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# ***Preliminary Evaluation of Some Aspects of the Employment Problems and Policies in African LDCs***



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UNITED NATIONS  
Economic Commission  
for Africa



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## I. Overview of the Employment Situation 2/

The problem of unemployment and underutilization of human resources has become a major development challenge for developing countries, not only in terms of creating new jobs for those who are presently unemployed, but more importantly in providing gainful employment for those reaching the working age in the course of the coming decade.<sup>3/</sup>

The International Labour Organization (ILO) has estimated that from 1980 to 1988 open and disguised unemployment in sub-Saharan Africa increased by one-sixth. This was four times faster than in the 1970s. With a population growth of 3.3 per cent projected for the 1990s, the sub-Saharan population of Africa may well double within the next twenty-two years and such a demographic explosion will have a direct impact on the growth rate of the labour force. Currently, the sub-Saharan labour force is expanding at a rate of 2.7 per cent and is projected to reach 3.2 per cent by the end of the century [ILO/JASPA (1989)]. The decision to reduce the size of the labour force must be made today, since the size of the labour force for the next fifteen years (1990-2005) is already determined by the number of children now living or newly born.

In the examination of the employment problem on its own right, available evidence seems to indicate that economic growth is not necessarily followed by increased absorption of the emerging labour force. Economists are now suggesting a sequence of prescriptions to cope with the problem namely: (i) increasing investment in labour intensive industries; (ii) elimination of factor price distortions; (iii) minimizing the increasing gap between rural and urban incomes; (iv) correcting the urban bias in the provision of social services; (v) balanced educational expansion and training schemes for rural youth; (vi) introduction of intermediate technology; and (vii) reduced reliance on the practice of tied foreign aid.

Unfortunately, all these policy prescriptions are being advocated (in developing Africa) for an economic structure which has barely changed since the era of colonialism. This structure is characterized by external dependence, and rapidly deteriorating ecological base leading to large numbers of people fleeing rural poverty, while current agricultural organization almost totally neglects the smallholder. Africa's export-oriented economic structure is, in most cases, primarily based on one or two primary commodities, its industrial structure is not only highly capital-intensive but also fails to utilize the capital fully. A simple and effective way of increasing labour use and at the same time lowering the capital-output ratio is to utilize the existing capital stock more intensively <sup>4/</sup> [Ranis (1957), Morawetz (1974), Kabaj (1965), (1968), Winston (1971), Farooq and Winston (1978) Betancourt and Claug (1976)]. However, continued severe economic conditions, especially foreign exchange shortages, unavailability of inputs and spare parts, persistent power interruptions and frequent machine breakdowns and lack of integration at the production and marketing levels between countries have forced the rate to decline to below 40 percent in the second half of the 1980s. Many countries have had to reduce the number of work shifts and to lay off workers. This confirms the often-repeated assertion that, in a large part of Africa, not only is the capital equipment sometimes idle, but also the labour force is currently underutilized [ECA (1985), ILO/JASPA (1985a)].

In addition, the aims, content, structure and values of the educational system are misdirected. Income distribution is such that, the structure of demand is biased towards capital and skill-intensive goods, and occupational wage structures inordinately favour academic rather than technical and other skills.

It is not surprising then that the foregoing policy prescriptions have failed to make appreciable headway in solving the unemployment problem in most African least developed countries.

Attempts to solve the unemployment problem in a piece-meal fashion without addressing the major development constraints that are exacerbating the unemployment problem have been of limited use. Indeed, "... development is much more than a matter of encouraging economic growth within a given social structure. It is rather the modernization of that structure, a process ... that requires the remaking of society in its more intimate as well as its most public attributes" [Heilbroner (1967)].

As the 1980s drew to a close, the employment situation continued to worsen. On the demand side, the structure of GDP remained virtually the same, strongly suggesting that there has been very little change in the economies of African LDCs. The agriculture sector continues to dominate GDP formation, accounting for an average of 43.3 per cent of total output during 1981-1988. The share of manufacturing in GDP remained virtually constant at about 7.0 per cent over the same period.

For the 28 African LDCs, the average annual growth rate of GDP stood at 2.09 per cent (at 1970 factor cost) from 1970 to 1980. In the ensuing period, the overall growth of GDP (at 1980 prices) decelerated to a mere 0.84 per cent per annum between 1980 and 1987. These averages, however, mask individual country performances. There were seven countries registering a negative growth rate in their GDP between 1980 and 1987 as against four for the period 1970-1980. Growth in the agricultural sector has equally been dismal. For the 28 African least developed countries, as a group, agricultural GDP declined from 0.87 per cent between 1970 and 1980 to a mere 0.42 per cent during the period 1980-1987. Ten countries registered negative growth rates in their agricultural GDP from 1970 to 1980 as against nine in the 1980-1987 period.

On the supply side, there has been marked acceleration in the rate of population growth with direct impact on the growth rate of the labour force. Between 1970 and 1985, nine African LDCs registered population growth rates of over 3 per cent per annum: Botswana (3.91%); Comoros (3.35%); Djibouti (5.83%); Guinea Bissau (3.56%); Mozambique (3.75%); Rwanda (3.32%); Somalia (3.87%); Uganda (3.09%) and Tanzania (3.46%) (see Table V).

Firstly because of the demographic momentum in Africa, the ILO has estimated that sub-Saharan Africa is the only region in the world where the share of youth in the total population will increase in the future. By the year 2020, youth will account for 21 per cent of the total population in the region, as compared to 17 per cent in Latin America, 16 per cent in Asia and 13 per cent in the industrialized world. Between 1960 and 1983, total enrolment in formal education increased five fold, but since the onset of the economic crisis in the beginning of the

1980s, the economies of the African LDCs have undergone little transformation. Thus a fundamental and structural cause of youth unemployment consists of the interaction between the massive expansion of the educational system which occurred in the context of slow growth and limited structural transformation of the economies of African LDCs [ILO/JASPA (1989)]. And many of the changes made towards vocationalizing the education system have not appreciably improved youth employment prospects. There are today a large number of registered unemployed masons, carpenters, tailors, metal workers, welders, mechanics and typists. The number of unemployed secondary and university graduates has also risen appreciably. This in essence suggests that "the problem of youth unemployment is not just a problem of mismatch between people and jobs, but of the supply of jobs or employment opportunities" [Livingstone, (1989)] p.404. In addition, countries are overhauling their entire educational system without taking steps to alter the prevailing salary differentials by levels of schooling [Emmerij (1973), Blaug (1974) (1979), Singer and Jolly (1973)].

Apart from the sluggish economic growth and the growing impact of the demographic tide on labour supply, the problem of unemployment is being exacerbated by the rural-urban exodus. Secondly, owing to increasing fiscal pressures, many governments are exercising stricter control on recruitment. Thirdly, barriers to trade, including those which limit the flow of technological information and experience represent the most serious constraint on the generation of employment opportunities in African LDCs. Finally, the social impact of the orthodox adjustment programmes have entailed significant reduction of expenditure especially on education and primary health care, as well as in the size of the public sector and parastatals with negative consequences on employment [ECA (1989a), (1988), Adedeji(1989)].

With the fall in formal sector employment, many of the unemployed have moved into what the United Nations has called "unspecified activities". According to the ILO, the informal sector created between 1980 and 1985 an estimated 6 million new jobs (for sub-Saharan Africa as a whole), whereas the modern sector added a mere 0.5 million jobs in the urban labour markets.

This informal sector includes own-account handicraft workers (seamstresses, embroidery makers, basket and mat makers, rope makers, silversmiths), street traders and service workers (peddlers, shoeshine boys, parking lot attendants, messengers, street entertainers, repairmen, gardeners, masseurs, food vendors, public letter writers), casual construction workers (carpenters, bricklayers, plumbers, electricians), and "underground" occupations (prostitutes, professional beggars, police spies, dope peddlers, pickpockets) [Friedmann and Sullivan (1974), ILO/JASPA (1985b)]

Be that as it may, problems of unemployment, underemployment and extreme poverty seem to have been accentuated in the 1980s. And even if some miracle was to lower the birth rate tomorrow, joblessness in African LDCs will continue to grow unless far-reaching reforms are instituted soon. Just as the causes of the problems of unemployment are broad and fundamental, so is the strategy to deal with them. Thus, of necessity, the findings of this study are confined to investigating some of the issues of employment in the manufacturing and agricultural sectors.

Even in manufacturing, our comments have been confined to factor price distortions and the choice of techniques.

Part II deals with the problem of labour absorption in the industrial sector while part III provides an account of labour absorption in agriculture. Part IV contains the conclusions and recommendations of the study.

## II. Labour Absorption In Manufacturing Industry: A Survey

### (i) Introductory Note

Policy-makers usually assume that the industrial sector will expeditiously absorb growth of the labour force. Unfortunately, industrial employment has lagged growth in industrial output, urban population growth and even general population growth rate [Meier (1970)]. No where in the world has this phenomenon been more pronounced than in the African Least Developed Countries.

Employment growth has been seriously lagging behind growth in industrial output expansion in all the sample eight countries in Table I except Botswana. The rate of labour absorption in the manufacturing sector fell behind the urban population growth rate in Benin, Burkina Faso, the Gambia, Somalia, Tanzania and Malawi. In addition, the growth in manufacturing value added exceeded the growth rate of total population in Botswana, Burkina Faso and Ethiopia. In the remaining five countries, however, (Benin, The Gambia, Tanzania, Malawi and Somalia) population growth outstripped the growth rate of manufacturing output.

Following the inability of the manufacturing sector to provide for expanding opportunities for productive employment, the agricultural and services sector (including the informal sector) have borne the brunt of absorbing the surplus labour. In addition, industrial output expansion and employment creation have not been commensurate with the preponderance of resources allocated to it [UNIDO (1985)].

Table I  
Annual Growth rate of Manufacturing Value-added,  
Employment, Urban and Total Population  
(1980-1986)

Country	Value added <sup>1/</sup>	Employment <sup>1/</sup>	Urban population <sup>2/</sup>	Total population <sup>3/</sup>
Benin <sup>a/</sup>	2.94	0.37	7.41	2.96
Botswana <sup>b/</sup>	15.59	16.50	8.17	3.58
Burkina Faso	2.61	1.40	4.84	2.49
Ethiopia	5.43	4.21	3.68	1.74
Gambia	-0.74	-8.64	5.06	3.01
Somalia	-5.10	8.44	5.92	3.57
Tanzania	-9.00	-1.75	11.60	3.74
Malawi <sup>b/</sup>	-8.68	6.02	7.56	3.18

1/ UNIDO, "Economic Indicators of African Development", Studies of the Rehabilitation of African Industry, No. 3, p. 94, 28 October, 1988;

2/ United Nations, Prospects of World Urbanization, 1988 (forthcoming);

3/ United Nations, World Population Prospects, Publication No. 106, New York, 1989.

<sup>a/</sup> Refers to 1981-1986.

<sup>b/</sup> Refers to 1980-1984.

Many reasons have been advanced for the low rate of labour absorption in manufacturing of which, factor price distortion and the choice of techniques, have been the most cited.

