The 8th AFMA Congress

Peer Reviewed Papers

Theme:

"Repositioning African Agriculture by Enhancing Productivity, Market Access, Policy Dialogue and Adapting to Climate Change"

MOI UNIVERSITY PRESS

Sustainability issues and Nigeria's Agricultural Development Paradigm

**Haruna, U[1]; Nasiru, M[1] and Umar, M. B.[2]*

[1] Agricultural Economics and Extension Programme,
Abubakar Tafawa Balewa University, PMB 0248, Bauchi, Nigeria.
[2] Department of Agricultural Technology, Jigawa State College of Agriculture, PMB 013, Hadejia, Jigawa State, Nigeria.
Corresponding Author: uharuna77@gmail.com +234 806 8452 020

Abstract

This study highlights on the sustainable issues and agricultural development in Nigeria by looking at the theory of natural resources' scarcity and its effects on growth and partly, on the principles of natural resources conservation. The environmental impact of continued population growth is felt through increase in energy demand, production, consumption and waste. Currently, Nigeria loses about 351,000ha of land to desert encroachment advancing southwards at the rate of an average 8km per annum. Bilateral relationships between poverty and environment were analyzed for understanding the real meaning of a sustainable human development approach. Sustainable development has currently come to the forefront of development studies. Linking rural economy, poverty and environmental degradation appears to incorporate the needs and aspirations of a developing country like Nigeria. The paper further examined the concepts of agricultural resources, and of agricultural hybridization of institutions, knowledge, methods and hybrids as means of juxtaposing conventional and traditional systems in agriculture. Thus, strong political commitments, will power and consistency in policy planning and implementation, are some of the means of improving and stabilizing both agriculture and the environment.

Key words: *Sustainable, Agriculture, Development, Environment, Hybridization.*

Introduction

Over the years approach to human development has changed due to an increasing focus on the environmental aspects of daily life. The Earth Summit in Rio de Janairo in 1992 and the World Summit in Johannesburg in 2002 marked the development path of the United Nations that reached the new and wider concept of sustainable human development. A sustainable development was defined as "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).

The first international environmentally-oriented development strategy was formally expressed in the World Development Report (WDR) of the World Bank in 1992 and under lined a classical growth-oriented policy description, work of human development and capabilities in order to represent much more comprehensive development strategy (Anand and Sen, 1996).

However, links between poverty, natural environment and social capital have been analyzed from a different perspective. In the 1992 WDR, poverty was interpreted as a major cause of environmental degradation while the protection of natural resources was still considered a constraint on economic growth and not an opportunity to achieve higher level of well-being. From the mid nineties onwards, a direction of integration through a new paradigm was adopted within the UNDP's Human Development Report (Anand and Sen, 1996; Sen, 2000).

In the paradigm, natural resources and environment were considered as a means of achieving well being such as education and health approach to development does not oppose but rather complements the primary objective of monetary stability and economic growth recommended by the World Bank and looks at new growth factors such as social and natural capital, environmental protection, participation of local communities, governance etc. (Dubois *et al,* 2002).

Bilateral relationships among poverty and environment are useful for understanding the real meaning of a sustainable human development approach. it is often true, that poverty can be a cause of environmental degradation, especially in the fragile rural areas of the developing countries, due to the lack of investments and over exploitation of finite resources, but it is also true that poor people are often forced to live in places where the standard of living including environmental conditions is very low (i. e. slums)

The object of this work is to presently analyze sustainable issues in agricultural development of Nigeria based on the theory of natural resources' scarcity and its effects on growth and partly, on the principles of natural resources conservation. The theory which is propounded by some classical economists like Malthus, Ricardo and Mills hold the view that scarcity of natural resources would eventually lead to diminishing socio-economic returns to human effort and ultimately to stagnation, retardation and cessation of socio-economic growth. Natural resource such as soil, water, and vegetation, livestock and minerals are specific in type, location, quality and relationships to one another.

Natural resources and new attention to the Human Development Index (HDI) were based on a specific sustainability interpretation with various critiques and proposals for implementing a "green HDI" (Atkinson *et al*, 1997; Dasgupta, and Weale, 1992; Dasai 1995; Hinterberger, 1999; Sagar and Najam, 1998) or constructive framework with HDI compared to sustainability measures (Anand and Sen 2000; Dasgupta and Maler 2001; Jha and Murthy 2003; 2004; Neumayer 2001).

