



Infrastructure for Agricultural & Rural Development in Sub Saharan Africa: Need for a Comprehensive Program and Adequate Investment

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Author's contributions

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

This study unanimously confirms that rural infrastructure is a sine qua non for significantly improving the quality of human life and phenomenally accelerating the process of agricultural development in Africa. Infrastructure projects, however, involve huge initial capital investments, long gestation periods, high incremental capital output ratio, high risk, and low rate of returns on investments. Rural infrastructure has direct and strong relationship with farmers' access to institutional finance and markets, and increasing crop yields, thereby promoting agricultural growth. Agricultural infrastructure has the potential to transform the existing traditional agriculture or subsistence farming into a most modern, commercial and dynamic farming system in Sub Saharan Africa. Increase in investment of agricultural infrastructure leads to increase in output and employment, a full investment formulation that meets the needs of domestic or external (multilateral and bilateral) funding sources will have to be carried out. Overall, a flexible, participatory approach will be needed, with full national and local involvement and commitment, while international partners, including Food and Agricultural Organization (FAO), give initial assistance to New partnership for Africa's Development (NEPAD) in this process. The paper therefore recommends that technical and financial assistance will be required to help build capacity in African countries to face the challenges and take full advantage of the opportunities flowing from the multilateral trading systems.

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1. INTRODUCTION

The African leaders of the New Partnership for Africa's Development (NEPAD) have clearly indicated that among their priorities are infrastructure and agriculture. Adequate and well-functioning infrastructure is essential for agriculture to be competitive due to reduced costs of delivering inputs to it and of taking produce out to markets, including any storage that this may entail; energy infrastructure is essential for development of agro-industries; information infrastructure is vital for timely technological information to farmers and agro-industrialists but also between producers and markets; water infrastructure is a precondition for irrigation while water-based power generation is the key to adequate and affordable power for Africa. In implementing agricultural development programs, Africa will need to take advantage of major transport corridors for location of production and processing if it is to reach distant markets competitively; in turn, in planning major infrastructure projects, Africa will need to include agricultural development opportunities among the economic benefits that will make transport, power, and water investments profitable [1,2].

The share of Africa in world agricultural exports dropped steadily from 8 percent in 1971-80 to 3.4 percent in 1991-2000, and reversing this decline will require increased efforts by the African countries, with the assistance of the international community, to surmount the hurdles, including domestic supply-side constraints [3]. The latter can be broadly divided into structural constraints, which are particularly prevalent in Sub-Saharan Africa and policy-induced constraints resulting from trade and macroeconomic policies that have biased the structure of incentives against agriculture and exports. However, Ahmed and Rustagi [4] found that African farmers received only between 30-50% of final market prices compared to 70-85% received by Asian farmers with most of the difference going to transportation. A comparative study of rural transport carried out in Ghana, Zimbabwe, Thailand, Pakistan and Sri Lanka in 1994-5 has shown that Ghana and Zimbabwe have transport charges that are two to two and half times more expensive than for Asian countries for comparable journeys of up to 30km. In this case data was collected from a variety of different types of vehicles including tractors, power tillers pickups and trucks [5].

In surveys in Tanzania designed to measure the impact of poor road condition it was found that over a 50km distance that an increase in roughness of 50% would increase truck charges by 16% and increase pickup charges by just under double[6]. A similar picture emerges for long distance transport which suggests that freight transport costs and charges in many Africa countries are also consistently higher than comparable costs in Asia. In the period 1986 to 1988 long distance freight transport tariffs in Francophone Africa were over five times higher than tariffs found in Pakistan. Similar levels of freight rates were found for long distance traffic in Zambia, Zimbabwe and neighbouring countries in 1989. In a study on the effect of road infrastructure on food prices in the then Zaire (Congo Democratic Republic), Minten and Kyle, [7] found that transportation cost was responsible for observed differences in food prices among producer region. Fig. 1 shows the percentage of the population estimated to be within 5 hours drive to a 50,000 person town. Many roads in Africa are roads in name only, and evidence suggests that transport costs are also increased by 40% in the wet season [8].

The provision of adequate and cost-effective rural infrastructure will clearly underpin the development of agriculture in general and, in particular, facilitate lower-cost production and marketing to enable countries in the region to respond to both national and international market demand [9]. An investment in infrastructure (e.g. rural roads) is extremely important for agricultural development [10], and weak transport infrastructure is a severe constraint to across much of Africa [7,11].

