GREEN REVOLUTION OR REVOLUTION ? THE CASE OF INDEPENDENT AFRICAN COUNTRIES *

By

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I. INTRODUCTION

Stagflation (i.e. inflation and unemployment) in developing countries especially African countries is now reaching a crisis stage. The upheavals and potential upheavals in political structures in many African countries cannot be unconnected with the problem of inflation and unemployment.

Of the many factors contributing to stagflation in most African countries, stagnant and in some cases declining agricultural production probably contributes the largest proportion. Virtually all African countries are net importers of foodstuffs and many are largely dependent on imported foodstuffs even though a large majority of their populations are in agriculture.

Most African governments have realized or appear to have realized the seriousness of the problem and have instituted or intend to institute programmes aimed at increasing agricultural production and productivity. Results from programmes already instituted are however very disappointing and point to a fact that African governments either in real terms pay lip service to increasing agricultural production and productivity (either deliberately or out of ignorance) or the programmes instituted are at variance to increased productivity or both. One is inclined to believe that most African governments actually do not pay the deserved attention to agricultural development and also, more importantly, that most of the programmes instituted are not conducive to increased and sustained agricultural production.

The purpose of this paper is to critically assess the «green revolution» strategies of African states and to argue that the agricultural policies of most African countries including the ones being proposed by most present day governments are based on some erroneous beliefs and are also so contradictory that the interplay of the policies block the productive forces in the traditional sector of the African economy (which by any standards is still the most important sector of any African economy), thereby continuing to stagnate agricultural production and consequently continuing the improverishment of the majority of the people and keeping alive the vicious cycle of poverty. It will be argued that it is only a consistent policy based on evolving a highly productive small-scale farmer as opposed to a «green revolution» based on large-scale production which can adequatly solve the food production problem of the African continent.

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The paper concentrates on the problem of food production because the major problem of African agriculture is in food production..

II. THE CALL FOR AN AFRICAN GREEN REVOLUTION

The term «Green Revolution» was coined to describe the introduction and rapid spread of high-yielding wheat and rice varieties in Mexico and the Indian sub-continent in the late 1960's and early 1970's *(1)*. The term has however been used of late to mean different things by different people in different places and sometimes has little bearing on the seed-fertilizer «Green Revolution» of Latin America and the Asian countries. That is not to imply that the seed-fertilizer «Green Revolution» in these countries was a success; it was not as will be discussed later.

«Green Revolution» in Africa seems to refer mainly to large-scale mechanized agriculture with passing remarks on fertilizer and improved seeds. The plans for «Green Revolution» in Africa from political rostrums and the press all point to a contention that only large-scale mechanized agriculture can solve the problem of agricultural production of the continent.

Large scale mechanized agricultural production that have been tried and those being planned in Africa can be categorized into three:

(a) Private farms owned by citizens of the countries. These farms are yet to be of any significance in almost all African countries.

(b) Private farms owned by foreigners or in partnership with the citizens of the countries. These farms have to some extent contributed to agricultural production in some African countries, notably Kenya, the Ivory Coast and Zimbabwe.

(c) Government owned farms which may or may not be in partnership with foreigners or citizens of the countries. These farms have consistently failed to contribute significantly to agricultural production in Africa.

Some people also consistenlty talk of large-scale cooperative farms but one is yet to see them.

The «Green Revolution» strategies of many African countries also stress improvements of small-scale production going on side by side with large scale production.

Before one goes on to analyse the possibility of sustained agricultural production by these methods and their combinations, it is perhaps more appropriate to look briefly at the experience of some developed countries from which most of these methods are being imported and also the experience of some developing countries in the use of some of the methods.

III. THE DEVELOPMENT OF AGRICULTURE IN ENGLAND, THE UNITED STATES, JAPAN, THE U.S.S.R. AND CHINA

Private large scale agricultural production proposals are often made with fingers being pointed to the great achievements of the United States, Canada, Britain and other countries. How did these countries transform their traditional agriculture into modernized agriculture?