(ii) Factor Price Distortions and the Choice of Technique <sup>5/</sup>

It has been repeatedly asserted that in the vast majority of African LDCs, currency overvaluation, low interest rates and duty free import of capital goods tend to favour capital intensive production at the expense of labour intensive technology.<sup>6/</sup>

Admittedly, there is evidence suggesting that previous industrialization strategies in most African LDCs were centered mainly on the development of the modern manufacturing industry, by the provision of substantial and indiscriminate protection, local investible funds at low rates of interest, and excessive fiscal concessions, such as accelerated depreciation allowances. On the



other hand, the development of the small-scale industry, with its employment potential has been seriously constrained by inappropriate fiscal and monetary policies.<sup>7/</sup> In Sierra Leone, for example, small-scale firms pay substantially higher tariffs on imported inputs than large-scale firms. As can be gauged from Table II, tariff rates for outboard motors were on the order of 36 per cent, which is similar to the rate for most noncompetitive imported consumer goods, such as sandals and toilet soaps. On the other hand, large scale firms enjoy lower or zero tariffs on imported inputs through a Development Ordinance Act that allows duty free imports of equipment and raw materials. Moreover, large-scale firms receive a high degree of protection with effective tariffs on competitive imports sometimes in excess of 100 per cent [Byerlee and Eicher et al. (1983)].

Table II  
Import duties on Raw Materials and Equipment and Competitive Imports for Major Industries in Sierra Leone

Industry	Duties on raw materials and equipment	Duties on competitive imports
Small-scale agriculture	Hand tools, 3%	Rice, free; palm oil, free; fish, 10%
Small-scale fishing	Nets, 36%; out-board motors, 36%	
Small-scale manufacturing: Cloth and clothing	Cotton fabric, 22%; * needles, button, thread 36%; sewing machines, 16%; dye-stuff, 36%	Dyed cloth, 20%
Woodwork	Plywood, 36%; nails, formica, polish, 35%	...
Metal work	...	Hand tools, 3%
Large-scale manufacturing		
Brewing )		Beer-stout, 127%*
Biscuits )		Biscuits, 60%
Sandals (plastic))		Sandals, 35%
Soap )	...+	Toilet soap, 36%
Suitcases )		Suitcases, 45%
Flour milling )		Flour, 167%

Source: Adapted from D. Byerlee, C.K. Eicher, C. Liedholdm and D.S.C. Spencer, Economic Development and Cultural Change, Vol. 31, Number 2, January 1983, p. 321.

\* Specific tariff converted to ad valorem rate based on current f.o.b. prices.

+ Most firms covered by Development Ordinance Act, which allows duty-free imports of raw materials and equipment.

In the bulk of the African LDCs, where the majority of the working population are engaged in agriculture, the industrial sector presents quite a small employment base, while employment in trade, commerce, and other miscellaneous services constitute an important component of non-agricultural employment (see Table III). There is however little scope for increasing labor intensity and the growth of employment in trade, commerce and other services by altering relative factor prices above that dictated by the overall growth of the economy. In addition, the growth of government employment opportunities is largely a function of the taxing and borrowing

capabilities of African governments and their willingness to expand recurrent expenditures. It makes, therefore, little sense to talk about altering these relationships by the use of more labour intensive techniques when government recurrent services are largely the services of labour anyway [Frank (1968)].

An ILO study contends that an enterprise will not opt for a more labour intensive technology merely because labour is cheap. Even if it uses a labour intensive technology, it is because such technology is economically competitive given the size of the local market, the nature of the end product or the difficulty of using more automated equipment. Consequently, to an industrial enterprise such notions as capital intensity or labour intensity are almost totally irrelevant [ILO (1984a)].<sup>8/</sup>

Table III

Government, commerce and services and informal  
sector employment in selected African  
least developed countries

Country	Share of government wages in total wages ; in the economy <u>1/</u>	Share of commerce and services employment in total industrial employment <u>2/</u>	Informal employment in urban areas as per cent of total labour force <u>3/</u>
	(1979)	(1985)	(1985)
Benin	35.56	62.48	27.0
Botswana	55.40	65.02	-
Burundi	39.15 <u>a/</u>	41.82 <u>c/</u>	2.9
Gambia	-	62.47	-
Malawi	16.94	21.77	5.0
Sierra Leone	27.87	44.24 <u>c/</u>	-
Togo	20.65 <u>b/</u>	-	17.8
Tanzania	-	43.12 <u>b/</u>	-

Source :

1/ IMF, Occasional Paper. No. 24, Oct. 1983, p. 46.

2/ ILO, 1987 Yearbook of Labour Statistics, (Geneva), pp. 337-346 "Commerce and Services include trade, restaurants and hotels, finance and insurance, real estate business services and community social and personal services.

3/ ILO/JASPA, African Employment Report, 1988, p. 70.

a/ Denotes 1978.

b/ Denotes 1982.

c/ Denotes 1986.

In examining the determinants of the technology choice in Sierra Leone's rice milling industry, Byerlee and Eicher contend that "the choice of technique is more sensitive to rice prices than to factor prices (labour and capital) because of the variation in technical efficiency among the techniques. Moreover, under most assumptions, one processing technique was not completely dominant, but rather a combination of techniques are used in the solution depending upon the local wage rate, available marketable surplus and local transportation costs in the particular region" [Byerlee, Eicher et al. (1983)] p.329. In a study of technology choice in ten manufacturing industries (parastatals) in Tanzania, Perkins alludes that in many developing countries minimum wages and job security legislation keep labour costs above the level at which labour can be employed. Cheap credit from the banking system and investment incentives based on capital employed (rather than capacity) encourage entrepreneurs to value capital at less than its social opportunity cost and hence to select more capital intensive techniques. However even at this distorted market prices the more capital intensive techniques in each industry in Tanzania had higher unit production costs than more labour intensive techniques. Hence one would expect entrepreneurs to choose more labour intensive techniques than those actually selected [Perkins (1983)].

According to Bhalla, the conventional approach of two factor substitution is of limited practical value in an African setting. Quite often, in many African countries, it is not so much the physical capital constraint as the human capital constraint which limits appropriate technological choices. Secondly, while correcting factor price distortions can contribute to a better allocation of resources, the current factor prices do not reflect the future potentialities of increases in technical knowledge and development of new appropriate technologies. Finally, correcting factor price distortions is of little avail unless accompanied by appropriate supervisory and managerial skills, appropriate institutions for gathering and disseminating information, and by an adequate planning, organizational and implementation machinery [Bhalla (1973, 1985)]. And Pack (in a study on the Substitution of Labour for Capital in Kenyan Manufacturing Industries confirms: "in the absence of technical expertise, appropriate relative factor prices may be of a limited efficacy in achieving socially appropriate factor proportions" [Pack (1976)].

Getting prices right could contribute to the alleviation of the unemployment problem but by how much and how quickly is a moot point which has to be empirically established. As a former World Bank official aptly remarked:

"... The favourite prescription of the economists - besides doubling or tripling growth rates - is to correct the price system, particularly exchange rates, interest rates, terms of trade between agriculture and industry and prices of all factors of production. But has this faith in the price system been tested empirically? When various developing countries corrected their exchange rates or interest rates at various times, was this followed by a great surge in their employment situation or merely by better utilization of capital, larger output and higher labour productivity? In any event, how large a segment of the economy does the price adjustment affect, when there is a large subsistence sector in these countries and the modern industrial sector generally contributed less than 10 per cent of total output? Or do they make only a marginal impression on the unemployment problem?" [Ul Haq (1979)].

The growth of employment in some industries in African LDCs is considerably reduced by a fast growth in labour productivity which occurs partly independently of the choice of technique with regard to output expansion. In Ethiopia, for example, this growth in productivity occurs for several reasons. Examples include: increasing quality of the labour force particularly on-the-job training and increased experience in factory environment, better management and organization, etc. (see Table IV) Labour productivity could also be enhanced in more disciplined cultures. Even if it is true that the cost of supervision and management is higher with labour intensive technologies, there was less need for close supervision in the Japanese system of paternalistic management [Bhalla (1973), Watanabe (1980)]. And in support of this hypothesis, Bhalla quotes Frederick Harbison, "...from the individual the ethical code demands unqualified loyalty to his group, subordination to his superiors, respect for his elders and complete identification with the goals of the house" [Harbison (1969)].

Table IV

Gross Value of production and index of productivity

Year	Gross value of production (E\$ million)	Employment	Gross value of production per employee (E\$)	Index of productivity
1966/67	365.0	44 349	8 232	100
1968/69	467.5	47 332	9 877	120
1969/70	542.6	48 903	11 096	135
1970/71	625.9	51 312	12 198	148

Source: Annual Survey of Manufacturing Industry for 1970/71, Ministry of Commerce, Industry and Tourism and the Central Statistical Office, Addis Ababa, July 1973, 1969.

In some industries, techniques cannot be varied to any considerable extent because some industries are capital intensive by their very nature while others could be more labour intensive. Available evidence in some African LDCs seems to indicate that there are industries where low capital/labour and capital/output ratios are common. Labour intensity or low capital/labour ratio is particularly pronounced in manufacturing industries producing food, textiles and wood and cork products. On the other hand, manufacturing industries such as paper and paper products, chemical, plastic and petroleum products do not only have high capital/output ratios but also high capital/labour ratios.

It is also important to emphasize that the capital intensity of manufacturing industries should not be a cause for great alarm. As Turnham points out, there has been a tendency in most developing countries to talk about backward and forward linkage effects more in relation to output or investment than to the indirect employment generating effects of such linkages [Turnham (1970)]. In this connexion, studies from the Ministry of Commerce, Industry and Tourism, have for example, shown that the establishment of cotton textile industry in Ethiopia created 11,108 permanent and 28,821 seasonal jobs in the Awash Valley in raw cotton production during the period 1966/67-1971/72.

Furthermore, the range of actual technological choice is to a very large extent limited by technical specifications of imported western equipment, and so long as capital goods production continue to be the exclusive monopoly of developed nations, the relatively insignificant demand of less developed countries will have only a negligible impact concerning the type of machine to be produced [Pack and Todaro, (1969)]. An OECD publication has described the problem with equal candour, "restructuring industrial processes and adopting equipment to use more labour and less capital could in some cases mean turning the clock back as in most industries there have been for years a continuous and often rapid replacement of manpower by complicated machinery and that alternative may be expensive to build because the demand for the simpler machines no longer exists in the big markets of the industrialized countries" [OECD (1970)] p. 123.

A country's position in international trade also limits its freedom to use or adapt old techniques. For instance, in areas where international competition makes it essential to adopt new techniques, employment creation should not be an overriding consideration in the case of export-based industries. This point of view has also been supported by ILO report on the employment situation in Colombia where, it has been shown that in the case of industries which have export possibilities or are threatened by foreign competition, over-emphasizing employment creation could be counter productive [ILO (1970), Baranson (1972)].

While the choice of a more labour intensive technique will add to output and employment, it will also add more to consumption through the creation of additional wage bills, thus reducing the volume of investable funds [Sen (1964), (1975)]. A reduction in investment and thereby in the future rate of growth, represents a cost, to society, of employing extra labour [Bhalla (1985)].<sup>2/</sup> And elsewhere, it has been argued that capital intensive technologies would bring about high returns to capital than would labourers because owners of capital have a high propensity to save and invest [Galenson and Leibenstein (1955)]. In the choice of technology, therefore, capital-intensive methods should be preferred because reinvestment would be greater and industrial development will proceed at a faster rate.

