	0.27377	0.283008	0.279	0.261	0.278	0.285	0.5061	0.0069	0.607	0.0069
0.00867	0.1223	0.1217	0.123503	0.1257	0.131366	0.128	0.119	0.128	0.133	0.2004	0.0032	0.105	0.0032
0.01812	0.5172	0.5109	0.506455	0.37642	0.282241	0.465	0.548	0.176	0.24	0.4301	0.0059	0.24	0.0059
0.00265	0.0676	0.0682	0.066255	0.06118	0.049368	0.061	0.072	0.056	0.045	0.0675	0.001	0.034	0.001
0.03504	0.8261	0.8306	0.823597	0.81422	0.625592	0.814	0.833	0.889	0.559	0.8919	0.0129	0.435	0.0129
0.05163	0.7282	0.7244	0.735136	0.74824	0.781943	0.762	0.708	0.763	0.791	1.1928	0.0189	0.626	0.0189
0.01013	0.2368	0.2348	0.233634	0.19323	0.158397	0.222	0.246	0.134	0.143	0.2385	0.0037	0.128	0.0037
1.00318	0.0393	0.0397	0.040369	0.05871	0.111458	0.045	0.036	0.087	0.131	-0.053	0.3882	0.025	0.3882
0.00075	1.0167	0.0166	0.016495	0.0141	0.011679	0.016	0.017	0.011	0.011	0.0307	0.0003	0.076	0.0003
0.00304	0.0735	1.0727	0.072299	0.05732	0.046261	0.068	0.077	0.034	0.041	0.0702	0.0011	0.038	0.0011
0.0016	0.0272	0.027	1.026856	0.02202	0.017869	0.025	0.028	0.015	0.016	0.0268	0.0006	0.014	0.0006
0.00044	0.0075	0.0074	0.007488	1.0073	0.006898	0.008	0.007	0.007	0.007	0.7964	0.0002	0.005	0.0002
0.00121	0.022	0.0219	0.021988	0.0207	1.019071	0.022	0.022	0.019	0.018	0.031	0.0004	0.027	0.0004
0.01579	0.5919	0.4783	0.721001	0.46332	0.325173	1.221	0.221	0.209	0.188	0.5004	0.0068	0.216	0.0068
0.0295	0.9822	1.0514	0.853181	0.65888	0.367004	0.353	1.353	0.308	0.306	0.7773	0.0106	0.492	0.0106
0.01983	0.2035	0.2445	0.202433	0.49401	0.217472	0.198	0.207	1.161	0.152	0.4948	0.0073	0.184	0.0073
0.01944	0.2047	0.2034	0.202485	0.28826	0.905775	0.194	0.211	0.133	1.13	0.304	0.0071	0.124	0.0071
8.8E-05	0.0016	0.0016	0.001599	0.00129	0.001049	0.002	0.002	8E-04	9E-04	1.0016	3E-05	9E-04	3E-05
0.00682	0.0823	0.0826	0.085318	0.12504	0.244834	0.097	0.074	0.141	0.289	-0.18	1.0026	0.052	1.0026
0.00092	0.0147	0.0148	0.01453	0.01196	0.009705	0.014	0.015	0.008	0.009	0.2116	0.0003	1.008	0.0003
-7.2E-05	-0.0017	-0.002	-0.00169	-0.00158	-0.00123	-0.002	-0.002	-0.002	0	-0.312	-3E-05	-9E-04	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.00903	0.2194	0.2185	0.217341	0.19164	0.154378	0.209	0.225	0.161	0.139	0.2287	0.0033	0.119	0.0033
1.0043	1.208	1.2039	1.201051	1.11946	1.079603	1.174	1.228	0.984	1.059	1.1278	1.0016	1.079	1.0016

Source: Parikh (1993)

largest total output multipliers are, respectively, for livestock, dry agriculture and wet agriculture (2.71-2.8), with next services, trade and dairy (2.6-2.67). In general, the SAM matrix in Boriya is sparse; all production activities have weak linkages with each other except within the agricultural sector. Intra-village trade is an isolated sector with very weak linkages. Outside salaries do not contribute much to intra-village output (the production multiplier of outside salaries is just 1.2 compared to that of agriculture which is 2.5.) On the other hand, the total income multiplier (total effect on the combined incomes of the four household groups) is much higher when the injection consists of salaries (mainly from outside the village) than for any of the other production activities. Salaries generate a total income multiplier of 1.52, followed by village nonagricultural production (1.49) and services (1.40). In contrast, agricultural activities display significantly lower total income multipliers of between 1.0 and 1.2. Reasons as to why non-agricultural activities generate less total output effects but more total income effects are presented shortly.

The salaries earned by unskilled laborers from Boriya in the nearby margarine factory have the same impact on the village economy as an injection of income through remittances from household members who have migrated to other parts of the country or abroad. However, an important difference is that the commuting laborers from Boriya continue to reside in their own homes and engage in an intersectoral rather than interregional migration pattern. This type of intersectoral migration pattern in the rural areas between traditional agriculture (from where commuting members of small farmers' households originate) and the informal sector (the sector of origin of most landless), on the one hand, and the rural formal industrial sector, on the other hand, has been one of the most successful features of the historical equitable growth path followed by countries such as Taiwan and South Korea. In particular, this pattern has been highly successful in attracting young females (often teenage) workers from small farms' households to work in nearby factories producing a range of commodities starting with textile and leather products and climaxing today in such sophisticated items as electronics and computer chips. This commuting pattern has some advantages compared to seasonal or permanent migration as is brought out in Chapter IV.

Aurepalle, compared to Boriya, has strong linkages among production activities. SPA shows that the linkages of trade and (non-agricultural) village production are strong with other activities mainly through the income and consumption linkages. Most of the consumption expenditures go towards "other food" and "non-food" items. Thus, the activities which are the most connected with these items--trade and village production--are strongly related

with all other accounts through these items. The magnitude of the total output multipliers for household industries' production, services and dairies is almost the same as for agriculture. There may be some tradeoffs between those activities that generate the greatest total output effects and those contributing to poverty alleviation. Provision of non-farm work for casual laborers or agricultural development of the whole region would potentially improve the incomes of the landless considerably. This is reflected by the fact that, as in Boriya, salaries generate the highest total income multiplier (1.9), followed by "agricultural services" and other services (both around 1.8). The impact of these non-agricultural activities on total incomes is, as in Boriya, much higher than that of agricultural production activities (between 1.33 and 1.56). The main difference between the two villages is that outside salaries constitute a much higher proportion of total household incomes in Boriya (46%) than in Aurepalle (9%).

We can now return to the question as to why total income multipliers for the non-farm activities are higher compared to those generated by agricultural activities and, vice versa, why agricultural activities generate larger total output effects than non-agricultural activities in these two Indian villages. The explanation is relatively simple and confirmed by SPA analysis (not shown here but available from the author upon request). In both villages, the proportion of value added to gross output tends to be surprisingly low for most agricultural activities. In fact, the small farmers suffered a net income loss in 1989/90. In other words, the total costs of the inputs was greater than the value of the output in that year so that net value added (i.e. returns to the imputed value of family farm labor plus imputed value of land rent) was actually negative. Although 1989 may have been an unusually unfavorable year weather-wise, it still remains true that in an average year, imputed returns to family labor and to rent on own farm land tends to be a small proportion of gross output. In contrast, a number of services such as barbers' services use very little intermediate inputs so that the bulk of the earnings from these services goes as income to the barbers directly. Unlike agriculture, where the production process requires many inputs, the services and the household industries sectors require few inputs. To repeat, the major part of the income goes to the owners of the service or the household industry which account for the higher observed income multipliers in these sectors compared to agriculture.

Conversely, the production multipliers are higher for agriculture compared to the non-agricultural sectors, as agriculture depends on many other sectors for its inputs in contrast with non-agricultural sectors. In turn, when the source of income for the poor household groups originates with

artisonal and service activities as opposed to agriculture, it generates significant consumption as opposed to production linkages. A final note of warning, the above findings may well be specific to the conditions existing in these two villages and might only be generalizable to similar villages.

In a detailed benefit/cost analysis based on the SAM of the comparative impact of irrigation vs. industrialization on total output and the conditions of the poor in Boriya, Parikh (1993) concludes that the establishment of a factory nearby the village would achieve both objectives better than irrigation. In a further comparison between an integrated rural development program (IRDP) and industrialization, she concludes that an IRDP scheme, giving self employment to the poor, can be an even better way to bring about rural development. At this stage two questions should be raised: 1) if the establishment of a factory nearby is so desirable, why did this process not take place in Aurepalle in contrast with Boriya? The most obvious reason is the location of Aurepalle. First, Aurepalle is a bit more interior than Boriya; it is 10 kilometers away from a state highway, whereas Boriya is just one kilometer away from such a highway. Secondly, reaching Aurepalle is a problem. The access road is not paved and no factory can be established without access to a proper road. Parikh (1993) argues that Aurepalle fulfills all the other conditions for successful rural industrialization such as proximity to a large market in a city nearby except for the access road. Thus, it would appear that a strong case can be made for the government providing the necessary physical infrastructure necessary to connect Aurepalle to the highway.

An apparent reason why this project was not undertaken is directly related to the Indian government policies regarding industrial development. The Indian program of industrial development consists of, first, emphasizing industrialization in large urban centers to be followed, next, by rural industrial decentralization. In the state of Andhra Pradesh (where Aurepalle is located) this second phase has not yet begun, in contrast with the state of Gujarat (where Boriya is located) where the industrialization process began earlier and has already reached the second phase. This is perhaps a good example of the dangers of an overly centralized and bureaucratic system. Under a more decentralized and flexible system, a project such as building an access road required for the location of a factory nearby a place such as Aurepalle might have occurred.

Before describing briefly the specific IRDP scheme suggested for Boriya, a general outline of IRDP as it operated in India seems indicated. Giving out buffaloes has been the most popular component of the program. This has led to complaints that rural artisans have not received adequate attention. Hence,

Trysem (Training Rural Youth for Self Employment) was launched and became an integral part of the IRDP. Under this scheme the BLOCK Development Officer sends off the names of perspective trainees to the district industries' center. After the training, the beneficiaries are expected to pursue self employment while receiving some assistance under the program. A common complaint is that much corruption takes place in preparing this list; in some cases the nominees lack the proper basic skills required to pursue the training courses or are well off and do not need the training in the first place. Even the artisans who succeed often face problems, in particular those of marketing their products or services. This happens because many times the training is given without considering the potential effective demand side. However, it would appear that through appropriate institutional improvements, better planning and less corruption, IRDP schemes can be quite successful in generating output and alleviating poverty. In Boriya the tailor who got his training within this scheme is earning about six times the average income of the poorest landless household group.

In Aurepalle the IRDP scheme that is underway and was evaluated so favorably by Parikh (1993) consisted of providing weavers with hand looms. The evidence suggests that these weavers after the training course can earn much more from selling their products than they could before. Hence, to conclude, an appropriate IRDP scheme tailored to the conditions existing in a given village can be highly successful in contributing to both the output and poverty alleviation objectives.

2. A Village SAM for Kanzara (India)

Subramanian and Sadoulet (1990) built a SAM of a rather representative Indian village. As the authors point out, "The search for solutions to the problem of rural poverty requires both a better understanding of its dynamics and of the effectiveness and limitations of anti-poverty programs that focus on creating employment and production assets for the poor." (p. 131) The village SAM is used to simulate the impact of weather-induced fluctuations in production and of the process of investment and accumulation in the village in order to reveal the most vulnerable group in need of compensatory programs. One interesting distinction made in the SAM is between hired female labor and hired male labor, and between family female labor and family male labor. This allows the investigators to say something about the impact of different programs on gender employment and indirectly on their incomes.

The simulations show the effects on the village economy of a fall in agricultural output of 10%. Weather fluctuations that affect the crops early in the production cycle will, in fact, result in similar relative declines in

incomes for the landless as for farm operators. However, since women's share of wage income from village agriculture is larger than men's, a fall in output that is confined to the village affects women's wage income more than men's. A well designed government employment program can be an effective response to a poor harvest and succeed in stabilizing the incomes of the landless and small farmers during such a shortfall in production. "Rather than being excluded, women are encouraged to participate, and by paying men and women equal wages, (unlike in agriculture), these programs provide women with increased income" (p. 164).

In another simulation (relying on constrained SAM multipliers), irrigation is shown to have a higher multiplier effect on the village economy than transfers. However, private investment in wells is undertaken mostly by large farmers and as long as there is a credit constraint, irrigated agriculture may not be accessible to small farmers who are sealed off the organized credit market. Investment in dairy cattle is shown to be an even more profitable alternative than irrigation, but it leads to greater inequality because the landless households' share in this form of investment is small. Again this shows the possible tradeoff between total output effects and poverty alleviation.

In another paper by Subramanian (1993) using the same SAM as above to look at production and distribution in a dry land village economy, the main conclusion that is reached is that "the predominance of agriculture in this village and region suggests that agricultural development remains indispensable to growth. Since value added per acre and labor absorption per acre are almost twice as high in irrigated as in dry land agriculture, investment in irrigation can make an important contribution to growth. But the extension of irrigation is limited by the scarcity of surface and ground water resources in the region. The importance of wage labor as a chief source of income for the landless and small and medium farmers suggests that employment programs can effectively stabilize the incomes of the poor in this region of unstable agriculture" (p.19).

3. District SAM for Kenya

Lewis and Thorbecke (1992) built a district SAM for the Kutus town, located in Kirinyaga District of Central Province in Kenya. The region in question is defined by a market center and its hinterland. A set of income and employment multipliers derived from the SAM is used for the analysis of certain aspects of regional economic development in Kutus. Five different types of households are identified, i.e. rural non-farm, small farm, large farm, lower education town, and high education town. The two poorest

household groups on a per capita basis are the "low education town" and the small farm households as indicated in Table 13. Two sets of multipliers are derived under two different assumptions regarding the existence of excess capacity in regional production. Fixed price multipliers are calculated assuming all production activities to be operating with excess capacity (i.e. supply is perfectly elastic). Alternatively, so-called mixed (i.e. constrained) multipliers are computed on the assumption that some sectors are functioning under conditions of excess capacity while others are operating at the limits of their capacity (i.e. supply is perfectly inelastic). Limited supply response, in the agricultural sectors especially, is believed by many to be the major constraint to stimulating regional growth and development.