English agricultural development could be said to have started with the Napoleonic wars. The wars induced high agricultural prices during the period 1780 to 1813, and thus stimulated agricultural production *(2)*. Crop rotation methods and improvement of livestock herds were indigenously evolved by English farmers together with innovations associated with more competent farm management *(3)*. These innovations emanated from the farming community and the government then helped in providing drainage loans in 1845 which led to improvements in the technique of drainage which was a pre-requisite for increased use of fertilizer *(4)*. By 1815, English agriculture had evolved into what was termed «high farming». The industrial revolution also helped in providing the necessary industrial materials including farm machinery *(5)*.

The lessons of English agricultural development did help to develop United States agriculture but the methods were not transplanted into the U.S. because the problems of development in the two countries were different. Use of fertilizers for example did not become important in the U.S. until about 1930 even though the 1870's were the period of agricultural expansion. American farmers felt their problem was scarce labour and abundant land *(6)*, they therefore, sought means of using little labour hence the advance in tractorization. The important point here is that it was the American farmer who realized the need for labour-saving mechanized agriculture, and research institutes and industry only responded to the wishes of the farmers. American farmers rejected drainage as being too expensive. They also rejected the cultivation of roots *(7)*. In short, American agriculture developed on the initiative and wish of the American farmer with scientific backing from research institutes and the government.

It must also be mentioned that foreign markets helped to develop American as well as British agriculture and are still helping to sustain agricultural production in these and other countries. It was James CHAMBERLAIN who once said that «the foreign office and colonial office are chiefly engaged in finding new markets and in defending old ones» *(8)*.

Japan drew upon the scientific advances of Europe and U.S. agriculture. She however, drew upon only what was relevant to her farmers. A technology was evolved which was a highly successful mixture of indigenous and imported elements *(9)*. In Japan, the emphasis was on yield per acre and so farm equipment developed in the U.S. and elsewhere were rejected. Japanese farmers concentrated on a seed-fertilizer revolution. This was backed by sound research work based on refinement of innovations initiated by the farmers themselves. Very simple tools acceptable to Japanese farmers such as power tillers, small mechanical reapers and other simple machines were introduced and Japanese industry developed initially

on the demands of agriculture. Agricultural output was consequently increased with very little demand on capital or foreign exchange *(10)*. As noted by JOHNSTON and KILBY, three features of the «Japanese model» are especially significant. Firstly, agricultural output was increased within the framework of the existing small-scale farming system. Secondly, the bulk of the nation's farmers were involved in increases in agricultural productivity, and thirdly, agricultural and industrial development went forward in «concurrent» growth *(11)*. It should also be mentioned that foreign markets for silk and silk products which was the speciality of the Japanese, contributed to the development of both Japanese agriculture and industry.

Agricultural development in the U.S.S.R. and China has been on the collective farming system but while the Soviets believe in central control of all production and distribution, the Chinese depend more on a decentralized system where the control is within the communes *(12)*. This basic difference can be traced to the difference in Stalin and other Soviet leaders' application of Marxist-Lennism which is basically urban industrially oriented; and Mao's application of it which is more rural agriculturally oriented. The Soviets emphasized heavy industry with or without links to agriculture while the Chinese emphasized light industries spread over the communes with forward and backward linkages to agriculture *(13)*. The Soviet agricultural model does not seem to hold much promise in Africa due to many problems associated with its implementation particularly in present African political and institutional set-ups. The Chinese model or at least many aspects of it, is however very promising in Africa. Like the English, American and Japanese models, the agricultural development in China has been shaped by the interests of farmers but unlike these countries, the farmers in China were the peasants, not property-owning farmers or the so called «progressive» farmers. China could not develop through property-owning or «progressive» farmers not only because of the Maoist ideology which stressed egaliterianism but also because of the need to increase effective demand for commodities that would result from increased production. Foreign markets provided the necessary effective demand for British and especially American agricultural products and China could not easily compete with these and other «old hands».

