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Environmental Impacts of Commercial Agriculture in Nigeria: A Review

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ABSTRACT

Smallholder farmers in Nigeria with total farm holdings of less than 5 hectares constitute about 70 percent of the farming population and produce most of the food crops and thereby contribute to food security and poverty reduction. Inspite of their contributions, they still have the challenges of globalization and liberalization which require producers compete in the markets hence commercial agriculture has come to the rescue which theoretical terms is associated with market oriented production. The objective of this paper is to review the environmental impacts of commercial agriculture in Nigeria. It presents an overview of the Nigeria's commercial agriculture, its prospects and opportunities. It also highlights the hidden (environmental, economic and indirect) costs of commercial agriculture. The appropriate policies and prospects that can enhance rapid development of commercial agriculture were also mentioned. The paper recommends that the Nigerian authority should create the enabling environment for favourable macroeconomic policies, competent government administration, adequate infrastructure, political stability and a strong human capital base to move the country from subsistence level to commercial agriculture.

KEYWORDS

Commercial agriculture, subsistence, Nigeria, farming, environmental impacts.

Introduction

There is no doubt that agriculture still remains the key pillar of most African economies. Agricultural production can be carried out at the subsistence or commercial level with the former being an agricultural system in which a farm family or community uses what it produces and produces what it uses while the latter produces agricultural commodities by obtaining production resources from the input markets and selling its agricultural outputs in the output markets with the objective of making profits. The significant difference between subsistence and commercial farming in a capitalized/ mixed economy like most African economies(Nigeria inclusive) is the emphasis on the objective of profit making

by commercial farmers. Some features of commercial agriculture can be measured in terms of physical factors (resource/ input and production output), financial size factors (which units of measurement are in monetary terms) and labour factors (measured by the amount of labour employed in the farm)(Alimi,2012).

Modern commercial agricultural practices involving chemical inputs such as fertilizers, herbicides and pesticides have been associated with huge increases in food production and productivity. However, the high chemical usage of fertilizers and pesticides used to bring about these spectacular increases in food production are not without problems. A visible parallel correlation between higher productivity, high chemical input use and environmental degradation and human hazards effects is evident in Nigeria where commercial agriculture is gradually gaining ground. This paper intends to discuss the environmental impacts arising from climate change, deforestation, irrigation, pollutants, soil degradation, waste as well as the high use of chemical inputs to increase production and productivity in Nigeria commercial agriculture and to show the health costs arising from direct exposure to pesticides during pesticide handling and spraying on farms by large-scale farmers.

Nigeria Commercial Agriculture: An Overview.

Agriculture plays an important role in the Nigerian economy as it contributes 40 percent to the Gross Domestic Product (GDP) with crop production accounting for an estimated 85 percent of this total, livestock for 10 percent with the remaining 5 percent from fisheries and forestry. The agricultural sector generates about 90 percent of the non-oil export revenue, employs about one-third of the total labour force and provides a livelihood for the bulk of the rural population (FMARD, 2006). Inspite of the contributions of agriculture to rural and overall economic development, Nigeria's potential with respect to commercial agriculture is largely untapped and the current status of agriculture is a source of major concern. The sector is dominated by poor small-holder farmers, often solely engaged in subsistence agriculture, while the agribusiness sector is in its infancy. (Awotide and Akerele, 2010).

Agricultural commercialization entails the production of crops and livestock for sale, for widespread distribution to wholesalers and retail outlets, storage, processing, export and local market and enterprise development. Some of these crops include commercial production of wheat, maize, tea, coffee, sugar cane and cotton, a number of tropical fruits such as cashew, mangoes, citrus, bananas etc, livestock such as poultry, piggery, dairy and fisheries (Ibrahim, Mohammed, Nmadu, Yakubu and Ibrahim, 2010).

Commercialization in theoretical terms is associated with market oriented production. The major objective of which includes generating more income, expand food production

to meet peoples demand and those of local industries, serve the needs of both domestic and foreign markets and create employment. Commercialization can be facilitated through research and extension services, economic liberation, development of rural financial markets and infrastructure, as well as access to scarce resources (Omeh, 2006).Agricultural commercialization involved a deliberate action on the part of agricultural production to use factors of production in such a way that a reasonable part of the crop produced is for exchange or sale (Okezie, 2006).

