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Globalisation and Technology: Problems and Prospects for the Agricultural Sector in Africa

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Abstract

This paper examines the linkage between globalisation as a phenomenon and technology as the catalyst on the state of the agricultural sector in Africa. It is observed that though agriculture is the dominant economic sector in Africa, it is currently facing a food crisis of monumental dimensions. Figures pertaining to food production growth rates and the percentage share of agriculture in total labour force are presented to highlight the poor state of this sector. Apart from the impact of globalization on the sector, the paper sought to determine the link between technological capacity and the food crisis in Africa on the one hand, and the prospects for increased technological inputs in African agriculture on the other. Fundamentally, the paper argues that Africa cannot begin to benefit from global developments in trade, technology and therefore improving the welfare of its peoples until food security is reasonably attained. It recommends the use of science-based technology generation to ensure sustainable agricultural development. African governments are called upon to balance the vicissitudes of the multilateral framework on agriculture with their immediate national objectives. Finally, the author opines that a brighter future awaits those countries that can competently manage the impact of globalization on this sector, while infusing appropriate technologies to ensure food security.

Résumé

Cette communication étudie la relation existant entre le phénomène de la mondialisation et la technologie, en tant que catalyseur du secteur agricole en Afrique. En effet, bien que l'agriculture soit un secteur économique dominant en Afrique, elle traverse cependant une crise alimentaire sans précédent. Les

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statistiques relatives aux taux de croissance de la production alimentaire ainsi qu'au pourcentage de l'agriculture au niveau de la main-d'œuvre sont mis ici en exergue, afin de mieux présenter l'état de déréliction de ce secteur. Outre l'impact de la mondialisation sur ce secteur, cette communication cherche également à déterminer le lien existant entre la capacité technologique et la crise alimentaire en Afrique, d'une part, et les perspectives d'une meilleure intégration de la technologie dans l'agriculture africaine, d'autre part. Cette présentation soutient que l'Afrique ne pourra goûter aux joies du développement commercial ou technologique, au niveau mondial, et ainsi améliorer le bien-être de ses populations, tant qu'elle n'aura pas assuré un niveau raisonnable de sécurité alimentaire. L'auteur recommande l'usage d'une technologie basée sur la science afin de garantir un développement agricole durable. Il en appelle aux gouvernements africains afin que ceux-ci procèdent à un équilibrage entre les vicissitudes du cadre multilatéral relatif à l'agriculture, et leurs objectifs nationaux immédiats. L'auteur conclut en affirmant que l'avenir appartient aux pays qui parviendront à gérer l'impact de la mondialisation dans le milieu agricole, tout en apportant des technologies adaptées, permettant d'assurer la sécurité alimentaire.

Background

Africa, the continent of expectations, still struggles to scrape together the basic existential necessities of food, shelter and clothing. It is alarming in this day and age that Africa's food crisis has assumed monumental proportions occasioned by a multiplicity of factors such as poor leadership, wars, and poor planning and implementation of development policies. Many have argued that Africa's crisis of development is significantly traceable to its incapacity technologically to cater for the welfare of African masses (Bhagaran 1990; Adubifa 1990; Aju 1994; Agbu 2002). As if this was not enough, reinforcing this handicap is the ubiquitous impact of what is now generally referred to as 'globalisation' on poor countries of the world. It is essentially the thrust of this paper to examine the linkage between globalisation as a phenomenon and technology as a catalyst, and their combined impact on the agricultural sector in Africa. Food is one element in human existence that is fundamental, and which to all intents and purposes, should be abundant, but ironically what we have in Africa is a food crisis.

Of course, this situation has led many countries in Africa to resort to food importation to bridge the shortfall in production. For instance, between 1997 and 1999, food imports as a share of total merchandise for Mauritania was 70 percent, Sierra Leone 83 percent, Gambia 38 percent, Ethiopia 10 percent, Mozambique 19 percent, Sudan 16 percent, while others have a total percentage food import of 5 percent (UNCTAD 2002).

The emphasis on agriculture is clearly justified when one considers the fact that it is the dominant economic sector in most developing countries.

This sector contributes about 76 percent of Gross Domestic Product (GDP) while employing nearly three-quarters of the total labour force (Alamgir and Arora 1991:2; Grobbelaar 1998:210). Alarmingly, the United Nations believes that there are about 200 million 'hard core hungry' people in Africa, out of a total population of about 640 million in the continent. The UN stated that Africa needed at least $4.6 billion annually to tackle increasing hunger amongst its people. It also observed that war had drained an estimated $52 billion in agricultural output in Africa between 1970 and 1997 (*The Guardian* 2002:1).