IV. THE SEED-FERTILIZER (Green) REVOLUTION IN THE INDIAN SUB-CONTINENT

The Seed-fertilizer «Green Revolution» of Latin America (Mexico) and the Indian sub-continent started in Mexico with the advent of high-yielding dwarf wheat varieties which was developed by a Rockefeller Foundation team in the 1960's. The characteristics that made the wheat variety so important were: its high fertilizer responsiveness, its lack of sensitivity to day length and its early maturing and dwarfish nature *(14)*. The development of wheat was followed by the development of high yielding dwarf rice IR 8 at the International Rice Research Institute (I.R.R.I.) in the Phillipines. Again, this was a fertilizer responsive, early maturing, adaptable variety *(15)*.

This «Green Revolution» was very significant because it came after American sponsored Community Development (CD) and Agricultural Extension (AE) programmes had failed in India *(16)*. The American experts had all the time assumed that Indian agriculture could be modernized in the same way as American agriculture had done, that is, by emphasizing on «progressive» farmers who would readily accept the findings of American sponsored scientific research and attempt at producing large scale. The programme failed, so the «Green Revolution» was a reliever for both the Indian authorities and the American «experts» since the «Green Revolution» was largely due to American scientific effort.

The Indian sub-continent (comprising India, Bangladesh and Pakistan) as well as Turkey, the Phillipines, Malaysia, Indonesia and Sri-Lanka benefitted from the new developments. Wheat and rice increased dramatically in these areas and some of the countries were self-sufficient in rice and wheat in the late 1960's and early 1970's. India with its vast population attained self-sufficiency in cereals in 1972 and even accumulated cereal reserves *(17)*. Unfortunately, however, the self-sufficiency was short-lived and almost the whole of the Indian sub-continent is again grain-importing.

No doubt, the «Green Revolution» did contribute substantially in the late 1960's and early 1970's to the economies of Asian countries but it is now obvious that it has not solved the grain problem of the Indian sub-continent let alone the global food problem. As accepted by Lester BROWN of the American Overseas Development Council, who was deeply involved in the programme, the «Green Revolution» does not represent a solution to the food problem, rather it is a means of buying time... during which brakes can be applied to population growth» *(18)*. He thinks the «Green Revolution» failed because of unchecked population growth. Though not saying a complete «no» to that, I think developments in China point to a fact that a check on population growth is only a part, nay, a very small part, of the solution of the world's food problem.

The partial achievements and failures of the «Green Revolution» in the Indian sub-continent has supplied us with lessons which must be learnt. Briefly, the causes of the failure of the «Green Revolution» could be put into two as follows: Firstly, the dramatic increase in grain production did not take place in India and the other countries everywhere and was not for every farmer. The «Green Revolution» was a boon for favourable regions and favoured classes of farmers. The emerging «progressive» farmers increased productivity but also increased disparity and disaffection *(19)*. The «Green Revolution» strategy regarded improving the lot of the poor farmer as an independent problem deserving a second place. Actually the «Second Part of the (Green Revolution) Strategy» was to help the poor farmers *(20)*, which never took off successfully. The result was increased output without any significant corresponding increase in demand resulting in a glut and consequently low prices for the products and eventually a recession in production. Secondly, Indian traditional agricultural concepts of organic and green manures was rejected in favour of inorganic fertilizers thereby making agriculture dependent on industry for its

inputs *(21)*. Industry was poorly developed in the Indian sub-continent so the fertilizers and other inputs had to be imported. Also no attempt was made to develop implements manufactured by local craftsmen and blacksmiths implying importation of American machinery and equipment even though there was evidence of much higher efficiency of production in the use of some locally produced equipment *(22)*. Obviously, the American implementers of the programme had to look after their interests as well. Patriotism has never been known to be a commodity for export.

One important consequence of the Asian «Green Revolution», is the fact that the availability of large supplies of grain in the late 1960's and early 1970's coexisted with serious malnutrition. The «Green Revolution» worsened the already existing malnutrition in the area due firstly to the lack of stress on proteinous foods in the programme and secondly to the maldistribution of income which prevented the majority of the people from getting the scarce proteinous foods.