It is difficult to establish the basis of these bold assertions in an African setting. What is certain, however, is that industrial parastatals using capital intensive technology have higher unit production costs and lower saving rates than small-scale industries using labour intensive methods. Indeed, across the continent, industrial parastatals (including agricultural parastatals) have either performed poorly, as measured by standard financial/economic criteria, or not as well as they ought to. Moreover, there is little evidence to show that they have produced the anticipated

levels of non-financial benefits in such areas as employment generation, income distribution, technology transfer and contributions to regional equity [ECA (1989b)].

The tying of foreign aid and the relative ease of securing supplier credit on the importation of machinery could also go in the direction of biasing to capital-intensity. Consequently, "the choice of technique in any particular project is often nearly a fallout from the chosen source of finance and related project inputs" [Williams, 1975 quoted in Jeffery James (1989)]. In addition, foreign investors are suspected of misusing patents, trade marks and licensing arrangements by tying up technology with items of transfer, rather than choosing the process and goods most appropriate for a particular country [Ranis (1979), Rosenblatt and Stanley (1979), Helleiner (1975), UNIDO (1983), Leff (1974), Lall (1981), Streeten (1972)].

The fact that most of the existing investment in manufacturing industry was initially started by foreign private investment with imported technology tends to justify the capital intensity of most industrial establishments in African LDCs. Even today, African LDCs have made little headway in product design and production techniques. Transferred technology often takes the form of a "black box", which the buyer learns to use without understanding it. One reason advanced for this lack of indigenous technological capability is "the weak development of local scientific institutions and their marked susceptibility to orient their activities in line with external influences" [Sussex Group (1970) quoted in Stewart (1974)]. <sup>10/</sup> In addition, the development of indigenous technology is constrained by the extremely scanty resources devoted for research and development expenditures. According to White, the reasons for low levels of spending include: low levels of income; shortages of trained personnel, the small sizes of firms in LDCs; the ready availability of developed country technology and the low risks involved in transferring it intact rather than trying to adapt it; the absence of competitive pressures to innovate; and the practice of MNCs, if they do any research and development for LDCs, to do it mostly in their home countries [White (1978)].

Within the African economies themselves, there is a considerable degree of technological dualism between the formal and informal sectors [Bhalla (1973)].<sup>11/</sup> Several traditional activities are threatened with extinction because either the products are not competitive with those from urban-based larger industries or because the demand for them is declining owing to availability of cheaper substitutes or to restrictions imposed by low rural purchasing power [ILO (1987)]. In Burkina Faso, for example, traditional local cloth weaving and dyeing are rapidly declining under competition from both factory-woven cloth and imported clothing. And the making of leather footwear was virtually destroyed following the installation of a modern foreign owned shoe factory, making plastic shoes from imported petroleum [Wilcock and Chuta (1982)]. In Botswana, the decision to license large scale Chibuku beer producers, had a negative impact on the income and employment opportunities of rural small-scale sorghum beer producers [USAID (1987)]. In Mali, Burkina Faso, Niger, Guinea, Togo, Central African Republic and Mauritania, a large number of trained artisans are obliged to leave the countryside because the demand for their products is too unreliable for them to make a living, so that their financial situation is unsteady and unpredictable [Trouve (1984)]. In Malawi, the effect of the low level of rural incomes on the demand for textile products is reflected in the low level of per capita



consumption of cotton and man-made fibres which is 1.3 kg per annum [Livingstone (1984)]. In Ethiopia, the rural "Crafts" industry faces serious problems of technological backwardness, low productivity, and severe competition from urban industry. In some cases, severe unemployment occurs with loss of local demand for such outputs and recourse cannot be had to part-time farming [Teshome (1984)]. In the United Republic of Tanzania, the existence of SIDO as the only parastatal with specific responsibility for small industrial enterprise, has paradoxically been used to legitimize the large parastatal holding companies to the neglect of the small-scale industry [Perkins (1983)]. When it was suggested to SUDECO (the Sugar development parastatal) that it should examine the possibility of establishing small-scale, open pan sulphated sugar mills, it refused saying that this was SIDO's responsibility [IBRD (1977) quoted in Perkins (1982)].

Thus, in spite of all the questions raised above, there are many production sectors where capital or labour intensive production could be more judiciously and effectively used to the economic advantage of African LDCs provided it is recognized that the case for the choice of techniques is not as simple as it looks. Professors Ranis and Fei emphasise the need for a "critical minimum of domestic ingenuity" in order to blend imported and indigenous technology is perhaps a salutary reminder. Stewart is even more explicit:

"The creation of a new technology is needed, as well as improved diffusion and selection of existing technologies. Such a change will not come about automatically, even with a reformed price structure. It requires institutional changes to bring about. But a new technology is not, in itself, enough to cure the employment problem. Changed income distribution, and the devotion of much greater resources to the traditional sector are also required. More than straight forward technological research is also needed to bring about the widespread diffusion of a new technology. The technological change needs to become an intrinsic part of the economic development of the countries concerned, so that innovations become self-generating, as they were in Britain in the 19th century, and should not be continually imposed from above. This is not a once and for all problem but a continuing one" [Stewart (1974)] p.107.

### III. LABOUR ABSORPTION IN AGRICULTURE

For the 28 African LDCs, as a group, the growth rate of agricultural GDP declined from 0.87 per cent during 1970-1980 to a mere 0.42 per cent during 1980-1987. This was quite disheartening considering that the overall population growth for this group of 28 countries was around 2.78 per cent per annum and especially so considering that agriculture constitutes the largest sector of the economies of African least developed countries both in terms of the numbers employed in the sector and its absolute share in GDP. The productivity of agriculture and the expansion of employment opportunities in rural areas are becoming increasingly constrained by population pressure and degradation of the ecosystem, the limited spread of yield increasing technology and institutional constraints and misguided government policies.

(i) Population Pressure and Degradation of the Ecosystem

Access to land in African least developed countries has been significantly affected by the high growth rate of the agricultural population. From 1970 to 1985, population in African LDCs grew by 2.16 per cent per annum, overall, although there were significant differences between countries. Of the 28 countries shown in Table V, seven countries had growth rates of over 2.5 per cent: Mozambique (3.48), Guinea Bissau (3.43), Somalia (3.34), Rwanda (3.21), Comoros (2.89), Tanzania (2.86) and Uganda (2.65). These seven countries, however, also had the highest population growth rates at over 3 per cent, during the same period.

Table V provides data on land use patterns and agricultural population growth rate, in African least developed countries. For the twenty eight African LDCs as a whole, arable land per capita declined from 0.53 in 1970 to 0.44 in 1985. These averages, however, conceal marked differences between countries. In one group of countries, the rapid growth of agricultural population has been accompanied by a steady decline in the available arable land per capita. This has been particularly true of Botswana, the Sudan, Togo, Guinea Bissau, Somalia and Lesotho. In another group of countries, the pressure on the land has been compensated for by crop intensity. <sup>12/</sup> In Rwanda, for example, the share of harvested land as a percentage of total arable land reached 148 in 1985; in Burundi the figure was 111 per cent; Malawi 94 per cent; and Uganda 86 per cent. The density of agricultural population per square kilometer of arable land was 769 in Rwanda, 455 in Tanzania and 385 in Burundi.

The decline in arable land has been aggravated by a reduction in fallow periods, and in the absence of concomitant improvement in technology and farming systems, the productivity of land continues to diminish. It has been argued that rising population, increased commercialization of agriculture and rural-urban migration have resulted in reduced use of shifting cultivation in Africa. In the first two cases, shortages of land and of male labour in the third, are leading to shorter fallow, and longer cultivation periods. Consequently, there are now relatively few areas in which shifting cultivation could be made a stable component of farming systems [Tiffin (1983)]. In addition, the irrigation potential has barely been effectively harnessed, while in many countries, there was a decline in irrigated area per head of agricultural population.

It must be stressed, however, that land size and arable land per head should not be considered the only viable yardstick for measuring the strength of the agricultural sector. The quality of the soil, the extent of fertilizer consumption, the nature and composition of rural assets such as the number of livestock become extremely crucial. However, rural assets should be interpreted with a great deal of caution. For instance, the number of livestock does not take into account the quality of herds. Even more important is the distribution pattern of the different types of rural assets which has a far-reaching impact on the distribution of income in the rural areas.

Table V  
Population Growth Rate, Density, Agricultural Labour  
force and Cropping Intensity in African LDCs

Country	Population Growth rate (%)		Agric.Pop. per km <sup>2</sup> Arable land	Agric. Labour force % share		Per caput Arable land (ha)		Cropping Intensity
	Total	Agric.		1970	1985	1970	1985	
Benin	2.71	1.33	119.00	80.90	65.90	0.53	0.52	
Botswana	3.91	2.16	114.00	85.50	66.80	2.19	1.84	12.00
Burkina faso	2.11	1.89	227.00	88.30	85.60	0.50	0.44	50.00
Burundi	2.10	1.97	385.00	93.50	92.00	0.32	0.26	111.00
Cape Verde	1.24	-0.83	400.00	64.10	47.40	0.22	0.25	
CAR	2.14	0.78	109.00	82.90	67.80	1.14	1.08	19.00
Chad	2.14	1.27	127.00	90.20	79.30	0.88	0.79	23.00
Comoros	3.35	2.89	476.00	86.70	81.10	0.32	0.21	-
Djibouti	5.83	-	-	-	-	-	-	-
Equatorial Guinea	2.01	0.59	182.00	75.00	60.80	0.57	0.55	-
Ethiopia	2.38	1.73	256.00	85.00	77.30	0.48	0.39	55.00
Gambia	2.13	1.81	323.00	86.60	82.60	0.32	0.31	-
Guinea	2.19	1.57	313.00	85.20	77.60	0.40	0.32	32.00
Guinea Bissau	3.56	3.43	250.00	84.10	80.60	0.55	0.40	-
Lesotho	2.41	1.89	417.00	89.10	83.20	0.38	0.24	72.00
Malawi	2.91	2.02	233.00	90.50	79.50	0.51	0.43	94.00
Mali	2.37	1.65	323.00	89.20	83.30	0.34	0.31	29.00
Mauritania	2.81	1.15	667.00	84.80	67.10	0.76	0.15	25.00
Mozambique	3.75	3.48	406.00	-	-	0.40	0.68	0.70
Niger	2.62	2.26	147.00	94.30	89.30	0.69	0.13	55.00
Rwanda	3.32	3.21	769.00	93.70	92.10	0.15	-	148.00
Sao Tome and Principe	1.76	-	-	-	-	-	-	-
Sierra Leone	1.61	0.71	145.00	75.50	66.00	0.63	0.69	47.00
Somalia	3.87	3.34	323.00	78.40	72.90	0.48	0.31	102.00
Sudan	2.99	1.96	115.00	77.00	65.90	1.09	0.87	49.00
Togo	2.58	2.08	156.00	76.70	71.30	0.86	0.64	49.00
Uganda	3.09	2.65	263.00	89.30	83.50	0.43	0.38	86.00
Tanzania	3.46	2.86	455.00	90.40	83.40	0.32	0.22	64.00
<b>Total</b>	<b>2.78</b>	<b>2.16</b>	<b>225.00</b>			<b>0.53</b>	<b>0.44</b>	

Source: FAO, Production Yearbook, vol. 40; FAO, Land Use computer print-out, 1987.