Generally, the record of African agriculture since the independence period has been that of denying food issues the attention they should have been accorded. This has been as a result of poor planning and implementation of policies, and often bad advice from external sources. Today, Africa is almost a laughing stock, and this is in a fast changing world in which food and its related aspects are taken for granted by citizens of the developed world.

Table 1: Food Production, Total and Per Capita – Annual Average Growth Rates (Percentages)

	Total Food Production			Per Capita Food Production		
Country	1997	1998	1999	1997	1998	1999
Angola	0.4	15.0	-4.6	-2.9	11.4	-7.5
Benin	12.5	-1.7	0.9	9.5	-4.2	-1.7
Burundi	-0.5	-5.8	0.1	-2.1	-7.1	-1.6
Central African Rep.	-2.9	3.4	1.7	-4.8	1.5	-0.2
Ethiopia	1.1	-7.9	6.2	-1.3	-10.1	3.7
Gambia	31.4	-1.9	43.1	27.1	-5.1	38.8
Madagascar	2.0	-0.8	3.2	-0.9	-3.7	0.2
Malawi	-4.2	23.9	11.5	-6.4	20.6	8.5
Mozambique	6.2	6.5	1.6	3.3	4.1	-0.6
Niger	-19.3	51.5	-4.1	-21.8	46.8	-7.1
Senegal	-5.9	-0.9	20.0	-8.3	-3.4	17.0
Somalia	4.2	6.0	-2.5	0.1	-10.2	-7.0
Sudan	1.4	2.0	-0.9	-0.7	0.0	-3.0
Uganda	2.7	7.7	2.4	0.0	4.8	-0.5
Zambia	-13.3	-5.3	13.4	-15.2	-7.5	10.9

Source: UNCTAD Secretariat Calculations, based on data from FAO.

Table 1 shows percentages of annual average growth rates of food production, totals and per capita in 15 African countries. The total food production growth rate fluctuated between the period 1997 and 1999. Growth rates differed widely from country to country. While Gambia was recording a recov-

ery in food production from -1.9 percent to 43.1 percent between this period, Niger succumbed to negative growth from a previously positive growth percentage of 51.5 percent to -40.1 percent food production, and from 46.8 percent per capita food production to -7.1. However, the point is that developing countries showed a low percentage growth rate of about 1.1 percent in 1997, 3.4 percent in 1998 and 4.8 percent in 1999. And for the same period, the per capita food production was 1.5 percent for 1997, 1.6 percent in 1998 and 1.8 percent in 1999. These growth rates were indeed very low and clearly indicated that there was something wrong with the way agriculture was being managed in these countries.

Indeed, in the past three decades African policy makers have been bombarded by often-conflicting ideas on agricultural development strategies from an array of diverse international development agencies. One such development strategy, from 1980 onwards, was the Structural Adjustment Programme (SAP). During this period, the role of the state in agriculture was down-played and local agricultural specialists and institutions were largely ignored (Grobbelaar 1998:210). The failure of this strategy is today evident in the persisting crisis of development in Africa, including the agricultural sector. Problems often identified with Africa's agriculture include inadequate funding and/or access to credit, poor research and development as this relates to inputs (chemicals, machinery and seedlings), and the often-unpredictable weather conditions. It was observed that African governments as a whole spent less than 2-5 percent of their GDP on agriculture (*National Concord* 1992). Now, this is grossly inadequate for societies whose economic history and culture revolve around agriculture.

Also, see below, figures relating to percentage annual average growth rates in agricultural production, total and per capita for the period 1997-1999, including the percentage share of agriculture of the labour force in 15 African countries.

From Table 2, it is evident that agriculture constitutes a sizeable proportion of people engaged in the labour force in these countries, ranging from 56 percent for the Republic of Benin to 91 percent for Burundi. However, the annual average growth rates in total agricultural production and per capita agricultural production have been significantly low and in some cases, tended towards negative. Perhaps, this explains the necessity for food imports for many of these countries as a result of what has become a general food crisis in the continent.