V. AGRICULTURAL STRATEGIES OF AFRICAN COUNTRIES SINCE INDEPENDENCE

The agricultural strategies of almost all african countries since independence especially with respect to the food subsector has been generally one of *laissez faire*, that is, allowing the «status quo» to prevail. There have however been a few cosmetic innovations such as Operation Feed the Nation in Nigeria, Operation Feed Yourself in Ghana and similar slogans (not programmes) in other countries. This *laissez faire* attitude has been partly due to the industrialization fever which swept through the continent following independence and whose hangovers are very much still with us.

The Ivory Coast and Kenya (and Zimbabwe) could be regarded as the only «independent» African countries with quite substantial private large-scale plantation type agriculture. The achievements of these plantations with respect to export crops have been very encouraging *(23)*. Tea, coffee and pyrethrum flourishes tremendously in Kenya, so is rubber, cotton, oil palm and cocoa in the Ivory Coast and tobacco in Zimbabwe. In the food subsector, the achievements are not so spectacular. The problem of these economies, however, is their complete control by foreign interests. The spectacular production of crops especially exported crops has not in any way helped the average Ivorian or the average Kenyan, so that, if a poor Ghanaian farmer is sent to a Kenyan village, he will not notice any difference in his standard of living nor will a poor Kenya farmer see any dramatic change in his life style if put in a village in Nigeria or Mali. These countries are very good examples of economic «growth» without development and even if we could be sincere with our computation of Gross National Product (GNP) and those other ambigous variables most of the production should be added to the GNP's of France, Britain and the United States. Most of the foreign exchange earned is sent to these advanced countries by the foreign farmers and so the effective contribution of this sector to the economy is negligible.

Private large- scale rice production was also quite successful in Ghana for a couple of years but that was mainly due to serious distortions in factor allocations due to very heavy subsidization of inputs and machinery which was a simple method of putting money into the pockets of the already affluent. These people therefore had to show something for the great gesture of the government hence the one or two years of good rice production. The drought came and separated the farmers from the businessmen who owned farms as part of their businesses. Politics (party politics) came and gave a final blow to the private large-scale rice industry in Ghana. Politics is of course a better business than rice farming. This is a clear case of government not directing attention to the productive forces in the economy.

Private large-scale farming even with foreign participation is gradually being encouraged in many African countries and the analysis that follows suggests that it has little chance of sustained success.

Large-scale state-owned agricultural production enterprises have existed in a number of African countries and some are usually in cooperation with other countries or foreign firms. This type of agricultural production has however been criticized for its inability to make profits due to mismanagement and so on. The Ghana State Farms of the early 1960's will suffice to illustrate the workings of farms owned by states. The then Ghana government created the State Farms under the State Farms Corporation; State-supported quasi collective farms under the Workers Brigade; cooperative farms under the United Ghana Farmers Cooperative Council and Youth Settlement Farms under the Young Farmers League *(24).* All these failed, due to many factors but the factors which encompass all others are that, firstly, the programmes were an imposition and secondly they were not directed at the productive forces in the economy, the peasant farmers. The set up of all the farms was in the form of manufacturing industries and obviously nothing could come out of such an agricultural set up.

Criticism of the small-scale (peasant) farmer for his inability to feed the growing populations because of his small units and lack of innovativeness has been going on even though it is the small scale farmer who continues to feed a very large proportion of the population in Africa. People always point to food import bills (of mainly maize, rice, meat and milk) and then call for large-scale agricultural production. What about the yam, cassava, millet, guinea corn, plantain and vegetables which are even more important in most areas of Africa? What about even the exported crops such as cocoa, oil palm products, cotton, groundnuts, coffee, tea and others? What percentage of these crops come from small-scale production? It is almost 100 % in most African countries. It is therefore no over-statement to regard the small- scale farmer as being the productive force in the economies of Africa inspite of his small units and crude methods of production. Governments do make passing remarks at helping the small-scale farmer with input subsidies, agricultural credit and the like, but are these so-called aids to the small farmer really effective? And why are they not? The answers lie in the contradictory agricultural policies of African governments.