The main findings are as follows: agricultural activities (livestock, coffee and foodcrops) perform best in terms of their contribution to total value added (1.10-1.24 for the mixed multipliers)--as shown in Table 14. However, the farm based non-farm activities (FBNF, consisting of beer brewing, basket making, masonry, carpentry, blacksmithing, painting, tailoring, retailing, etc.) is not far behind with a mixed multiplier value of 1.05. Small farmers (one of the two poorest groups) benefit mostly, as one would expect, from agricultural activities, i.e. livestock (1.93, coffee 1.69 and foodcrops 1.68). However, they also benefit very significantly from FBNF (1.53). On the other hand, the low education town "household" benefit mostly from coffee (1.86), and FBNF (1.76), followed by livestock, coffee and services (1.51-1.66).

The multiplier analysis also reveals, in Table 15, that it is the non-farm activities that have the greatest impact on regional hired labor (wage labor). Service sector production is the most important stimulant to wage employment (.18), followed by the farm based non-farm (.15), and manufactured sectors (.11), respectively. The fact that the service sector performs best in terms of generating wage employment contradicts, in this instance, the argument of some analysts that it is the manufacturing sector that holds the most promise for generating wage employment. Lewis and Thorbecke (1992) mention that

> "Local officials in Kutus consider many service sector activities in the region to be nothing more than a regulatory nuisance and eyesore, offering little opportunity for the generation of income and employment. Even more surprising perhaps is the performance of the farm based non-farm sector in generating employment. That sector's role in economic development is usually thought to be limited to providing small amounts of additional income to those households who experience a lack of success in farming for one reason or another." (p. 891)

This is clearly a misperception concerning the potential role of the rural informal sector in generating employment and income. At the same time, after

Table 13. *Distribution of household and per capita income, Kutus Region, 1987 (000 KSh)*

Household type	No. of households	% of total	Total population	% of total	Total income	% of total	Per household income	Per capita income
Rural nonfarm	671	10.19%	3,576	7.61%	23,005	8.23%	34.285	6.433
Small farm	1,789	27.18%	11,862	25.24%	54,479	19.50%	30.452	4.593
Large farm	2,828	42.97%	26,782	56.99%	162,155	58.04%	57.339	6.055
Low education town	423	6.43%	1,990	4.23%	8,977	3.21%	21.222	4.511
High education town	871	13.23%	2,785	5.93%	30,782	11.02%	35.341	11.053
Total	6,582	100.00%	46,995	100.00%	279,398	100.00%	—	—
Average	—	—	—	—	—	—	42.449	5.945

Source: Lewis-Thorbecke (1992)

Table 14. *Value-added multipliers for Kutus region production activities*

Production activities	Fixed price multipliers (FPM)	Mixed multipliers (MM)	MM/FPM	Mixed multipliers ranking
Livestock	1.460	1.241*	0.850	1
Coffee	1.443	1.124*	0.779	2
Foodcrops	1.429	1.103*	0.772	3
Coffee Processing	1.263	0.070	0.055	9
FBNF†	1.258	1.045	0.831	4
Services	1.070	0.901	0.842	5
Manufacture	0.844	0.694	0.822	6
Transport	0.584	0.465	0.796	7
Retail	0.584	0.395	0.676	8

*Denotes that the multiplier is supply driven. That is, the multiplier gives the amount by which value added would increase given a 1.00 KSh increase in supply of the commodity listed at the left. All other multipliers are demand driven. See text for further explanation.
†Farm-based nonfarm.

Source: Lewis-Thorbecke (1992)

Table 15. *Hired Labor Multipliers for Kutus Region production activities*

Production activities	Fixed price multipliers (FPM)	Mixed multipliers (MM)	MM/FPM	Mixed multipliers ranking
Services	0.194	0.182	0.938	1
FBNF*	0.166	0.151	0.910	2
Manufacture	0.120	0.109	0.908	3
Foodcrops	0.107	0.084†	0.785	4
Coffee	0.107	0.084†	0.785	5
Coffee Processing	0.102	0.014	0.137	6
Livestock	0.099	0.083†	0.838	4
Transport	0.065	0.056	0.862	
Retail	0.054	0.040	0.741	

*Farm-based nonfarm.
†Denotes that the multiplier is supply driven. That is, the multiplier gives the amount by which the wage bill would increase given a 1.00 KSh increase in supply of the commodity listed at the left. All other multipliers are demand driven. See text for further explanation.

Source: Lewis-Thorbecke (1992)

a country has reached a certain stage of development rural industrialization in the formal sector increasingly becomes a needed alternative employment funnel for the rapidly disappearing informal industrial and service-oriented activities. This issue is further discussed in the policy Chapter IV.

Another finding is that "high education town" households benefit relatively more and small farmers and low education town households (the two poorest household groups) benefit relatively less from every and all types of production activities in the region. This demonstrates that the distribution of income is exceedingly difficult to change through stimulating increases in sectoral output alone. However, it suggests that over time a high payoff to education may prevail.

4. A Mexican Village SAM

Adelman, Taylor and Vogel (1989) constructed a village SAM for a representative village in Central Mexico. The SAM is classified in such a way that it distinguishes three types of factors, (family labor, hired labor and capital); and, three types of households groups, (the landless, the small land holders and the large land holders). The novelty of the SAM is that it specifies and highlights the remittances from migrants (i.e. family members of the village households working either in the rest of Mexico or the United States) to their relatives within the three village household groups. Table 16 gives the average per capita household incomes of the three household groups and the composition of household incomes. The key importance of remittances--particularly for the poorest landless group is brought out in the table. The major findings of interest for poverty analysis are the following. First, the analysis of the SAM shows that the image of the village as a more or less isolated and self-contained economic entity is clearly wrong. Trade between the village and the outside world, as well as migration represent large components of the village economy, altering significantly consumption and investment possibilities and the income distribution. (p. 19) As the authors point out "Closed linkages with labor markets outside the village represent the critical, yet often neglected aspect of rural out migration in less developed countries." (p. 9)

Secondly, the village input-output table contained in the SAM shows that production linkages within the village economy are weak. This sparseness of the I-O matrix and lack of a variety of economic activities in the village undoubtedly reflect the high opportunity cost of labor owing to the existence of attractive migration opportunities to the rest of the Mexico and the U.S. (p. 8) An interesting observation is that even though the input-output linkages are minimal and the village economy is very open, SAM linkages within

TABLE 16

AVERAGE PER CAPITA INCOME AND COMPOSITION OF HOUSEHOLD INCOMES

Household Group	Average Per Capita Household Income	Composition of Household Incomes						
			Labour		Mexican Migrants			
		Capital	Family	Hired	Uneducated	Educated	Mexico to U.S.	Total
	pesos	per cent						
Landless	20,008	9.7	16.7	12.1	0.0	31.1	30.4	100.0
Small Landholder	35,225	19.3	44.2	1.9	7.3	7.1	20.2	100.0
Large Landholder	32,173	40.6	31.6	0.4	0.3	10.7	16.4	100.0

Source: Adelman, Taylor, Vogel (1987)

the village are substantial. They arise primarily through the income-expenditure side of the village economy. This highlights an important parallel between the previously discussed case of Boriya and the present Mexican village. Both have limited intersectoral linkages within their respective villages and large linkages with activities outside the village. While the external source of the income injection into these villages differs (salaries received by factory workers as opposed to remittances) the impact is similar. In the first it is an intersectoral commuting flow of labor while in the latter it is either a seasonal or permanent interregional migration.

Thirdly, the tendency to assume that ranking households by land holding size is equivalent to ranking them by extent of poverty may require revision, at least for villages in which migration is significant. Households with middle-sized holdings, which require less labor for agricultural purposes can afford to allocate a larger share of household labor to migration than do large land holders. As a result, migration receipts may lift their incomes above those of large land holders (p. 19).

Fourth, migration can be a significant anti-poverty policy. The landless whose average per capita income including migration remittances, just covers their subsistence needs, would literally starve in this particular village if all migration possibilities were cut off. Their average per capita incomes would fall to about 39% of their subsistence needs. (p. 19) The bulk of landless households' income comes from labor migration; 31% is from internal migrant remittances (i.e. from relatives working elsewhere in Mexico) and 30% is from remittances from Mexican workers in the United States. (p. 11) In a more general context, the relationship between migration--in its various forms--and poverty alleviation is a complex one. This issue is discussed in Chapter IV.

Fifth, nearly 40% of village remittance income comes from educated migrants within Mexico, indicating the cumulative importance of past investments in education. Moreover, more than one third of household savings are allocated to educating the children of the village. (p. 20) Human capital formation was a major form of investment in this village. This finding, together with high returns-to-schooling in Mexico reinforce Schultz' argument that the poor invest in education to escape the poverty trap and are rational in doing so. Investment in education is bound to be a high priority in peasant households in which limited access to land, technology and productivity-enhancing infrastructure limits the returns to other types of investment.

One of the policy experiments that was run on the village SAM simulated government income transfers to each of the three categories of village

households. The simulation revealed that transfers to the landless have both the best equity and the best growth-inducing potential. However, what is not discussed is the form which these transfers should take. An obvious alternative would be to improve the physical infrastructure around the village and consider fiscal incentives to encourage factories--relying on unskilled labor--to locate in such areas.

5. Other Studies of Farm-Non-Farm Linkages and Their Impact on Poverty

P. Hazell and S. Haggblade and associates have studied in some detail, in different parts of the developing world, the linkages between farm and non-farm activities and their impact on poverty alleviation. (Hazell and Haggblade, 1989; Haggblade, Hazell and Brown, 1989) In the process they have reviewed a very large number of empirical studies of these linkages and their work can be considered a good synthesis of the experience of poor developing countries. Hazell and Haggblade (1989) argue convincingly that

> "the fate of the poor is intimately linked to agriculture in most developing countries. The majority of the poor are located in rural areas, and they depend on agriculture for their incomes--either directly in the case of farmers and agricultural workers, or indirectly in the case of self-employed persons and workers engaged in agro-processing, trade, service, and other non-farm activities that cater largely to rural demands. The urban poor also depend on agriculture as a source of affordable food." (p. 1)

Haggblade et al (1989) note that

> "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 poverty considerations argue persuasively for such a focus. In addition, many believe that a small farmer's strategy will generate maximum growth rates, Asia-style, through linkage multipliers with a rural economy." (p. 1174)

Although, they assign a key role to agriculture, it will become clear in the discussion which follows that without complementary emphasis on rural non-agricultural activities and gradual decentralized industrialization the development process could be short-circuited. They proceed to review and measure, in great detail, the power of agricultural growth linkages in Africa and compare them with the Asian growth linkages. They consider as "rural" any locality that exists primarily to service an agricultural hinterland. Consequently, rural areas may include towns of substantial size, perhaps as large as several hundred thousand. "Non-farm activities" include all economic activities other than crop and livestock production, encompassing services, construction, mining, commerce and manufacturing. It also includes agro-industrial activities which store, process and market agricultural commodities.

Africa's rural inhabitants typically derive 25-30% of their income from non-farm sources. That proportion is likely to be higher in Asia where the rural economy appears to support about double the non-farm employment activity found in most of Africa (per thousand population). Some activities, such as female-dominated food preparation do appear consistently to enhance interhousehold income equality. (p. 1177) Non-farm enterprises tend to be very small, more often than not one-person enterprises. Women account for a substantial proportion of both management and employment in African rural non-farm enterprises. (p. 1179)

During the structural transformation, activities such as transport, financial services and metal working are among the first to split off from the farm household, while weaving and tailoring, resource extraction and construction remain integrated longer. (p. 1180) As economies become integrated, rural non-farm enterprises must face competition from the outside. Manufacturers, especially those producing easily transportable items, face the stiffest competition. Yet, rural services remain insulated since, by their nature, they are difficult to move across base. (p. 1180) As the process of socioeconomic development continues among non-farm activities, commercial and service employment increases most rapidly with size of locality. Different studies concluded that over the recent past, total rural employment has been growing more rapidly than agricultural employment in all regions of the world, including Africa. Studies of Sierra Leone and Rwanda suggest that repair services and food processing have grown most rapidly, both overall and in small and medium sized rural towns, while manufacturing in general appear to have declined in the smallest localities. Tailoring and welding have held constant and they along with carpentry have grown very rapidly in the medium-sized towns.

Among the determinants of growth in the rural non-farm economy the following were identified: 1) development of rural towns; 2) level of infrastructure; 3) agricultural income per capita; and 4) population density.

As a prerequisite for estimating the magnitude of agricultural growth multipliers, as well as an aide in gaining a fuller understanding of the nature of farm-non-farm linkages, available evidence on the strength of intersectoral linkages in rural Africa was examined. Five different linkages were identified a) capital flows, b) labor flows, c) production linkages, d) forward linkages from agriculture to processors and distributors, and e) consumption links. With regard to capital flows, there is a great deal of evidence indicating that the outflow of capital from agriculture is larger than the reverse flow from non-farm activity to agriculture. With regard to labor flows, non-farm labor usage moves contra-cyclically to demands of the

agricultural calendar, resulting in substantial seasonal labor flows between the rural farm and non-farm sectors. It is estimated that 20-40% of the rural labor force works in both farm and non-farm activities (p. 1185)

Production linkages are typically backward linkages; some rural enterprises supply inputs required by farmers. In general these linkages in Africa appear to be weaker than those measured in Asia. In Asia, the most important backward linkages are fertilizer, followed by equipment, then cement and building materials. Most African countries cannot aspire to viable fertilizer production and topography and hydrology severely limit irrigation potential, thereby reducing the demand for pumps and irrigation equipment, cement and building materials. Forward linkages are much more important than backward linkages in Africa (at least double in Kenya and over 15 times as great in Zambia). Food processing achieves most prominence. After food processing, distribution of agricultural products generates the second largest of the forward linkages from agriculture.

Consumption links increase with per capita farm incomes. The demand for local services, housing, durables, livestock and horticultural products typically increases more rapidly than does the demand for food grains. "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." (p. 1187) African spending patterns support far less rural non-farm activities than do those in Asia.

Hazell derives a model that estimates the increase in regional value added that would occur if, through development of new technology or investment in agriculture it were possible to relax the supply constraint limiting output of major agricultural tradeables. Given a 1-unit increase in value added from the region's major tradable agricultural output, the model estimates the resulting total increase in regional value added. (p. 1189) In both a study of the Muda River Region of Malaysia as well as the North Arcot Region of South India agricultural growth multipliers of 1.83 were computed, indicating that one dollar increase in value added from tradable agricultural output would result in an additional $0.82 increase in regional income. In contrast, similar multipliers computed for Africa give a range from 1.27 to 1.5, placing the African growth multipliers at about 60% of those estimated in Asia. Consumption linkages account for about 80% of total agricultural growth multipliers in Africa while in Asia, the relative importance of consumption linkages appears much smaller--i.e. of the order of 50-60%.