Table 2: Agricultural Production, Total and Per Capita: Annual Average Growth Rates

	Percentage share of Agriculture in:		Annual average growth rates (%)					
	Total Labour Force	GDP	Total agricultural production			Per Capita Agricultural production		
Country	1999 *	1999 *	1997	1998	1999	1997	1998	1999
Angola	72	7	0.5	14.7	-5.0	-2.7	11.2	-7.9
Benin	56	38	7.7	-1.9	0.7	4.9	-4.5	-2.0
Burundi	91	52	-1.8	-5.2	2.1	-3.3	-6.6	0.5
CAR	74	55	-2.1	1.2	-1.2	-4.0	-0.8	-3.0
Chad	77	36	8.3	21.1	-12.2	5.2	18.1	-14.5
Ethiopia	83	52	1.1	-7.3	5.9	-1.4	-9.5	3.3
Gambia	80	31	30.4	-2.3	43.1	26.0	-5.4	38.5
Malawi	84	38	-1.0	10.7	7.6	-3.3	7.7	4.6
Mozambique	81	33	6.9	7.1	1.5	4.0	4.5	0.6
Niger	88	41	-19.3	51.0	-3.9	-21.8	46.2	-6.9
Senegal	77	18	-5.2	-1.3	18.9	-7.6	-3.9	15.9
Somalia	75	65i	4.3	-6.0	-2.5	0.2	-10.3	-6.9
Sudan	63	40	0.7	1.6	-1.0	-1.4	-0.4	-3.1
Uganda	81	44	-0.3	7.0	3.4	-2.9	4.1	0.5
Zambia	71	25	-10.9	-5.1	12.9	-12.9	-7.2	10.6

Source: Culled from UNCTAD Secretariat Calculations based on data from FAO. See *The Least Developed Countries Report* (2002) Geneva; and *The Economic Commission for Africa*; the World Bank; UNDP and others. * Or latest year available, [1]1990.

It is therefore against this background that we seek to interrogate the state of agriculture in Africa in the context of globalisation that is clearly propelled by technological innovations. For instance, how does the on-going globalisation process affect agriculture in Africa? Secondly, is there any link between technological capacity and the food crisis in Africa? And, thirdly, what are the prospects for Africa's agriculture through the use of modern technological developments?

It is quite right to argue that Africa cannot begin to benefit from global developments in trade, technology and in improving the welfare of its people until it is capable of ensuring a reasonable level of food security for its people.

Globalisation and technology: Conceptual linkage

It appears that the phenomenon known as globalisation has two very visible categories – trade on the one hand and technology on the other, especially

information technology. This is not to say that globalisation or the activities of transnational companies (TNCs), are recent phenomena. Rather, today, their activities (the TNCs) are made much easier by the application of micro-electronics in the form of information technology. Everyone is closer to each other now, and it appears that there is no hiding place anymore. Again, markets are now inter-linked and even inputs are all standardised and may have to eventually be purchased from the same source.

Generally, globalisation is associated in the minds of many people with the fear of unemployment and growing inequality, both nationally and internationally. On the other hand, it is also regarded as an opportunity to bring the benefits of progress to the entire world (Hemmer et al. 2000). Although the definition of globalisation is subject to various perspectives, it is generally agreed that it is an economic phenomenon with far-ranging consequences, economic and otherwise. There is also, a general agreement that globalisation entails the extreme internationalisation of the economic process.

However, a comprehensive definition of globalisation conceives of it as the worldwide division of labour, steadily penetrating everywhere, ultimately leading to the fragmentation of multi-stage production processes between different locations. Among the most important consequences of this are the rapid growth of the international trade in goods, and of foreign direct investment as well as the integration of capital markets, all contributing towards increasing the inter-dependence of markets and production processes in different countries (Nunnenkamp et al. 1994:3).

It is important to note that the increasing flows of goods and resources across national borders and the emergence of a contemporary set of organisational structures to manage these flows is tightening the international poverty trap of commodity-dependent LDCs and intensifying the vulnerabilities of LDCs which have managed to diversify out of primary commodity exports into the export of manufactures and/or services (World Bank 2002:VIII).

Again, while the full effects of changes occurring in the global environment are not yet well known, there is a danger of the increasing exclusion of LDC producers from global markets as buyers within commodity chains upgrade their volume, reliability and quality criteria for purchasing, and as more stringent market requirements call for ever increasing larger investments to meet buyers' requirements and specifications (World Bank 2002:VIII).

However, of more importance to us is the fact that one of the fundamental conditions on which the emergence of a global economic network depends is the development of technologies, which have served to overcome the restrictions imposed on human mobility by space and time. It is clear that

globalisation in its present form is largely predicated on new technologies of transport and communication. (Hemmer et al. 2000:3). With the end of the Second World War (1939–1945), modern transport technology attained an entirely new level of efficiency (inter-continental air travel, bulk freights, container technology etc.), building upon the first great leap in transportation in railways and steamships from the last century. Hence, the mobility of persons and goods has been considerably enhanced through the efficient shortening of geographical distances and cost of transportation.

In addition, progress in communication technology has also been dramatic in the last three decades especially through the micro-electronic revolution. Technologies of telecommunication and data processing are now easily accessible, whilst the cost of transaction and communication has been drastically reduced. Through the Internet super highway and/or corporate Internet systems, data can now be transmitted virtually in zero time. This has greatly facilitated communication among trade partners and considerably improved management efficiency in international groups.