According to Poulton,C.,Tyler,G.,Hazel,P.,Dorward A.,Johnathan Kydd,J. and Stockbridge, M. (2008), Commercial agriculture implies the movement from a system of subsistence production to a market-based system of production. They identified the defining characteristics of commercial agriculture as being "production primarily for market". In other words, it is not dependent on scale of production or related to particular types of crops. Von Braun and Kennedy (1994) defined commercial agriculture in terms of the degree of dependence on markets for the supply of production inputs. Considering "production primarily for market" as the defining characteristic of commercial agriculture, the importance of the small-scale farmers cannot be over emphasized as rational commercial businesses whose production activities vary according to market opportunities. Commercial agriculture therefore will naturally involve raising the cash earnings of small-scale farmers and other *dramatis personae* of agricultural related enterprises. Small holder agriculture remains the major source of livelihood for most of Nigeria's rural poor, yet it is failing to provide a route out of poverty for the majority. If commercial agriculture (production primarily for market) is to be significantly enhanced in Nigeria, the factors contributing to low agricultural productivity must be further understood. Sustainable commercial agriculture is costly and is only viable if it can generate the revenues that are needed for investment in inputs. Thus, profit maximization is the objective of commercial agriculture.

Agricultural commercialization is a powerful driver of growth as it places new emphasis on capital formation, scientific progress and technological development. As a result of the contribution of agriculture to the nation's GDP, the Nigerian Government through its agencies resolves to fully exploit these contributions and came up with the move to commercialize agriculture with the objectives of improving the efficiency of agricultural production systems as well as improving access to markets for targeted value chains among small and medium scale commercial farms. These were to be actualized through the developmental role of the Central Bank of Nigeria in collaboration with the Federal Government of Nigeria represented by the Federal Ministry of Agriculture through the establishment of the Commercial Agricultural Credit Scheme (CACS). The scheme focused on crops as cotton, oil palm, wheat, rubber, sugar cane, fruits and vegetable and livestock such as dairy, poultry, piggery, fisheries and forestry.

Prospects for Commercial agriculture in Africa

According to Awotide(2010),the poor performance of African agriculture (Nigeria inclusive) implies that the continent has been lagging behind in adapting to the structural transformation of the international agro-food market which has opened up new business opportunities for developing-country producers, while at the same time increasing competitive pressure (OECD Development Centre, 2007).

The prospect for commercial agriculture in Africa (Nigeria Inclusive) is grounded on five (5) principal factors as presented by IBRD and World Bank (2009).

1. **Rapid Economic Growth and Strong Demand Prospects:**

Accelerating rates of income growth in Africa (above 3 percent per capita annually in most countries), combined with still-high population growth rates and rapid urbanization, provide diverse and ample opportunities in domestic and regional markets.

2. **Favourable Domestic Policy Environment:**

The macroeconomic environment in many African countries is today not only broadly favourable to agriculture but also more favourable than was the case in Brazil in the 1960's when the agricultural revolution began in the Cerrado region. Because of the spread of macroeconomic stability, introduction of market-determined exchange rates and opening of trade regimes, economic growth rate have sharply accelerated. Net taxation of agriculture has fallen across Africa and lower inflation and real interest rates favour expanded agricultural investment.

3. **Improved Business Climate**

The business climate has improved remarkably in recent years in many African countries including (to varying degrees) Mozambique, Nigeria and Zambia. Investments in basic infrastructures such as roads, electricity, water and communications are being given priority and institutional reforms are being implemented to reduce administrative burdens on business and combat corruption. Decentralization initiatives and the development of civil society have improved the ability of the rural population to participate in their own development and defend their interests. This in turn has started to open space for independent producers and business organizations of all kinds. A number of African countries have already reformed (or are in the process of reforming) their land laws, protecting customary rights while at the same time opening opportunities for security of tenure for investors.

4. **Increased Incentives to Invest in Agriculture:**

Stronger demand, better macro and sectoral policies and an improved business climate will lead to higher returns to agriculture in Africa; inducing increased investments from home and abroad. Foreign capital (including repatriated funds that previously fled Africa for safer haven) is beginning to flow into African agriculture and related value chains as evidenced by recent Chinese acquisition of land leases in Tanzania and the Democratic Republic of Congo, rising interest on the part of European energy firms in securing land concessions for bio-fuels, feedstock production, and surging foreign investment in high value African agricultural export enterprises.