Hazell and Haggblade (1989) look at technical progress in agriculture and its impact on rural poverty. They show that indirect gains from

agricultural growth in terms of non-farm linkages generated by technical change in agriculture can accentuate both the growth and poverty reducing impact of agricultural growth. On the demand side, agriculture exerts a preponderant influence since non-farm enterprises depend primarily on farm inputs and consumption demand of agricultural households. Driven largely by agricultural earnings, rural income levels determine the extent of consumer diversification into non-foods. (p. 9) On the supply side agriculture influences primarily the labor market; wages and agriculture set the opportunity cost of labor directed to non-farm activities. Secondly, the composition of agricultural output furnishes raw materials which rural producers can transport, transform or market. Characteristics of the agricultural sector, however, do not unilaterally govern the size, composition and evolution of the non-farm economy. Non-agricultural factors such as the policy environment, infrastructure, human capital, castes, tradition and the availability of non-agricultural raw materials operate primarily on the supply side and influence the nature of rural non-farm activities.

In a different formulation of the income multiplier based on Indian district level data, they reach the following conclusions: 1) on average, a 100 rupee increase in agricultural income will generate about additional 63 rupees in rural non-farm income, 38 rupees going to rural areas and 25 to rural towns; 2) except for irrigation, all of the ancillary factors--infrastructure, population density and per capita agricultural income--have a positive impact on the agricultural growth multiplier. For example, a 10% increase in road density will increase the aggregate rural areas plus rural town multiplier by 2.2% (p. 14).

The non-farm economy is very important to the rural poor. Non-farm activities occupy an important place in rural economies throughout the developing world, particularly in Asia and Latin America. While non-farm enterprises account for only 14% of full-time employment in rural Africa, their share jumps to 26% in Asia and 28% in Latin America, respectively. The rural non-farm economy plays a key although variable equity-enhancing role across countries. Landless and near-landless households everywhere depend on non-farm earnings; those with less than half a hectare typically earn over half their income from non-farm sources. (p. 7) In particular, manufacturing and services activities requiring little investment, such as food preparation and processing, weaving, pottery, domestic and personal services, typically account for a greater share of income for the rural poor than for the wealthy. In contrast, wealthy households earn more from transport, commerce and manufacturing activities such as milling and metal fabrication that require sizeable levels of investment. The seasonality of

non-farm earnings run counter-cyclically to agricultural incomes--so they dampen seasonal income fluctuations. Women, relatively more active than males, in non-farm activities in Africa and Latin America, dominate many of the equity enhancing non-farm activities such as food processing, beverage preparation, weaving, gathering, selling of prepared snack foods and personal services.

The lessons from the body of evidence summarized above need to be put in their proper perspective. While recognizing the fundamental role of traditional agriculture in triggering the growth required to create the backward and forward linkages for a take-off and sustainable development of rural industrial and service activities, the latter need to be actively encouraged and designed. The pattern and sequence of small scale rural and later large scale industrialization must be carefully planned so that it meshes closely with the pattern of agricultural growth into a balanced development process. In this context a comparative study of the structure and performance of rural industries across different states in India (Papola, 1987) came to the following conclusions. First, in those states in India, which have experienced rapid agricultural growth, the rural industrial structure has also undergone some change. This is primarily through the addition of certain new industries such as a) those processing agricultural produce where transportation to distant urban areas may pose a problem (e.g. cane crushing units); b) a large number of units serving the requirements of new technology have come up, particularly repair of machinery, tools and implements; and c) blacksmithing. Secondly, although a close relationship between agricultural growth and performance of rural industries across states was observed in terms of the similarity of rank order of the states in respect to these two variables, Papola (1987) argues that the

> "differential performances of rural industries among states and regions does not seem to arise so much from differences in the composition of industries as from certain specific characteristics of the region, so that the same industry has significantly different performance in different states. This is where the relationship between agricultural development and the rural industrial sector appears meaningful...The relationship however is direct in terms of input-supplying and output-using linkages only to a limited extent. Mostly the relationships seems to be rather indirect, through rise in income levels, purchasing power and also to some extent investible surplus generated by agricultural growth giving a general fillip to existing industries and partly leading to emergence of new and dynamic ones." (p. 104)

Technological possibilities, infrastructure facilities and links with urban areas accompanying agricultural development also seem to be contributing to better performance of rural industries in agriculturally better developed states.

Thirdly, Papola (1987), after examining the link between agricultural development and rural industrialization across different states in India concludes that "the hypothesis that agricultural growth by itself leads to industrialization of rural areas both in terms of diversification and improved performance thus seems only partially validated in the India case". (p. 105) He points out that independent efforts at technology upgrading, diversification of industries in rural areas, provision of and access to credit, infrastructure and marketing facilities are all very crucial elements.

E. OECD-SAM and Computable General Equilibrium Model of Indonesia and Other Countries to Explore Impact of Stabilization and Structural Adjustment on Growth and Equity

Since 1980, in response to balance of payments and budgetary crises, a large number of developing countries had to implement drastic stabilization and structural adjustment (SSA) programs to reduce external and internal imbalances. The impact of these SSA programs on the poor has been and continues to be a matter of debate. This raises two questions: 1) to what extent was an observed worsening in the standard of living of the poor during the SSA period, in a number of countries, the result of pre-crisis disequilibria or SSA measures? In order to answer this question, the analyst has to compare what happened during the adjustment period with a counterfactual case where the government opts not to stabilize the economy and past trends continued; 2) are there certain packages of SSA policies that can alleviate somewhat the negative effects of an unavoidable adjustment process on the poor?

To answer these questions, the OECD Development Center launched a research program on "adjustment with growth and equity". A two-pronged approach was used: case studies were prepared in order to reveal the diversity of adjustment experiences, and model-based counterfactual analysis was used to examine whether socially a less costly program could have been designed. Six country case studies were prepared for respectively, Indonesia, Malaysia, Chile, Ecuador, C te d'Ivoire, and Morocco. All of these studies except Chile relied on Computable General Equilibrium (CGE) and macroeconometric models to evaluate the impact of the package of SSA measures actually implemented, as well as a number of counterfactual policy scenarios.

As explained in Chapter II, the SAM framework that is used to derive multipliers presumes fixed and constant technological and behavioral coefficients. The structure and behavior of the socioeconomic system are assumed to remain as they were in the base-year SAM. Therefore, any

multiplier analysis based on a SAM is essentially static, in nature, and, strictly speaking, only valid in the short-run. When the structure of the economy and the behavior of the agents are changing, a more dynamic analytical tool such as CGE models is more appropriate. CGE models can be viewed as a dynamic extension of a SAM. They are built, and often calibrated, upon the initial conditions given by a base-year SAM while containing a whole set of dynamic relationships linking various macroeconomic and sectoral variables within a comprehensive and consistent general equilibrium system.

The CGE approach, by construction, focuses on macroeconomic, sectoral and intersectoral phenomena, and the resulting income distribution by household group. It is thus a particularly appropriate tool, especially when it includes a financial sector, to analyze the impact of alternative stabilization and adjustment policy measures and shocks originating abroad. It stresses the indirect approach to poverty reduction, "namely processes that tend to occur through growth, via employment creation and the level of wages, or via increased value added in the sectors of economic activity where the poor are important producers" (deJanvry and Sadoulet, 1992, pp. 20-21).

In their synthesis volume reviewing the experience of the six countries during adjustment, Bourguignon and Morrisson (1992) showed not so surprisingly, that the impact of adjustment policies on equity depends on the initial conditions as well as on the nature of the adjustment program. Certain generalizations, however, can be made to minimize the negative impact of adjustment on poverty. Employment and income trends moved differently in urban than in rural areas. The situation tended to improve in the latter, first, because the impact of a devaluation--the key SSA measure--was favorable to agriculture by raising the prices of tradeables and thereby producer prices received by farmers and, secondly, because labor supply grew more slowly in rural areas than in cities. In five of the six countries, trends in agricultural incomes and employment were favorable during adjustment. Only incomes of small peasants in Ecuador were observed to fall during the adjustment period. Those peasants lacking land were forced to rely on their income from work in the non-agricultural sector and suffered from the recession in that sector.

In contrast, in the urban areas, a slowdown in aggregate demand combined with the rapid growth in labor supply (typically 4-5% a year) led to a sudden rise in unemployment and a swelling of the informal sector. As its active population grows, informal production goes up but since aggregate demand is stagnant, the adjustment process occurs through lower prices and, consequently, lower incomes for those working in the informal sector. Real wage trends in the modern sector tended to fall following the SSA process

except in the two countries that adjusted early on (before the crisis), i.e. Indonesia and Malaysia.

The comparative country studies show that distributional conflicts can arise during adjustment. Since the poor constitute a very heterogeneous group including mostly small farmers, the rural landless and the urban low education and unskilled group, the composition of the sources of income differs sharply across these different groups. In a crisis period, followed by an adjustment process that brings about structural and sectoral changes in the economy, these different socioeconomic groups fare quite differently (deJanvry and Sadoulet, 1992).

It is therefore not surprising that specific SSA measures affect these poor groups in very different ways. A devaluation of the exchange rate, as was already mentioned, has a very asymmetric impact. It favors the tradeables' sector over the nontradeables, and since agriculture accounts typically for a much larger share of the total output of tradeables than urban informal and formal production, the rural population--and particularly the rural poor--clearly benefits from a devaluation in contrast with the urban population. However in those countries where an incipient manufactured export sector exists, a devaluation can stimulate exports and create new employment opportunities after a few years. This happened in Indonesia as is discussed subsequently.

Many fiscal policies, likewise, are more likely to have a more negative impact on the urban poor than on the rural poor. Curtailment of current expenditures on health and education (such as cuts in food subsidies) and wages and salaries affect the net incomes (including imputed benefits from public services and transfers) of the urban poor more unfavorably than the net incomes of the rural poor. First, a disproportionate share of these benefits normally accrues to the urban population so they are more affected by retrenchment in these programs. Secondly, reduction in food subsidies has a much greater impact on food consumption in the urban areas where food prices, already pushed upward by the devaluation, rise even further. Small farmers who rely on own farm production for a part of their food consumption are better insulated and, in fact, as long as they are net producers of food stand to gain on a net basis from higher prices. On the other hand, if budget retrenchment takes the form of a decline in government investment, particularly infrastructure and public work projects, then both the rural landless and the urban poor and, to a somewhat lesser extent the small farmers, will suffer. Such projects require much unskilled labor that is typically supplied by these groups (this was illustrated in case study III.A.1 with respect to Indonesia).

Monetary policies tend to be relatively distributionally neutral in their impact. However, to the extent that the intensive use of monetary instruments is effective in controlling capital flights and reducing the foreign deficit, it reduces the required exchange rate adjustment. Thus, while rural areas are still relatively less affected than the urban population, compared to the pre-crisis situation, rural households lose in a relative sense when adjustment relies extensively on monetary instruments as a partial substitute for a devaluation (deJanvry and Sadoulet, 1992).

The different effects of SSA policy measures on the welfare of the various groups of poor leads to a near insoluble conflict. It is practically impossible to design a SSA package of measures that will impact equally and symmetrically on the rural and urban poor. The comparative studies revealed clearly these distributional conflicts during the adjustment period. To alleviate somewhat these conflicts and the hardships adjustment can bring to a specific group of poor, a key recommendation is that timely foreign assistance can play an important role in making adjustment packages that are desirable on economic grounds more politically feasible and palatable (Bourguignon, de Melo, and Morrisson, 1991).

Notwithstanding some of the rather robust findings (discussed above) that appears to hold true across a wide sample of adjusting countries, Bourguignon, de Melo and Morrisson (1991) warn that

> "Sharply different distributional outcomes can occur with identical adjustment packages when institutional characteristics differ widely. Sharply different distributional outcomes can also emerge as a result of changes in the mix between current and capital expenditure cuts. This diversity suggests the needs for careful package design--passe partout adjustment programs will not do. Tailoring adjustment programs to take into account the economic and political environment is essential for equity and for the sustainability of the program itself." (p. 1505)

We can now turn to a more specific examination of the Indonesia case study undertaken within the auspices of the above OECD program. Keuning and Thorbecke (1992) built a SAM for Indonesia that, among others, disaggregated government expenditures into 13 different categories. This SAM was used to explore the impact of the actual budget retrenchment program between 1983 and 1987 on income distribution. It was found that the actual pattern of expenditures cut was quite selective and shielded, in a relative sense, current expenditures on education and health. The government adjustment program also cut expenditures on large capital intensive projects significantly more than on labor intensive regional projects (INPRES) in areas such as rural infrastructure and irrigation, marketing and storage facilities and rural electrification. These regionally decentralized projects--discussed in some detail in case study III.A.1--relied on unskilled labor largely

supplied by the rural non-agricultural households , the agricultural employees' households and small farmers. These groups provide the bulk of the unskilled and manual labor required in the construction phase of investment projects, and they later enjoy the fruits of increased productivity. Comparing the actual pattern of government expenditures by categories with some counterfactual scenarios, it comes out clearly that these same poor household groups as well as the urban poor benefitted, again in a relative sense, from the shielding of expenditures on health and education by the government.