The implications of the foregoing are that technological progress in this age has served to enhance the mobility of most production factors, so that they are no longer restricted to any particular location. Hence, the cheaper it is to move semi-finished products or production factors over large distances, the more the competition between geographically distant locations will intensify (Straubhaar 1996:223).

There is therefore little doubt that new technologies go hand in hand with globalisation and this has grave implications for the developing world. Since it is common knowledge that many countries of the developing world, especially in Africa are technologically backward, it implies that their ability to participate or compete in the present globalising world is severely constrained. How for instance, can such African countries compete effectively in exporting their agricultural produce or even determining the price at which it can be sold? This has grave ramifications for the agricultural industry in the continent.

An overview of the agricultural sector in Africa

Just as the other sectors in Africa are undergoing crises of various dimensions, the agricultural sector generally understood as a key sector in any effort at poverty alleviation in the continent is undergoing severe problems, sometimes generated by the global environment. Some of the problems include the use of poor technologies, inappropriate land policies, the issue of subsidies and global agricultural pricing mechanisms, and poor agricultural strategies.

In Africa, it is said that 50–80 percent of the population live in the rural areas, and this rural population is predominantly made up of peasant farmers. Generally, agriculture accounts for over 40 percent of GDP, 30 percent of exports, and about 75 percent of employment (Ake 1996:45). Unfortunately, as the World Bank has admitted, at least 50 percent of its agricultural projects in Africa have failed, its highest failure rate in the world (Ake 1996:43).

Suffice it to say that the performance of the agricultural sector has been dismal in the past three decades. The disruptions caused by wars and civil strife, drought, pattern of land use, the marginalisation of women, the refusal to take poor people seriously, undue external control and rapid population growth are some of the constraints affecting agriculture in Africa (World Bank 1981:142). Again, the large and inefficient subsistence sector presents special obstacles to the development of agriculture in the continent. There is generally very little knowledge about new methods of crop rotation and seed protection. In addition, research and experimentation are generally low or lacking. The absence of knowledge about rainfall and soil quality, and pattern of land use presents unusually serious obstacles to effective agricultural development in many African countries.

In Africa, the use of fertilizer is very low, about 7kg per hectare, as compared to European countries which utilise about 251kg per hectare. This is important, because there is a positive correlation between the use of fertilizers and high yields. In Senegal, research on their rice scheme showed that for every additional kg of nitrogen, the additional yield of paddy was 20kg per hectare. Hence, the need for African farmers to utilise modern chemical inputs in their farming practices cannot be over-emphasised. However, the big question is how these farmers, who often are peasant smallholders, can áfford to purchase the required chemical inputs and necessary farm machinery. As against this, it has been suggested that African farmers should rather make more use of animal manure and animal power in the cultivation of farmland.

However, the point remains that adequate attention has not been paid to the necessity for the mechanisation of agriculture in Africa as a way of quickly improving agricultural productivity. This it appears, is in line with the general neglect of technology and matters relating to it, and the reversal of this situation is the sine qua non for Africa's development. Let us just take a look at the use of one item of agricultural machinery, tractors.

Table 3 shows the use of tractors as an input into agriculture in some countries, and also the figures on agricultural value added per worker (1995 $) in terms of agricultural productivity.

Table 3: Agricultural Inputs: Use of Tractors (1997–1999)

Countries	Per 1000 Agricultural Workers	Per 100 sq. km. of Land
Botswana	19	175
Cameroon	0	1
Côte d'Ivoire	1	13
Egypt	10	303
Ethiopia	0	3
Ghana	1	10
Kenya	1	36
Madagascar	1	14
Mozambique	1	18
Nigeria	2	11
Somalia	1	18
South Africa	53	59
Sudan	2	6
Uganda	1	9
Zimbabwe	7	72

Source: Culled from World Bank, *World Development Indicators*, Washington, 2002. Note: The data are varied over three years.

The level of mechanisation of agricultural inputs such as tractors is extremely low in Africa and this therefore affects the overall output. Apart from Botswana and South Africa, it is clear that the very low use of tractors in agriculture is a major impediment to food production. With low output there is of course, an inadequate food supply and hence few possibility of amassing a surplus for the export market, a market that is also qaulity conscious.

Among the major inputs to agricultural productivity generally are land, fertilizers, and agricultural machinery. There is no single correct mix of inputs – appropriate levels and application rates vary by country and over time, depending on the type of crops, the climate and soils, and the production process used (World Bank 2002:141). However, Africa has long faced the problem of being able to deploy the correct mix of inputs to improve agriculture.