Be that as it may, the notion of a plentiful supply of land is increasingly being questioned [FAO (1978)]. To begin with, much of the arable land in Africa is not farmed because of the continued prevalence of tse tse flies which virtually precludes the use of approximately one-third of the continent including some of the best watered and most fertile land [Eicher (1982)].<sup>13/</sup> In some countries, land is relatively the scarcest factor of production taking into account not only the limited size of the fertile land but also the high cost of reclaiming new marginal land, the limited capital available (for the purchase of yield increasing inputs such as fertilizers, and pesticides) and the necessity to meet the nutritional requirements of the human and animal population. On the basis of a careful review of the literature, one study concludes that nearly 40 per cent of the land area in sub-Saharan Africa was already subject to land pressure by the late 1960s, as a result of the population growth that had been accelerating since the 1940s [Hance (1975)].

Further, the capacity of a deteriorating eco-system to sustain the rural labour force in African LDCs in meaningful employment is increasingly being questioned [Brown and Wold (1985), Macdonald (1986), Mortimore (1989)]. It is estimated that about 18 million tons of topsoil are lost in developing Africa each year and sand dunes are advancing at high rates [ECA (1989c)]. In Ethiopia, for example, the measurement of sediment in a stream draining a heavily farmed watershed indicates a soil loss of about two tons per hectare each year, but individual fields within the same watershed experienced annual losses of as high as 80 tons per hectare [Soil Conservation Research Project (June 1984), cited in Brown (1985)]. In the northern Sudan sand is moving towards southern regions at about 7-10 km per year [ECA (1989c)]. African deserts are expanding, (see Table VI) according to UNEP deserts are advancing at a rate of 60,000 sq. km. per year in Africa, and desertification may affect more than 10 million sq. km. in the near future if measures are not taken promptly. Deserts currently occupy an area of 6.1 million sq. km. in the continent [ECA (1989d)].

Forest resources are fast being depleted as the demand for food crops, animal fodder and firewood has increased. The Miombo ecosystem surrounding the tropical humid forests (Angola, Tanzania, Zambia, Mozambique, Northern Nigeria, Central African Republic, Cameroon, south of Chad and Burkina Faso) is an example of forest degradation and depletion affecting several countries in the continent. Its area, which was estimated to be around 190 million ha in 1985, is decreasing at a rate of about 200,000 ha per year. In Rwanda, the Nyungwe forest, located in the Zaire-Nile divide, lost about 17,000 ha or 17 per cent of its total area from 1958 to 1979. In the Sahelian and Sudano-Guinean ecozones, overgrazing and overcutting for fuelwood and construction purposes have partially contributed to the degradation of the countries' forest cover and environmental conditions. In Ethiopia, only about three per cent of the total land is covered by forests and it is estimated that more than 100,000 hectares of forest disappear each year. In Burkina Faso, the clearing of about 50,000 ha of forests each year represents annual losses of FCFA 1.2 billion. Reforestation of that area would cost at least about FCFA 62 billion. In Niger, sylvo-pastoralism provides employment for about 80 per cent of the population, but is hindering the normal development of natural forests [ECA (1989e)].

In general, when drought and heavy deforestation have jointly intervened, arid lands have become deserts and semi-arid ones have partially or totally lost their capacity for agro-sylviculture and livestock raising. This is a worrying phenomenon because arid lands limit the use of yield-increasing technology such as fertilizers and restricts labour absorption in agriculture. Arid lands made up a significant proportion of the total land area in countries such as Botswana (100 per cent), Burkina Faso (78 per cent), Chad (94 per cent), Djibouti (100 per cent), the Gambia (89 per cent), Mali (96 per cent), Mauritania (100 per cent), Mozambique (54 per cent) and Niger (100 per cent) [Jahnke (1982)].

Table VI

Desertification trends in selected African LDCs, 1977-1984

Country	Sand dune encroachment	Deterioration in range lands	Forest depletion	Deterioration of irrigation systems	Rainfed agriculture problems
Botswana	+	+	0	0	0
Burkina Faso	0	+	+	+	++
Chad	++	++	+	++	++
Ethiopia	+	++	++	+	+
Guinea	0	0	+	+	+
Lesotho	na	+	++	0	++
Mali	+	++	++	+	+
Mauritania	+	++	++	+	+
Niger	+	++	+	++	+
Somalia	+	+	+	+	+
Sudan	++	+	+	+	0
Tanzania	na	+	+	na	++
Uganda	++	0	0	+	+

Key: 0 = stable; + = some increase;

++ = significant increase; na = not available.

Source: Adapted from Leonard Berry, "Desertification: Problems of Restoring Productivity in Dry Areas of Africa", presented to the 1985 Annual Meeting Symposium, African Development Bank, Brazzaville, People's Republic of the Congo, May 8, 1985.

(ii) The Limited Spread of Yield Increasing Technology

The final outcome of technological change in agriculture is influenced by institutional, policy and physical production environmental factors such as soil quality, access to irrigation water. Farmers lacking access to such conducive environmental factors have seldom benefited from an increase in production or employment generation [Anderson and Hazel (1985)]. The positive impact of seed fertilizer technology on employment reportedly arises from its yield-increasing capacity which, in turn, calls for increased labour input for harvesting, threshing and marketing of products. Secondly, the economics of irrigation becomes more attractive thereby inducing governments and private individuals to expand irrigation facilities. As a result, growing periods could be prolonged occasioning the intensive utilization of land and labour. Unfortunately, African LDCs have yet to take optimum advantage of seed-fertilizer and irrigation technology partly because the necessary infrastructure for seed variety improvement, seed quality control, seed production and distribution have not been developed. Out of 37 developing African countries reporting to the FAO Seed Review in 1984/1985 (of which 20 were African LDCs), only 22 per cent had advanced seed variety research institutions; 28 per cent had institutions for seed quality control and another 28 per cent practiced seed production and distribution [FAO (1987)]. In West Africa, for example, less than two per cent of total sorghum, millet and upland rice is sown to cultivars developed through modern genetic research [Matlon and Spencer (1984)].

The International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) has had little success with direct introduction of Indian sorghum and millet varieties to West Africa [Matlon (1983)]. And after seven years of trials in which over 2000 varieties were imported, the West Africa Rice Development Association (WARDA) found only two varieties that performed as well as the best local varieties [Matlon and Spencer (1984)].

Experience suggests that this poor record is caused by a complex of factors including excessive emphasis to the development of high-yielding but input dependent crop varieties in view of the regions soil, level of infrastructure development and limited farm level capital [Matlon and Spencer (1984)]. Moreover the new varieties are highly sensitive to pests.

Further, labour productivity in the agriculture of sub-Saharan Africa is very low. This is the failure of the research stations to generate new and appropriate technological packages so that, in many instances, the extension staff do not have a valid message to extend [Ghai and Smith (1987)].

Apart from the constraints mentioned above, the consumption of fertilizer per hectare of arable land for the vast majority of African LDCs is abysmally low (See Table VII). This is partly because fertilizer use entails substantial foreign exchange costs exacerbated by high transport costs to and within landlocked countries. Secondly, the fertilizer/ crop price ratio plays an important part in affecting the use of chemical fertilizer by farmers. In Ethiopia, for example, fertilizer consumption by farmers rose from 13000 MT in 1974 to 51000 MT in 1979, but suffered a set back after 1979 because fertilizer price was doubled whereas the price of crops remained unchanged.14/

**TABLE VII**

**Fertilizer Consumption and Irrigation in African LDCs**

Country	Fertilizer consumption kg/ha 1/		Irrigation	
	1975-80	1981-86	Potential 2/ *	% of potential 3/ developed (1986)
Benin	0.9	3.1	86	6.98
Botswana	1.6	0.9	100	2.00
Burkina	2.2	4.6		
Burundi	0.7	1.7		
CAR	0.7	0.6	1 900	0.00
Chad	1.9	1.7	1 200	0.83
Ethiopia	2.4	4.0	670	24.18
Gambia	11.4	16.9	72	16.67
Guinea	0.8	0.4	150	46.67
Lesotho	10.1	14.3	8	0.00
Malawi	11.1	14.0	290	6.21
Mali	5.5	8.8	340	57.35
Mauritania	8.3	5.3	39	30.77
Mozambique	5.6	6.9	2 400	41.67
Niger	0.5	0.9	100	25.00
Rwanda	0.3	0.9	44	9.09
Sierra Leone	1.1	1.4	100	30.00
Sudan	4.5	6.1	3 300	56.36
Togo	1.6	3.8	86	8.14
Tanzania	6.0	5.7	2 300	5.61

1/ ECA Secretariat calculation based on FAO Fertilizer Yearbook of various years.

2/ FAO - Investment Center: Irrigation in Africa South of the Sahara, Rome, 1986, p. 14.

3/ ECA Secretariat calculation using irrigated area in 1986 from FAO Production Yearbook 1987 and Potentially Irrigable Land.

\* = ('000 ha)

Finally, there is an increasing tendency to use chemical fertilizer for export crops as opposed to food crops. As can be seen from Table VIII, food crops which constituted about 92 per cent of the arable land and probably that proportion of agricultural labour force appropriated about 53 per cent of the fertilizer consumed between 1979 and 1981. In contrast, 47 per cent of the fertilizer consumed over the same period was directed to export crops which accounted for only 8 per cent of the harvested land in the 28 African LDCs. This in essence suggests that the fertilizer consumed in the vast majority of African LDCs is not earmarked to the sector where it is needed most either in enhancing agricultural output or in deploying the agricultural labour force in meaningful employment. This is not however to belittle the application of fertilizer on export crops other than to indicate that gains in accumulating foreign exchange through crop exporting are likely to be eroded by increasing food imports unless food crops are also accorded sufficient attention in fertilizer use both to enhance agricultural output and employment. And with annual population growth of over 3 percent in some of the African LDCs, research institutions should be restructured to devote more attention in developing seed varieties of food crops that are adaptable to specific locations and more responsive to fertilizer use.

Turning now to irrigation, out of a total land area of around 13 million square kilometers for the 28 African LDCs as a whole, only about 1.07 per cent could be irrigated in 1982. Unfortunately, even this potential has not been effectively harnessed. In 1986, 18 African LDCs could irrigate only 2.8 million hectares out of an irrigation potential of 13.2 million hectares (see table VII). In many African LDCs, agricultural production and employment creation is being obstructed by the emphasis given to large scale irrigation schemes which are characterized by high capital intensity, high recurrent costs, and low yields (due to the absence of double cropping, poor water control, inappropriate agronomic packages and the lack of complementary inputs). In fact, out of an irrigated area of nearly 2.7 million hectares in twenty two African LDCs in 1982, 79 per cent was used for large scale modern schemes [FAO (1986)]. Evidences however have revealed that small perimeters, labour intensive irrigation schemes managed and operated by family and or community groups are substantially profitable both in financial and economic terms [Matlon and Spenser (1984)]. Unfortunately the potential area affected by such projects in the African LDCs is extremely low. 15/



Table VIII  
Annual Fertilizer Consumption in African LDCs by Major Crops  
(Average 1979-81)

	Harvested Land (000 ha.)			Fertilizer applied (in tons)		
	Total	Export Crop	Food Crop	Total	Export Crop	Food Crop
	47 640	3 808	43 832	260	122	138
Share %	100	7.99	92.01	100	46.74	53.26

Source: ECA secretariat calculation; FAO: African Agriculture: The Next Twenty-five Years, Annex V, Input Supply and Incentive Policies, Rome, 1986, p. 105.