The most remarkable achievement of the adjustment program in Indonesia was the apparent reduction in poverty and undernutrition. A comparison of the poverty picture in 1984 and in 1987 shows a continuation of the poverty alleviation process. The fact that the government sheltered, in a relative sense, current expenditures on health and education helped to sustain a poverty alleviation trend going back to the early 1970s. However, some major structural intersectoral changes were occurring in Indonesia in the eighties--quite independently of the SSA program. These developments are extremely interesting and relevant in the context of the present study and need to be briefly reviewed. First, the intensification of paddy production through multiple cropping and use of high yielding variety, and greater mechanization of a number of tasks led to a substantial reduction in labor requirements per hectare. A detailed study of recent economic and social trends, with special emphasis on income and employment in 13 villages in lowland, rural, Central and East Java, provides strong supporting evidence for the presumption that the total labor requirements to produce the annual rice crops were falling. Comparing the results of a re-survey of these villages in 1987, with previous surveys undertaken in 1971 and 1980, the authors find that "rice production would not absorb more farm laborers and the number of persons employed in cultivation and post-harvest processing, at least in the major rice producing areas of Java, can be expected to continue to decrease". (Collier, Utama and Wiradi, 1988) Additionally real wages for farm laborers were found to have steadily increased in all 13 of the villages studied. On the other hand, off-farm employment in village enterprises and trading activities in the re-surveyed villages had greatly expanded in the last 5-10 years, together with the daily migration for employment in nearby towns and seasonal or more permanent migration to the more distant cities of Jakarta and Surabaya. A common characteristic of these migrants is that they tend to be young and better educated, typically possessing the equivalent of primary school education. Factory employment is a typical outlet for daily migrants residing in villages within 10-20 km of an industrial center, while many of the

seasonal migrants end up in informal service activities in big cities or as construction workers. (See Thorbecke, 1992, for a further discussion of these trends.)

The Indonesian CGE model (Thorbecke, 1992) also shows that the two devaluations in 1983 and 1987 probably also benefitted rural households more than urban households because agricultural exports constituted a larger share of total exports than did manufactured exports at the beginning of the adjustment period. At the same time the favorable effect of the devaluations on consumer goods and manufactured goods tradeables led to a tripling of the value of manufactured exports and yielded significant positive employment effects. Beginning in the mid-1980s for the first time manufactured exports induced more employment than any other export sector. (Azis, 1989) The employment generating capacity of these two sectors is very strong. The increase in textile exports (in real terms) increased 5 times as fast between 1980-85 than between 1975-80. Azis (1989) calculated that exports of textiles and wood products created approximately 4.6 million jobs spreading through various activities in the economy. There is no doubt that the various adjustment measures (devaluations, trade and financial liberalization, and removing the restrictions on foreign capital inflows) discussed previously played a leading role in the observed very rapid expansion of labor intensive manufactured exports. In the Indonesia case, as had been the case previously with Taiwan and South Korea, the textile industry and such manufactured exports as sporting goods, cassette tapes and toys, contribute to urban and rural poverty alleviation to the extent that many firms are located along the highway running from East Java to West Java. A whole network of feeder roads from rural areas are connected with this highway and allow the productive employment absorption of commuting workers from landless and small farmers' households.

IV. MAJOR FINDINGS FROM CASE STUDIES AND POLICY IMPLICATIONS

The preceding case studies and other related evidence have brought out a number of findings relating to structural and intersectoral determinants of poverty--and more particularly rural poverty. The most important of these findings, focusing more specifically on the role of rural nonfarm activities and industrialization, are discussed next together with the policy implications they suggest. The evidence, mainly based on the case studies in Chapter III, is grouped according to broad topics for the convenience of analysts and policy makers. Since the evidence and its following discussions are based on the case studies, they are, of course, not comprehensive. A more comprehensive and general discussion of related issues--not directly based on the specific case studies explored in Chapter III--is provided in Annex I. Many of the issues and findings brought out by the case studies are highly interrelated and apply at different levels of aggregation from the more macro domain to the more micro domain. These features may help in the formulation of an appropriate and effective anti-poverty strategy. Many of the case studies' findings and policy recommendations flowing from them are fairly general and robust--remaining valid across different settings. Others, on the other hand, depend on specific sets of initial conditions.

A. Structural Adjustment

When the stabilization and structural adjustment (SSA) policies succeed in restoring internal (i.e. budget) equilibrium and external (balance of payments) equilibrium, the macroeconomic framework can provide an enabling environment for a renewed process of growth with equity. It was seen in the comparative country studies that distributional conflicts can arise during adjustment. Specific SSA measures affect the various groups of poor households in very different ways. A devaluation favors the tradable goods sector over the nontradeables and, since agriculture accounts typically for a greater share of the total output of tradeables than urban informal and formal production, the rural population--among which the small farmers and landless--clearly benefits from a devaluation in contrast with the urban population. Likewise, many fiscal instruments such as cuts in current expenditures on health and education (for instance reduction or elimination of food subsidies) affect the net incomes (including imputed benefits from public services and transfers) of the urban poor more unfavorably than the net incomes of the rural poor.

The higher relative domestic prices of tradeables following a

devaluation encourage agricultural output. However, the ultimate impact depends on the extent of supply responsiveness. In most East Asian, Southeast Asian and South Asian countries, the supply response to higher prices is positive, varying from slight to fairly significant. In contrast, in parts of Africa, particularly SubSaharan Africa, supply response is extremely inelastic because it does not benefit, as do these other regions, from a whole set of other complementary elements conducive to an increase in output such as an adequate physical infrastructure and road network, irrigation, a competitive and efficient marketing network for both inputs and products, and a favorable policy and legal environment. In those countries, "getting the prices right" is a necessary but hardly a sufficient condition for stimulating agricultural output.

In general, it was seen in III.E that in five of the six countries (two in Latin America, two in Africa, and two in Southeast Asia) trends in agricultural incomes and employment were favorable during adjustment. In turn, the growth in agricultural output stimulated a derived demand for nonagricultural commodities mainly through forward SAM linkages and consumption linkages of the various socioeconomic household groups employed in agriculture. This provided the impetus for the growth of agro-processing and transportation activities. Although the direct effects of SSA on the rural informal sector are likely to be unfavorable, to the extent that it relies largely on nontradeable and service type activities, this sector could still benefit indirectly from a rise in demand for its products generated by higher agricultural incomes. There is some evidence that such a process occurred in Indonesia where it was found that off-farm employment in village enterprises and trading activities had greatly expanded in the eighties. Another impact of structural adjustment is that it removes many of the incentives enjoyed previously by larger firms producing import substitutes under heavy protection. The removal of this protection can open up new opportunities for emerging small and medium size enterprises that are not burdened by embedded inefficient capital intensive technologies and inefficient management. This brings up a final issue related to the impact of the SSA process on the choice of technology.

B. Technology

The evidence illustrated by the case of Indonesia (III.A.3) reflects a pervasive issue in development. It was seen that when alternative technologies are available in the production of given goods and services, the traditional technology tended to generate greater aggregate output and

employment effects than its corresponding modern counterpart. This is largely caused by the greater direct and indirect employment linkages generated by the traditional technologies. Since traditional (labor intensive) technologies rely extensively on unskilled labor which is the main asset of the poorest rural and urban household groups, those are the groups that benefit most income-wise from traditional technologies.

In some instances, the more modern vintage technology is not appropriate given the underlying resource endowment and may have been adopted because of the prevalence of distorted prices influenced by policy (i.e. minimum wage legislation and other social charges raising the price of labor above its equilibrium level; and, in contrast, subsidies on interest rates, special fiscal incentives reducing the price of capital below the value of its marginal product). An additional distortion encouraging the adoption of inappropriate capital intensive techniques is an overvalued exchange rate allowing the imports of machinery and capital equipment from abroad at artificially low prices. The removal of the above distortions, when they exist, which is part and parcel of a SSA package, is a very effective way of combining the efficiency and equity objectives. By providing employment opportunities, particularly for the unskilled, the incomes of the poorest socioeconomic groups in both the rural and urban areas are favorably affected. Undue mechanization and tractorization in agriculture, or adoption of large scale modern processing mills in the presence of distorted factor prices are examples of undesirable and inappropriate choices of techniques.

In other instances, the modern technique is more efficient (in terms of total factor productivity) than its traditional counterpart.[5] For tradable goods, competition in world markets calls for an efficient state of technology, typically designed and originating in the industrial world and hence capital intensive and labor saving. The range of choice among competitive and commercially viable techniques becomes quite restrictive and the elasticity of substitution between capital and labor very limited. Under these circumstances, it may no longer be possible to identify an appropriate technology such that the marginal rate of substitution of capital for labor is equal to the reciprocal of its wage/rental ratio, that is, no tangency point exists between isoquants and the price lines and at best a corner solution is obtained. In such instances, a tradeoff may exist between output and efficiency objectives, on the one hand, and employment and poverty alleviation objectives on the other.

Static and dynamic consequences should be distinguished. Whereas in a narrow static sense, export industries may not create much employment on a net basis, there are at least three indirect and dynamic effects of technology

transfer: 1) increasing exports contribute to economic growth; 2) indirectly, through economic growth and the multiplier effects of various intersectoral linkages, all kinds of ancillary production activities such as food production (a highly labor intensive sector) are encouraged; and 3) the transfer of technology leads to a significant accumulation of human capital through a process of learning by doing and learning by looking. Engineers, skilled workers, and sometimes even unskilled workers, acquire new knowledge and a general process of skill upgrading is underway. In fact, technology transfer is at the heart of the new endogenous growth theory which is very much in vogue among theoretical economists.

C. Poverty Groups

The poorest socioeconomic household groups (i.e. the landless agricultural employees, the rural nonfarm employees, the small farmers, and the urban poor) in each of the case studies are those household groups whose main, if not exclusive, endowment consists of their own unskilled labor. Typically, those households possess very limited education (i.e. are deprived of human capital), no land or only marginal or small landholdings, and no physical or financial capital assets. Hence, their endowment and portfolio of assets is extremely restricted.

The rural landless and urban poor rely mainly, if not exclusively, on wage labor as a source of income. The rural landless households typically earn approximately half of their incomes working as hired laborers in agriculture and the other half from nonfarm sources. In the case studies, they benefited from trade activities, land transportation, personal services, and industries such as textiles, and food processing. The urban poor receive the bulk of their income from being engaged in informal traditional activities in the unorganized sector. Small farmers enjoy somewhat more diversified sources of income. In the case studies, they benefited from non-agricultural activities such as food processing, restaurants and land transportation, and from food crops production, livestock production, fishery and non-food crops. They can apply their family labor to work on their own farm and receive imputed labor income therefrom and imputed rent income reflecting the productivity of their own parcel. In addition, some small farmers' family labor can take wage employment opportunities working for other farmers, or in rural nonagricultural activities.

In general, the case studies reveal that the landless benefit relatively much less from output increases in almost any production activity than do other socioeconomic groups. Typically, the values of the income multipliers

accruing to this group from different production activities were quite low. In Indonesia, they tended to benefit most from government investment (e.g. public work projects and irrigation schemes) in agriculture, food crop production and fisheries. Also in Indonesia, the group consisting of rural nonagricultural low income households benefited mostly from mainly informal nonfarm activities (trade, land transportation, and personal services), all activities relying extensively on unskilled labor. In an indirect way this group benefited also, to some extent, from increases in the output of food crops through the trade and transportation services connected with moving food crops through marketing channels to rural and urban markets.

The case studies of Indonesia, Gambia, among others, revealed that urban poor households benefit mostly from informal activities such as land transportation, informal trade, informal restaurants, textile production, personal services, and finance. Interestingly, a part of the income accruing to urban poor is indirectly generated from an increase in the output of agricultural activities via the trade and transportation margins and services performed by unskilled workers coming from urban poor households. In Gambia, as in many other developing countries, urban-rural transfers take place. For instance, an increase in largely urban informal or formal trade output raises the incomes of the urban nonpoor as well as urban poor, who then transfer or remit a share of their incremental income to the rural poor. In Gambia, formal trade activities and public services also yield relatively high income multipliers for the urban poor.

D. Linkages between Agriculture, Industry and Services

The most important conclusion reached on the basis of a detailed quantitative examination of the intersectoral linkages prevailing in the various case studies at the country, region, village or town level, is that the growth of rural industrial and service activities is intrinsically related to the growth of the agricultural sector. These close linkages can be observed in the relatively large multipliers from agriculture to rural industrial and service activities. For example, in the Indonesia case, multipliers from agriculture to transportation, trade and restaurant were much higher than others, and in the Gambia case, multipliers from agriculture to domestic informal trade dominated other multipliers.

While recognizing the critical role of traditional agriculture in triggering the growth process required to create the backward and forward linkages for a takeoff and sustainable development of rural industrial and service activities, this does not mean at all that the latter should be a

passive partner in the development process. Rather than having agriculture as the active partner and rural services and industry as the dependent passive partner, both sectors need to play active roles as coequal partners consistent with the structural, technological and behavioral relations that bind these sectors together. These relations are first, on the production side, the backward and forward linkages that, at an early phase of development, tend to originate mainly from agriculture, and the consumption linkages that create an effective demand for nonagricultural commodities and services. In the case studies of Indonesia and Gambia, it was shown that agriculture is most important to the rural poor, and services are most important to the urban poor, while the direct effects of industrial output on those two groups is relatively small. It was shown also that the weak poverty alleviation effects of industry are due to the fact that poor groups hardly participate in the production of industrial goods because of their lack of skills. If the poor are to benefit from industrialization, policy makers should provide appropriate education or vocational training opportunities to the poor, which will enable them to participate in the production process. At a somewhat later phase of development, the whole system can be moved by appropriate measures originating outside of agriculture. The pattern and sequence of small scale rural, and, later, large scale industrialization must be carefully planned so that it meshes closely with the pattern of agricultural growth into a balanced development process.

In many parts of the developing world, agriculture is still a crucial source of national and regional growth. At the national level, the key role of agriculture in development is illustrated by Mexico (III.C). The SAM for Mexico shows strong rural to urban linkages as well as agriculture to non-agriculture linkages. During an early phase of economic development, backward linkages from agriculture tend to be weak. The intermediate demand for such inputs as fertilizer, equipment and cement is much weaker in Africa than it is in Asia. In the case studies, the ratio of intermediate demand to output was higher in the Indonesian SAM (crops and livestock: 0.32-0.48) than in the Gambia SAM (crops and livestock: 0.11-0.13). In any case, forward linkages are much more important. Such activities as food processing and distribution of agricultural products in Africa tend to be 2 to 15 times larger than backward linkages. Likewise, in Asia and Latin America forward linkages dominate significantly backward linkages. The importance of production linkages is that, if the technology is appropriate, they provide employment and income opportunities to the rural poor, particularly the small farmers and to a lesser extent the landless.

Furthermore, consumption linkages resulting from increased employment

and incomes in agriculture rise sharply as a function of per capita incomes. The demand for local services, housing, a whole variety of consumer goods, and durable goods increases much faster than the demand for foodgrains. The Asian experience suggests that production of many of these commodities and services is labor intensive. Hence, rural employment in the non-foodgrains sector is strongly positively influenced by rises in per capita farm incomes. This relationship is somewhat less strong in Africa. Some of the consumption linkages affect urban, industrial and service production (e.g. for consumer goods) and benefit indirectly the urban poor. It has been calculated that consumer linkages account for about 80% of total agricultural growth multipliers in Africa, while in Asia they account for 50-60% of total growth.