Table 4: Agricultural Output and Productivity: Agriculture Value added per Worker (1995$)

Country	1979–1981	1998–2000
Botswana	630	688
Cameroon	834	1,104
Côte d'Ivoire	1,074	1,136
Egypt	1,206	1,773
Ethiopia	-	138
Ghana	670	558
Madagascar	197	181
Mozambique	-	134
Nigeria	414	672
Somalia	-	-
South Africa	2,899	3,866
Sudan	-	-
Uganda	-	353
Zimbabwe	307	366

From table 4, in contrast to the situation amongst African countries in which South Africa posts the highest figures of value added per worker of $2,899 for (1979–81) and $3,866 for (1998–2000); Australia recorded $20,354 and $33,765 respectively, Belgium $21,868 and $55,874 respectively, and United Kingdom $20,326 and $34,938 respectively within the period under review. From the World Bank perspective, agricultural productivity here generally refers to the ratio of agriculture value-added measured in constant 1995 US dollars to the number of workers in agriculture. The agriculture value-added here also includes that from forestry and fishing.

A cursory glance at the state of agriculture in places like Nigeria, the Southern African region, and the East and Central Africa region reveals the contradictions in the political economy of agricultural production in Africa.

Nigeria for example, has a total land area of about 92. 4 million hectares, out of which about 83 million hectares are arable. This is indeed a relatively large proportion of earth's finite total arable land. Yet Nigeria is staring a food crisis in the face. This is also notwithstanding the fact that about 60-70 percent of the labour force is employed in the agricultural sector. Despite the growth in food output between 1990 and 1997, there had been an increase in food imports, from 8.2 percent to 20.5 percent of the total food requirement over the period (NES 2000). In fact, Nigeria imports about N180 billion worth of food items yearly. In spite of the large food imports, the agricultural sector in Nigeria received only N3.87 billion in the 2002 budget, which was

subsequently reviewed upwards after an agricultural summit made representations to the government, to N12.3 billion (*The Guardian* 2002:6).

Nigeria has now adopted a new agricultural policy after recognising that there is a limit to which it can liberalise and open its doors to international competition. Considering the unpredictability of the oil sector from which the country derives the bulk of its foreign exchange, the government is presently paying more attention to the agricultural sector. To this end, it is now making available fertilizers and farm chemicals at a 25 percent subsidy, with subsidies on farm tractors and other farming implements. The new policy will also see to the provision of improved seedlings, fingerlings and day-old chicks as well as drugs and vaccines. The government is also to provide for improved storage facilities, credit facilities for farmers at the right time, and will also serve as the buyer of last resort to avoid a crash in prices which may lead to losses by farmers.

In addition, inventors are being encouraged to take patents for agricultural implements fabricated for medium and small scale processing of agricultural produce which is dearly required in order to avoid wastage. All these of course, are in recognition of the fact that the state has to assist in ensuring food security in the country. This approach had been used by many countries in Europe, who in spite of the numerous protestations at various multilateral negotiations still maintain subsidies on many of their products. Africa on its side cannot do otherwise.

Nigeria is also taking advantage of its bilateral relations in addressing its problems in the agricultural sector. It invited 500 Chinese experts, facilitated by the Food and Agricultural Organisation (FAO), to assist it in the establishment of rural earth dams to ensure better water management for year-round farming. It has been observed that Nigeria is blessed with abundant arable land in the north of the country, but food production is limited by the unavailability of water for all year farming. If this can be done, then the country may significantly improve its output of food crops.

The point must therefore be made that with respect to new technologies and pricing for primary products and farm produce, there is very little that disadvantaged developing countries can do, short of planning their own agricultural strategies using local technology for ensuring subsistence. The question of exporting products, which implies competing effectively with other producers from around the world, is largely untenable at this period in time. Therefore, there is still a lot that the state can do in assisting smallholder peasant farmers, who constitute the bulk of agricultural producers in Africa, to improve on their output.

In the case of the Southern African region, statistics as at 1994 indicated that as in several other parts of Africa, that majority of the people still reside

in the rural areas – 70 per cent in Botswana, 87 percent in Malawi, 50 per cent in South Africa, 69 per cent in Zimbabwe and 64 percent in Namibia (Rukuni 1995). This has implications for the agricultural sector in the region, in terms of the problem of unemployment and of access to land.

It is estimated that about 140 million people live in the Southern African region. In most of the countries in this region the rural people are poor, and resource base is relatively poor or underdeveloped, whilst the climate is relatively unstable. In the recent past, state intervention in agriculture in virtually all of the countries in the region largely favoured large-scale commercial farmers and had resulted in dualistic (developed/underdeveloped) and bimodal production systems. In addition, there has been a range of political influences that had been impacted negatively on farming and regional trade in farm products. Civil wars contributed to reducing the capacity of agriculture. Indeed, the share of agriculture in GDP is decreasing for all the states in Southern Africa except maybe Angola, Mozambique and Zambia.