However, the World Development Report of the World Bank in 1992 (Development and the Environment), was the first international development approach based on environmental resources where a neoclassical position on income growth as an end of the development process remained the main task of World Bank policies. The vision of environment and natural resources as a means to achieving higher income growth level was adopted for years while poverty has been analyzed as one of the major causes of environmental degradation within least developing countries. Such a framework was far from the Brundtland Report on sustainable development definition where basic needs of poor people were placed at the centre of debate. The UNDP reports of 1994 and 1996 have implemented a widely notion of human development including natural environment, shifting attention from economic growth to capabilities linked with environment (Anand and Sen, 1996). **The Nigerian Rural Economy: Poverty and Environmental Degradation**

Expanding population which exacerbates social, economic, and ecological impoverishment makes all the existing environmental problems more critical. This increase has several components including a desire for large families, mounted fertility and population momentum; to increase for sometime after fertility has stabilized. The environmental impact of continued population growth is felt through increase in energy demand, production, consumption and waste. Currently, Nigeria loses about 351,000ha of land to desert encroachment advancing southwards at the rate

of an average 8km per annum. As reported by Abdul (2001), economically, desertification accounts for 73% of the estimated US$5.1106million the country is losing to environmental degradation. He further, noted that with Nigerian population projected to rise to 114.5 million by the year 2020, the fuel wood demand (a principal cause of deforestation) is expected to reach 83.5million cubic meters.

The disproportionate disappearance of these free gifts of nature will definitely be replaced by human misery in form of "food and social insecurity" because nature abhors a vacuum (Abdul, 2001). This is a cause for concern since both intensity and urgency of the situation require a concerted and well articulated planning and action by all and sundry. For the simple fact that the first victims of desertification hence, environmental degradation are the rural poor. Hungry, unemployed, and uneducated, they will be forced to migrate into towns and cities to engage in menial jobs, and eventually become a powder keg for social instability.

No wonder, Nigeria record the re-current communal-cum-religious crises in its chequered history. Fortunately, these problems are avoidable, what is needed is political commitment, strong will power and consistency in policy planning and implementation, more especially a favourable climate for both agriculture and the environment.

The Sustainable Development Paradigm

Sustainable development which meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). In discussion and use of concept, Hopkins (1991) recognizes three aspects of sustainable development:

1. **Economic**: An economically sustainable system must be able to produce goods and services on a continuing basis to maintain manageable levels of government and external debt, and to avoid extreme sectoral imbalances which damage agricultural or industrial production,

2. **Environment**: An environmentally sustainable system must maintain a stable resource base, avoiding over-exploitation of renewable resources only to the extent that investments are made in adequate substitutes. This includes maintenance of bio-diversity, atmospheric stability, and other ecosystem functions not ordinarily classed as economic resources,

3. **Social:** A socially sustainable system must achieve distributional equity, adequate provision of social services, including health and education, gender equity, and political accountability.

Certainly, the goal set forth requires the insight of multiple disciplines. Economists, one might argue, would tend to give greater weight to economic objectives, ecologists to the environmental dimension, and the social theorists to the social issues. To balance these perspectives we need to understand them and explore their internal logics.

a) The Economic Perspective.

Sagar and Najam (1998) suggests that the issue may be resolved by recognizing that some issues can be appropriately dealt with through neo-colonial market efficiently, while others require the application of a 'safe minimum standard' approach to protect essential resources and environmental functions. He points that the criteria of possible severity and reliability of ecological damages should be used to decide which theoretical framework is more appropriate: the concept of a safe minimum standard can be applied to concerns about intergenerational fairness, resource constraints and human impact.

The safe minimum standard posits a socially determined, albeit 'fuzzy' dividing line between moral imperatives to preserve and enhance natural resources systems and the free play of resource trade-off. Following a safe minimum standard, society would rule out actions that could result in natural impacts beyond a certain threshold of cost and irreversibility. Central to the safe minimum standards approach are the role of public decision-making and the formation of societal values. The safe minimum standard will be defined differently by ecologists and economists, depending on moral judgment about moral imperatives and the value of discounting.

This represents a fundamental shift in the economic paradigm. Much as the Keynesian revolution validated the concept of government intervention to achieve macroeconomic stability, the acceptance of sustainability as a valid social goal places a new complexion on all policy issues concerning the relationship between human-economic activity and the environment. In order to explore further, the implications of this approach, we need to examine the ecological and social dimensions of the issue.

b) The Ecological Perspective.

Natural systems must exist to the unyielding laws of thermodynamics, and the science of population. Ecologists have explored the implications of these laws for living organisms. According to Edwards (2009) two of the fundamental axioms of ecological and evolutionary biology are that organisms are exuberantly over proactive and that limits set by time, space and energy are inevitably encountered. The foundations of all modern

ecology and evolutionary biology rest in part upon the consequences of these two axioms.