Ten African LDCs (Mauritania, the Niger, Burkina Faso, Mali, Chad, the Sudan, Ethiopia, Somalia, Tanzania and Botswana) have a rain-fed growing period of less than 120 days on more than a quarter of their territory. In the high risk tracts of these countries, irrigation is usually necessary for reliable arable agriculture. In fact, Botswana, Burkina Faso, Mali, Mauritania, the Niger and Somalia have exceeded their population carrying capacity for low input rain-fed farming [FAO (1986)].

The impact of tractorization, irrigation and fertilizer use can be considered together to judge the effect of technological change on the labour absorption capacity of agriculture. While tractorization could by itself be labour displacing, it could however augment labour demand if combined with irrigation and growing fertilizer use. By the same token, increased use of fertilizer may in itself have a limited impact on labour use, yet it can increase demand for labour considerably if combined with irrigation [ILO (1988)]. However, in some arid and sub-humid farming areas, attempt to move straight from the hoe to the tractor have resulted in utter failure. The reasons for such dismal performance are many and include shortage of skilled manpower (among machine operators and repairers), generally poor backup facilities for machine use and, in some instances, choice of unsuitable locations (in terms of soil and climate) or unsuitable equipment [Hunt (1989)]. In the final analysis, whether a country chooses animal draft power or tractorization for a particular operation depends on the related cost of labour and capital, the interest rate, potential utilization capacity, size of farms, availability of fodder, the relative maintenance costs of animals and tractors and the difficulty of obtaining spare parts, fuel and repair services [Pingali et al. (1987)].

Empirical evidence of the impact of technological change on employment in African LDCs is difficult to come by. However, field observations made in different parts of Ethiopia have revealed the impact of fertilizer on employment and yield to be significant. As Table IX shows, demand for labour in maize farming increased in the range of between 22 per cent to 54 per cent when fertilizer was applied. The corresponding increase in yield ranged between 35 to 55 per

cent. In the case of teff, demand for labour increased between 10 and 25 per cent while the increase in yield ranged from 24 per cent to 54 per cent. The increase in labour demand for wheat ranged from 18 to 60 per cent while the increase in yield ranged from 18 to 32 per cent.

Table IX

Observation of the Impact of Application of Fertilizer (N/P205) on Labour Demand and Yield on Peasant Maize, Teff and Wheat Farms in some parts of Ethiopia

Location	Year	No. of Sites	Labour demand without fertilizers (in mds)	Fertilizer applied kg/ha of N/P205	Labour demand with fertilizers (in mds)	% Increase of labour demand and yield due to fertilizer		Tasks
						Labour	Yield*	
MAIZE								
JAKO	1984	2	92	75-0	128	39	48	FWH
BAKO	1985	5	124	100-50	169	36	54	F/H
BAKO	1986	5	97	100-50	149	54	55	FWH
NAZARET	1986	6	40	69-69	50	25	35	FWHT
AWASA	1984	1	27	0-46	33	22	49	FWHT
TEFF								
HOLETA	1986	5	130	41-69	163	25	54	FWHT
HOLETA	1987	4	157	20.5-23	172	10	24	FWHT
WHEAT								
AWASA	1984	3	29	18-46	38	31	31	FHT
AWASA	1985	3	40	18-46	47	18	18	FHT
AWASA	1986	5	20	18-46	32	60	32	FHT

Source : Compiled by ECA secretariat from Progress Reports of the Agricultural Economics Department of the Institute of Agricultural Research, (Various Years) Addis Ababa.

FWHT - Fertilizing, Weeding, Harvesting and Threshing.

\* The corresponding yields before the application of fertilizer were : for maize 2015 qt/ha, 25.06 qt/ha, 27.61 qt/ha, 23.92 qt/ha and 6.68 qt/ha; for teff 8.30 qt/ha and 13.28 qt/ha; and for wheat 14.70 qt/ha, 19.67 qt/ha and 14.52 qt/ha.

(iii) Institutional Constraints and Misguided Government Policies

In a context of growing rural population and deteriorating ecosystems, broad-based development aimed at attacking mass poverty, redressing income inequalities and generating increased employment opportunities is being obstructed by a growing concentration of land ownership, a large increase in very small and marginal holdings, an increase in landlessness and virtually no direct land rights for women.

A comparison of inequalities in the distribution of land holdings over time in African LDCs has unfortunately not been possible for lack of a comprehensive data base. However, judging by the low gini coefficients in Table X, the distribution of land holdings in many African LDCs is still uneven [FAO (1988)]. In Lesotho, in 1970, 20 per cent of the rural households controlled 45 per cent of the allocated land; in 1980, they controlled 53 per cent. At the bottom end of the scale, 40 per cent controlled 16 per cent of allocated land, while in 1980, the holdings of this group had declined to six per cent [Ministry of Agriculture (1986)].

A study in Malawi shows that as a result of improved weather conditions and a 66 per cent increase in the price of maize in 1981/82, farmers with holdings greater than 1.6 hectares were able to produce more than double their maize output, whereas those with less than 0.4 hectares increased output by only 26 per cent [ILO/JASPA (1986)]. A "farmer, with a holding of less than 0.5 hectares does not have any option of increasing his production in respect to higher prices of a given crop, since all his land is devoted to growing the basic food crops" [Muskwa (1984)]. In some of the African LDCs, landlessness is being accentuated by the higher rate of population growth, and by the failure of the rural and non-agricultural activities to absorb the rural labour made surplus by the commercialization of the economy.

Table XInequality in the distribution of land holdings in  
Selected African Least Developed Countries

Country	Year	Gini Coefficient
CAR	1973	0.37
Chad	1972	0.83
Ethiopia	1977	0.43
Lesotho	1970	0.39
Malawi	1981	0.36
Mauritania	1981	0.36
Niger	1981	0.32
Sierra Leone	1971	0.44
Togo	1983	0.45

Source: FAO, The Impact of Development Strategies on the Rural Poor, World Conference on Agrarian Reform and Rural Development, Rome, 1988.

In addition to landlessness arising from shortage of land in certain African countries (such as Lesotho and Rwanda), there is also a growing tendency to privatize land rights which has resulted in the dispossession of the poorest through the process of adjudication or forced sales due to indebtedness [FAO (1985) (1988)]. The increasing privatization of land rights of communal tenures have made women to lose their customary rights over land. Even in countries which have adopted progressive land reform legislation (e.g, Ethiopia) the membership of Peasants' Associations or Cooperatives has been restricted to the male household heads except in the case of households with widows or divorcees as the head [Sahle Mariam (1982) cited in FAO (1985)].

In the Jahally-Pacharr project in the Gambia, only 52 per cent of the women surveyed in ten sample villages were actually registered as official tenants of a piece of a project land and only half of these had real decision-making authority over field activities and use of the harvest [Von Braun et al. cited in Dey (1990)]. In the Banfora region of Burkina Faso women have lost their independent access to rice land through the chefs de terre. Initially improved land was reallocated on the understanding that the male household heads would subdivide their plots among their wives. As it turned out, however, the male household heads continued to tighten their control over the land which has considerably increased in value [Dey (1984)]. And in many countries, the male household heads were recognized as official tenants or settlers who could sign the tenancy agreement, receive inputs and services. Women were denied direct access to irrigated lands and new productivity enhancing technologies [Dey (1984)].

Part of the problem of rural employment is political in nature. Many Governments who normally support the goals of rural development are hesitant to make the kind of fundamental policy changes that such rhetoric implies. For example, the root cause of the decline of agriculture in Africa is the almost total neglect of the small-holder, who is by far the major food producer. Development policies in most African countries reflect a strong urban bias that has turned the terms of trade against small farmers. While Governments subsidize the costs of farm inputs, these subsidies tend to go to a small number of large-scale farmers. Government policies have had a tendency to refer to small farmer development, mainly to attract donor financing [Friedrick (1986)]. And despite the fact that women make up 47 per cent of Africa's labour force and contribute two-thirds of the labour hours they are the category of farmers most overlooked by policy makers, extension officers, banking institutions and land reformers because of the erroneous assumption that the progressive farmer open to new ideas is a man [FAO (1983) cited in FAO (1989), Burfisher and Horenstein (1985) cited in FAO (1989)].

In almost all cases, the agricultural sector (where underdevelopment is most pronounced) is expected to contribute far more to the growth of other sectors than it receives in either direct or indirect support. In Sierra Leone, for example, agriculture contributed Le 10.6 million public funds in the form of government revenue and Marketing Board Surplus but received back Le 5.4 million (or 51 per cent) in 1973/74 [ILO/JASPA (1981)]. In Malawi, in order to acquire the financial resources needed for the development of the estate sector after independence, it was necessary to impose a heavy tax on peasants through the state crop marketing board (ADMARC). The result of this onerous tax burden was to reduce the real rate of return to peasant labour. The reduction in the real rate of return to labour in the peasant sector induced a transfer of labour from peasant agriculture to estates (despite a continuous decline in the real wage paid), increased distributional inequity and reduced the living standards and prospects of the majority of the population [Kydd and Christiansen (1982)].

In some countries, public and business savings are channelled into investment for agriculture. However, if account is taken of the fact that these savings are brought about by suppressing farmers' disposable incomes through taxation or raising the prices of agricultural inputs and keeping down the prices of outputs, the net inflow of funds to rural areas may be far less than is reported in official figures [Mauri (1972)]. Finally, the meager investment resources earmarked for the development of agriculture in African LDCs, testifies the low priority accorded to the sector (see table XI) and this is despite the fact that agriculture is the mainstay of the economies of African LDCs.

**Table XI**  
**Share of Agriculture in Total Development**  
**Expenditure of Selected African Countries**  
(in percentages)

Year	Botswana 1/	Somalia 2/	Gambia 3/	Equatorial Guinea 4/
1981/82	9.5	1.1	n.a	-
1982/83	9.6	1.4	3.6	-
1983/84	7.7	5.2	24.0	-
1984/85	10.1	5.2	12.1	-
1985/86	12.5	3.3	21.7	-
1986/87	16.6	n.a	28.8	24.3
1987/88	13.9	n.a	18.7	16.0
1988/89	10.9	n.a	n.a	22.0

**Source:**

- 1/ Republic of Botswana, Statistical Bulletin, March 1989, vol. 14, No. 1.
- 2/ Central Bank of Somalia Bulletin, March 1985, No. 55.
- 3/ Central Bank of the Gambia, Quarterly Bulletin, October to December 1988.
- 4/ Three Year Public Investment Programme, Malabo, Equatorial Guinea, March, 1989.

The institutional infrastructure - namely banking, insurance and finance - has tended to be less and less village oriented and more and more drawn to the urban seats of power, authority and financial patronage. Indeed, commercial banks in African LDCs tend to cluster in urban conglomerations and concentrate on funding the foreign trade sector but are loath to offer credit to agriculture to an appreciable degree [Abebe (1987), (1990)] (see table XII).