Different attempts, using somewhat different techniques, have been made to estimate the order of magnitude of the impact of an increase in the value added of tradable agricultural output on the total regional value added. For both Malaysia and parts of India, multipliers of the order of 1.8 were found; in contrast, the corresponding multipliers in most of Africa were significantly lower ranging between 1.3 and 1.5.

E. Rural Nonfarm Activities

It was found in a number of the case studies that, whereas agricultural activities tend to generate larger total output effects than non-agricultural activities, the latter tend to generate larger total income multipliers as compared to those generated by agricultural activities. This observation provides, of course, a crucial rationale for rural industry and services playing an active role in the development process.

Rural nonfarm activities are crucial to poverty alleviation. It was observed that rural nonfarm activities have large income multipliers on the rural poor, especially on the rural employees, because they have little land or skill to participate in other production activities. In the Indonesia case, land transportation, trade and personal services were most beneficial to the rural non-agricultural low income group, and their multipliers were a little higher than those of agriculture. In the Gambia case, the rural poor group (which consisted of rural farmers and rural non-agriculture employees) benefited not only from agriculture but also from non-agricultural activities, such as trade activities. In the Mexico case, it was observed that rural non-farm activities were more effective than similar activities in urban areas in alleviating poverty. Also, nonfarm activities appear to have the greatest impact on hired (wage) labor (see Kenya case study, III.D.3 as well as a number of other studies).

While nonfarm enterprises account for only 14% of total employment in rural Africa, their share jumps to 26% in Asia and 28% in Latin America. Africa's rural inhabitants derive typically between 25 and 30% of their incomes from nonfarm sources. Thus, generally speaking, even though agricultural activities tend to have the largest value added multiplier impact on the regional economies, they tend to have lower income multipliers for workers relying on wage labor. There is also evidence that the service sector and informal production activities may do better in terms of generating wage employment in the rural and, often urban areas, as the evidence from Kenya, Indonesia, and other studies reveals.

Nonfarm enterprises are typically very small (many of them consist of only one person) and informal. During the structural transformation that goes, hand in hand, with socioeconomic development, activities such as transportation, financial services and metal working are among the first to split off from farm households, while weaving and tailoring, resource extraction, and construction remain integrated longer within the household or the small farm community. As economic development proceeds, rural nonfarm enterprises face more competition from outside. In particular, village manufacturers face the stiffest competition (as the example of Boriya discussed in III.D.1, reveals). Rural services remain insulated longer within the village. As the structural transformation continues, total rural employment in nonfarm activities grows much faster than agricultural employment.

F. Interregional Interdependence and Linkages

The analysis of a variety of village and district SAM demonstrated that the view of the village as a more or less isolated and self contained economic entity is clearly erroneous. Indian villages (such as Boriya) engage in substantial external transactions importing most of their consumer goods and many services from outside the village. Also, employment opportunities outside the village for village residents and outmigration can be extremely important sources of incomes to village dwellers. The example of Boriya revealed the impact that a factory outside of a village can have on the generation of income and income distribution within the village; while the Mexican village SAM demonstrated the major impact that outmigration can have on remittances back to the village and their subsequent effects on income distribution and particularly on poverty alleviation. The salaries earned by the unskilled laborers from Boriya in the nearby margarine factory (III.D.1) and by the landless and small farmers in Central and East Java working in the

informal and formal rural sectors (III.A.2) have the same impact on the village economy as an injection of income through remittances from household members who have migrated to other parts of the country or abroad, as in the example of the Mexican village studied previously (III.D.4). However, an important difference is that the commuting laborers in the prior cases continue to reside in their own homes and engage in an intersectoral rather than interregional migration pattern. One important advantage from a societal standpoint of this pattern, compared to seasonal or permanent migration, is that it reduces urban congestion and spares resources that would otherwise have had to be provided for housing and a variety of urban infrastructural facilities. At the same time, this circular commuting intersectoral migration provides new skills to the rural residents.

An important issue in the design of a strategy combining growth with poverty alleviation relates to the strength and direction of interregional linkages. In most developing countries, the tendency is to concentrate public and private investment projects around central areas (typically the capital city or major agglomerations). The two-region SAM distinguishing between the Center (Java) and the Outer Islands (III.A.2) generated some interesting findings. Comparing, first, the intra-regional multipliers of the Center vs. the Outer Islands region, it turns out that the intra-regional multipliers in the Center region tend to be larger than the corresponding ones within the Outer Islands region. This means that an injection of investment (for instance a large project) undertaken in the Center region would have greater direct and indirect total output and income effects within the Center region than a similar project would have within the Outer region. The Outer region, on the other hand, shows stronger interregional multipliers than does the Center region. The implication of this is that a project undertaken in the Outer region would trigger greater output and employment effects in the Center region than vice versa. However, when the total multipliers (intra plus interregional multipliers) are computed it turns out that they tend to be larger when the origin of the injection is in the Outer region than when it is in the Center region. This suggests that a project undertaken in the Outer region would have greater total impact in terms of income and employment on the whole economy of Indonesia than a corresponding project undertaken in the Center region.

The policy implications of these observations are potentially very important, particularly if these findings can be confirmed on the basis of more sectoral and micro evidence. It suggests that when conditions are favorable in terms of supply response in the periphery, both output and poverty alleviation objectives can be served simultaneously through

appropriate projects being implemented in the periphery.

G. Government Intervention

Some of the case studies of village SAMs explored the impact of various intervention schemes on village output and poverty alleviation such as investment in dairy cattle, irrigation, rural industrial decentralization (e.g. the establishment of a factory close to the village) and various integrated rural development schemes. Benefit cost calculations of these different alternatives tended to indicate that appropriately designed rural industries and IRDP schemes can be most effective. In the Indian context (based on detailed studies of three villages) investment in dairy cattle and in irrigation tended to have high benefit cost ratios but at the cost of even greater inequality. The landless have no access to credit or land and hence cannot purchase cattle, and small farmers are, typically, sealed off the organized credit market and may not be able to buy pumps and other equipment complementary with irrigation. In the Indonesia case, where government investment and expenditures are specified in more detail, it was observed that small farmers and rural non-agricultural low income groups benefit from government investments on agriculture, energy, and trade, and government expenditures on education and health.

Improving the physical infrastructure in rural areas can help unclog the transportation and marketing channels within rural areas and between the latter and cities. Micro projects such as a 10Kl. paved road from the village of Aurepalle to a site close to the main highway would remove the main bottleneck to the establishment of a factory that, in turn, could provide jobs and salaries to the unskilled villages. An incidental yet important additional advantage of a well designed public works projects (such as the building of a rural road) can be an effective response to the seasonality of output and incomes in agricultural activities. In the Kanzara of India case, it was noted that a well designed government employment program can be an effective response to a poor harvest and succeed in stabilizing the incomes of the landless and small farmers during such a shortfall in production. One significant feature of such government programs is that they can be operated, not only in a countercyclical way with the agricultural calendar, but also to counteract poor harvest or drought--absorbing productively the seasonally underemployed and the wage and small farm family labor available during the drought.

H. Migration, Education, and Women

Migration can contribute to alleviation of poverty. It was shown that in the Mexican village SAM the average per capita income of the landless would fall to 39% of their subsistence level if migration possibilities were cut off. In the same Mexican case, 31% of landless households' income comes from internal migrant remittances and 30% is from remittances from Mexican workers in the United States.

Education is the most fundamental way of affecting income distribution and reducing poverty. The various case studies brought out cogently that the rural poor are endowed with very little, or no land and possess practically no education. Adding to their stock of knowledge and skills is the best way in the long run to raise their productivity.

In the Mexican village SAM case, 40% of remittance income came from educated migrants within Mexico. Human capital formation was a major form of investment in that village. A key recommendation in Gambia was that literacy improvement is required to provide functional education and skills to the poor who are typically illiterate. In Aurepalle, under the IRDP program, the design of the training courses was flawed in two respects: 1) trainees were not properly selected and 2) many times the content of the training courses was inconsistent with the potential effective market demand side. Conversely, when these vocational training courses were well designed, they proved to be quite successful in contributing to greater output and poverty alleviation. It was also observed that education at the village level prepares the various categories of migrants (commuting, seasonal and permanent) better in obtaining jobs outside the village and coping with the outside world. In many settings, the salaries earned by commuting or seasonal migrants and the remittances provided by permanent migrants make a major contribution to poverty alleviation at the village level.

Given their extremely limited endowment, the provision of additional human capital to the poor households may be, in the medium to long term, the most effective measure to achieve a more equitable income distribution and reduce absolute poverty by opening up new employment opportunities for the poor. In turn, the impact of education on labor productivity contributes significantly to poverty alleviation.

Some findings are related to the status of women and the scope for productive employment of women in rural settings. It was seen that women represent a significant proportion of both management and employment in African and Asian rural nonfarm enterprises. In many parts of the developing world women are more active than men in equity-enhancing activities, such as

food processing, beverage preparation, weaving, gathering and selling of prepared food snacks and personal services. Some activities are dominated by women such as food preparation. Another relevant finding relating to women's wage income derived from agricultural production (see case study on Kanzara, III.D.2) is that fluctuations in agricultural output may have disproportionate effects on their incomes. Since women's share of wage income from village agriculture is larger than men's, a fall in output affects women more unfavorably than it affects men. This observation would appear to be applicable to similar settings in Asia and Africa where women are known to be more involved in agricultural activities than men.

Endnotes

*The author would like to gratefully acknowledge the excellent research assistance of Rimjhim Mehra and Hong-Sang Jung. In addition, he benefited from Alka Parikh's computer assistance and discussions with her relating to the intersectoral linkages of the two Indian villages for which she built Social Accounting Matrices.

1. Agricultural production in Bangladesh increased at about the rate of 3% in the 1960s, but about 1.1% since then.

2. For a comprehensive and non-technical discussion of the SAM, see Pyatt and Thorbecke (1975). The present section relies on that source.

3. It can be noticed by looking at that diagram that paths 1, 3 and 4 all use the same first arc from handpounded rice to farm food crops. In interpreting the diagram, it should also be noted that next to the origin of each arc the corresponding marginal expenditure propensity (c_{ji}) is specifically indicated. Likewise, the product of two or more consecutive arcs along any elementary path (i.e., the direct influence) is also given at the end of each relevant arc. Thus, for example, path 1 in Figure 8, Case Ia, shows that the marginal expenditure propensity from handpounded rice to farm food crops amounted to .783. (For a more detailed and technical discussion of this and other cases, see Khan-Thorbecke, 1989, that provides the basis for the present discussion.)

4. The present description of the economic structure of Gambia relies extensively on Dorosh and Lundberg (1993) and Jabara (1990).

5. The discussion which follows is based on Thorbecke (1993).

REFERENCES

Adelman, I. (1984) "Beyond Export-Led Growth", World Development 12(9):937-49.

Adelman, I., J.E. Taylor and S. Vogel (1987) "Life in a Mexican Village: A SAM Perspective," paper prepared for International Symposium on The Social Accounting Matrix (SAM) Methods and Applications, June 1987, Naples, Italy.

Adelman, I. and J.E. Taylor (1990) "Is Structural Adjustment with a Human Face Possible? The Case of Mexico," The Journal of Development Studies, 26(3):387-407.

Akinboade, O.A. (1992) "The Social Accounting Matrix for the Gambia and Strategy for Poverty Alleviation," United Nations Development Programme, The Gambia, mimeo.

Azis, I.J. (1989) 'Export Performance and the Employment Effect", paper presented at the conference on the Future of Asia Pacific Economies, November 8-10, 1989, mimeo, Bangkok, Thailand.

Azis, I.J. (1992a) A Comparative Evaluation of the Regional Development Experience in Indonesia, Jakarta: Inter-University Center, Department of Economics, University of Indonesia, Research Report No. IUC-1.

Azis, I.J. (1992b) "Regional Balance and the National Development Strategy", Chapter 2 in S. Sediono and K. Igusa (Eds.), Regional Development and Industrialization of Indonesia, Regional Economic Balance and Industrialization at Local Level, Institute of Developing Economies, Tokyo.

Azis, I.J. (1992c) "Interregional Allocation of Resources: The Case of Indonesia", Papers in Regional Sciences, 71(4):393-404.

Bourguignon, F., J. de Melo, and C. Morrisson (1991) "Poverty and Income Distribution During Adjustment: Issues and Evidence from the OECD Project", World Development 19(11):1485-1508.

Bourguignon, F. and C. Morrisson (1992) Adjustment and Equity in Developing Countries, A New Approach, Development Centre of the Organisation for Economic Cooperation and an Development, Paris.

Collier, W.L., P.T. Indeco Duta Utama and I.I.G. Wiradi (1988) "Employment trends in lowland Javanese villages", April.

Cornelisse, P.A. and E. Thorbecke (1991) "Markets and Transactions in Developing Countries," Institute for Policy Reform, Working Paper.

Defourny, J. and E. Thorbecke (1984) "Structural Path Analysis and Multiplier decomposition within a Social Accounting Matrix Framework," The Economic Journal 94:111-136.

deJanvry, A. and E. Sadoulet (1992) "Poverty Alleviation, Income Redistribution, and Growth During Adjustment", paper presented at the Brookings Institution and Inter-American Dialogue's Conference on "Poverty and Inequality in Latin America", Washington, DC, July 16-17.

Dorosh, P.A. and M.K.A. Lundberg (1993) "Aid Flows and Policy Reform: A General Equilibrium Analysis of Adjustment and the Impact on Their Poor in the Gambia", Cornell Food and Nutrition Policy Program, Washington, DC, February, mimeo.

Haggblade, S., P. Hazell and J. Brown (1989) "Farm-Nonfarm Linkages in Rural Sub-Saharan African", World Development 17(8):1173-1201.

Hazell, P. and S. Haggblade (1989) "Technical Progress in Agriculture and Rural Poverty", paper prepared for the IFPRI-World Bank Conference on Poverty Research, Airlie House, Virginia, October 25-28.

Hidayat, T. (1991) The Construction of a Two-Region Social Accounting Matrix for Indonesia and Its Application to Some Equity Issues, PhD Thesis, Department of Economics, Cornell University.

Islam, R. (1987) Rural Industrialization and Employment in Asia, International Labor Office, Asian Employment Program, Bangkok.