VI. CONTRADICTORY AGRICULTURAL POLICIES OF AFRICAN GOVERNMENTS

Policies relating to agricultural development in most African states are based on certain erroneous beliefs. They include the following:

(a) That our traditional methods of restoring soil fertility and checking soil erosion are primitive.
(b) That our traditional tools and equipment are too crude to be developed upon.
(c) That subsidization of agricultural inputs including machinery will help peasant farmers.
(d) That mechanized agriculture in the form of tractorization and small-scale production can coexist.
(e) That the advantages of mechanized agriculture are greater than the disadvantages.
(f) That there is still more technology to be transferred in agriculture from the developed countries.
(g) That capital is an overrinding factor of production in agriculture.
(h) That since demand is not being met it is only the supply side that must be concentrated upon; presumably on the basis of the old adage that supply will create its own demand.
(i) That economic growth implies economic development or is a measure of economic development.
(j) That the developed countries and their agents (including the World Bank) are interested in the development of agriculture in developing countries.

With regard to the beliefs that traditional methods of restoring soil fertility and checking soil erosion are primitive and that our traditional tools are too crude to be developed upon, the experiences of Japanese and Chinese agricultural development and the failure of the Indian subcontinent «Green Revolution» should convince anybody that for a technology to be acceptable to the majority of farmers, the farmers' own innovative ability should be taken into consideration. Any technology transplanted whole into a different cultural and institutional set-up is bound to fail and African scientists should realize that their training is not to be able to mechanically operate machines developed elsewhere but to be able to develop technologies that are scientifically sound, economically feasible and culturally compatible. The development of such technologies implies starting from the known, that is, the crude traditional methods and working towards the unknown.

Subsidization of agricultural inputs including machinery has almost been accepted by most African governments as a means of relieving peasant farmers of some financial burdens and hence a means of encouraging increased agricultural production. Most subsidies have however proved ineffective and in some cases even harmful because the peasant farmers

cannot successfully compete with property-owning or «progressive» farmers. Subsidization of agricultural inputs implies a decrease in the average total cost of the inputs. With the relatively inelastic demand for agricultural products, Figure I will be the situation a representative small-scale farmer will find himself before and after subsidization assuming (quite appropriately) that the small scale farmer is an atomistic producer and that agricultural production by many small-scale farmers approximates well to a perfectly competitive situation. It is further being assumed (for the purpose of easy analysis) that even though small-scale farmers produce a number of crops (and livestock) at the same time, their total production can be regarded as the production of a single commodity.

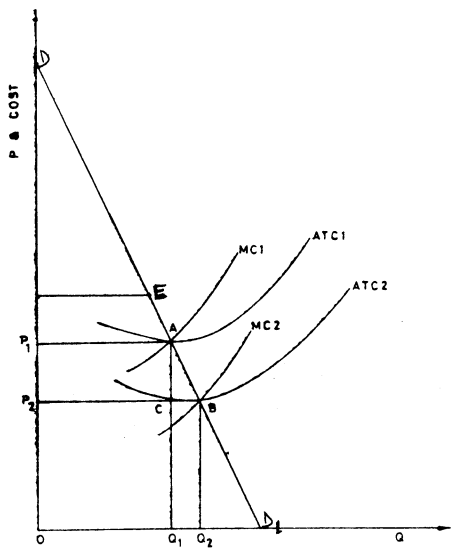

Fig. 1 – *Income to Farmer Before and After Input Subsidization.*

P, represents price of the commodity being produced, Q, is the quantity, ATC is the average total cost curve, MC is the marginal cost curve (MC above ATC is the supply curve). DD1 is a linear demand curve for the commodity *(a)*. Price elasticity of demand along DE is greater than unity, is unity at E and less than unity along ED1 and as such revenue increases along DE, is maximum at E and decreases along ED1 *(25)*. The analysis here concentrates on the ED1 portion of the demand curve since the demand for agricultural products tend to be price inelastic. Now, subsidies lead to a rightward shift of the cost curves. The relevant cost curves, prices and quantities are now those with the subscript. P1 P2 CA less CQ1Q2

(a) A linear demand curve is used for the purpose of easy analysis but it can be shown that as long as other assumptions hold non-linear curves will give similar conclusions.