5. **New Technologies:**

New technologies offer agricultural entrepreneurs in Africa advantage that their Thai and Brazilian counterparts have acquired over the past four decades.

- Techniques for managing Guinea Savannah soils to make them more productive and sustainable are much more advanced than a generation ago, although research is still needed to adapt technologies developed in other regions to African conditions.
- The bio-technology revolution offers the potentials to tailor solutions more quickly to constraints limiting expansion of cash crops in Africa, but only if the African countries develop the regulatory and research capacity to exploit this potential.
- The Cell-phone revolution is helping to link African farmers and traders quickly and affordably to information about potential sources of demand and supply.

Opportunities For Enhancing Commercial Agriculture In Nigeria

Specifically, agriculture is being accorded high priority by the government in the development of the Nigerian economy of recent. Therefore, the **emerging opportunities for enhancing commercial agriculture i**n Nigeria are highlighted below.

The economic policy environment in Nigeria is becoming increasingly conducive and investment friendly in the past couple of years to make the economy market oriented and private sector led. According to Ayoola (2010), several opportunities abound in the country for commercial agricultural production which includes the following.

- The present democratic government that creates a more favourable environment for policy making and enterprise activities.
- The large size of agricultural sector as a source of products for commerce and trade in agricultural commodities.

- The large population of the country with particular reference to its growing youth and the workforce.
- The diversity of agricultural resource base and huge markets for local trade in food and non-food agricultural commodities.
- The presence of many financial institutions undergoing reforms and as sources of funds for agricultural production and marketing activities.
- The scope for institutional reforms and restructuring of agricultural administration towards eliminating waste and streamlining the role of government, with a view to improving production and marketing efficiency.
- The on-going infrastructure development programmes particularly in the communication, energy and transport sectors for enhancing the efficiency of production and marketing activities; and
- The presence of several agencies and international bodies in trade and finance as well as human rights advocacy, which represents a critical source of official development assistance to the country for agricultural development.

If all these are harnessed, opportunities for enhancing commercial agriculture would need no debate. These are however not without challenges.

Challenges To Commercial Agriculture in Nigeria

The challenges posed to commercial agricultural development are no less daunting than the magnitude of efforts and resources required for addressing them effectively, which creates the need for external assistance from financial and technical partners. The several **challenges** facing commercial agriculture of the country include the major ones such as: The generic problems of production and marketing of crops, livestock and fisheries in terms of poor access to credit and technical inputs namely fertilizer, seed and pesticides, the problems of maintaining the soil, environment and the natural resource base etc. Other major challenges facing the sector are poor rural infrastructure such as physical infrastructure (rural roads, water supply, storage facilities electricity supply and market infrastructure). Moreover the subsisting policy environment does not seem right for the transformation of the sector. In addition to this, there is also the problem of youth unemployment as they drift in large numbers from rural areas to urban centers, with the attendant effect on food security of the nation. Inadequate marketing channel exist in rural areas particularly for food and other agricultural commodities (Ayoola, 2010).

According to Awotide et al (2010), the challenges to commercial agriculture in Nigeria are;

- Agricultural performance in Nigeria is greatly impaired by the low level of development of infrastructure. Physical and marketing infrastructures are poorly

developed, storage and processing facilities are rudimentary and access to market is highly restricted.

- Inadequate market information has been a disincentive to intending farmers and a source of frustration to many small holders in remote parts of the country.
- Inadequate access to credit facilities has worsened the problem of under investment in the agricultural sector. With the scarcity and rising cost of farm inputs, it is difficult for many farmers to engage in commercial agriculture especially in view of their low level of income and savings. And with limited access to modern means of production the problems of low productivity and low quality of output continue unabated.
- The agricultural subsidies provided to farmers in developed countries constitute an impediment for African farmers' exports because consumers tend to favour the artificially cheaper products from developed countries. Subsidized imported products also often displace the locally produced products in African countries.
- Low International agricultural prices constitute a major constraint to the survival of African farmers. These are causes of unfavourable and volatile price trend which include imbalances between supply and demand, slow consumption growth, over-protection by developed countries and political instability.
- The high tariffs imposed by developed countries on agricultural products from developing nations reduce the ability of the later to export their products and compete in the world market. Developing countries often face low tariffs for raw materials but higher tariffs for processed foods, thereby limiting their ability to move up the value chain.
- Export dumping is a persistent trade distorting practice which has contributed to the low performance of African agriculture over the years.
- The international markets for some agricultural commodities have become much more concentrated. Large trading companies dealing in many commodities have replaced smaller and specialized companies while the total share of all trading companies has fallen relative to direct purchases by final sellers. A highly concentrated commodity market has a strong influence on prices and will not allow free expression of the forces of demand and supply. The concentration of the markets for certain commodities implies that fewer larger companies can dictate the prices they are willing to pay to producers. Despite these challenges, farmers are striving to delve into commercial agriculture with its attendant environmental impact.