Jabara, C.L. (forthcoming) "Structural Adjustment in a Small Open Economy: The Case of the Gambia", in D.E. Sahn (Ed.) Economic Crises and Reform in Africa, Ithaca: Cornell University Press.

Jabara, C.L., M.K.A. Lundberg and A.S. Jallow (1992) "A Social Accounting Matrix for The Gambia," Cornell Food and Nutrition Policy Program, Working Paper 20.

Jazairy, I., N. Alamgir and T. Panuccio (1992) The State of World Rural Poverty: An Inquiry into Its Causes and Consequences, International Fund for Agricultural Development (IFAD), Published for IFAD by New York University Press.

Keuning, S. and E. Thorbecke (1992) "The Social Accounting Matrix and Adjustment Policies: The Impact of Budget Retrenchment on Income Distribution", Chapter 3 in E. Thorbecke and Associates, Adjustment and Equity in Indonesia, Development Centre of the Organization for Economic Cooperation and Development, Paris.

Khan, H.A. and E. Thorbecke (1988) Macroeconomic Effects and Diffusion of Alternative Technologies within a Social Accounting Matrix Framework, The Case of Indonesia, Gower, a study prepared for the International Labour Office within the framework of the World Employment Programme, Aldershot, England and Brookfield, Vermont, USA.

Khan, H.A. and E. Thorbecke (1989) "Macroeconomic Effects of Technology Choice: Multiplier and Structural Path Analysis Within a SAM Framework," Journal of Policy Modeling 11(1):131-156.

Lewis, B.D. and E. Thorbecke (1992) "District-Level Economic Linkages in Kenya: Evidence Based on a Small Regional Social Accounting Matrix", World Development 20(6):881-897.

Papola, T.S. (1987) "Rural Industrialization and Agricultural Growth: A Case Study on India," in: Islam, R. (Ed.), Rural Industrialization and Employment in Asia, ILO/ARTEP, New Delhi.

Parikh, A. (1993) The Impact of Decentralization of Industries on Rural Development, Cornell University, PhD dissertation.

Santiago, C.E. and E. Thorbecke (1988) "A Multisectoral Framework for the Analysis of Labor Mobility and Development in LDCs: An Application to Postwar Puerto Rico," Economic Development and Cultural Change, 37(1):127-148.

Subramanian, S. (1993) "Production and Distribution in a Dry-Land Village Economy", Department of Agricultural and Resource Economics, UC Berkeley; and Indira Gandhi Institute of Development Research, Bombay, mimeo.

Subramanian, S. and E. Sadoulet (1990) "The Transmission of Production Fluctuations and Technical Change in a Village Economy: A Social Accounting Matrix Approach", Economic Development and Cultural Change, 39(1):131-173.

Thorbecke, E. (1988) "The Impact of Stabilization and Structural Adjustment Measures and Reforms on Agriculture and Equity," in: Berg, E., Ed. Policy Reform & Equity: Extending the Benefits of Development, San Francisco: Institute for Contemporary Studies.

Thorbecke, E. (1993) "Development and Poverty Alleviation through Employment: The Key Issues in the Coming Years and the Role of the International Labor Office," paper presented to ILO staff, Geneva, Sept. 8.

Thorbecke, E. and Associates (1992) Adjustment and Equity in Indonesia, Development Centre of the Organisation for Economic Cooperation and Development, Paris.

Thorbecke, E. and T. Hidayat (1992) "An Analysis of Some Equity Issues in Indonesia within a Two-Region Social Accounting Matrix," Department of Economics, Cornell University, mimeo.

Thorbecke, E. and H.S. Jung, "A Specific Multiplier Decomposition Method to Analyze Poverty Alleviation," (1993, Department of Economics, Cornell University, mimeo).

United Nations Industrial Development Organization (1992) Industry in the Least Developed Countries Structure and Development, Vienna.

World Bank, World Development Report 1990, (1990) Poverty, Oxford University Press.

Annex I. Policies for Poverty Alleviation: A More General Discussion

The case studies in Chapter III were based on specific countries and time periods. The findings and policy implications that were derived from those case studies in Chapter IV were by necessity, somewhat selective and limited in scope. Therefore, it was felt desirable to broaden the policy discussion beyond these case studies by raising some more general policy issues relating to, respectively, the treatment of agriculture, rural nonagricultural activities, rural industrialization and technology and regional development.

A. Policies for Agriculture

We turn, first, to agriculture and ask what set of policies and institutions within this sector are most conducive to a balanced, equitable and sustainable growth path and, more specifically, to the creation of an enabling environment within which nonfarm activities and rural industrialization can bloom?

The main policy implication is that whereas during the process of socioeconomic development the agricultural sector, as a whole, has to provide a surplus for the rest of the economy to help capital formation and the growth of the incipient industrial and service sectors, this surplus at an early stage of development should not be squeezed out too quickly. There is much evidence, that those countries that turned the internal terms of trade too early and too strongly against agriculture in their price policies met with agricultural output stagnation. In contrast, such countries as Taiwan, South Korea, Indonesia, and Thailand were able to continue to provide resources to the agricultural sector, while extracting a surplus on a net basis out of a growing agricultural output. Price policies in agriculture need to be such as to not discourage farmers' incentives to increase output by adopting more efficient technologies (such as green revolution technologies) that tend to be scale neutral-relying extensively on labor as the major input. One common feature of the most successful developing countries is that they tended to follow a unimodal strategy within agriculture. A unimodal agricultural strategy, in contrast with a bimodal strategy, emphasizes the growth of small scale agriculture and tries to reduce if not eliminate the dualism between small scale subsistence agriculture producing domestic food crops, and large scale commercial farms and plantations often producing cash and export crops with mechanized technologies. A unimodal strategy is most successful where an initial land reform led to a relatively equal distribution of land. In any

case, through the simultaneous application of a package of policy measures such as the provision of credit, extension services, high yielding varieties, research efforts financed by the government, and the building of infrastructure projects in the rural areas, such as farm to market roads, the stage can be set for the take-off of small scale agriculture and the alleviation of rural poverty. In short, a dynamic agricultural sector can create, through its positive impact on agricultural output and the growing incomes of rural households, a strong and sustained effective demand for nonagricultural goods--particularly manufactured consumer goods--and thereby provide a major impetus to industrial production.

B. Policies for Nonagricultural Activities, Rural Industrialization and Technology

Labor productivity in rural industries is generally very low, particularly in those industries where the poor are employed. However, in some industries whose products and services are demanded by economically better off people, such as carpentry, tailoring, dairy products and goldsmithing, the level of productivity can be higher. The low productivity of cottage industries is related to a number of factors. First, seasonality or part time employment in cottage industries have negative consequences particularly for acquisition of skills and technology upgrading. Part time operation makes investment in skills training and more advanced equipment too costly. Secondly, the fact that cottage industries are viewed by those involved mainly as secondary activities lowers the requirements of profitability. This is because the opportunity costs of family labor, particularly female labor, is very low. In a number of industries, labor productivity is found to be lower than the wage rate in agriculture. Policies designed at promoting rural industrialization must keep in mind that cottage scale industries, that are presently only viable within the confines of the household, will have to be rather radically upgraded if they are to become truly income generating in the sense that earnings in this sector would at least become compatible with wages in the agricultural sector. (Islam, 1987)

A detailed study of rural industrialization in Asia (Islam, 1987) concluded that

> "rural industrialization....needs to be viewed not merely as an adjunct to agricultural growth, but as an independent element of the strategy for rural development, particularly for generating employment and income for the nonagricultural population. In that sense it has to be a part of the policy and strategy of industrialization in general, and location and diversification of industries in particular, and not merely a program of protection

and promotion of village and agriculture related activities". (p. 106)

If this sector is to fulfill its function as an active and coequal partner to agriculture in the development process, the following policy and institutional measures--many of them inferred from the case studies--appear indicated.

First, an adequate physical infrastructure network is essential as a bridge to the ultimate consumers in villages, towns and cities. The advantage of physical infrastructure facilities, in addition to helping to lubricate transactions between agriculture and nonagriculture and between rural and more urban areas, is that they also rely heavily on unskilled labor during their construction phase. For example, it was shown that in Indonesia, public works and public investment projects were crucial in providing employment opportunities to the landless and the rural nonagricultural poor. Public investment in physical infrastructure, such as a well designed farm to market road network and storage facilities, not only helps reduce marketing margins and induce a larger flow of goods from agriculture to rural and urban towns, but, as importantly, helps lubricate the flow of mainly consumer goods from rural towns and urban agglomerations to the hinterland.

An incidental yet important additional advantage of a well designed public works projects (such as the building of a rural road) can be an effective response to the seasonality of output and incomes in agricultural activities. One significant feature of such government programs is that they can be operated, not only in a countercyclical way with the agricultural calendar, but also to counteract poor harvest or drought--absorbing productively the seasonally underemployed and the wage and small farm family labor available during the drought.

Secondly, education is the most fundamental way of affecting income distribution and reducing poverty. The various case studies brought out cogently that the rural poor are endowed with very little, or no land and possess practically no education. Adding to their stock of knowledge and skills is the best way in the long run to raise their productivity. (Refer to Chapter III.D, and Chapter IV.H).

Thirdly, there is increasing evidence that availability of, and accessibility to (industrial) consumer goods such as radios, bicycles, clothing and leather products provide a strong incentive to small subsistence farmers to increase production on their own farms, and vice versa, that the lack or shortage of such goods constitutes a serious obstacle to the generation of a larger marketed surplus and often leads traditional farmers to revert back to subsistence production (i.e. self-sufficiency).

Fourthly, marketing channels need to be made more competitive,

efficient and equitable. A key issue related to marketing is to insure, as much as possible, that the produced rural nonagricultural goods and services face an adequate effective demand. This problem is compounded by the observed historical tendency towards the de-industrialization of the countryside in the process of economic development. This tendency has to be first altered and, subsequently reversed, if rural industrialization is to be successful. This requires that, in the short to medium term, existing rural industrial activities not be wiped out through urban industrial competition and that, in the medium to long term, the rural industrial sector moves into items which have a high income elasticity of demand and which involve more advanced technologies. A key problem is that of quality control. As cottage industries' enterprises gradually convert to upgrading their technologies (see next point) and produce for a larger market, quality control is essential to remain competitive in the domestic market and, of course, a sine qua non for penetrating foreign markets.

During this transition period when informal enterprises slowly evolve into more formal ones (say, from family enterprises relying exclusively on family labor to partnerships and incorporated forms of organization relying increasingly on hired wage labor) it is particularly important that the various levels of local governments not discriminate against the informal sector through a variety of regulations such as licensing, zoning ordinances, and imposition of social charges on employers.

Likewise marketing problems are inevitable in the transition phase. The fact that cottage industries tend to be small and dispersed means that owners have no financial means to engage in independent marketing activities. They have to rely on a network of intermediaries. Often these intermediaries manage to capture much of the surplus, leaving very little for the producers. This makes the system both inefficient and inequitable. The system needs to be made more competitive, particularly by bringing the producers in closer contact with their final consumers. Cooperative organizations among small producers can, under certain circumstances, improve their bargaining power.

Fifth, the growth of cottage industries and informal enterprises depends on technology and skill upgrading, in addition to design improvements and product diversification to bring about a better match between supply and demand. At the same time, it should be kept in mind that technology upgrading may also increase capital intensity and reduce labor absorptive capacity. Emphasis should therefore be given to upgrading activities that can be profitable using labor intensive technologies. In this connection, attention should also be devoted towards the development of new indigenous technologies that are relatively labor intensive.

The availability of a technological shelf and its dissemination at the village and small town level by industrial extension agent could be very helpful in guiding an appropriate choice of techniques and technological upgrading. More generally, the transfer of (labor intensive) technology across developing countries is likely to prove more appropriate, given the similarity in their factor endowments, than a north-south transfer. Organizations such as the UN bodies, and in particular UNIDO, could help in the identification of efficient labor intensive technologies in different countries and then facilitating the transfer of such technologies to countries where similar conditions prevail. A shelf of technologies--clustered by industries, commodities and level of development--could be systematically assembled by such an organization as UNIDO. Once such a shelf had been gathered, UNIDO and other UN agencies would have to work closely with national and local governments, in developing countries, in helping the process of dissemination and adaptation to the local conditions of appropriate technologies (UNIDO, 1992). Technological upgrading should proceed in parallel with training--and skill upgrading.

Export can contribute to improving technology. In the Indonesia case, as happened previously in Taiwan and South Korea, the textile industry and other consumer goods industries contributed to urban and rural poverty alleviation. Not only do these labor intensive exports act as a conveyor belt for the transfer of technology, but they also inculcate new skills to the largely unskilled workers through a process of "learning by doing".

In some instances, a tradeoff may exist between output and efficiency objectives, on the one hand, and employment and poverty alleviation objectives, on the other. The upgraded, modern technique, may be more efficient (in terms of total factor productivity) than its traditional counterpart. When this situation prevails, and is not due to distorted artificial prices, the government cannot ignore the negative distributional impact of what could become a massive substitution of labor intensive technologies by more capital intensive ones, and may have to take actions to slow down this process somewhat. Clearly, modernization should occur and the adoption of more efficient and often more capital-intensive techniques go, hand in hand, with the process of socioeconomic development and most governments will only tolerate a limited sacrifice in terms of efficiency for the sake of creating more employment and greater poverty alleviation.

Sixth, the gathering and conveying of information relating to most of the issues brought out in the preceding points, such as improving marketing practices, responsiveness to market demand and the identification of appropriate types of technology and skill upgrading could, within limits, be

integrated within an industrial extension service. In a sense, this service would be the analog for rural industry and services of the agricultural extension service. Logically, industrial extension falls within the domain of ministries of industry and to be successful, such schemes would have to be decentralized and closely coordinated with provincial--and district level governments. In both Indonesia, through the Bapedas (the provincial planning offices), and in Kenya (through the district planning offices), the institutional machinery appears to be in place for a start to be made with the concept of rural industrial extension. The implementation of an industrial extension service is, of course, much more difficult than that of an agricultural extension service. In the latter, extension agents can specialize and become experts in the production and marketing of one, or at most, a few products. Outside of agriculture, the variety of activities and the range of firm size and technological alternatives is such that most industrial extension agents would, by necessity, have to be generalists. One mechanism worth thinking about is having generalists being assisted by a much smaller cadre of industry specialists. Still, an additional institutional concept that might prove to be useful in the promotion of rural industrial decentralization is that of industrial estates. This concept is discussed in the next subsection.