B is the loss in revenue to our representative farmer as a result of subsidization which has the effect of a relatively small increase in output and relatively large decrease in price. All the farmers are going to experience this situation and usually under such a situation there is a struggle for survival and poor peasant farmers who cannot cope with the fall in price and in revenue are naturally flushed out. As subsidization of inputs continues, a crop of capitalist farmers are produced *(b)*, who by their oligopoly power can influence prices and could hold consumers to ransom if the need arises. In most of Africa, however, the stage of a crop of capitalist farmers is usually not reached because as was the case in Ghana, unfavourable weather conditions and better opportunities elsewhere normally drive these farmers out from the farms, afterall, their aim is profit (money) maximization; and agriculture slumps back to start all afresh. Even if a crop of capitalist farmers results, what moral justification has any government to continue to subsidize a few people in the society? Also with the skewed income distribution, a glut in production will be inevitable thereby driving down prices, and driving out the profit seeking farmers. Maize production in Kenya is already experiencing a glut *(26)*.

The above arguments also go to partly illustrate why large-scale and small-scale agricultural production cannot coexist to the mutual benefit of both groups of farmers and the country. Another reason is the fact that a large-scale farmer with his capital advantage and the need for labour will offer a wage which is likely to draw the peasant farmer away from his farm to the large farm and eventually to other businesses when the large farm proves unprofitable. As long as large-scale agricultural producers are profit-maximizers (expected profit maximizers), small-scale agricultural producers cannot coexist with them successfully.

Mechanized agriculture is meant to:

(a) reduce labour requirements and fatigue in farming and lead to increased acrage;
(b) ensure more thorough land preparation and greater speed of operations; and
(c) ensure more timely operations.

One however wonders whether these so called advantages are tenable. We know, for example, that peak labour requirements for crops such as cotton, groundnuts and cassava are at harvesting. Which mechanical methods in Africa are used to harvest these crops? Even crops like sorghum, millet and maize are yet to get suitable technologies developed for their harvesting. It is only rice which can be mechanized from planting to harvesting and how many Africans can claim that rice is a staple food? One is therefore unable to agree that mechanization adequatly reduces labour requirements. And even if it does, whom does reduction in labour requirement benefit? It is also on record that mechanization destroys structures

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(b) It should be noted that this is one of the neoclassical models of agricultural development.

of African soils and exposes them to erosion hazards *(27)*. Mechanization also means inability to do mixed cropping and it is by mixed cropping that malnutrition can be forestalled in most African countries. I think it is time Africans declare tractorization a disaster technology.

With regards to technological transfer, I do not think there is any more technology to be transferred in agriculture. We know the goods and bads of fertilizers, herbicides and insecticides applications, improved seeds and so on. Africa now has plant breeders, animal breeders, agricultural engineers, agricultural economists and many others connected with agriculture even up to the professor grade. What more technology do we need? If we cannot utilize the knowledge so far acquired then it is time we allow the small farmer to continue with his own «primitive» innovations. We must now be thinking of (indigenous) technological development and not technological transfer.

It is sad that even academics still believe that capital is an overriding factor of production in agriculture even though evidence points to the contrary. China, Korea and other developing countries have proved this to be a farce. Even Japan, a capitalist country developed her agriculture with little emphasis on capital. If capital was such an overriding factor, one would wonder why the Arab sheikdoms continue to import food. Some limited amount of capital may be necessary for agricultural development but the assumption of its overriding role is certainly erroneous.

The failure of the Indian sub-continent «Green Revolution» is a pointer to the need to stress on demand as well as supply of agricultural commodities. Supply will create its own demand only if the demand is not only a wish. The wish of the poor in society to eat an egg a day is not demand.