Potential Environmental impact of Commercial Agriculture.

The **environmental impact of commercial agriculture** varies based on the wide variety of agricultural practices employed around Nigeria. Some issues involved are in;

1. Climate change-According to a United Nations Report (2007), Climate change and agriculture are interrelated processes, both of which take place on a global scale. This is a challenge to commercial agriculture. While global warming has significant effect on agriculture, at the same time, agriculture has been shown to produce significant effects on climate change, primarily through the production and release of greenhouse gases such as carbon dioxide, methane, and nitrous oxide, but also by altering the Earth's land cover, which can change its ability to absorb or reflect heat and light, thus contributing to radioactive forcing.

2. Deforestation-One of the causes of deforestation is to clear land for pasture or crops. Hance, Jeremy (2008) mentioned that 5% of deforestation is due to cattle ranching, 19% due to over-heavy logging, 22% due to the growing sector of palm oil plantations, and 54% due to slash-and-burn farming. Though in the year 2000, the United Nations Food and Agriculture Organization (FAO) found that "the role of population dynamics in a local setting may vary from decisive to negligible," and that deforestation can result from "a combination of population pressure and stagnating economic,social and technological conditions."(Alain,2000).

3. Irrigation-International Institute for Land Reclamation and Improvement mentioned that Irrigation can lead to a number of problems (ILRI),1989. Some of them are;

- Depletion of underground aquifers through over-drafting.
- Ground subsidence-This is groundwater recharge which is an ecological restoration, mitigation, and remediation technique.
- Under-irrigation gives poor soil salinity control which leads to increased soil salinity with consequent build-up of toxic salts on soil surface in areas with high evaporation. This requires either leaching to remove these salts and a method of drainage to carry the salts away.
- Over-irrigation because of poor distribution uniformity or management wastes water, chemicals, and may lead to water pollution.
- Deep drainage (from over-irrigation) may result in rising water tables which in some instances will lead to problems of irrigation salinity requiring water table control by some form of subsurface land drainage.
- Irrigation with saline or high-sodium water may damage soil structure owing to the formation of alkaline soil.
- Runoff causing surface water and groundwater-aquifer hydrologic cycle water pollution.

4. Pollutants- A wide range of agricultural chemicals is used and some become pollutants through use, misuse, or ignorance. Some examples are in;

- Pesticide drifts (in soil contamination, groundwater and water pollution as well as air pollution *spray drift).*
- Pesticides, especially those based on organochloride.
- Pesticide residue in foods.
- Pesticide toxicity to bees (in list of crop plants pollinated by bees and pollination management).

5. Soil degradation- Soil degradation occurs in the form of soil contamination and erosion (sedimentation).

6. Waste- Plasticulture-the use of plastic materials in agriculture raises problems around how to carry out the recycling of agricultural plastics.

Hidden Costs of Commercial Agriculture

According to Drury and Tweeten (1997), many of the costs of commercial agriculture have been hidden and ignored in short-term calculations of profit and productivity, as practices have been developed with a narrow focus on increased production. Recent studies around Nigeria have revealed that there are long-term consequences of commercial agriculture. Some of such costs are in;

1. Environmental cost-Approaches to producing food must be measured partly by their impact on the environment they depend on. The current commercial system of agriculture impacts the environment in many ways. It uses huge amounts of water, energy, and chemicals, often with little regard to long-term adverse effects. But the environmental costs of agriculture are mounting.

