

Teaching Agriculture In Tropical Africa: Understanding The Local Culture For The Design Of A Sustainable Curriculum

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Abstract

For several decades Western agriculturists have been working in African countries to impart knowledge in a teaching capacity. This educational effort has been carried out, since then, to increase agricultural productivity and to improve the living conditions of the local populations. The final outcome of many of these development projects has not had the expected impact, although funding, equipment and human resources were readily available. As it was demonstrated later on, the knowledge transfer had taken place without understanding the real needs of the project recipients. This omission seems to have occurred due to a lack of knowledge of the local culture. This article examines the design of an effective agricultural curriculum, especially tempered for an educator working in a foreign country, and stresses the importance of learning local cultural parameters to insure program success.

Introduction

African countries have been the recipients of major development endeavors by the industrialized nations since the early 1960's and several institutions of the United Nations and many non-governmental organizations (NGOs) devoted their resources, over the years, to improve living conditions on the African continent. In this context, many agricultural projects were sponsored with the aim of eradicating famine, and the clear objective of promoting nutritional self-sufficiency in the new independent African nations. A review of the literature substantiates the widespread concept that much of the aid has done little to improve African agriculture or alleviate human suffering (Biguzzi, G., Tosolini, A., Ricci, A., Melandri, E., Cavalieri, R., Misuriello, R., Berton, G., Zarantonello, M., Squarcina, S., Turay, J., Kamara, A., Benzi, O. & Sheriff, F. 1995; Borsari, 1997b; Chiasson, 1987). In fact, some may even argue that some aid may have aggravated the situation and perpetuated the crisis (Lele, 1992).

The nature of an agricultural project can be extremely diverse when it is part of a development endeavor. Technical support can be donated directly to farmers and rural communities through extension, or by imparting formal education, at various levels in schools and universities. A project of agricultural extension will involve the cooperation of the expatriate with local growers and, or trainers. An example of such a program is the Farming Systems Research methodology (FSR) which is being used to improve vegetable production in Swaziland. The focus of FSR (Figure 1) is

small holders with limited resources (Bevacqua, 1987). This model, as well as the development of small farmers cooperatives in Sierra Leone (Biguzzi, et al., 1995) revolves around the producer and adds a new dimension in improving food production in Africa, at a grassroots level. In an educational program however, the recipients of instruction are the students who primarily need to fulfill their degree requirements and sharpen their professional skills, before entering the labor workforce.

Focusè Small holders with limited resources

Phasesè diagnosticè experimentationè extension

Involvesè farmers and scientists in on-farm research

Goalè recommendations compatible with farmers' circumstances

Fig. 1. Farming systems research (FSR) provides the methodology for the on-farm horticulture research in Swaziland (modified from Bevacqua, 1987).

Sustainability is an emerging concept that is progressively determining a paradigm shift in agriculture on the global scale. The educational applications linked to this concept should be highly regarded, especially by institutions where minimal, or non-existent is the level of technology available (Borsari, 1998a). In addition to this, the extreme population pressure on the land, particularly in vast zones of West Africa, is leading inevitably to rapid changes in farming practices (Vierich & Stoop, 1990).

Fallow periods in Nigeria traditionally exceeded ten years but in recent times these have been shortened considerably to four years or less, in order to maximize the number of crops harvestable per year and to satisfy the increasing needs of human populations for food and fiber commodities. IITA's (International Institute of Tropical Agriculture) work in this area is aimed particularly at the development of appropriate technologies to meet the changing circumstances and needs of a dynamic agricultural and socio-economic environment (Ortiz, Austin, & Vuylsteke, 1997).

The main objective of this work is to discuss criteria for designing a sustainable curriculum for African colleges and to enhance the efficacy of agricultural instruction by the expatriate educator involved in such a project, through a better comprehension of African cultures.