The simple assertion of limits however, does not fully capture the contribution of ecologists to the discussion of the sustainability. What Edwards (2009) identified as a third axiom of ecology has even more significant implications. The third axiom "concerns processes that generate variability and novelty", the generation of genetic diversity, the resultant processes of evolution and change in species and ecosystems.

Apparently, an integration of economics and ecology is required and this can only be possible with the assistance of the third element of the sustainability triad- the social perspective. If we cannot rely on unregulated markets to solve our problems, then we must turn to social action. But, social action by whom and at what level? And how do the environmental issues relate to the other great failure of development to date- the recurrence of the quality? It is in the social arena that we must seek the way to the formulation of policies for sustainable development.

c) The Social Perspective.

The human development approach emphasizing issues of basic needs and equity is well grounded in the history of economic theory. The focus on basic needs and equity in development has been represented by the UNDP's series of Human Development Reports. In addition, to calculating the Human Development Index (HDI), which offers a different measure of development success from per capita GNP or GDP, the Human Development Reports focus each year on a different aspect of social and economic development, such as democratic governance (1993), Gender Equity (1995), Poverty (1997).

Whereas, the HDI does not explicitly include an environmental measure, the 1994 report discussed the relationship between sustainability and equity: the concept of sustainable development and whether there is any reason to pass them on to the next generation, because inter-generational equity a major restriction of the world's income and consumption patterns may be a necessary precondition for any viable strategy of sustainable development. Development patterns that perspective today's inequities are neither sustainable nor worth sustaining in the 1997 report, a section on "resisting new faces of poverty" discusses factors which cause worsening conditions for the world's poor. Prominent among these are the HIV/AIDS pandemic, which is 'creating a new wave of impoverishment, degradation on marginal lands- the dry, swampy, saline and steep areas where many of the rural poor struggle to survive'

Certainly, the issue of environmental sustainability is intertwined with that of poverty and inequity. It has frequently been noted that the causative relationship runs both ways: increased poverty and loss of rural livelihoods which accelerates environmental degradation as displaced people put greater pressure on forests, fisheries and marginal lands. While there are clearly wide differences of prospective and emphasis between the critics within and without the development establishment, there seems to be a widely felt discontent with present development theory and practice, and it appears that the elements of new paradigms are emerging.

Review of the Development Approach.

1. The original idea of development was based on a straight line progression from traditional to modern mass consumption society. Within this framework, a tension is developed between the promotion of economic growth and the equitable provision of basic needs. Development is thus, as it has proceeded over the past half century has remained inequitable, and has had growing negative environmental impacts,

2. A concept of sustainable development must remedy social inequities and environmental damage while maintaining a round economic base,

3. The conservation of natural capital is essential for sustainable economic production and intergenerational equity, market mechanisms do not operate effectively to conserve natural capital, but tend to deplete and degrade it,

4. From an ecological perspective, both population and total resource demand must be limited in scale, and the integrity of ecosystems and diversity of species must be maintained,

5. Social equity, the fulfilment of basic health and educational needs, and participatory democracy are crucial elements of development, and are inter-related with environmental sustainability.

To bring the argument down to earth, and get a sense of what principles mean for development, we can examine some sectoral specifics. In each major area, it becomes apparent that true sustainability warrants a major shift from existing techniques and organization of production.

Agriculture: The need to feed an expanding population at higher per capita levels of consumption is straining global soil and water systems. The response to this must be two fold. On the production side, current high-input techniques which are leading to serious soil degradation and water

pollution and overdraft must be replaced by organic soil, integrated pest management, and efficient irrigation. This in turn implies much greater reliance on local knowledge and participatory input into the development of agricultural techniques.

Energy: Both supply limits and environmental impacts in particular, the accumulation of green house gases, mean that it will be necessary to accomplish a transition away from fossil fuels well before 2050 (Nura *et al*, 2011). A non-fossil system would be significantly more decentralized, adapted to local conditions and taking advantage of opportunities for wind, bio-mass and off-grid solar power systems. This is unlikely to occur without a major mobilization of capital resources for renewable energy development in countries now rapidly expanding their energy systems.

Industry: As the level of global industrial production increase several folds over current levels, which themselves represent a quadrupling over 1950 levels, it is apparent that 'end-of-pipe' pollution control not be adequate. The new concept of 'industrial ecology' implies the restructuring of whole industrial sectors based on a goal of reducing emissions and revising materials of all stages of the production cycle. Cooperative efforts between corporations and governments will be needed to achieve goal.