- Irrigation systems are pumping water from reservoirs faster than they are being recharged.
- Toxic herbicides and insecticides are accumulating in ground and surface waters. Other adverse effects are showing up within agricultural production systems themselves for example, overuse of herbicides and insecticides has led to rapidly developing resistance among pests that is rendering these chemicals increasingly ineffective. Also the negative effect of herbicides and insecticides on biodiversity cannot be over emphasized.
- Chemical fertilizers are running off the fields into water systems where they generate damaging blooms of oxygen-depleting microorganisms that disrupt ecosystems and kill fish. Many of the negative effects of commercial agriculture

extend far from fields and farms. Nitrogen compounds from farms travel down the rivers to degrade coastal fisheries and create a large "dead zone" where aquatic life cannot survive.

- Unmanageable and polluting mountains of waste and noxious odor are the hallmarks of industrial-style CAFOs (confined animal feeding operations) for poultry and livestock, causing environmental and health hazard.

2. Economic Costs-Estimating the economic costs of commercial agriculture is an immense and difficult task. A full accounting would weigh the benefits of the somewhat lower prices consumers pay for food and the profits of agri-business giants, including fertilizer and pesticide manufacturers, against the health and societal costs of environmental pollution and degradation for instance. Such costs are difficult to assess for a number of reasons (Krebs,1992).

One difficulty is our partial understanding of potential harms. A good example is the potential for endocrine disruption that many pesticides appear to have. Endocrine disrupters are molecules that appear able to mimic the actions of human and animal hormones and disturb important hormone-dependent activities like reproduction. More research is needed to determine the extent of the health and environmental damage done by such compounds and the relative contribution of agriculture and other sectors and activities. Among the many environmental costs that need to be considered in a full cost accounting of industrial agriculture are

- The damage to fisheries from oxygen-depleting microorganisms fed by fertilizer runoff.
- The clean-up of surface and groundwater polluted with CAFO waste.
- The increased health risks borne by agricultural workers, farmers, and rural communities exposed to pesticides and antibiotic resistant bacteria.

3. Indirect Costs-Other enormous **Indirect costs** implicit is the high energy requirements of commercial agriculture. This form of agriculture uses fossil fuels at many points: to run huge combines and harvesters, to produce and transport pesticides and fertilizers, and to refrigerate and transport perishable produce across the country and around the world. The use of fossil fuels contributes to ozone depletion and global warming, which could exact a high price on agriculture and the rest of the society through increased violent weather events, droughts and floods, and rising oceans (Raeburn,1995).

Policies To Support Agricultural Commercialization

In due consideration of the challenges for commercial agricultural development in Nigeria, government policies should include:

- Increase production capacity with a view to agricultural diversification including cash crops, livestock and fisheries production.
- Develop the agricultural processing industry through domestic and foreign capacity investment in agribusiness and increased value addition.
- Increase the efficiency of agricultural market and distribution through the promotion of government and private sector sponsored market research, market information systems and improving regional linkages between producers, distributors and consumers.
- Development of internationally accepted product grades and standards.
- Expansion of rural credit facilities at market interest rates.
- Rehabilitation, expansion and intensification of dry season irrigation scheme with participatory community based management.
- Diversification of farming systems and development of agro-forestry through adaptive research, trials and demonstrations on farmer's fields.
- Expansion of small scale community managed irrigated systems.
- Farmers demand driven extension.
- Sustainable land-use management with soil erosion control, afforestation, plantation, forestry and conservation management.
- Rural savings mobilization and extension of micro- credit.
- Development of a competitive rural finance system with market interest rates being applied in most areas and subsidies given in other areas to promote technology adoption amongst the poorest socio-economic strata.
- Opening community market access through feeder road upgrading and expansion and market information delivery.

Conclusion

Commercial agricultural production obviously does have environmental impacts, especially when natural habitats have to be cleared for production to take place. The artificial inputs used in commercial agricultural production can reduce soil biodiversity; they pollute waterways, often killing flora and fauna that live in them or depend upon them; and they pose a serious threat to human health if not used carefully. However, set against that, one needs to recognise that subsistence agriculture in the context of a rapidly growing population can lead to even faster destruction of natural habitats. Moreover, whilst pollution from fertilisers and agrochemicals is not a problem in subsistence agriculture, the depletion of soil fertility is, and so, too, is the damage to human health

caused by malnutrition and poverty, both which are endemic amongst populations that depend upon
subsistence agriculture. Therefore, while commercial agriculture is not condemned, governments concerned should incorporate issues raised in this write-up into the development of commercial agriculture with their attending remedies.

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