The Culture of Agriculture on the African Continent

It is not the primary goal of this article to unravel the socio-cultural aspects of African agriculture. What is important to understand however, is that farming in Africa has always been done at the subsistence level and nothing has basically changed from this perspective, through the millennia (Ableman, 1993; Chiasson, 1987). Small scale farming has always been the only option available to manage African farming systems, since the lack of mechanization and very diverse environmental conditions do not allow farmers to cultivate their crops on extensive land surfaces. For these

reasons, I wish to reiterate the importance of implementing sustainable farming practices with low dependence on external purchased inputs, that focus on a long term productive capacity, conserve biological and cultural diversity, and are built on knowledge and culture of local inhabitants (Vierich & Stoop, 1990; Borsari 1997b; Borsari 1998a). Human skills and farming techniques are also very diversified in various geographic areas of the continent even though land-clearing by slash-and-burn method is very well known and practiced by the majority of the local African communities (Ablemann, 1993; Chiasson, 1987). This technique however, obliterates sustainability and its environmental impact is having devastating effects on different ecosystems. As a result of slash-and-burn agriculture, African farming systems have become extremely vulnerable and therefore, this common practice should be abandoned (Borsari, 1997b).

Another unique peculiarity of African agriculture that needs to be mentioned is the important role played by women and children in the maintenance of local farms. According to Due and Gladwin (1991) African women's labor force participation rates are fortysix percent of men's on average. This cultural aspect should not be forgotten when international agencies plan to implement agricultural development projects. The knowledge of growing crops and raising livestock is passed on to new generations just through the repetitions of practices and procedures without any formal type of instruction.

Rather than forcing the introduction of genetically improved cultivars that are highly demanding on local resources to fully express their potential, and other ecologically expensive inputs, agriculturists working in the tropics should learn more about native ecotypes and thus, protect these genomes from the risk of extirpation.

They should take time to learn about local resources and crops, and how they are cultivated, in order to minimize the disruption of African farming systems from their millenarian equilibrium.

The homeostasis of African agriculture was lost long ago. Major changes have been occurring since the "white man" forced the introduction of large-scale farming systems on the continent. The recovery from this phenomenon seems very difficult to obtain because of the various reasons of this agricultural crisis. Eventually, the chance for avoiding a total ecological collapse will depend also on the agriculturists' ability of redesigning an agriculture method that will embrace archaic farming techniques with the most modern, sophisticated technology, applicable to specific, local conditions. Only after completing a long-term study phase and before making decisions and implementing practices, can one expect any real potential for improving local farming systems, through appropriate technologies and the scientific knowledge added by the professionals working in the field. Therefore, these practical approaches of the local teaching methodology and technology in agriculture will deserve serious consideration for the successful implementation of an educational project in the agricultural sciences, in this unique socio-cultural context.

Foreign Aid to African Agriculture

Historically, foreign aid to African agriculture has seldom been successful for development purposes, except when it was grassroots oriented (Biguzzi, et al., 1995). The intentions behind these efforts were essentially altruistic but in practical terms, the objectives were only partially pursued. Even with the best resources available, equipment and other technology, the collaboration of well trained specialists and the plethora of funding, these ambitious projects were not able to achieve the expected results. Johnson and Okigbo (1989) evaluated in their paper the impacts of USAID projects to assist in developing agricultural faculties in Nigeria. Both successes and failures are partly attributable to the complex Nigerian political, social and cultural environment. The backgrounds, attitudes and particularities of individuals in both public services and the universities, and the British colonial legacy, with its "rules of the game", educational points of view, and attitudes toward the functions of government and universities constrained development of land grant orientations at the three agricultural faculties in this country. Recently, even the most powerful organizations seem to have learned from their own mistakes and as a result, the innovative approach geared toward sustainable development is now more seriously considered in tropical agriculture. Alternative farming techniques such as: cover cropping, green manuring, alley cropping; the introduction of agroforestry techniques and the support to polycultural farming systems instead of monocultures, have become an integral part of agricultural instruction and extension in Africa (Borsari, 1996; Borsari 1997a; Borsari, 1997b).