In spite of the provision of various incentives (cheap loans and fertilizer subsidies and fiscal incentives such as duty free import of tractors and fuel), large-scale commercial farms are not sufficiently achieving the twin objectives of employment creation and increased production. Furthermore, in a market oriented economy, large-scale farm owners (or landlords) may have other interests which hold greater economic importance for them than farming so that they fail to make full use of the resources at their disposal [Dorner and Kanel (1971)]. Even where there is maximum use of resources, the input mix favours mechanized operations, which are labour displacing.

**Table XII**  
**Share and average annual compound Growth rates of Agricultural and trade credit in total loan portfolio of commercial banks of African least developed countries**

Country	Period	Agricultural credit in total loan portfolio of commercial banks (% of shares)	Agriculture credit average annual compound growth rates	Domestic and foreign trade credit in total loan portfolio of commercial banks (% of shares)	Domestic foreign trade credit average annual compound growth rates
Benin 1/	1984-1986	13.5	-3.8	27.3	5.3
Botswana 2/	1981-1987	8.5	1.9		
Burkina Faso 3/	1984-1986	5.2	19.8	34.2	41.4
Burundi 3/	1986-1988	3.1	29.4	43.9	22.4
Central African Republic 4/	1983-1988	1.0	60.4	69.0	-1.1
Chad 4/	1983-1988	0.9	-23.8	74.2	13.5
Ethiopia 5/	1980-1987	4.9	6.8	58.2	-0.3
Gambia 6/	1983-1987	31.4	-14.4	23.9	2.6
Lesotho 7/	1983-1988	4.7	96.6	55.1	9.1
Malawi 8/	1973-1986	43.8	27.4	26.1	9.2
Mali 1/	1984-1986	4.1	12.9	45.7	1.7
Rwanda 9/	1980-1986	37.6	18.5	19.5	23.4
Sierra Leone 10/	1976-1985	3.7	27.8	53.2	16.2
Somalia 11/	1978-1984	9.3	-4.0	56.0	26.1
Sudan 12/	1982-1987	0.3	17.4	41.1	30.7
Tanzania 13/	1970-1986	5.3	13.8	66.9	23.2
Togo 1/	1984-1986	1.9	-18.0	42.0	5.9

Source: Adapted from Abebe Adera, "Financial Repression and its Impact on Financial Development and Economic Growth of the African Least Developed Countries", Savings and Development, No. 1, 1990.

1/ Banque Centrale des états de l'Afrique de l'ouest, Annual Report 1986 (including short, medium and long-term credit).

2/ Bank of Botswana, Statistical Bulletin, volume 13, No. 1, March 1988.

3/ Banque de la République du Burundi, Bulletin Mensuel, Douzième Année, No. 1 janvier 1989 et onzième Année No. 8 - août 1988.

4/ Banque des Etats de l'Afrique Centrale Statistique Monétaire No. 154 - août - septembre 1988 No. 132; No. 140, mars 1987; No. 132, mai 1988; No. 124 - août-septembre 1985; 123 juin, juillet 1985.

5/ Commercial Bank of Ethiopia, Annual Reports, 1979/80 - 1986/87

6/ Central Bank of the Gambia, Quarterly Bulletin, No. 4, October-December 1987.

7/ Central Bank of Lesotho, Quarterly Review, vol. VII, No. 3, September 1988.

8/ Reserve Bank of Malawi, Financial and Economic Review, vol. XX-No. 1, 1988.

9/ Banque nationale du Rwanda, Bulletin No. 13, Décembre 1986.

10/ Bank of Sierra Leone, Economic Review vol., 20, No. 1&2, January - June 1986.

11/ Central Bank of Somalia, Bulletin No. 55, March 1985.

12/ Bank of Sudan, Economic and Financial Statistics Review, vol. 29, No.3 July-Spt 1987.

13/ Bank of Tanzania, Economic and Operations Report, 30th June,

1987.

In contrast, subsistence farming using family labour provides the greatest volume of total employment for a given land area. The small family farm will have a much more highly-motivated labour force than the larger farm [Myint (1965), Berry and Cline (1979), Livingstone (1986), Corina (1985), Kanel (1967), Owen (1966), Lele (1989)]. In conditions of abundant available rural labour and continuous population growth, productivity per unit of land is indeed of prime importance. Additional activities can be undertaken on the same area by interplanting, fallow reduction, integration with livestock, incorporating a vegetable garden, etc. The advantages of multiple cropping are not merely that the labour force is utilized more evenly throughout the year but also the cultivator has something to fill almost continuously, thus reducing his credit problem.

In summary, the increasing population pressure, coupled with the degradation of the ecosystem, the limited spread of yield increasing technology and institutional constraints and misguided government policies are exacerbating the rural-urban migration which has led to excessive urbanization. It is to this aspect of rural-urban migration that attention will now be drawn.

One study concludes that, "there is some evidence that many migrants come from relatively small pockets of the country where land degradation and population pressure are great and where there is little opportunity for changing agricultural technologies" [Levi (1973)].

A detailed study of six different areas in Malawi revealed that migration from any given area was mainly a push process since it occurred predominantly in impoverished areas with poor lands and no export crops. In contrast, in areas near European settlements labour migration was less pronounced [Read (1955)]. In the United Republic of Tanzania out migration occurred largely in the poorer localities with no exploitable natural resources [Guilliver (1982)]. A study of three northern provinces in Sierra Leone revealed that migration to Freetown was being precipitated by the degradation of the soil [Banton (1957) cited in ECA (1989f)]. In the Sudan, a major push factor which operates strongly in drought years, is the gradual desertification of a broad belt of land, notably in northern Kordofan and northern Darfur. In years of poor rainfall, members of the farming families have to migrate to find work in order to survive [ILO (1987)].

The response of Burkina Faso to the aridity situation in 1975 has been massive emigration, estimated at 908,100 persons in 1975, to the Cote d'Ivoire; Mali's emigration also to the Cote d'Ivoire accounted for 421,900 persons in 1975. In 1970, 13 per cent of the population of Togo emigrated to Ghana [Zachariah and Conde (1981)].

There is also some evidence that the more schooled individuals have a higher propensity to migrate from rural to urban areas. In Ethiopia, for example, 80 per cent of the children who attended school in Wolmera district (Shoa Administrative Region) did not become farmers and of those who did, most had only completed the fourth grade [Fasil (1985)]. In Botswana, the tendency to migrate increases with education; a national survey on migration, conducted by the Central Statistical Office, reveals that the biggest group of migrants is aged 15-34, with a level of education of standard 1-7 or less [Gwebu (1982)].



The implications of rural-urban migration on agricultural output has equally been marked as the younger and more able-bodied men cease to be available to engage in agricultural activities. Farm level surveys throughout sub-Saharan Africa have consistently shown that male adults were working an average of 1000 hours per year in agricultural production as compared with 1500 to 3000 hours in Egypt and many Asian countries. The migration of adult male to urban areas will further exacerbate the level of underemployment in agriculture [Eicher and Baker (1981)].

In crop agriculture, labour must be present at exactly the correct time in terms of rainfall, if people are to be able to plough their lands. In the National Migration Survey of Botswana, it was established that lack of available labour as the reason for not ploughing farm lands on time. It was further established that the absence of men working at the mines of South Africa leads to sharp decline in crop output.

In Mali, the loss of craft production, particularly of agricultural equipment, caused by seasonal migration is substantial. This, in turn, stimulates further migration and non-subsistence cash cropping, in order to obtain the money for such purchases [Rey (1976)].

An ILO study makes the following observations on the chain of results that arose from poor performance of agriculture hence migration in Lesotho: ".....it is not just that agriculture output is lost because the men are away but that ploughing and planting is increasingly performed by women and boys.....; the decision making power in regard to crop and livestock has largely passed into the hands of women and is generally neglected as being marginal to the off-farm earnings of the male heads of rural households..... The result is a vicious circle in which inadequate farm income induces migration and migration fosters inefficient farm practices, encouraging still more migration. Thus gradually, Lesotho is becoming a rural dormitory suburb of RSA" [ILO/JASPA (1979)], pp. 62-63.

In addition to rural-urban migration, some of the labour force in African LDCs migrate abroad because of better economic opportunities. Somalis working in the Gulf countries earn five to six times the average Somali wage. Remittances would equal fifteen times the Somali based wage bill, nearly two fifths of a properly counted GNP and 1.5 times the non-agricultural GDP [Jamal (1988)]. In the Sudan, migrant remittances from the Gulf countries is estimated to range from US\$ 1.6 to US\$3 billion per annum during 1983/1984 [ILO (1987)]. In Botswana the average mine work wage was, in 1978-1979, three times higher than the wage for a similar unskilled job in either Gaborone or a large village in Botswana and nearly six times higher than a similar job in a sub-peripheral remote village. In terms of the potential effect upon GDP of a cessation of mine labour recruitment from Botswana a decline in GDP of within 5.7 per cent or Pula 28.8 million was estimated [Harris (1982)]. The average daily wage of Basotho working in South African mines in 1976/1977 was 22 times higher than wage paid to an adult agricultural labourer in rural Lesotho and nearly three times as high as the minimum wage paid by government sponsored agricultural projects [ILO/JASPA (1979)]. Over the same period remittances accounted for 47.2 per cent of the GNI of the country [Government of the Kingdom of Lesotho (1985)].

Besides its deteriorating impact on agricultural production and employment, migration has led to excessive urbanization. From 1970 to 1985, the urban population in African LDCs grew at an average annual rate of 5.49 per cent compared with 5.04 per cent for developing Africa as a whole. These urbanization trends have been particularly marked in the United Republic of Tanzania (12.1%); Mozambique (10.7%); Botswana (9.1 %); Mauritania (8.5%); Burundi (8.3%); Cape Verde (8.2%); Benin (8.0%); Chad (7.9%); Rwanda and Malawi (7.7%); Lesotho and Niger (6.9%); Somalia (6.1%) and Togo (6.0%)[ECA (1989f)].

The level of urbanization in the African LDCs rose from 15.0 per cent in 1970 to 22.0 per cent in 1985. In 1985, urbanization levels exceeded the 30 per cent mark in Djibouti (77.7 per cent); Equatorial Guinea (59.7 per cent); Cape Verde (53.3 per cent); Uganda (49.5 per cent); Central African Republic (42.4 per cent); Benin (35.2 per cent); Sao Tome and Principe (37.6 per cent); Mauritania (34.6 per cent) and Somalia (32.5 per cent) [ECA (1989f)].

Urban growth rates relative to the rural from 1970 to 1985 were exceedingly excessive in all the African LDCs. Urban rates were over eight times the rural rates in Equatorial Guinea; over seven times the rural rates in Cape Verde, Mauritania, Sierra Leone and over six times in Benin and Chad.

Apart from the heavy burden on recurrent cost budgets in providing jobs for the unemployed, the rapid increase in urban population through rural emigration creates demands for such services as water, electricity, transport and housing. It is precisely the existence of these services in urban areas which contributes to such emigration. The bulk of the unemployed population, however, do not generate the output or tax revenues needed to provide those services.

Growing rural-urban migration coupled with the natural increase in urban areas, the limited structural change that has taken place in the last two decades and the marked deceleration of economic growth has further intensified the problem of unemployment in the African LDCs. Because urban areas are swelling with people and the sectors which do not produce farm goods have not absorbed a substantially larger percentage of a growing labour force, more workers are drifting to jobs in the tertiary sector (including menial, domestic, and government service work) and to what the United Nations has called "unspecified activities: - mainly disguised unemployment.