ESSANG has shown empirically, using data from the «Ondo circle» of Nigeria, that properly conceived and implemented measures which make the distribution of income less unequal have considerable potential for increasing food demand and preventing agricultural development from generating a market glut *(28)*.

In almost all development plans of African countries, the Harrod-Domar model where the growth of the economy is assumed to be dependent on the availability and product of capital is used. The model is based on an aim of economic growth, but in developing countries, economic growth should be the result and not the aim of economic policy. Concepts such as GNP or GDP do not mean anything to the common African. It is time developing countries concentrate on computing an index of poverty and leave the GNP or GDP computations to the developed world. Our poverty index should of course be based on the poorest in society.

It is again sad that developing countries continue to believe that the developed world and their agents will want to see a developed Nigeria or a developed Tanzania. Recent events in Afghanistan, I believe have brought into focus, the political weaponry of food. Developed countries will continue to pretend to be interested in the agricultural development of the developing world because their industrial goods such as fertilizers, tractors and other equipment must sell. No developed country has ever been

interested in agricultural projects which de-emphasize the importation of machinery and equipment. The failures of Lome I, and the so-called North-South Dialogue is enough to convince developing countries that no development can come from outside. To whom will the U.S. sell its rice if Africa is self-sufficient in food? (And to whom will the U.S.S.R. sell its weapons if Africa can manufacture them?).

VII. A STRATEGY FOR AFRICAN AGRICULTURAL DEVELOPMENT

For a sustained increase in African agriculture production, certain factors must be considered basic:

(a) Demand must be adequate to keep up prices;
(b) Technology to be adopted should grow out of the farming community and refined by scientific research. At worst, technology which does not grow out of the farming community should be proved to be compatible with the potentiality of the farmer and the onus of proof should lie with the scientist and not the farmer.

These two basic conditions demand that large-scale production should be discouraged as much as possible.

African governments should concentrate effort on only the small-scale farmer. Farm households should be helped to develop their agriculture without having to compete with money seekers for both resources and markets for their produce. Since it is not possible to prevent anybody from going into farming, large-scale farmers could be discouraged by disallowing them subsidies of all kinds. Factors of production should not be distorted for profit maximizers.

There is now, more than ever, an urgent need for agricultural scientists in Africa to leave the computers and green houses and go to the villages to collate and simply identify the varieties of crops grown; the various technologies used in restoring soil fertility, in checking soil erosion and in cultivation; and to develop technologies to incorporate these ideas. With their training in «advanced» technology, it should be possible to develop technologies that can improve agricultural production and productivity. The aim of the African agricultural scientist should be to ensure optimum use of the local resources-human, animal, soil, water and other natural resources. This suggestion implies a restructuring of a whole lot of institutions including the Universities so that a professor working in a village will not have to abandon his research work to be a Vice-Chancellor or take up any other administrative post. It also implies some degree of rural infrastructural development.

As a productive small-scale farming system is gradually evolved, it will be the farmers who would see the need to cooperate in certain ventures. This kind of cooperation should be given government guidance but not interference. In particular government should provide small-scale irrigation facilities for groups of farmers. Farm plots in big irrigation schemes should be shared among local small farmers either individually or in groups and it must be seen that those given plots are those working on them.

Mixed cropping and mixed farming should be encouraged to forestall protein deficiency in the diets of the farm households. In areas where cattle can be reared, every household should be encouraged to keep at least one milk cow.

This is a simple model based on the need for African countries to direct developing efforts at the productive forces in the economy and the need to develop to above a certain poverty level. This poverty level index should be determined by social scientists and others drawn from all African (developing) countries.

I am not pretending that the details of such a development strategy will be simple particularly as the strategy is to some extent directed against the interests of policy makers and implementers but I believe it is the only way African agriculture can be developed.

I have come short of suggesting a Maoist model of development for a number of reasons; Firstly, African leaders whether capitalist or socialist leaning are committed to neither. Some are even not committed to the development of their countries. Secondly, ignorance due to non-education and mis-education abounds and thirdly, many years of confused political systems in Africa have made many Africans suspicious of all «isms».