For South Africa in particular, it appears that there are some lessons to be learnt from their experience. Because of its isolation from the world during the apartheid years, it was not affected by the global changes in agriculture or the Structural Adjustment Programme. This notwithstanding, the small farmers faced constraints as a result of a number of South African policies (Grobbelaar 1998:212). Agricultural development in South Africa had been characterised by greatly differing approaches to white and black agriculture. The contradictions in this society still largely reflect in the state of black agriculture in this country. White agriculture and commercial farming received high priority in South Africa's development policies. State intervention and support strongly influenced the pattern of agricultural development which placed more emphasis on large-scale mechanised agriculture. The support given to the commercial farmers included controlled marketing to reduce price and marketing risks, state run research and extension services, and agricultural credit measures (Vink and Kassier 1990). Overall, the result was quite satisfactory. In fact, for the period 1980-1989, South Africa was self sufficient in all major agricultural commodities, having achieved an overall self-sufficiency index of 130 (Van Rooyen and Van Zyl 1990). It is these same strategies that many countries in the developing world, including Nigeria, are now trying to implement.

On the other hand, farming by black Africans in South Africa developed almost entirely as a separate mode of agriculture. In contrast to white commercial farmers, African small holder farmers usually operated at low input levels. Generally, they faced several problems having to do with the political system of apartheid, in terms of land, inputs and marketing access.

Today, the situation is gradually changing as the South African government continues with its incremental land distribution programme. It is expected that agricultural development and land reform should be addressed through optimising the contribution of the agricultural sector to economic empowerment of vulnerable groups, and designing successful agricultural settlements as part of the land reform and redistribution programme (Grobbelaar 1998:218).

With respect to the Eastern and Central African countries, their governments made large investments in agriculture, especially in agricultural research. External donors also provided considerable assistance to these government to facilitate agricultural technology generation and transfer. However, the rate of technology development and adoption has failed to cope with the demands of rapidly increasing populations, a deteriorating natural environment, and overall economic development. New technology either does not reach the farmer or is not viable under current conditions.

In Ethiopia for example, agriculture is also the most dominant economic activity as in many other countries of Africa. The sector contributes about 43 percent of the GDP, employs about 74 per cent of the population, and accounts for more than 90 per cent of the country's exports. However, the sector is yet to attain its full potential as a result of what was referred to as 'inappropriate agricultural policies', and current reform policies are being reinforced by the application of new agricultural technology. To what extend this has improved Ethiopian agriculture is yet to be ascertained.

Kenya has a land area of 567,000 square kilometers and a population of about 24.9 million growing at about 3.8 per cent per annum and GDP per capita of about $380 in 1990. The high rate of population growth and the resultant pressure on land have resulted in the fragmentation of small holdings, increasing landlessness and migration into marginal areas. Kenya basically has an agricultural economy with agriculture providing 31 percent of GDP, about 76.5 per cent of the populations are rural and about 60 percent of the export earnings are derived from the sectors. However, a major problem in Kenya, as in many other countries that rely substantially on agriculture for export earnings, is the emphasis on cash crops like coffee, tea and cotton as opposed to food crops like maize, wheat, rice etc. At this juncture in Africa's development, it is sometimes important to ask the question: to what extent should governments focus attention on cash crops as opposed to food crops?

Just as in Ethiopia and Kenya, agriculture is also the most important sector in Tanzania, accounting for 50 per cent of the country's GDP. The sector also generates more than 80 per cent of its rural employment. During the 1980s, the agricultural sector had a positive growth as a result of government policy. Again, the problem of production of cash crops as opposed to food crops

became an issue. In terms of agricultural inputs, the trend is for more input to be provided for cash crops than food crops. Again, it is time to interrogate this trend if countries like Tanzania and indeed Africa is to come to grips with its food shortages. For a country that has great potential in the production of maize, cassava, rice, sorghum, millet, grain legumes, banana, wheat and sweet and European potatoes, food problems in terms of inadequacy should normally not be at the forefront of its development discourse.

In the final analysis, many countries in Africa are facing persistent low agricultural productivity. What is fairly well agreed therefore, is that the continent requires to develop and adopt improved farming technologies if it is to begin to reverse its food crisis. There is therefore a sense in which science-based technology generation should be at the forefront of sustainable agricultural development.