For obvious historical reasons, the impact of the British educational system and its agricultural model in developing countries has been the dominant one among various paradigms proposed by other western nations, throughout the centuries. May (1987), concedes that the over-production in agriculture occurring in the Western Countries, has been creating opportunities in Britain for the education and training organizations to increase their work overseas. Although I find hard to believe that over-production of agricultural commodities might have been the sole reason in directing European aid to African agriculture, I am cognizant that the world-wide market expansion of agricultural commodities must have played an important role for the enhancement of Western interventions, since the late 1970s. The abundance of natural resources available in tropical countries has certainly seduced industrialized countries to intervene with aid, and other forms of support in Africa. Undoubtedly, these efforts must have been promoted also by the opportunity of exploiting local resources for the benefit of their own, internal economies.

Assessing the Needs and Understanding Local Environmental Conditions

A sound development project should always assess the needs of the project beneficiaries in order to be efficient, cost effective, and ultimately successful. This initial assessment may be regarded as a long, exhausting and sometimes frustrating experience for the expatriate who is responsible for

this preliminary phase. At this stage the project is far from being practical but rather a lot of discussions and listening to local community representatives are required, in order to develop the more practical phase that will follow thereafter. Its success will be only ephemeral without motivating and promoting the full participation of the project recipients. It becomes extremely important to point out that failure of working diligently during this initial stage may compromise the credibility of the entire program and negatively affect the project goals, when the practical phase will be initiated (Fox, 1987).

For the design of an agricultural curriculum in Africa, the steps mentioned above are also valid. In addition to this, the initial assessment will benefit the expatriate trainer who becomes more aware of the different conditions in which he/she is going to operate. Under these circumstances, the project developer will also recognize the need to adapt to the new environment and thus, become an effective and responsible component of the development project.

Designing a Sustainable Curriculum for African Institutions

The design of an "ad hoc" curriculum requires always a holistic approach which includes several parts such as: teaching, learning, curriculum materials and curriculum design (Hill, 1988). A study program may be perfectly feasible and thus easily implementable, but not necessarily sustainable. This is one of the reasons why a curriculum development endeavor may begin with a general assessment of needs, or with a specific problem that the curriculum designer attempts to resolve (Borsari, 1998b). In this context sustainability refers to a maximum level of benefits for students and their communities, while maintaining, as low as possible, the environmental costs of producing these benefits. The accolades that American agriculture has been receiving for years because of its successful results, should not lead agriculture experts to the tempting assumption of transferring American farming systems to Africa. Farming is an activity that must be adapted to the particular conditions of each region of the world and I believe this to be a peculiar principle of the sustainable agricultural curriculum. A shift away from this philosophy is inimical to local cultures and eventually, it obliterates sustainability.

In the meantime, some American universities are attempting to revitalize their agricultural curricula (Silletto, Von Barga, & Shinstock, 1993), and acknowledge the socio-cultural differences between the two worlds. The objective of preparing agriculturists who come to these institutions also from different countries (Johnson, 1983), is a plausible pursuit that reiterates the necessity of embracing a holistic approach if the curriculum must dwell within the sustainable framework I have been discussing so far. There may still be major obstacles to broad-based curricular change (Elliot, Hirsch, & Puro, 1993) but the effort is perfectly legitimate. Colleges of agriculture have the responsibility of redesigning their curricula toward the sustainable paradigm. This modern approach is more compatible to the changing agricultural environment in which college graduates will have to thrive. Without losing the global perspective of a modern agriculture constrained by the need of

producing food for a growing world population, the new generation of agriculturists will have to become better trained in the management of local resources. Only under these circumstances can sound technical decisions be made, while respecting the environment, farming communities, and local economies. Therefore, the implementation of a sustainable curriculum in the agricultural sciences must include the study and use of readily available resources, and it should be tailored to fit the local culture if participation by the curriculum recipients and success of this endeavor is truly desired.