Finally, poor households lacking collaterals tend to be sealed off the organized credit market and are dependent on the unorganized credit market dominated by money lenders. Credit is either not available to them, or only available at extremely high rates of interest. If technological upgrading is to occur, the provision of credit may be a necessary prior condition. Women, who in Africa and Asia, are often more active than men in a variety of nonfarm activities are particularly vulnerable. Institutional reforms are needed to improve the access of micro, often informal, enterprises to credit. The Grameen Bank in Bangladesh represents a possible model to follow. Likewise, a new Indonesian credit program makes, among others, credit accessible to women in their own names to help them finance their incipient small enterprises and combines the granting of credit with vocational education and short courses to provide them a minimum of management skills, such as bookkeeping. One important requirement of credit schemes is that they not, or only to a limited extent, be subsidized--if they are to be sustainable and not distort the choice of technique. This requirement adds a further obstacle to the design of appropriate credit schemes. Supervised credit schemes linking industrial extension information with credit would seem indicated in many instances.

C. Policies for Regional Development

In the case of Indonesia, the availability of land in the Outer Islands and the process of transmigration helped provide the necessary resources for a relatively elastic supply response. The government has become increasingly aware of the advantages of regional development from both a growth and equity viewpoint. Several policies have been initiated to support regional development in the Outer Islands. These policies can be classified into three major categories: fiscal, deregulation and sectoral and spatial measures. These measures are discussed next.

Fiscal policies play an important role in supporting regional development in Indonesia. In a highly centralized system where local governments, on average, raise only 30-40% of their regional budgets, the central government is the major actor in the provision of grants and subsidies (particularly, regional, INPRES grants at the provincial and local levels) to promote the development process at the regional level. These grants and subsidies can be broadly used for the operation and maintenance of infrastructure, development and routine expenditures. The central government also provides sectoral grants (sectoral INPRES) to promote and enhance regional openness (regional road and market grants), social entitlements (health and education facilities), and environmental refinement (reforestation grants). Per capita allocation for INPRES grants has increased steadily for several depressed Outer regions. On a per capita basis, allocation to the more backward Outer regions tends to be 3-4 times the national average.

Deregulation measures were initiated as a component of the SSA package in the 1980s. One major deregulation policy that has had a major impact on regional development relates to investment regulations. Three major initiatives were undertaken: first the streamlining of investment approval process, secondly, replacing the priority list with a negative list that gives less restriction on sectoral investment directed to the regions, and third, providing a better climate for status of ownership and joint ventures to attract foreign investment. The impact of these deregulation measures on attracting regional investment has been spectacular. For example, in the Eastern Islands, 52% of the total number of domestic investment projects between 1968 and 1990 occurred in the last five years of this period (i.e. between 1986 and 1990). The corresponding figure for foreign investment projects amounts to 60%.

Faced with major disparities in population density between the Center and the periphery Indonesia has sought to wed the underutilized labor of Java with the underutilized land of the Outer Islands through a variety of sectoral

and spatial programs. The early transmigration program was later supplemented through the development of regional transportation networks, improved port facilities and more recently, through a program calling for the establishment of 300 industrial estates between 1985 and 1995. Industrial estates, consisting of a complete infrastructural base (access roads, plants and buildings, provision of electricity and other utilities), are being built by the government to attract private enterprises. These enterprises, in turn, rent the facilities from the government. The intention is to spread these industrial estates throughout the periphery and away from the crowded agglomerations of Java. Decisions on location are arrived at jointly between Central and local governments. It is expected that these estates will provide an even better climate for attracting regional investment and hence promote regional industrial development. Furthermore, in some instances, it is envisaged that private companies will be running these industrial estates rather than the government. In addition to industrial estates, the government is also promoting industrial zones to promote industrial exports. The concept of industrial zones is currently being emphasized as a lubricant for free trade areas and is expected to play a significant role in maximizing the benefits of AFTA (ASEAN Free Trade Areas) established in 1992. In some cases, industrial estates and industrial zones are to be combined with similar developments in other countries into what has been called "growth triangles" (e.g. North Sumatera-Malaysia-Thailand, Kalimatan-Sulawesi-The Philippines, and Irian Jaya-Papua New Guinea-North Australia).

One important recommendation to improve the employment and poverty alleviation effects of industrial estates is to encourage subcontracting arrangements among different size firms located within the same industrial estate. The experience of East Asian countries during their early industrialization phase suggests that the role of subcontracting and franchising was crucial in developing a complementary, mutually beneficial relationship, between large and small firms. It helped insure that the large scale sector did not grow at the expense of the smaller firms using more labor intensive technologies. It is not clear whether the Indonesian government is envisaging promoting such arrangements. However, it should be noted that for years it has been trying to form production organizations based on the principle of horizontal and vertical integration, by tying small-scale producers (called the "plasma") to higher-level large-scale enterprises (called the "nucleus"). The systems of organization are known as nuclear estate system (NES). The integration is horizontal in the sense that very different producers of the same product are grouped together in one unit. The underlying philosophy is vertical in that the plasma can benefit from

economies of scale enjoyed by the nucleus (estate) in regard to inputs and extension of services and in processing and marketing the product. So far, the NES scheme has been implemented mainly in the tree crop sector but could be extended to a number of other sectors including industrial activities.

It would appear from the preceding detailed discussed, that a number of initiatives such as industrial estates are potentially transferable to many developing countries if properly tailored to the local conditions. In this context, the training of civil servants is crucial. As Azis (1992c, p. 29) put it,

> "To enable the desired implementation, and in parallel with the process of decentralization, changing role and attitudes of regional bureaucrats are inevitable conduits. It is in this context we should ponder the active training currently provided for various regional officials as not only a crucial step but also a necessary vehicle for the realization of an operational decentralized system."

Annex II. Technical Notes

A. Fixed Price Multipliers

The first step is to decide which accounts are endogenous and which are exogenous. It is assumed here that three accounts are endogenously determined, i.e. factors, institutions (households and companies) and production activities, while all other accounts are exogenous (governments, capital and the rest of the world). The three endogenous accounts are the same as those depicted graphically in Figure 4 of the main text and in Table A in this annex. In particular, the five endogenous transformations are given in Table A. Thus, for example, T_{13} (in both Figure 4 and Table A) is the matrix which allocates the value added generated by the various production activities into income accruing to the various factors of production, and T_{33} shows the intermediate input requirements (i.e. the input-output transactions), while T_{32} reflects the expenditure pattern of the various institutions including the different household groups for the commodities (production activities) which they consume.

If a certain number of conditions are met--in particular, the existence of excess capacity which would allow prices to remain constant--the framework depicted in Table A can be used to estimate the effects of exogenous changes and injections such as an increase in the output of a given production activity, government expenditures or exports on the whole system. The underlying logic, as will be seen shortly, is that exogenous changes (the x_i's) in Table A determine through the SAM matrix the incomes of a) the factors (vector y_1); b) the household and companies incomes (y_2); and, c) the incomes of the production activities (y_3). For analytical purposes, the transaction matrix is converted into the corresponding matrix of marginal expenditure propensities. These can be obtained simply by dividing a particular element in any of the endogenous accounts by the total income for the column account in which the element occurs.

Let C_n be the coefficient matrix of marginal expenditure propensities. Expressing the changes in incomes (d_{y_n}) resulting from changes in injections (dx) (see Khan-Thorbecke, 1988), one obtains

$$d_{y_n} = C_n d_{y_n} + dx$$

$$= (I - C_n)^{-1} dx = M_c dx$$

M_c has been coined a <u>fixed price multiplier matrix</u> and its advantage is that it allows any nonnegative income and expenditure elasticities to be

Table A. Simplified Schematic Social Accounting Matrix

				Expenditures				
				Endogenous Accounts			Exog.	
				Factors	Institutions: Households and Companies	Production Activities	Sum of Other Accounts	Totals
				1	2	3	4	5
Receipts	Endogenous Accounts	Factors	1	0	0	T_{13}	x_1	y_1
		Institutions, i.e. Households and Companies	2	T_{21}	T_{22}	0	x_2	y_2
		Production Activities	3	0	T_{32}	T_{33}	x_3	y_3
	Exog	Sum of Other Accounts	4	$1'_1$	$1'_2$	$1'_3$	t	y_o
		Totals	5	y'_1	y'_2	y'_3	y_o	

Source: Khan-Thorbecke (1988)

reflected in M_c. For a detailed description and derivation of fixed price multipliers, see Khan and Thorbecke (1988).

B. Structural Path Analysis Methodology: Transmission of Economic Influence within the SAM Framework

Recently, Defourny and Thorbecke (1984)[1] have applied structural path analysis to a SAM framework. Because the SAM is a comprehensive--essentially general equilibrium--data system, the whole network through which influence is transmitted can be identified and specified through structural path analysis. Since the application of the latter to the SAM framework is quite new, the principal elements and components of the structural path methodology are presented very briefly in this section before applying them to SAM-Tech in the next section.

The starting point is to equate the notion of expenditure to that of "influence". Graphically this means that each average expenditure propensity a_{ji} (or, alternatively, marginal expenditure propensity c_{ji}) of an "arc" (i,j) linking two poles of the structure and oriented in the direction of the expenditure is to be interpreted as the magnitude of the influence transmitted from pole i to pole j.

The marginal expenditure propensity (c_{ji}) reflects the "intensity of arc (i,j). Fixed price multipliers derived from the matrix of marginal expenditure propensities, C_n, assume that the intensity of the influence between any two poles is captured by the corresponding value of the marginal expenditure propensities. Since the empirical analysis which follows is based on fixed price multipliers, the analysis proceeds by equating influence with marginal expenditure propensity. A path which does not pass more than one time through tne same pole is called an "elementary path". Finally, a "circuit" is a path for which the first pole (pole of origin) coincides with the last one (pole of destination). In Figure A.2 below the path (i,x,y,j) is an elementary path while path (x,y,z,x) is a circuit.

The concept of influence can be given three different quantitative

---

[1]The brief review of structural path analysis which follows draws heavily on Defourny and Thorbecke (1984).

interpretations, namely, (1) direct influence, (2) total influence, and (3) global influence which are discussed below.

1. **Direct influence**

The direct influence of i on j transmitted through an elementary path is the change in income (or production) of j induced by a unitary change in i, the income (or the production) of all other poles except those along the selected elementary path remaining constant. The direct influence can be measured, respectively, along an arc or an elementary path as follows,

(a) Case of direct influence of i on j along arc (i,j)

$$I^{D}_{(i,j)} = c_{ji}, \qquad (1)$$

where c_{ji} is the (j,i)th element of the matrix of marginal expenditure propensities C_n. Matrix C_n can therefore be called the matrix of direct influences--it being understood that the direct influence is measured along arc (i,j).

(b) Case of direct influence along an elementary path (i,...,j). The direct influence transmitted from a pole i to a pole j along a given elementary path is equal to the product of the intensities of the arcs constituting the path. Thus,

$$I^{D}_{(i\ldots j)} = c_{jn}\ldots c_{mi}. \qquad (2)$$

For example, Figure A.1 below represents a given elementary path, p = (i,x,y,j)[2]

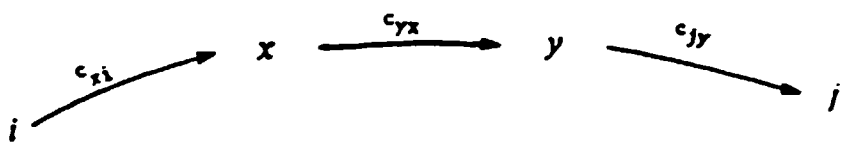


Figure A.1. Elementary path

and

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[2]As will be seen subsequently, a multitude of different elementary paths may go from i to j. In any case, a number of examples of elementary paths and, more generally, of the whole network of paths applied to the Indonesian SAM are presented in case study III.A.3. of the main paper. Hopefully these concrete examples will bring some added realism to these concepts.

$$I^{o}_{(i,x,y,j)} - I^{o}_{(i,x,y,j)} = c_{xi}c_{yx}c_{jy}. \qquad (3)$$

2. Total influence

In most structures, there exists a multitude of interactions among poles. In particular, poles along any elementary path are likely to be linked to other poles and other paths forming circuits which amplify in a complex way, the direct influence of that same elementary path. To capture these indirect effects, the concept of total influence was introduced.

Given an elementary path p = (i,...,j) with origin i and destination j, the total influence is the influence transmitted from i to j along the elementary path p including all indirect effects within the structure imputable to that path. Thus, total influence cumulates, for a given elementary path p, the direct influence transmitted along the latter and the indirect effects induced by the circuits adjacent to that same path (i.e. these circuits which have one or more poles in common with path p). Figure A.2 reproduces the same elementary path p = (i,x,y,j) appearing in Figure A.1 and in addition incorporated explicitly all circuits adjacent to it.

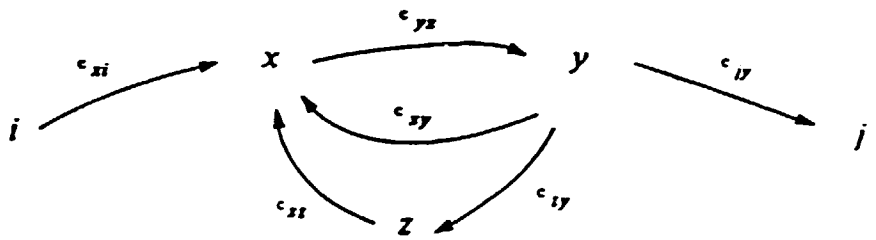

Figure A.2. Elementary path including adjacent circuits

It can readily be seen that between poles i and y the direct influence is $c_{xi}c_{yx}$ which is then transmitted back from y to x via the two loops yielding an effect $(c_{xi}c_{yx})(c_{xy}+c_{zy}c_{xz})$ which in turn has to be transmitted back from x to y. This process yields a series of dampened impulses between x and y

$$c_{xi}c_{yx}\left(1 + c_{yx}(c_{xy} + c_{zy}c_{xz}) + [c_{yx}(c_{xy} + c_{zy}c_{xz})]^2 + \ldots\right)$$
$$= c_{xi}c_{yx}[1-c_{yx}(c_{xy}+c_{zy}c_{xz})]^{-1} \qquad (4)$$

To complete the transmission of influence along the above elementary path p the above effects have to travel along the last arc (y,j) so that the above effects have to be multiplied by c_{jy} to obtain the total influence along this path,

$$I^{T}_{(i-j)p} = c_{xi}c_{yx}c_{jy}[1-c_{yx}(c_{xy}+c_{xy}c_{xx})]^{-1} \qquad (5)$$

It can readily be seen that the first term on the righthand side represents the previously defined direct influence, $I^{D}_{(i-j)p}$ and the second term is the path multiplier M_p, i.e.

$$I^{T}_{(i-j)p} = I^{D}_{(i-j)p}M_p. \qquad (6)$$

M_p captures the extent to which the direct influence along path p is amplified through the effects of adjacent feedback circuits.[3]

3. Global influence

Global influence, in contrast with direct and total influences, does not refer to topology, namely, the specific paths followed in the transmission of influence. Global influence from pole i to pole j simply measures the total effects on income or output of pole j consequent to an injection of one unit of output or income in pole i.