Probably no other issue has greater effect on the ability of the average developing country farmers or marketers to profitably market their produce than the availability of rural infrastructure such as an effective transport link to a place where buyers congregate. In Nigeria, the distribution of the agricultural produce is hindered by either lack of motorable roads in the rural areas or poorly maintained rural roads in few areas where they exist. Even, the roads linking the major towns in the country are characterized by sharp and dangerous bends, big potholes, and narrow bridges and are mostly untarred. The railway networks are poor and undeveloped since the colonial era, and its operation has been politicized to a greater extent that the younger

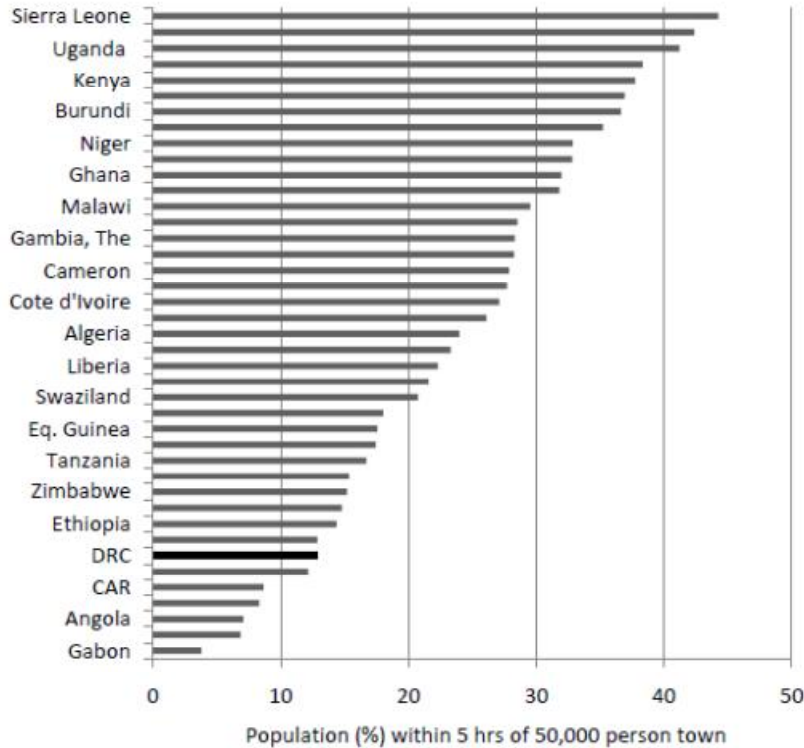


Fig. 1. Transportation access to urban markets in Sub-Saharan Africa
 Source: Authors Computation

generations do not know about its existence as a type of transportation system. Similarly, the water ways are not developed neither are the few ones in existence are not improve upon to meet the demand.

This research sets out estimates of complementary investments in rural infrastructure that are required to support the growth in agricultural production due to the land and water developments foreseen in Africa. These infrastructures include rural roads, storage facilities for crops, livestock and fish products as well as related processing and market facilities. Due to lack of precise, up-to-date information regarding the current stock of rural infrastructure in any particular country, the estimates should be viewed as providing preliminary and indicative orders of magnitude only [12].

2. INFRASTRUCTURE: INTERFACE WITH AGRICULTURE

Infrastructure covers the fields of energy; water and sanitation; transport as well as information and communications technologies (ICT). The NEPAD Infrastructure Action Plan has the overarching goal of reducing poverty. It is driven

by the belief that Africa needs to exit from international economic marginalization through development and that such development cannot occur without trade while trade in turn cannot occur without infrastructure. The leaders of NEPAD believe that regional infrastructure is important because African economies are typically too small to generate the necessary economies of scale to reduce transaction costs and so improve competitiveness.

Energy: Although Africa has 13% of the world's population and produces of the world's energy, it consumes only 3% of global commercial energy. Africa is said to be the continent where residential connections are fewest; in 1991, it is reported that fewer than 22% of African households were connected to [electricity] networks. This state of affairs is a symptom of the low degree of modern economic activity. NEPAD aims to develop fully all forms of Africa's energy resources so as to deliver affordable energy services for development. Of the projects and programs proposed, only one has potential for direct impact on agriculture, especially on rural industrialization. It is a US\$3 million study (proposed for 2003-2005) on "Co-operation in Rural Energy Networks".