A critical observation of the agricultural scene in Africa reveals that except maybe for South Africa, many governments have been intervening at all stages of production, consumption and distribution without much improvement. The question is, why is this so? Some of the policies have resulted in discrimination against agriculture by shifting resources out of the sector. Although there has also been experimentation with large-scale farms and the mechanisation of agriculture, experience has shown that very little was achieved as a result of a mixture of problems of overstaffing, mismanagement, and under-utilisation of machinery. Also, inadvertent importation of food items like wheat and rice, and the raising of producers' prices of export items have all contributed to the fall in production of food (Singh 2000:9).

However, it is a good sign that the marketing boards abolished in most African countries are now being resuscitated as was done recently in Nigeria. Many of these boards were abolished during the SAP years, and subsequently created problems as the private sector was generally unable to take up the functions previously rendered by the public sector marketing boards.

African agriculture in the global economy

One of the major questions facing many African governments is the fate of agriculture in a global environment characterised by inequality of access to influence and technology. Africa, formerly a net exporter of food, is today heavily dependent on food aid and imports. Increasingly, the issue of food security at individual, sub-national and national level is becoming a very crucial matter. Because of decreasing agricultural productivity, and the input and market constraints facing developing countries, discussions are now underway at the international level to develop a more rational trade regime which would require agricultural policy changes in the industrialised countries. However, negotiations on this had often been deadlocked.

At the WTO meeting in Doha in November 2001, negotiations on agricultural subsidies remained highly contentious. The key concern was what to do with export subsidies which practically pitted the EU against the entire WTO membership. The EU would not accept any draft language that contemplated the 'phasing out' of export subsidies. While Doha managed to retain the phrase, it was included with the qualification that talks must be conducted 'without prejudging the outcome of the negotiations' (Garth Le Pere 2002).

Generally, external factors which affect African agriculture in the context of the global economy include the globalisation of agricultural inputs and products markets, the WTO emphasis on trade liberalisation, lowering of import and export tariffs and the removal or drastic reduction of agricultural subsidies (Olayemi and Okunmadewa 1999). Others include the arrival of new agricultural technologies, associated developments in Intellectual Property Rights (IPR) and advances in information technology.

Since there are many smallholder farmers in Africa, a major question revolves around the potential impact of the above scenario on them. It is therefore necessary for African countries to understand the technological and institutional pre-requisites for their participation in a globalised economy (Kydd 2002). Let us note for example, that the increase in the role of the globalised market and its associated pricing regime generally led to agriculture becoming more closely integrated into the international division of labour. The fact remains that beyond the sectoral crisis of agriculture is the need to thoroughly examine the validity of accumulation strategies based on expanding the export sector (whether agricultural, mining or energy) and the effects of the process of accumulation and the development dynamic (Amara & Founou-Tchuigoua 1990:14).

There is little doubt that the agricultural sectors of many developing countries are under severe pressure from the modern agrifood system (Goodman and Reddift 1991; McMichael 1996), especially since the dominant developmental ideology for many years was 'accelerated industrialization' and 'modernization' which were largely based on support for manufacturing and mechanised agriculture. Hence cheap food was required to maintain a cheap wage labour force that could attract foreign investment and capital accumulation. More often than not, mechanised agriculture was initiated by state farms or by capitalist farmers in close alliance with the state. These developments created important markets for the rapidly growing sectors of the post-war economy - surplus food production, capital goods or machinery and agricultural input supplies (Amanor 1999:29).

Beginning from 1940, the globalisation of an agrifood technology complex was given added impetus by the Rockefeller and Ford Foundations. Subsequently, many international agricultural research institutes were founded. These include the International Rice Research Institute (IRRI) in the Philippines in 1959, The International Maize and Wheat Improvement Center (CIMMYT) in Mexico in 1963, the International Institute for Tropical Agriculture (IITA) in Nigeria in 1967, the International Potato Center (CIP) in Peru in 1972, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India in 1972, and the International Livestock Centre for Africa (ILCA) in 1974. It was however, in 1971 that the International Agricultural Centres were unified into the Consultative Group for International Agricultural Research (CGIAR), an advisory group for developing nations coordinated by the World Bank. The point which is being made here is that agriculture and its related architecture have been globalised, and that this globalisation did not occur in the immediate past, but is the result of many years of evolution of the international system, especially after the Second World War.

For African agriculture to be able to achieve its objectives, which includes ensuring food security for the African peoples, the role of the state is still required just as was the case in Europe and in the United States. African governments just have to learn now to walk the tight rope of balancing the vicissitudes of the multilateral framework on agriculture and their immediate national objectives. Again it is germane to note that any improvement in the agricultural sector necessarily requires a certain level of preparedness by African governments to effectively join the globalisation process. Hence, the problem is not just a sectoral one when we think in terms of the global economy, but a composite one, which requires a multidisciplinary approach in seeking solutions.