Renewable Resources System: World fisheries, forests, and water systems are severely over-stressed. With even greater demand on the all systems expected in the next century, all levels of institutional management must be urgently reformed. Multi-lateral agreements and global funding are needed to conserve transboundary resources. National resource management systems must be shifted from goals of exploitation of conservation and sustainable harvesting, and local communities must be strongly involved in resource conservation.

Each of these areas poses challenges which are social component of sustainability in no just an idealized goal, but a necessity for achieving the economic and ecological components. Existing institutions of all kinds, including corporations, local and national governments and transnational organizations will have to adapt to the requirements of sustainable development. Democratic governance, participation and the satisfaction of basic needs are thus, an essential part of a new development synthesis.

The Environment and Sustainable Agriculture

As Solow (1986) offers a dialectical critique or modernism and debunks the "myth" and argue against the present notion that the rise of science has irrevocably changed the world and separated us "modern" from our predecessors "the pre-modern". According to him, modernity has tried

to polarize and classify ideas into "nature" and 'culture", "science", "social" "human" and "things". Thus, it dismisses the inconvenient "intermediaries", the "networks" that exist between these extremes. He called the middle between society and nature, the "middle kingdom". It is within this sphere, he argues that systems are constructed, and ideas crossbred, and where much of the discourses on the modern world actually take place. In this third sector, politics, science, technology and nature are constantly mixed making the distinction between nature and culture (with each in a separate mental chamber) illusory and difficult to maintain.

Solow's thinking when applied to agriculture sheds light on the scientific basis of conventional agricultural practice which from its very foundations ignored the connection between nature and culture, production and the environment. Modern agriculture depicts the false separation and isolation of "science" from "society". As such, the complex web translations and interactions for the most part leading to the promotion of a system that exploits nature's resources without the environment. Modernism encourages us not to mix up knowledge, interest, justice and power. Similarly, monoculture sums up modern agriculture not to mix.

Conventional agriculture has pursued technical innovations and the use of external non-renewable energy sources and inputs for the sake of economic gain. In bridging the divide in agriculture and development studies, Solow (1986) cautioned on saving the best of modernity should served as a guiding principle. First, there can be a *'hybridization'* of institution whereby traditional institutions such as the family are hybridized in to formal institutions as custodians of sustainable resources management practices and indigenous knowledge that could contribute in building stable global food systems.

Equally, traditional institutions can benefit from the 'modern' scientific knowledge of the changing environment, climate change and changes in ecology. While the latter can also, draw from farmers' repertoire of sustainable farming practices. Ignoring traditional institutions has resulted in promotion of agricultural policies that are ineffective in resource management and the imposition of inappropriate development policies, both of which have negatively impacted the environment and the peoples' livelihood.

Many of the institutions have survived both colonialism and the post-colonial state and institutions. It is these institutions that 'hybrid agriculture' that seeks to incorporate in resource management, modern

institutions can benefit from the pristine knowledge of rural communities and their institutions. On the other hand, customary institutions can also, develop reflexivity and abandon certain anachronistic elements that characterized it.

Second, there can be '*hybridization of knowledge*' such that IK and modern scientific knowledge can draw from what is good and valuable in both systems. For instance, African agriculture has been known as very flexible and amenable as reflected in the adoption and success of the variety of crops that have been introduced on to the continent. Similarly, many traditional not only experiment in the new breeds but, also combined breeds purposely to develop strains (Richards, 1985). The production of non-traditional fruits and vegetables has intensified since; they were introduced to several African countries in the few decades (Jaffe, 1995; Barrett *et al*, 1997).

Third, there is possibility of the *'hybridization'* of methods. That is perhaps, the most problematic in the sense that many aspects of the methods of conventional agriculture (such as the use of agro-chemicals) are significantly in conflict with the principles of agri-ecology and sustainability. The effects of modern farming methods have resulted in water pollution, proliferation of susceptible species, increased use of pesticides and soil depletion etc. These effects are undesirable agricultural practices. Hence, there is the need for more research in this area on the possibility of combining durable methods of farming system with sustainable ones not only to increase food quality and output, but also to encourage a more sustainable use of non-renewable resources, protect soil fertility, reduce pollution, ensure economic viability and exploit natural cycles.

Fourth, there can be a '*cross hybridization of hybrids',* where for instance, modern farming methods can benefit from traditional knowledge systems. Aspects of traditional farming such as the focus on stability and risk reduction, system diversity and entropic complexity of natural systems can be valuable to conventional agriculture in achieving sustainability. Similarly, agro-ecology is generally high in net energy yield due to the fact that external energy inputs are relatively low.