Table XIII summarizes the available evidence on urban and open unemployment. The data further reveals that open unemployment is more serious for the population aged 15 to 24 years.

**Table XIII**  
**Estimates of urban open unemployment in selected African Least Developed Countries, 1960s, 1970s and 1980s**

Least Developed Countries	Year	Towns	Percentage reported unemployed	Population
Benin <u>a/</u>	1960s	Urban areas	13	Men aged 15-60
Botswana <u>c/</u>	1984/85	"	56	Youth aged 15-19
Central African Republic <u>b/</u>	1976	Urban areas	17	Labour force
		Bangui	17	Male labour force
			27	Female labor force
Ethiopia <u>c/</u>	1984	Urban areas	24	Youth aged 15-24
Malawi <u>b/</u>	1977	Urban areas	19	Adults 20-24
		Urban areas	5	Labour force
		Blantyre-Limbe	4	Male Labour force
Sierra Leone	1974 <u>a/</u>		8	Female Labor force
		Small urban	13	Educated & uneducated
		Large urban	15	Educated & uneducated
Tanzania	1971 <u>a/</u>	7 towns	5	Men
			21	Women
Togo <u>b/</u>	1970	Urban areas	4	Labour Force
		Lome	6	Male labour force
			12	Female labor force

a/ J. Gugler, "Migration to Urban Centres of Unemployment in Tropical Africa," in A.H. Richmond and D. Kubat (eds) International Migration: The New World and the Third World, Beverley Hills: Sage Publications 1976, page 185.

b/ ECA, Demographic Handbook for Africa, Addis Ababa, 1988.

c/ ILO, African Employment Report 1988, Addis Ababa: Jobs and Skills Programme for Africa, 1989.

#### IV. CONCLUSIONS AND POLICY RECOMMENDATIONS

1. Given the rapid population growth and the inadequate labour absorption capacity of industry, agriculture must be organized not only to produce marketable surplus but also to provide much more productive employment than it does at present. More than ever before, it has become increasingly apparent that unless concerted efforts are made to modernize the agricultural sector, the number of people fleeing from rural poverty in the 1990s will be accentuated at a much faster rate than the decade of the 1970s and the 1980s. And with no adequate employment growth in the modern sector, destitution and poverty in the city slums is accelerating. In spite of this eminent danger, however, agriculture is still being looked at as the step-child of the whole development exercise. There is still a great deal of public policy bias towards agriculture both in terms of investment allocation and price manipulation. Investment priorities are highly distorted. Farmers' taxes are often used to support urban-oriented infrastructure rather than to promote agriculture. The taxation of agriculture is by no means the only factor influencing relative returns. Government expenditure patterns and subsidization of urban activities have been responsible for diverting labour out of agriculture. Government investment policy and credit institutions have tended to reinforce a dualistic agricultural sector. Agricultural services such as marketing, credit, research, extension and input supply have been heavily concentrated on a comparatively small group of commercial producers with almost total disregard for the development of small-holders. Until recently, the role of women in development was accorded little importance.

In order to focus on the small farm as a vehicle for increasing production, employment generation and income distribution, a radical amelioration of existing institutional constraints is imperative. It has been shown that "simply providing more investment, new technology and new services has proved to be inadequate for alleviating mass poverty when there are no instruments for influencing their ultimate distribution within the rural economy" [Lee (1980)] p. 102. There is no technical gimmick for better income distribution where no effective political will exists.

Furthermore, as soon as these institutional constraints are ameliorated, not only labour absorption in agriculture will gain momentum but the production base of the overwhelming majority of small-holders in African LDCs could be significantly enhanced both to produce marketable surplus and to generate the investment required to step up production in manufacturing and agriculture [Thisenhusen (1969), (1971), Owen (1971)].

2. Agricultural research and extension should be redesigned not only to bring about a far-reaching impact on the productivity of land but also on the productivity of labour. In particular, research and extension should be redesigned in such a way so as to cover the hitherto neglected segments of the rural population (particularly rural women) and ensure that their efforts will not be constrained because of lack of access to education and technical skills, land and credit, etc. Extension workers should move away from the narrow contours of diffusing agricultural education and redesign their programmes in a holistic way so that the issues of ecology, nutrition, marketing, banking, literacy are all perceived in an integrated fashion. Research on fertilizer application should be conducted at farm sites in order to determine levels of optimum dose, taking risk and

profitability into account. In addition to establishing a broader set of agricultural research objectives for technological development, there is also need for a multi-year time frame for technology evaluation. In the medium term, for example, agriculture research in African LDCs, should focus on the development of seed varieties which will cater to the needs of the small holder even if that means only moderate yield increases. This includes breeding of varieties with shorter crop cycle or modified plant structure and development of varieties with improved seedling vigor, drought resistance and resistance to most pests and diseases.

3. Small perimeter labour intensive irrigation schemes owned and operated by individual farm families or small holder communities (co-operatives) tend to be financially profitable and create less burden to government treasuries than large-scale schemes. And yet the potential of such schemes is less exploited than the larger ones in the African LDCs. In view of the drought proneness, short growing period, and the need to increase the carrying capacity of agricultural lands, especially in some African LDCs, irrigation, and particularly small-scale irrigation schemes, should be considered as a priority in their development agenda of rural areas.

4. Farm level surveys throughout sub-Saharan African have consistently shown that male adults are working much less hours per year compared to their counterparts in other developing regions. While this problem can be significantly improved by meeting the specific constraints facing smallholders, the agriculture sector alone, is unlikely to absorb productively all new labour entrants in land scarce economies of the African LDCs. Consequently, careful attention should be paid to rural non-farm activities which have hitherto been neglected. As is well known, the emphasis on planning in many African LDCs has often been to treat rural non-farm economic activities as peripheral to national development strategies. It should however be pointed out that Governments should view both the horizontal multiplication of non-farm employment opportunities and their vertical integration into existing economic structures, as one of the key strategies for reducing unemployment and out-migration. It should also be stressed that policies which influence agriculture will have powerful effects on the non-farm component of rural development. Such policy measures would include investments in physical and social infrastructure, adequate agricultural support services and rural credit programmes that are both effective and efficient [Okafor (1983), Guhu (1979), RSIE (1988), Anderson and Leiserson (1980)].

5. As regards the reduction of excess migration, three policy considerations deserve special mention. At the farm level, Governments should take measures which will help remaining family members to sustain agriculture output per capita through the promotion of alternative methods of soil fertility maintenance with lower male labour demands (such as green manuring), by promoting less labour-intensive staple food crops such as cassava. Secondly, Governments may act to raise returns to farming through research into new crops, crop varieties and production technology and through changes in both the agricultural price structure and real minimum wages [FAO (1984)]. A great deal could also be achieved in enhancing agricultural production and rural employment if taxes derived from agriculture are ploughed back for the development of the rural marketing and transport infrastructure. Besides agricultural interventions, Governments should attempt to influence industrial location by for instance, offering tax rebates, credit facilities and building fully-serviced industrial estates in rural villages.

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6. As propounded in the Kilimanjaro Programme of Action for African Population and Self-Reliant Development, population should be seen as a central component in formulating and implementing policies and programmes for accelerated socio-economic development. Over the long-run, a successful programme of population control could make a significant contribution not only to the attainment of major socio-economic objectives but also to the ultimate elimination of the problem of unemployment. Empirical evidence in developing countries has shown that savings rates are heavily influenced by dependency ratios which in turn are determined by the rates of overall population growth. What is more, a country with low population growth will have less need to invest its scarce resources in schools, hospitals and other elements of these social infrastructure and can invest them more directly in productive projects [ECA (1984), Todaro (1971), Leff (1969), Enke (1971), Hammer (1985)]. As one writer has most succinctly commented : "It is a false claim that some countries need more population to fill their land or accelerate their economic growth. There are no vacant lands equipped with roads, schools, houses and the tools of agricultural or industrial employment. Therefore, the people who are to fill those lands, before they can live even at the current low standard of living, must first eat up a portion of the present scarce supply of capital - it is this burden which defeats a nation's efforts to raise its standard of living by increasing its population" [(McNamara (1968)), p. 13.

7. It should also be pointed out that many African LDCs lack concerted national, subregional and regional policy instruments for integrating environmental concerns into economic planning and programmes for sustainable development. As alluded to above, population movements as a result of degraded environmental conditions are increasing the number of the unemployed in the urban areas. Therefore, in order to achieve a more equitable, productive and sustainable balance between people, resources, environment and development, the integration of environmental and resource considerations at all levels of planning and decision making assumes paramount importance [ECA (1989)]. As it is, there is little backlog of basic research on tropical environmental problems which impede agricultural production. Consequently, there is an increasing need for regional co-operation in scientific research among African LDCs in order to alleviate the problem of resource (human, financial) shortages.

8. With respect to the small as against large-scale industry, a joint study undertaken by the UNDP, UNIDO, ILO and the Government of the Netherlands on the successes and failures of rural small industrial enterprises in different parts of developing countries casts an interesting light. According to this study, demand-side policies (whether arising from agrarian reforms and more equitable distribution of land and income or from prices and market incentives to farmers) resulting in an aggregate increase in rural incomes have been more effective in stimulating Rural Small Industrial Enterprise (RSIE) through increase in the demand for such consumer goods as food, clothing, housing durables. Supply-side strategies - skill training programmes, appropriate technology diffusion, small investment credits, and industrial infrastructure development - play an important supporting role, but do not generate self-sustained employment. In the absence of increasing demand for rural non-farm products, supply-side measures to increase the production of such items may prove self-defeating. Furthermore, efforts directed at improving the lot of small-scale urban entrepreneurs without a concomitant effective policy to address the problem facing the rural small enterprises sector could increase rural-urban migration with no

opportunities in prospect. Consequently, policies relating to structure of protection, exchange rate, interest rate, credit, licensing and import quotas have to be unbiased and neutral in their effect and should not discriminate between large-scale and small-scale industries or between urban and rural industries [RSIE (1988), Di Tullio (1973)].

9. Appropriate technological alternatives will vary across countries according to differences in endowment and tastes, as well as overtime within a country [Ranis (1979)]. More specifically, "the question of whether or not an efficient alternative technology exists is closely tied up with the whole strategy of the country's development, and can only be addressed within the context of a particular strategy" [Stewart (1977)]. African LDCs should therefore re-examine their institutional structures of research and development in order to ensure that they are as responsive as possible to the practical needs of their own producing communities. To begin with, detailed operational information about simpler technologies is difficult to come by in many African countries. If such information was more widely and readily available, investors would be more willing to use the alternative employment -generating technology. Consequently, the building up of an indigenous technological capability that could respond to the unique circumstances of labour-surplus societies, the development of new products and processes, the adaption and improvement of existing technologies and the engineering to achieve commercial success become paramount [Moore (1983)]. Commentators on the Japanese experience have noted that, "most new technologies developments in Japan have been in the areas of assembly processes of manufacturing technology, rather than inventions of new technologies. The Japanese do not confuse technological development with innovation. They speak of two entirely different fields of endeavour" [Gregory (1980) cited in Moore (1983)].