Conclusion

For too many years development projects in Africa have been conducted with paternalism and lack of vision by the industrialized western nations. In too many instances "the way to do it" was taught arrogantly and systematically by expert agriculturists associated with western organizations and congregations, without the awareness of the enormous cultural gap that was keeping human beings apart. Cohen (1988) argues that the food deficit problem in Africa resulted from low level of technology and very little attention paid to the problem during the colonial era. In his opinion small holders alone may not hold the solution to the food deficit. Therefore, it is essential to support a wide variety of projects and programs designed to help rural peoples and to develop commercial food production for the home market under protected conditions. Another important factor that explains food deficit on the African continent has to do with the substantial increase in food import to the African nations. This problem has resulted primarily from an overvalued exchange rate that encourages consumers to eat imported food rather than relying on domestic food production (Jaeger, 1992). Knowledge and technology that Africans were neither able of applying, nor to appreciate were imposed upon their culture without too many conscientious feelings. As a result, lack of involvement in participating in these efforts ended in mediocre outcomes, and sometimes the miserable failures of these ambitious projects aimed at liberating Africa from the threats of famine were also inevitable. No one among the "experts" paid any attention to learn about local farming systems because the major objective of agriculture is large-scale food production. The mission goal for the prophets of the green revolution was to increase crop yields through costly agronomic operations, genetically manipulated plants and man-made molecules. The justification for investing so many resources in these high-energy expensive inputs was due to the skyrocketing increase of the human population, particularly in the developing nations. Therefore, this linear way of thinking drained away the interest from ancient agroecosystems that in the tropics had been providing a livelihood for generations of local farmers and their communities. This reductionist approach, based on the simplistic necessity of feeding the world, has been having catastrophic ecological and environmental consequences on the global scale for several years.

In Africa for example, a massive process of desertification is one of the most evident retributions of an outraged nature that was brought out of balance because of human ignorance and greed.

Western technology and know-how had not succeeded in securing a future for the human species because of the enormous limitations that still exist in understanding the correct functioning of agroecosystems, especially around the equator, where their equilibrium seems to be the most fragile of all. The new generation of agriculturists must become cognizant that agriculture, despite the effort of producing food and fiber, is disrupting the equilibrium of natural systems. Nature may be very resilient to various man-made operations, but it is the agriculturist's responsibility at the end, to avoid the loss of nature's opportunity of recovery from these induced, anthropocentric changes. For this reason, I wish to advocate the importance of education as the most important instrument to facilitate the shift from conventional, to a more sustainable agriculture paradigm. The incorporation of these ecological principles in the African agricultural curriculum becomes, therefore, the most important component of a study program, and they should be linked harmoniously, to proper technical instruction.

The chronic fatalism that has always been attributed to the lack of knowledge of African cultures and the paucity of proper education in these societies, have often been abused to justify the poor results in agriculture and other development initiatives. In educational projects as well, the basic approach has always stemmed from the reproduction at the site of what was working in the industrialized country; and with the naïve assumption that if this model had already been efficient, then it would have worked also in Africa. Because of these erroneous assumptions, a very meaningful lesson had to be learned by the wealthy, western world during the most recent years of development history. Development projects can annihilate sustainability if volunteers and expatriates engaged in these efforts are not better trained in understanding the history and the culture of the country where they are going to operate. The language itself can become an enormous barrier to overcome. However, justifying language gaps for avoiding, or minimizing participation of local counterparts in the project is certainly not going to help and so, this ignorant attitude must be avoided. Only with a little bit more of humility, understanding, perseverance and faith in the capability of the African people, can development projects truly promote the improvement of education and human living conditions on the African continent.

Reference

- Ablemann, M. 1993. *From the Good Earth*. New York, NY: Harry N. Abrams, Incorporated.
- Bevacqua, R., F. 1987. *Farming Systems Research Training in Swaziland*". HortScience, 22, 661.
- Biguzzi, G., Tosolini, A., Ricci, A., Melandri, E., Cavalieri, R., Misuriello, R., Berton, G., Zarantonello, M., Squarcina, S. Turay, J., Kamara, A., Benzi, O. & Sheriff, F. 1995. *Sierra Leone. Un popolo alla prova*. Parma, Italy: AlfaZeta.

