Chapter 91
Harnessing Nigeria's Investment in Satellite Technology for Sustainable Agriculture and Food Security

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ABSTRACT

This paper examines the relevance of satellite technology in promoting and sustaining agricultural development and food security in Africa and Nigeria in particular. Some of the common problems facing agricultural development in Nigeria and Africa as a whole are discussed. The authors justify the relevance of Nigeria's investment in satellite technology for improving agricultural production in Nigeria and Africa as a whole. The paper also presents selected applications of NigeriaSat-1 in sustainable agriculture and food security as embarked on by the government of Nigeria through the National Space Research and Development Agency. Policy recommendations were made to further boost agricultural production and food security in Africa and particularly Nigeria.

INTRODUCTION

The world's agriculturally-based commodity markets, especially in many developed countries of the world, are constantly influenced by a large array of information collected globally, on a continuous basis, on key productive and commodity indexes (Abiodun, 2005; Changnon & Kunkel, 1999). Daily and long-term weather forecasts and location-specific (geospatial) data/information from satellites are now the rule rather than the exception to enhance and sustain agricultural productivity (Abiodun, 2005, 1999). In most of the developing countries, including most of the

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countries of Africa, the reverse is the case. For close to three decades now, African scientists have been calling attention to the urgent need for Africans to develop and apply the most practical tools to tackle the challenge of boosting sustainable food production in the continent (Adeniyi, 1981; Makambwe, 1979). In Nigeria for example, the present government's sustainable development agenda (seven-point agenda) is partly geared towards self-sufficiency in basic food commodities (Nigerian Muse, 2007), especially those which Nigeria has a comparative advantage to produce locally, such as roots and tubers (cassava, yams, potato, cocoyam) and cereals (maize, sorghum, millet, rice, etc), as well as oil palm, ground nuts, fruits, vegetables, live stocks and fish. Dependency of the third world countries such as Nigeria on foodstuff importation is one of the crucial factors in the current global food crises (Friedmann, 1982). This underscores the need for Nigeria to integrate the use of modern technology, such as space technology into the strategy for improved agricultural production.

Earth Observation or remote sensing satellite data continues to be gainfully employed as a critical component of the information economy and for sustainable development by most societies of the world (Abiodun, 2005). Today, Nigeria and few other countries in Africa are still striving to survive in a digital world whose daily activities are almost totally dependent on space acquired and space transmitted information (Abiodun, 2005). Hence the decision by Nigeria to invest in and utilize satellite technology to address its socio-economic needs cannot be over-emphasized. This paper summarizes some of the efforts of Nigeria at utilizing space technology to support and improved food production in Nigeria (NASRDA, 2008).

CHALLENGES OF SUSTAINABLE AGRICULTURAL DEVELOPMENT AND PRODUCTION IN NIGERIA

Prior to the attainment of independence in Nigeria, the agricultural sector dominated the economy, and accounted for more than 50% of GDP (Ekpo & Umoh, 2010). At that time, groundnut was produced in the north, cocoa in the west and several cash crops such as rubber and oil palm in the mid-west and eastern regions. However, with the rapid expansion of the petroleum industry, agricultural development was neglected, and the sector entered a relatively declining phase. Consequently, between the nineteen-sixties and the eighties, Nigeria gradually drifted from a position of self-sufficiency and reliance in basic foodstuffs to one of heavy dependence on agricultural imports. For Nigeria to overcome this type of backward integration and evolve a system of sustainable agriculture where production and consumption are balanced by a sustained and sound environmental management, the under-listed challenges must be given appropriate consideration in the agricultural development process.

- Unconsolidated scattered small holder farms into relatively large enough farms for any meaningful financial and technological support including information-based farming practices to enhance production
- No access to easy to use and up-to-date data/information of small holder farms, to monitor their crops performances and determine the best/optimum storage, harvest and processing procedures and about the alternative markets for their goods; this often resulted into low productivity or waste of the farm produce.

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