There are, however, two issues that are obstructing "the indigenous capacity to invent and innovate" [Bruton (1985)]. Apart from the meagre resources earmarked for the development of R & D, the incentive to innovate and adopt new technologies is undermined by the very high levels of protection that are being pursued by the African LDCs themselves. As one study has pointedly asked: when competition from imports is largely removed, why should a domestic enterprise take the risks involved in research and development of new products and processes? Consequently, in industries competing with imports, a clear-cut industrial policy has to be formulated to decide how and how much they should be protected against foreign competition. The crux of the problem is that too much protection fosters inefficient industries and nurtures vested interests, while too little nips the young industries in the bud. [UNIDO (1983)] Secondly, in many African LDCs, the highest levels of protection are given to light consumer industries with low or negative protection of value added being given to capital and engineering products. Since the last group is the primary carrier of technological change and, through linkages, affects the transmission changes to other parts of industry, the low levels of protection impede the ability of such industries to grow. A partial solution, lies in narrowing the range of protection by decreasing protection in the high range and increasing it for capital goods, so as to move toward greater uniformity of treatment [Moore (1983)].

10. Last but not least, appropriate incentives through the correction of factor price distortions constitute only one element of action to ensure appropriate technological decision-making and employment generation. Income distribution, administration and managerial organizations may be equally important determinants of technology choice.



### NOTES

1/ We are grateful for helpful comments made by Ms. N. Forni, Human Resources, Institutions and Agrarian Reform Division, FAO, Rome, and Mr. Moise Allal, Employment and Technology Branch, ILO, Geneva.

2/ In 1981, 21 countries in Africa were classified as LDCs, but by 1988 the number had grown to 28. Of this total, 12 are landlocked and four are island countries. They are all characterized by very low income per head, the majority of the population living at below minimum acceptable standards in basic needs and predominantly in the subsistence sector; extremely low agricultural productivity and weak agro-support institutions; the low share of manufacturing in GDP; inadequate levels of exploitation of natural resources, especially of minerals and energy, because of lack of knowledge, finance and skills; low per capita export levels and even of skilled personnel at all levels; weak institutional and physical infrastructure, especially in the areas of transport and communications, and major geographical and/or climatological handicaps such as a land-locked situation, insularity, drought and desertification. In addition, the African LDCs also face acute population problems. Collectively, they accounted for 37 per cent of the total estimated population of 540.5 million of developing Africa in mid-1986. In general, however, the LDCs are characterized by relatively small and scattered population, ranging from 0.11 million in Sao Tome and Principe, to 44.6 million in Ethiopia. Seven countries (Cape Verde, Comoros, Djibouti, Equatorial Guinea, the Gambia, Guinea-Bissau and Sao Tome and Principe) have populations of under a million and in only five does population exceed 10 million (Ethiopia, Mozambique, the Sudan, Uganda and the United Republic of Tanzania).

3/ "In addition, to the numbers of people unemployed, many of whom may receive minimum incomes, it is also necessary to consider the dimensions of (1) time (many of those employed would like to work more hours per day, per week or per year); (2) intensity of work (which brings into consideration the matter of health and nutrition); and (3) productivity (lack of which may be attributed to inadequate complementary resources with which to work). Even these are only the most obvious dimensions of effective work, and factors such as motivation, attitudes and cultural inhibitions must also be considered" [Edwards (1974)].

4/ Japan is known to have used this technique early in its development process, running machines longer hours and at higher speeds than was customary in the United States. The subsequent increased need for maintenance added further employment.

5/ The author of this article has partly relied on an earlier work published in 1974. See, Abebe Adera, "Some Thoughts on the Employment Problem in Ethiopia", Eastern African Economic Review, Oxford University Press, vol.6, No.1, (June 1974), pp. 81-90.

6/ There is a comprehensive study conducted on this subject for Sierra Leone. See for example, Derek Byerlee, Carl K. Eicher, Carl Liedholm, and Dustan S.C. Spencer, "Employment-output Conflicts, Factor Price Distortions, and Choice of Technique: Empirical Results from Sierra Leone," Economic Development and Cultural Change, Volume 31, Number 2, January 1983, pp. 315-336; P.C. Perkins, "Technology Choice, Industrialization and Development Experiences in

Tanzania," The Journal of Development Studies, Volume 19, No. 2, January 1983, PP. 213-241; Norman S. McBain and James Pickett, "Appropriate Technology in Ethiopian Footwear Production", in Appropriate Technology Problems and Promises (edited by Nicolas Jequier, OECD (Paris, 1976), PP. 296-308; N.C. McBain, "Developing Country Choice: Footwear in Ethiopia", World Development, Vole 5, Number 9/10, Sept./Oct. 1977, PP. 829-838; C. Cooper, R.Kaplinsky et al., "Choice of Technique for Can Making in Kenya, Tanzania and Thailand, in Technology and Employment in Industry, (edited by A.S. Bhalla), ILO, 1985, PP. 91-124. D. Williams (1975): "National Planning and the choice of technology: The case of textiles in Tanzania, Economic Research Bureau Paper, No. 75.12, Dar es Salaam, June. Jeffrey James, "Bureaucratic, Engineering and Economic Men: Decision-making for Technology in the United Republic of Tanzania's State-owned Enterprises" in The Technological Behaviour of Public Enterprises in Developing Countries (edited by Jeffery James), London and New York [Routledge (1989)].

7/ The literature on small-scale industries in Africa has become more extensive. ILO (1984b) "Rural Small-scale Industries and Employment in Africa and Asia", edited by Enyinna Chuta and S.V. Sethuraman (Geneva); David Wilcock and Enyinna Chuta, "Employment in Rural Industries in Eastern Upper Volta", International Labour Review, Vol. 121, No. 4, 1982; J.Trouve, "Development of Rural Industries in French-speaking Africa: A Critical Review" in Rural Small-Scale Industries and Employment in Africa and Asia" (edited by Enyinna Chuta and S.V. Sethuraman), Geneva, 1984; ILO (1987) Rural Industries and Non-farm Employment (Geneva); John M. Page, Jr., and William F. Steel "Small Enterprise Development Economic Issues from African Experience", World Bank Technical Paper Number 26, 1984; Teshome Mulat, "Employment in Small-scale Manufacturing and Handicraft Industries in Ethiopia", Labour and Society, Vol.9, No. 2, April-June 1984; Enyinna Chuta and Carl Liedholm, Employment and Growth in Small-scale Industry, "Empirical Evidence and Policy Assessment from Sierra Leone (MacMillan, 1985); M. Allal and E. Chuta, Cottage Industries and Handicrafts, "Some Guidelines for Employment Promotion" [ILO (1985)].

8/ Bhalla has argued that capital intensive products are not necessarily inappropriate for low income consumers. A case in point is that plastic shoes are more durable and cheaper than leather shoes produced with labour-intensive techniques. On distributional and equity grounds, such capital intensive products may well be appropriate for even low income consumers [Bhalla (1985)]. Discussions with technology transfer are mostly framed in terms of the costs of the transfer and of the production characteristics of the techniques, with utter disregard of the effect of new products, or changing characteristics of old products [James and Stewart (1981), Ginneken and Baron (1984)]. In Kenya, for example, the consumption of fine, sifted maize flour has increased rapidly as a result of, at least partly of advertisement, and yet the product is made by a more capital intensive method, generating fewer employment opportunities [Baron (1980)]. A study of footwear in Ethiopia found that moulded plastic sandals appear to offer much better value as simple covers for the foot soles of peasant families. The price per pair is less than one-seventh of the hand sewn leather shoe [McBain (1977)].

9/ The ILO Comprehensive Employment Mission to Sri Lanka stated that rough estimates suggested that employment of otherwise unemployed unskilled labour meant an expenditure of some 60-70 per cent of their extra income on food, which at the margin was imported or diverted from exports of coconuts [ILO (1973)].

10/ Moore contends that not only do gaps exist in the knowledge of production techniques, (particularly in the engineering industries) but it may be costly to acquire the information, when there is no certainty as to the reliability of the sources. "The sellers of machinery do not act from altruistic motives to help the buyer decide what is really best for him" [Moore (1983)]. "Other factors that limit the demand for appropriate techniques include an engineering bias toward capital intensity - a desire for the newest and best; management bias towards capital intensity and product quality bias which places emphasis on automated and controlled production needed to establish and maintain high quality". [James (1989)], pp.81-92. According to Dahlman and Westphal, "more important than the differences in the methods of transferring technology is the maneuvering possibility within each method. The main areas of maneuvering relate less to technological means, more to technical informations and understanding" [Dahlman Larson and, Westphal (1985)], see also [Westphal, Rhea and Pursell (1981)]. And Rains writing on the Japan's experience points out that unlike some of the contemporary less developed countries, Japan clearly did not wish to transplant capital intensive technology ahead of its entrepreneurial and skilled labour capacities [Rains (1973)].

11/ Activities undertaken by the informal and the formal sectors are not entirely distinct. There is a considerable degree of overlapping of functions between the formal and the informal sectors in many African LDCs.

12/ According to FAO arable land comprises (a) land under temporary crops (Double cropped areas are counted only once); (b) temporary meadows or pastures; (c) land under market or kitchen gardens and (d) land temporarily fallow or idle. Cropping intensity refers to the relationship of harvested area to arable land. Harvested area refers to the area harvested times the number of cropping cycles per year. Changes in crop intensity arise through reductions in fallow periods, the incorporation of ideal land, deserts and arable land reserves, flood control and the expansion of the irrigated land area. In general, the alterations come about through changes in the four categories of arable land, including multiple cropping. Loss of arable land results from the withdrawal from cultivation of unproductive land, continued overuse resulting in soil degradation and land lost through the creation of artificial lakes or dams [FAO Production Year Book].

13/ According to Eicher tsetse control is a long-term and costly activity which includes clearing of vegetation which harbours flies, spraying, release of sterile male flies and human settlement [Eicher (1982)].

14/ It has elsewhere been argued that structural constraints rather than low producer prices have been primarily responsible for the low adoption of technological improvements in agriculture in sub-Saharan Africa [Delgado and Mellor (1984), Beynon (1989)]. Others have stressed the inadequate institutional, human capital physical infrastructure environment [Lele (1988)] and still

others have criticized the emphasis of getting price right as excessive [Lipton (1987)]. In a study of cotton production in western Burkina Faso, for example, technological change based on increased input use led to reduced real costs per unit of output, and a dramatic improvement in the profitability of cotton production relative both to labour, the scarce input, and to sorghum, the major competing activity. This was in spite of falling real price of cotton in terms of food grains [Ranade, Jha and Delgado (1988)].

15/ There has been widespread recourse to inappropriate foreign models in planning large-scale irrigation development in Africa. "Most of these models are generally static and descriptive of the situation at project formulation. Rarely incorporating an historical perspective, they usually fail to identify constraints to and possibilities for modification in the production system and gender relations to take advantage of new irrigation technology" [Dey (1990)]. In addition, Dey has argued that the prevailing sexual division of agricultural labour means that these technologies are in effect sex-specific and that indiscriminate introduction of these technologies may distort the existing relative balance in labour demand for male and female tasks [Dey (1984)].

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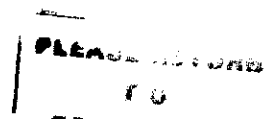
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