Conclusion

The wave of sustainable development has currently come to the forefront of development studies. Many of the related issues (resource depletion, population explosion, soil degradation, loss of habitats and species) are recurrent sustainability issues. Linking rural economy, poverty and

environmental degradation appear to incorporate the development needs and aspirations of a developing country like Nigeria.

It also becomes clear that conventional agricultural development cannot be divorced from environmental issues. They are interdependent parts of a greater whole. Elsewhere strenuous efforts have been made to explain the relation between "natural" and "cultural" concepts of hybridization as a combined development strategy that involves the institutions, knowledge, methods and cross-hybridization of the hybrids of both traditional and modern systems. Improving small-holder agriculture in enhancing food security and reducing poverty will entail:

Stepping-up improving investment in infrastructure, sustainable technology and facilitating access to credit and sustainable inputs,

Stepping-out: Investment in non-farm economy e.g. education, health care, and

Hanging-in: Providing social protection and investing in technology for food production.

References

Abdul, K. (2001). Desertification and Nigeria's Future Media Trust Limited, Kaduna, Weekly Trust paper, 30 Nov. 2001. P.29

Anand, S., and Sen, A. (1996). Sustainable Human Development: Concepts and Priorities, Office of Development: Concepts and Priorities, Office of Development Studies. Discussion Paper No. 1, UNDP, New York.

Anand, S., and Sen A. (2000). Human Development and Economic Sustainability, World Development Vol. 28 (12), pp 2029-2049

Atkinson, G. Duborg, R. Hamilton, K, Monasinghe, M, Paerce, D. and Young, C. (1997). Measuring Sustainable Development Macroeconomics and the Environment, Edward Elgar Publication, Great Britain.

Barrett, H., Browne, A., llbery B. Jackson, G., Binns T. (1997). Prospects for Horticultural Exports under Trade Liberalization in Adjusting African Economies. Department for International Development, Coventry University, Coventry, United Kingdom.

Dasgupta, P., and Weale, M. (1992). Measuring the Quality of Life. *World Development* 20:119-131.

Dasgupta, P., and Maler, K-G. (2001). Wealth as a Criterion for Sustainable Development, the Beijer International Institute of Ecological Economics Discussion Paper 139: 1-20.

Desai, M. (1995). Human Development, Concepts and Measurement. European Economic Review 35: 350-357

Dubois, J-L, Mahieu, F-R, and Poussard, A. (2002). Social Sustainability as a Component of Human Development. Working Paper, St Edmound's College University of Cambridge, United Kingdom.

Edward, A. (2009). Integrating Contested Aspirations and Policy: Development as Hanging-in, Stepping-up and Stepping-out. Development Policy Review 27 (**2**): 131-146.

Hinterberger, F. (1999). Sustainable Human Development Index: A Suggestion for Greening the UN Indicator of Social and Economic Welfare, Wuppertal Institute.

Hopkins, M. (1991). Human Development Revisited: A New UNDP Report, World Development. 19 (**10**): 1469-1473.

Jaffee, S. (1995). The Many Faces of success. The Development of Kenyan Horticultural Efforts. **In:** Jaffee, S. and Morton, J (eds). Marketing Africa's High Value Foods. World Bank, Washington D.C.

Jha, R., and Murthy, K.V.B. (2003). An Inverse Global Environmental Kuznets Curve. Australia South Asia Research Centre (ASARE) Working Paper Series, Australian National University.

Neumayer, E. (2001). The Human Development Index and Sustainability: A Constructive Proposal. *Ecological Economics* 39: 101-114.

Nura, A.Y.; Ibrahim, A. Q; Hamidu, B. M. and Haruna, U. (2011). Analysis of firewood supply in Bauchi State, Nigeria. *Progress in Renewable Energies* **1** (1):1 – 7. www.woaj.org

Richards, P. (1985). Indigenous Agricultural Revolution: Ecology and Food Production in West Africa. Hutchison Education, London, United Kingdom.

Sagar, A.D., and Najam, A. (1998). The Human Development Index: A Critical Review. *Ecological Economics* 25: 249-264.

Sen, A. (2000). The Ends and Means of Sustainability. Keynote Address at the International Conference on Transition to Sustainability, Tokyo, Japan. May 2000.

Solow, R. (1986). The Integrated Allocation of Natural Resources. *Scandinavian Journal of Economics* 88:141-148.

World Commission on Environment and Development (WCED) (1987). Our Common Future, Oxford University Press, United Kingdom.