Water: For water, the Action Plan refers to agriculture specifically, viz. "...the available resources have to be harnessed to meet the growing basic needs of water supply... contribute to food security through use of water for irrigation, and also be able to tap the available renewable hydropower potential of the continent." The Action Plan also states: " ... despite widespread and deteriorating food insecurity on the continent, and the fact that agriculture is the main user of water in most African countries, in two-thirds of them, less than 20% of the irrigation potential has been utilized To complicate the situation, degradation of water catchments is becoming a widespread environmental hazard with serious ramifications on water quality and on the continent's ability to feed itself." Noting that in the world, about 30-40% of food comes from the irrigated 16% of total cultivated land [1]. The Plan sees this as an area of opportunity and observes that: Africa has large irrigation potential but relatively little land under this use compared to other regions; there have been major problems with irrigation schemes and future success requires reforms; the African sub-regions that use irrigation most are the ones least endowed with water resources. The Action Plan blames the combined effect of intensive agriculture and deforestation for degradation of river basins and also is concerned at the adverse impacts of drought, desertification and the associated deforestation, over-grazing, soil erosion, and overexploitation of underground water in arid zones such as the Maghreb and the Sahel.

Transport: Africa is the continent with the greatest number of landlocked countries [13]. It has the lowest density of paved roads of any of the world's regions, which hinders access to markets. For example, there are an estimated 1.8 million km of roads in Sub-Saharan Africa, of which only 284 000 km (16 percent) are paved. Poverty and remoteness are particularly associated in Africa where the combination of scarce and poor roads results in high transport costs and make parts of the economy only semi-open. For example, recent studies in Burkina Faso, Uganda and Zambia have shown that walking is the principal means of transport for 87 percent of rural households [14,15]. Consequently, many countries face extraordinary costs in accessing global markets. Indeed, the Action Plan quotes UNCTAD data showing that in a number of countries, the share of transport cost in value of trade is staggering: for example, transport and insurance payments as a

percentage of the value of exports is: Malawi (55.5%); Chad (51.8%); Rwanda (48.4%); Mali (35.6%); Uganda (35.5%); CAR (32.8%) [16,17]. Clearly, this level of costs would be particularly damaging for agricultural trade where primary products are often of low value and great bulk [17,6,18,5,19]. This situation can have many implications for agriculture, including:

- The need for value-addition to traded products so as to make transport costs more affordable;
- The advantage of maximizing location of agricultural, agro-industry and agro-storage development programs close to many transport corridors Africa and Regional Economic Organizations have developed or are promoting;
- The desirability of planning the development of rural roads so as to optimally link to major transport infrastructure of inter-country significance.

3. INVESTMENT STRATEGY

Most of the African countries to be included in the investment strategy come within the Less Developed Country (LDC) category and, as such, have been exposed to years of fiscal austerity programs. Austerity explains part of the decline in funding but other contributors include failures to find alternative sources of income to replace declining revenues from weaker terms of trade in their traditional markets; the drop in Oversea Development Association (ODA) funding; and reduction in private finance for infrastructure. With regard to ODA: in 1990, Africa received 30 percent of global agricultural ODA, but its share declined to 21 percent in 1998. Moreover, the total flow of official development assistance to primary agriculture declined over the same period from US\$11 billion to only US\$7.4 billion [20]. The lack of funding has contributed not only to insufficient infrastructure construction but also to a lack of appropriate maintenance - hence there are also substantial needs for rehabilitation. Thus, the strategy to address rural infrastructure requirements both to complement the projected expansion in areas benefiting from land and water developments and the requirements of the other major agricultural sub-sectors (particularly livestock and fisheries while in some countries their forestry) will clearly depend on the country concerned and would have the following main elements:

- Investments in existing and new rural infrastructure would support the expansion

of agricultural production arising from the rehabilitation and development of water management and land improvement works, as well as underpin the sustainable development of the livestock and fisheries sub-sectors and provide for more general socio-economic development and poverty reduction in the rural areas. In some humid central African countries, important forest resources are inaccessible for commercial exploitation for lack of both river and road/rail infrastructure.

