

CONCEPTS FOR SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT

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Abstract

Livingstone (1975) clearly states that during the past decade' emphasis in ecology has shifted from ecosystem studies to the evolutionary background of natural communities This shift to natural community should include the use of school gardens and periurban farming in agricultural intensification. The growing evidence of systematic and evolutionary complexity of ecological environment, complexity of ecological environment where farmers and students are to utilize limited resources in farming practices within the community, requires immediate attention by the local and international communities. Looking at the current population strength of the world, utilization of every resource for the production of crops and animals would be vital in sustainable systems.

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Introduction

The recognition of systematic and evolutionary complexity of ecological phenomena has been a major factor affecting agricultural production as ecologists sometimes lose sight of the organisms and ways of remineralizing the lost nutrients, While in pursuit of transferred calories or cycled geochemical (Livingstone, 1975) Recognition of this complexity would result in dealing with all the factors affecting sustainable agriculture more realistically, as indicated by Livingstone (1975). To better understand the ecosystems, agriculture education

should start from the grassroot level where secondary and high school students are introduced to the new scientific methods of food production. The implementation of this would mean setting up of demonstration farms in schools at all levels where research should be conducted on more vulnerable garden crops and testing various nutrients using natural methods in amending the soil fertility. This would create an awareness among the students at secondary and high school levels of the phenomena governing food production.

Pearce's (1994) review indicates that only a few groups of individuals and institution/organizations have recognized the concepts that have attracted the attention of political, popular, and academic institutions to sustainable development. Significantly, "sustainable development" now figures as a goal in dozens of national environmental policy statements by various research institutes and young scientists.

FUTURE PACE OF AGRICULTURAL PRODUCTION

No question is more important for the future of humanity than whether growth in agricultural production can keep pace with the increasing population and income driven demand for food (Naylor, 1995). This concern is certainly not new; for several decades scholarly attention has been devoted to issues of agricultural productivity, land use change, and population growth. The vulnerability of agricultural systems throughout the world has increased the number of natural resource constraints and global environmental changes which spawned a new era of literature. As the world is currently posing questions on sustainable agriculture, would there be a contribution when there are challenges on setting up vegetable farms in high schools? would the establishment of school gardens provide food for nearby communities? The answer is

yes. The growing of crops within schools will provide food for both the school community and nearby community people. This has been evident from my 10 years of teaching experience in high schools and with the establishment of demonstration plots, as food for both teachers and students within the community was provided at more reasonable prices.

The review conducted by FAO (1994) states that there should be an intensification of agriculture in a global form. The intensification of agriculture over the years has shown an impressive production of grains and crop yields in the past decades (FAO, 1994). Intensification of agriculture without adequate restoration of soil fertility may threaten the sustainability of agriculture (Roy et al., 2003). Continuous cropping without adequate restorative practices may endanger the sustainability of agriculture. Farmers and students should understand that nutrient depletion is a major form of soil degradation. A quantitative knowledge on the depletion of plant nutrients from soils will help them understand the state of soil degradation and maybe helpful in devising nutrient management strategies (Roy et al., 2003). This group can acquire this knowledge when being involved in a research either through school garden demonstration or participating in improved agricultural programmes.

World population is increasing daily, and as the population increases more food is needed to satisfy their needs. The involvement of high school students will contribute towards food availability and help in further research for the advancement of agriculture.

Assessing Agricultural Sustainability

The concept of agricultural sustainability has three dimensions (biological economic, and social) that are important in determining the future viability of intensive agricultural production (Herd and Steiner, 1995). Evidence presented in literature indicates that a number of physical constraints, particularly those related to the depletion and degradation of soil, water, and energy resources, threaten future agricultural growth (Smil, 1994). Literature also shows that farmers and society face large costs with respect to declining resources in agricultural. To date, the synergistic effects among inputs have worked in favor of agriculture (Loomis and Connor, 1992; Evans, 1993; Plucknett, 1994; Plucknett, 1995)

Changes in agricultural technology, infrastructure, and farm management are needed now more than ever in Africa, literature review indicates that investment on agriculture are not keeping pace of meeting the growing world population. Defining new dimension in the modern world is a new challenge for agricultural improvement.

Recommendation

Development requires a sound land use planning. Land use planning needs a biophysical and socio-economic evaluation component, since socioeconomic conditions may change instantly and the biophysical environment is more stable.

SUGGESTIONS ON HOW TO PROMOTE AGRICULTURAL DEVELOPMENT

- Governments must commit themselves to a coherent and comprehensive vision of agricultural and rural development.
- Maintaining sound and stable macroeconomic and trade policies that encourage investment in agriculture.
- Strengthening human capital in rural areas through health and educational services and access to productive resources.
- Establishing a strong institutional environment that improves access to markets, ensuring dissemination of information standards setting, and provides an adequate legal and regulatory framework for development.
- Enabling research and extension services to develop productive and robust technologies under farm conditions.
- Upgrading marketing systems, transport and communication infrastructure to support farmers' access to seasonal and longer-term capital and inputs, and providing them with strong price incentives.
- Safeguarding natural resources and environment capacity.
- Providing marketing assistance.

FACTORS AFFECTING FARMERS

The factors affecting farmers today maybe much more complex than those faced by developing countries which achieved sustained agricultural growth in the last three decades. New and emerging challenges confronting them can be identified under three broad headings:

- overcoming their marginalization resulting from integration of markets due to globalization and liberalization.
- Adapting to technological change.
- Coping with the new institutional environment.

Globalization of Markets

Globalization and liberalization are becoming more vulnerable to changes in the world market conditions, on account of their small economic size and their increasing reliance on imports for food supplies. Their problems have been compounded by the long-term decline in real prices of their major primary commodity exports, despite some temporary increases experienced in the early 1990s (<http://www.fao.org>)

Technological Challenges

Keeping pace with the increasing domestic demand for food, meeting requirements for enhancing competitiveness and ultimately raising rural incomes, necessitate raising agricultural productivity. Sustained agricultural growth requires more ingredients than that of 'the green revolution'. Investment in irrigation and rural infrastructure, human development and institutions will contribute immensely towards overcoming these challenges. New developments in biotechnology may also pose further threats to technological challenges.

Measures to Accelerate Agricultural Development

- Emphasis needs to be given for increasing the production of tradable products (cash crops).
- Determining the most appropriate roles relevant to government agencies, donors, civil organizations, and commercial entities.

Recommendations for National and International Actions

- Meeting the new challenges facing agriculture will further accelerate development.

- Further emphasis on macroeconomic and sectoral incentives has a great role to play in agricultural sustainability.
- strengthening institutional capabilities will promote further research on agricultural advancement.
- Raising and sustaining productivity and competitiveness will broaden markets.
- Diversifying production and trade should be the focus of investors, government and individuals.
- improving access to foreign markets will encourage more farmers to enter into the agricultural domain.

Reference

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