What prospects for the agricultural sector?

The changes taking place globally pose threats as well as opportunities. What Africa has to do is to look out for the opportunities, in this case, in the agricultural sector. Several emerging markets hold enormous promise for growth in the agricultural business. However, we must not underestimate the tumultuous character of the transition taking place in the global environment.

In terms of the requirements for agricultural growth in Africa, it is on average, satisfactorily endowed. It has abundant agricultural land and a huge potential for irrigation, while the climate enables its inhabitants to produce almost every kind of crop (World Bank 1990:99). Generally, what agricultural planners require to ensure in the policies, even in the face of the jigsaw called globalisation, is that the necessary inputs into the agricultural sector

are provided: relevant technologies, experienced hands, land, credit, seeds and fertilizers. In addition, there should be a minimal provision of transport infrastructure, adequacy of marketing and farm service centres for input delivery, and output marketing. Also, there should be adequate storage and processing facilities and the dissemination of market intelligence and information.

Achieving what is akin to an agricultural revolution on the continent should therefore constitute the primary target for the next decade or so. Since agriculture employs the bulk of African peoples and keeps people busy and fulfilled, it should as a matter of priority be considered a key sector in all African countries. Attention to this sector, and investment in it, will not only check the present surge of rural-urban migration with its attendant social ills, but also ensure food security for all. Indeed, what man or woman is taken seriously who cannot feed himself or herself! The same goes for countries. Therefore, any country that is capable of fulfilling the basic need of being able to feed its population invariably earns the respect of members of the international community. Yes, man does not live by bread alone, but physiologically; he requires the bread to be able to do other things, both for himself and his community and country.

It is however, recognised that this project of being able to provide food for all is not an easy one. It is a complex project and requires a multi-dimensional approach. The right technological choices also have to be made. And this implies the design of adequate supportive economic policies - of price and income systems and ensuring the rationality of the choices they induce, of the supportive industrialisation priorities and pattern of financing among others (Amara and Founou-Tchuigoua 1990:4).

Overall, there is a great prospect for African agriculture especially in terms of being able to feed Africans without having to beg for food aid. Again, export of produce is possible, but will require a concerted and coordinated effort on a regional basis amongst the various countries as climatic conditions differ. The engagement between Nigeria and South Africa and the fast-trade approach to development between Nigeria and Ghana can also be extended to the agricultural sector. So many permutations are possible, both in terms of inputs into the sector and utilisation of the surplus. These possibilities need to be explored.

On the whole, improved productivity in agriculture can be assured with the introduction of new and relevant technologies, including the use of machines, improved plant and animal stock or varieties, better crops as previously mentioned and more effort on post-harvest care. It is also important

to ensure adequate investment and access to water for the farmers in addition to subsidies.

Conclusion

Considering the linkage between globalisation, technology and the crisis in African agriculture, it is urgent that individual African states assess their internal situation and revise their policies in order to ensure their food security. More in-depth assessment and measures are required to enhance the exportation of the surplus produce.

Although the success of price-stabilisation commodity agreements has at best been mixed, the need to address the specific problems faced by commodity-exporting countries cannot be stressed the more. This notwithstanding, globalisation has displayed the tendency to reduce the activities of middlemen in the agricultural sector, which characterises agricultural marketing on the continent. This implies the possibility of reducing the selling price of agricultural products. This notwithstanding, globalisation also tends to widen the market for agricultural products and it is important for African countries to exploit this opening.

If we are to improve agricultural productivity in Africa, and avoid incessant food crises, it is important to explore what globalisation can bring about with respect to the utilisation of appropriate technologies in enhancing the fertility of land, improving seedlings and predicting the climate and harvest potentials. Just as in the agricultural sector, Africa cannot expect to be respected unless and until it recognises that technology is the key in the growth of human societies, and also the instrument for ensuring its survival. In pursuing this goal, the role of the state cannot as of necessity be overemphasised.

Just as the state still has an important role to play in revitalising the agricultural sector, there is the necessity for private sector engagement in research and development and marketing for small farmers, who are numerically predominant in Africa. Subsidies are still necessary, but should not only be targeted on the issue of market failure, but also for the entire gamut of variables affecting smallholder agriculture.

The future in terms in ensuring national food security belongs to those countries that are able to competently manage the impact of globalisation on the agricultural sector on the one hand, while at the same time are able to infuse appropriate technologies in their agricultural processes and practices. The crisis in African agriculture is generally a reflection of Africa's crisis of development, and at this period in time, should be addressed radically and comprehensively.

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