- In the design of an appropriate approach to rural infrastructure, the areas of emphasis will clearly vary by country and priorities should be based on clear linkages to related national policies and national poverty reduction strategies.
- Innovative approaches to financing, using a range and mix of public and private funding and perhaps new approaches to mobilizing resources for, and managing, larger-scale rural infrastructure would be considered.
- Clear linkages would be established to countries' priority agricultural sector policies and programs, including those designed to take advantage of external market trading opportunities. The recovery of the current degraded stock of rural infrastructure to its full operational capacity would be an essential priority.
- The need for continuing maintenance throughout the period to 2015 would be included.

Institutional support will be required for capacity building and training in support of all levels and types of institutions responsible for the planning, design, construction and continuing operation, maintenance and management of rural infrastructure; these would range from central to local level/decentralized government entities, representative bodies, private sector actors, NGOs and CBOs, etc. Clearly, the way forward will be influenced by the fact that current assets of productive and rural infrastructure differ from country to country not only in terms of scope, extent and coverage, but also in the way that they are owned, managed and financed. In the last decade, such infrastructure has come to be seen not so much as a public asset, but rather as a stream of demand-driven services involving the State, the private sector and, particularly, the users themselves. In the future, in the relative absence of a strong private sector, rural infrastructure in Africa will have to be financed by

a larger proportion of concessional loans and grants and be more community-based, provided the appropriate capacity can be built. An appropriate mix of financing from public sources (domestic resources as well as international loans and grants) and private resources will also have to be considered, in line with the capacity of the existing stock and its conditions, country policies, institutional capacities and private sector interests including the interests of rural communities. Prospects for export growth in Africa are more promising in new crops and processed products than in traditional primary commodities and several non-traditional agricultural commodities, particularly, but not exclusively, horticultural products, would appear to offer important opportunities for some African countries. The developments in water and land infrastructure, with complementary investments in rural infrastructure would underpin such market diversity.

4. EXPECTED IMPACT

Benefits arising from investments in rural infrastructure and improved market access will clearly need some time to materialize in terms of impact on productivity, agricultural growth and consequent poverty reduction. However, available evidence points to an increase of 1 percent in GDP per caput in developing countries for every one- percent increase in the stock of infrastructure per person [20]. For Africa, this impact is likely to be larger due to the constraints placed on the region's competitiveness by geography and the resulting difficulty of accessing markets. In particular, Sub-Saharan Africa has the highest percentage in the world of land-locked populations and the lowest share of population with access to coast or river. Proper rural infrastructure is therefore necessary to make up for at least part of the region's geographical handicaps, especially in the face of increasingly integrated world markets. There are also a number of other direct benefits that can arise in the short- and medium-term, which will contribute to stimulate economic growth. First, construction of rural infrastructure directly stimulates output and employment and, in African economies where labor is relatively abundant, increased impact occurs due to the multiplier effect. Secondly, good quality infrastructure promotes domestic market activity and market integration by lowering both transaction costs and the costs of inputs. In addition, it expands the size of the market for domestically produced goods and services by

facilitating access to regional international markets.

5. FUTURE INTERNATIONAL SUPPORT

Clearly, the projections of rural infrastructure requirements need to be placed in their specific country-based policy and socio-political frameworks, with consideration also taken of the countries' physical conditions and socio-economic settings. Investments will need to be judged in a strategic manner so that the benefits of diversification and intensification of agricultural production are fully realized and can respond to the changes in market conditions. The proper identification of rehabilitation needs and priority investment requirements will necessitate a broad and multi-sectoral approach, involving several sectoral ministries within each government as well as a range of civil society actors.

After full agreement has been reached on both the strategy and broad content of the national program, full investment formulation that meets the needs of domestic or external (multilateral and bilateral) funding sources will have to be carried out. Overall, a flexible, participatory approach will be needed, with full national and local involvement and commitment. International partners, including FAO, could initially assist NEPAD in this process in four ways:

- Refinement of current estimates of rural infrastructure assets based on a review of data availability on rural roads, storage, processing and market facilities, supported by in-depth country studies.
- Providing linkages to other UN Specialized Agencies who have responsibility for associated areas of activity. For example, ILO is concerned with the employment generation aspects of rural infrastructure works and has a good deal of African experience that could be drawn upon for use by member countries.
- Providing assistance to member countries in investment identification and preparation, on a case by case basis, and linked to the interest of international public funding sources.
- Expanded technical support for Regional Economic Organizations aimed at enhancing their capacity to promote intra-regional trade in farm products, improve agricultural product standards and support national programs for expanded agricultural output.