The global influence is captured by the reduced form of the SAM model derived previously

$$dy_n = (I-C_n)^{-1}\,dx = M_c dx \qquad (7)$$

Let m_{cji} be the (j,i)th element of the matrix of fixed price multipliers M_c then, as was seen previously, it captures the full effects of an exogenous injection dx_i on the endogenous variable dy_j. Hence

$$I^{G}_{(i-j)} = m_{cji} \ ,$$

and matrix $M_c = (I-C_n)^{-1}$ can be called the matrix of global influences.

It is important to understand clearly the distinction between global influence and direct influence. The latter is linked to a particular elementary path which is entirely isolated from the rest of the structure (i.e. assuming ceteris paribus). It captures what could be called the immediate effect of an impulse following this particular path. Global influence, in contrast, differs from direct influence for two fundamental reasons:

(a) It captures the direct influence transmitted by all elementary

---

[3]For a formal derivation of M_p, see Appendix in Defourny-Thorbecke (1984).

paths linking (spanning) the two poles under consideration. Indeed, given two poles i and j, the effects of an injection affecting the output or income of i on the output or income of j manifest themselves through the intermediary of all paths with origin i and destination j. The direct influence, transmitted by pole i to pole j along different elementary paths with the same origin and destination, is equal to the sum of the direct influences transmitted along each elementary path.

(b) In addition, these paths are not considered in isolation but as an integral part of the structure from which they were separated to calculate the direct influence. Hence, global influence cumulates all induced and feedback effects resulting from the existence of circuits in the graph and is equal to the sum of the total influences of all elementary paths spanning pole i and pole j (see eq. 10).

An example should clarify this point. Figure A.3 reproduces the elementary path and adjacent circuits explored in Figure A.2 and adds two other elementary paths with the same origin i and destination j, i.e. (i,s,j) and (i,v,j).

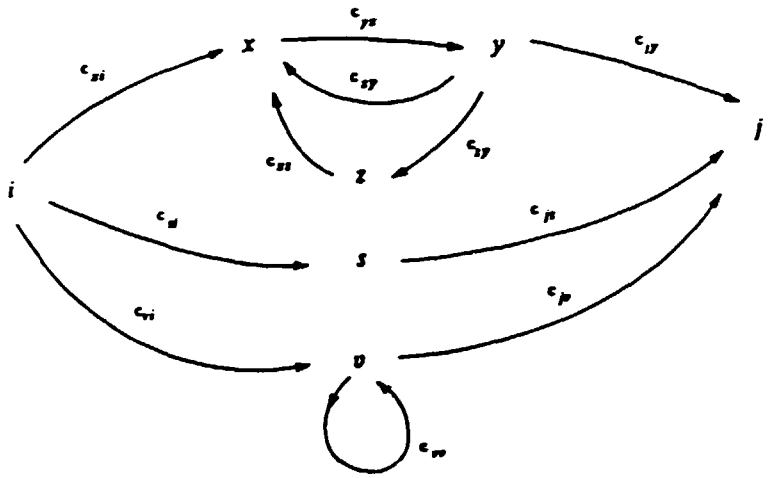

Figure A.3. Network of elementary paths and adjacent circuits linking poles i and j.

In the above example, it is clear that path (i,s,j) is an elementary path without any adjacent circuit while path (i,v,j) contains one loop centered on v. For simplicity, we can refer to these last two paths as 2 and 3, respectively--the initial path being referred to as 1.

$$
\begin{aligned}
I^{G}_{(i-j)} = m_{c_{ji}} &= I^{T}_{(i,x,y,j)} + I^{T}_{(i,s,j)} + I^{T}_{(i,v,j)} \\
&= I^{T}_{(i-j)_1} + I^{T}_{(i-j)_2} + I^{T}_{(i-j)_3} \qquad (9) \\
&= I^{D}_{(I-j)_1} M_1 + c_{si}c_{js} + (c_{vi}c_{jv})\ (I-c_{vv})^{-1} \\
&= I^{D}_{(I-j)_1} M_1 + I^{D}_{(i-j)_2} + I^{D}_{(i-j)_3} M_3
\end{aligned}
$$

Note that in the case of the second path, the multiplier is one since the path has no adjacent circuits. Thus, in general, the global influence linking any two poles of a structure can be decomposed into a series of total influences transmitted along each and all elementary paths spanning i and j, i.e.

$$
I^{G}_{(i-j)} = m_{c_{ji}} = \sum_{p=1}^{n} I^{T}_{(i-j)_p} = \sum_{p=1}^{n} I^{D}_{((i-j)_p} M_p, \qquad (10)
$$

where p stands for elementary paths 1,2,k,...,n.

C. Multiplier Decomposition to Estimate Impact of Change in Demand for and Output of Different Production Activities on Poverty Alleviation[4]

In the present context we are interested in estimating the impact that different production activities have on poverty alleviation. Depending on the technology used, the factor endowment of the poor socioeconomic groups and the extent of interlinkages on the demand and supply sides (i.e. the degree of integration of the economy), certain production activities contribute more to poverty alleviation than others.

As was shown in Annex II.B. the fixed price multiplier matrix (M_c) is defined as

$$
dy_n = C_n dy_n + dx = (I-C_n)^{-1}dx = M_c dx \qquad (1)
$$

Table A in Annex II.B shows how the matrix of marginal expenditure propensities (C_n) is partitioned;

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[4]The discussion which follows is based on Thorbecke and Jung (1993).

$$C_n = \begin{bmatrix} 0 & 0 & C_{13} \\ C_{21} & C_{22} & 0 \\ 0 & C_{32} & C_{33} \end{bmatrix} \qquad (2)$$

Hence equation 1 can be written in explicit form as

$$\begin{aligned} dy_1 &= C_{13}\,dy_3 + dx_1 \\ dy_2 &= C_{21}dy_1 + C_{22}dy_2 + dx_2 \\ dy_3 &= C_{32}dy_2 + C_{33}dy_3 + dx_3 \end{aligned} \qquad (1a)$$

which yields

$$\begin{aligned} dy_1 &= C_{13}dy_3 + dx_1 \\ dy_2 &= (I-C_{22})^{-1}C_{21}dy_1 + (I-C_{22})^{-1}dx_2 \\ dy_3 &= (I-C_{33})^{-1}C_{32}dy_2 + (I-C_{33})^{-1}dx_3 \end{aligned} \qquad (1b)$$

We are focussing on the contribution that different production activities make to poverty alleviation. Thus starting with an exogenous change in demand for a given production activity (dx_3, above) we want to know the ultimate impact on the incomes of the different household groups (dy_2, above) and, more specifically, on the additional incomes accruing to the poor household groups (a subset of the vector dy_2). Thus, we concentrate on that part of the fixed price multiplier matrix that links production activities to household groups (i.e. M_{c23}). Let m_{ij} be an element of this matrix; it shows the total direct and indirect effects of an increase of one unit in the demand for (and the output of) production activity j on the incremental incomes received by socioeconomic (household) group i.

M_{c23} can be decomposed multiplicatively into two different matrices, which represent what we coin distributional (D) and interdependency (R) effects, respectively,

$$M_{c23} = RD \qquad (3)$$

where dimensions of matrices M_{c23}, R and D are (household groups x production activities), (household groups x household groups) and (household groups x production activities), respectively. Our purpose is to compare impacts of different production activities on poverty groups, which requires identification of each effect by each production activity and each household group. Fixed price multipliers and distributional effects corresponding to

each pair of production activity and household group can be obtained directly from matrices M_{c23} and D. To derive the interdependency effects, we used the following procedure. Note that dimensions of matrices M_{c23} and D are equivalent, while matrix R is a square matrix. We define as $r_{ij} = m_{ij}/d_{ij}$, where m_{ij} is an element of M_{c23} and d_{ij} is a corresponding element of D. Then, a number (scalar) r_{ij} represents the effect of matrix R on a specific d_{ij}, both of which multiplicatively determine a specific m_{ij}, (i.e. $m_{ij} = r_{ij}\ d_{ij}$). We refer to r_{ij} as the interdependency effects of production activity j on household group i.

The distributional effects (d_{ij}) represent the initial effects of a change in output of a production activity on the income of a socioeconomic group. The strength of the distributional effects depends mainly, as is shown next, on the technology in use (e.g. how labor intensive it is, how much it relies on the factors of production possessed by poor household groups), and the factor endowment of the poor households (e.g. how much unskilled labor and land they possess). In turn, the interdependency effects (r_{ij}) capture the direct and indirect effects of spending and respending by the particular poor household group under consideration and other groups that benefitted, income-wise, from the exogenous output injection.

Interdependency effects reflect the extent of integration within the economy on both the demand and supply sides. The more consumers spend on domestic goods and services, the more diversified their consumption pattern, the larger these effects. Likewise, the greater the intersectoral linkages on the production side, the higher the interdependency effects. Next we define and discuss in more detail distributional and interdependency effects, respectively.

Distributional Effects

Distributional effects originate with an exogenous change in output of a given production activity (dx_j). Say that textile output is increased by one unit. In order to produce this additional unit, intermediate inputs such as cloth, other fibers, and fuel may be required. These intermediate input effects are captured by the matrix $(I-C_{33})^{-1}$. In addition to these intermediate inputs, primary inputs such as unskilled labor, capital and land are needed. The demand for these factors of production is given by matrix C_{13}. In turn, additional income will flow to the household groups depending on their factor endowment (how much of the factors used in the production of textiles they possess). This transformation is represented by C_{21}. If the prevailing textile technology requires much unskilled labor, poor socioeconomic groups such as the rural landless and the urban uneducated, that

are well endowed with this factor, will benefit. When factors owned mostly by a poor household group are used intensively by a specific production activity, the distributional effects will be large and vice-versa. Finally, income transfers occur between and among different socioeconomic groups and are captured by $(I-C_{22})^{-1}$.

Thus, from the above discussion, the total distributional effects are defined as

$$D = (I-C_{22})^{-1} C_{21}C_{13} (I-C_{33})^{-1} \quad (4)$$

Interdependency Effects

While the distributional effects capture the initial impact on a change in sectoral output on incomes, the interdependency effects capture the spending and respending effects. The incremental incomes received by the poor are, in turn, spent on food, clothing and other commodities. To satisfy this additional demand, a corresponding output has to be produced requiring intermediate and primary inputs that ultimately generate an additional indirect flow of incomes for the poor. Thus, interdependency effects aggregate the impact of the initial, first round of spending and subsequent rounds of respending by the household groups. As mentioned previously, interdependency effects reflect the degree of integration in the socioeconomic system on the production and expenditure sides. What we call interdependency effects, in the present context, are equivalent to the closed loop effects that have been identified by Pyatt and Round (1979) in their alternative multiplier decomposition method. It has been shown that

$$R = (I - C'_{21} C'_{13} C'_{32})^{-1} \quad (5)$$

where $C'_{21} = (I-C_{22})^{-1} C_{21}$; $C'_{32} = (I-C_{33})^{-1} C_{32}$; and $C'_{13} = C_{13}$ (see Pyatt and Round, 1979).

It can also be noted that if the marginal expenditure matrix (C_{32}) is denoted by $E(E=C_{..})$, we obtain the following expression for R

$$R = (I - DE)^{-1} \quad (5a)$$

In other words, the interdependency effects can be fully expressed as function of the distributional effects (D) and the marginal expenditure propensities matrix (E). The larger D and E, the larger the interdependency effects.

Thus, the matrix of fixed price multipliers linking production

activities to household groups M_{c23} can now be expressed as follows

$$M_{c23} = RD = (I-DE)^{-1}D \tag{3a}$$

If m_{ij} is an element of M_{c23}, then, in turn, it can be decomposed multiplicatively into two components

$$m_{ij} = r_{ij}\ d_{ij} \tag{6}$$

where d_{ij} is an element of D, and r_{ij} is calculated as $r_{ij} = m_{ij}/d_{ij}$.

Therefore, a multiplier m_{ij} can be decomposed as

$$m_{ij} = r_{ij}\ d_{ij} \tag{7}$$

In equation (1), $dy_2 = M_{c23}\ dx_3$, let dy_{2i} be an element of vector dy_2, and dx_{3j} be an element of vector dx_3. Then,

$$dy_{2i} = m_{ij}\ dx_{3j} = r_{ij}\ d_{ij}\ dx_{3j} \tag{8}$$

Suppose we are interested in the overall impact of a change in the demand for (and output of) sector j (say, textiles) on the incomes of the poor household group i (say, the urban uneducated), then the magnitude of m_{ij} gives us this estimate. To compute the impact of a change in output of sector j on overall poverty alleviation (PA_j^n) then m_{ij} has to be aggregated across the various poor socioeconomic groups, i.e.

$$PA_j^n = \sum_{i=1}^{q} m_{ij} \tag{9}$$

where the poor household groups go from 1 to q.

For example, j could stand for textiles and the i=1...q poor household groups might consist of the urban uneducated, the rural landless, the small farmers and the rural nonagricultural employees.

Likewise, we can compute the total contribution to poverty alleviation of the distributional effects. Thus, if PA_j^d stands for the contribution to overall poverty alleviation of a change in output of production activity j due to distributional effects, then,

$$PA_j^d = \sum_{i=1}^{q} d_{ij} \qquad (10)$$

To derive interdependency effects, we define $PA_j^r = PA_j^n/PA_j^d$, which yields

$$PA_j^n = PA_j^r \; PA_j^r \qquad (11)$$

In tables 3b and 8b in the text we present PA_j^n, PA_j^r and PA_j^d for Indonesia and Gambia, respectively.