In conclusion, I think there is cause to be optimistic of agricultural development in Africa. The so-called «oil crisis» is likely going to benefit African agriculture. As it gets more and more expensive to run machines on a non-renewable resource like oil, African governments will have to pay more attention to the renewable resource of human and animal power, and will at the same time see the need to encourage the development of more appropriate technologies and forget about transfer of destructive technologies.

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RESUME

L'auteur aborde dans cet article le problème du développement agricole dans les pays africains indépendants. Son but est d'expliquer l'échec de cette agriculture à assurer une nourriture correcte et suffisante des populations africaines et de suggérer quelques mesures qui selon lui, pourraient aider les gouvernements à résoudre ce problème. Il commence l'article par une caractérisation de la Révolution Verte, stratégie agricole que beaucoup de pays africains ont adopté sans au préalable en analyser les avantages et les inconvénients. Pour l'essentiel, la Révolution Verte, telle qu'elle est comprise par les gouvernements africains doit nécessairement passer par la création d'une agriculture mécanisée de grandes exploitations.

L'auteur commente ensuite brièvement les expériences des pays qui ont créé et appliqué cette stratégie à savoir l'Angleterre, les Etats-Unis, le Japon, l'URSS et la Chine. Mais l'auteur s'empresse de noter que la réussite de cette stratégie agricole dans ces pays tient moins aux aspects techniques et technologiques purs de cette stratégie qu'au fait qu'elle a été élaborée et voulue par ceux-là mêmes qui devaient l'utiliser et que la Science n'est intervenue que bien après pour aider à perfectionner ce qui était déjà là. En d'autres termes l'agriculture s'est développée dans ces pays sur l'initiative et le désir des agriculteurs paysans, le gouvernement et les instituts de recherche n'ayant fait qu'apporter leurs concours sous formes de recherches scientifiques et de capitaux. L'échec de la Révolution Verte dans le sous-continent indien est dû aux facteurs suivants :

a) l'augmentation extraordinaire de la production des graines qui en a résulté n'a pas été homogène. Ainsi seules certaines régions ont connu ce boom agricole.

b) la révolution verte n'a profité qu'aux régions qui en étaient favorables et aux classes de fermiers privilégiés.

En outre, elle n'a pas pu résoudre le problème de la malnutrition.

A la lumière de ces expériences, l'auteur étudie ensuite les stratégies agricoles des pays africains depuis l'indépendance. Ces stratégies ont pour dénominateur commun une politique de laissez-faire en matière agricole, politique en partie dûe au vent de l'industrialisation à tout prix qui a soufflé en Afrique après les indépendances. Les exemples de la Côte d'Ivoire et du Kenya sont suffisamment significatifs de cas de pays qui ont connu une croissance économique sans développement. A cette politique de laissez-faire, il faut ajouter quelques idées erronées à propos du développement agricole. Ces idées soutiennent en gros que les méthodes agricoles traditionnelles, étaient trop primitives, que la mécanisation de l'agriculture pouvait coexister avec les petites exploitations agricoles et surtout que l'investissement était une nécessité absolue. Pour l'auteur toutes ces idées sont erronées.

Il fait ensuite remarquer que puisque nous ne sommes pas en mesure d'utiliser les connaissances en matière de technique et technologie agricole accumulées jusqu'à présent, nous devons maintenant permettre au petit agriculteur de continuer avec ses propres innovations primitives. Nous devons donc penser au développement de la technologie indigène et non plus au transfert de technologie. Compte-tenu de tout cela, l'auteur conclut que les facteurs susceptibles de promouvoir la production agricole en Afrique sont :

- *la demande doit être suffisamment importante pour éviter une fluctuation des prix.*
- *la technique à utiliser doit venir des agriculteurs eux-mêmes et que la science ne doit que la raffiner.*

Ces deux exigences fondamentales font que la grande exploitation agricole doit de plus en plus être découragée au profit des petites exploitations.