6. CONCLUSION

Rural infrastructure plays a critical role in agriculture and rural development, economic growth and empowerment for the African rural poor. The lack of adequate and reliable infrastructure touches the life of every African family daily. Investments in rural infrastructure, particularly roads, energy, water, storage, processing and market facilities, will therefore be required to support the anticipated growth in agricultural production to improve competitiveness. Family efforts to escape poverty and lift themselves above subsistence levels are limited by the present poor access to markets, supplies and vital information. Local roads and tracks are often impassable making it difficult, if not impossible for rural families to access the economy.

In the wake of market liberalisation many marketing parastatals are being forced to revise their mission statements. Those that formerly had exclusive rights to market staple foods such as grains, and under market liberalisation have had this exclusive function taken away from them, are wrestling with the question of what their role should be now. They may have alternative roles which they could assume such as becoming the buyer and seller of last resort, or becoming an instrument of development whereby the parastatal acts as the marketing agent of small scale farmers and with their storage and transport resources close the competitive gap between smallholders and the large farms and plantations. Then again, the marketing parastatal may be commercialised, or even privatised, in order to increase the level of competition when new grain suppliers enter the market. Whatever role is chosen, it should be expressed within the organisation's mission statement.

Transport infrastructure consists of the network of roads and tracks on which the population travels by means of walking or using non-motorised and motorized vehicles. This network includes the intra-village tracks (both informal and formal) as well as local government networks that link the rural population to the rest of the economy and the outside world. Other rural infrastructure elements - storage facilities for crops, livestock and fish products, and related processing and market facilities - are clearly more closely linked to activities in the agricultural sector and have evolved over time in extent, sophistication and modalities of ownership and

operation, depending on socio-economic conditions and country policies. In the latter respect, it can be noted that there have been cases of inappropriate, and often uneconomic, investments in Africa in the past. Indeed, in some countries, there is already an abundance of crop storage facilities operated by more-or-less defunct grain marketing boards which is not necessarily being made available to the private sector. A possible exception to this is storage for food security reserves. However, in most cases, there is a need to carry out an inventory of available stores, rehabilitate them and then seek means to involve more the private sector. With regard to post-harvest activities, clearly the days of expensive government involvement in most agro-processing facilities are past, and future emphasis will probably be very much on commercial investment by the private sector.

7. RECOMMENDATIONS

The paper therefore recommends the following:

1. Investment requirements will include public and private resources, which will be shared according to particular country policies and agreements, etc.
2. Need for NEPAD and African Governments to articulate requirements for crop storage and processing capacity, enhanced safety and quality standards as well as crop marketing facilities and promotional services, as a function of the anticipated increased agricultural production following investments in water management and land improvement.
3. Requirements for livestock and fisheries infrastructure to be based on recent national-level sector studies and formulated investment programmes, as well as general assessments of sub-sectoral needs.
4. Actions in support of improving African countries' access to external markets will also include a number of policy and institutional related themes. For example, developed countries could improve access to their own agricultural markets, inter alia: (i) granting duty-free and quota-free market access, similar to those provided by the EU to LDCs; (ii) easing rules of origin criteria; and (iii) providing assistance to African countries to meet SPS/TBT standards.
5. Technical and financial assistance will be required to help build capacity in African countries to face the challenges and take

full advantage of the opportunities flowing from the multilateral trading system, and to participate fully as equal partners in the new WTO negotiations on agriculture.

6. Government could guarantee an efficient storage mechanism by passing a law permitting owners of agricultural commodities to place them in specifically located warehouses but still retain ownership of the goods. The warehouse operator issues a receipt that can be used as collateral for a loan against the inventory. The same law may also require the warehouse operator to purchase a bond to assure return of the merchandise or monetary reimbursement. Furthermore, government can privatize the National Strategic Grain Reserves under the ongoing commercialisation and privatization programme. This would reduce government expenditure and make the agricultural distribution more efficient.

COMPETING INTERESTS

The author has declared that no competing interests exist.

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