Borsari, B. 1996. *Utilization of Leucaena leucocephala in Sierra Leone*. In B. Neugebauer (Chair), *Agroforestry*. Symposium conducted at the 11th International Federation of Organic Agriculture Movement, Copenhagen, Denmark.

_____1997a. *Utilization of Leucaena leucocephala as goat feed during the dry season in Sierra Leone*. Proceedings of the Louisiana Academy of Sciences, USA, 60, 51.

_____1997b. *Agriculture in tropical Africa: Achieving a balance between land use and conservation*. Paper presented at the annual meeting of Sigma Xi, Scientific Research Society, Louisiana Chapter, Eunice, LA.

_____1998a. *Sustainable agriculture: Concepts and Educational Applications*. In B. Borsari & M. F. Vidrine (Ed.), *Sustainable Agriculture Seminar Proceedings: Vol.1. Low Input Agriculture: Feasible Alternatives to Conventional Agricultural Practices* (pp. 14-19). Eunice: LSU-Eunice Press.

_____1998b. *Preliminary Considerations Concerning the Design of a Standardized Undergraduate Curriculum for Agricultural Sciences*. Manuscript Submitted for Publication.

Chiasson, J.1987. *African Journey*. New York, NY: Bradbury Press.

Cohen, R. 1988. *Satisfying Africa's Food Needs: Food Production and Commercialization in African Agriculture*. American Journal of Agricultural Economics, 70, 507-508.

Due, J. M. & Gladwin, C., H. 1991. *Impacts of Structural Adjustment Programs on African Women Farmers and Female-headed Households*. American Journal of Agricultural Economics, 73, 1431-1439.

Elliot, D., Hirsch, M., L. & Puro, M. 1993. *Overcoming Institutional Barriers to Broad-based Curricular Change*. Innovative Higher Education, 18,(1), 37-46.

Fox, B. 1987. *Training for Growth. The Work of the International Agricultural Training Programme in Developing Agricultural Training skills*. Agriculture International, 39, (Suppl.), 7-8.

Hill, J., C. 1988. *How to be Responsive to Stakeholders in Curriculum Studies*. NASSP Bulletin, 72, (509), 8-13.

Jaeger, W., K. 1992. *The Effects of Economic Policies on African Agriculture*. Tropical Agriculture, 70,(3), 297.

Johnson, G., L. 1983. *The Relevance of U.S. Graduate Curricula in Agricultural Economics for the Training of Foreign Students*. American Journal of Agricultural Economics, 65, 1142-1148.

- _____ & Okigbo, B., N. 1989. *Institutional Building Lessons from USAID's Agriculture Faculty Development Projects in Nigeria*. American Journal of Agricultural Economics, 71, 1211-1218.
- Lele, U. 1992. *Aid to African Agriculture: Lessons from Two Decades of Donor's Experience*. Canadian Journal of Agricultural Economics, 43, 179-187.
- May, B. 1987. *British Education and Training in International Agricultural Development*. Agriculture International, 39, (Suppl.), 4-6.
- Ortiz, R., Austin, P. D. & Vuylsteke, D. 1997. *IITA High Rainfall Station: Twenty Years of Research for Sustainable Agriculture in West African Humid Forest*. HortScience, 32, 969-972.
- Sanders, J., H., Meyer, R., L., Fox, R., W. & Peres, F., C. 1989. *Agricultural University Institution Building in Brazil: Successes, Problems, and Lessons for Other Countries*. American Journal of Agricultural Economics, 71, 1206-10.
- Silletto, T., A., Von Barga, K. & Shinstock, J., L. 1993. *Revitalizing a Curriculum. University of Nebraska-Lincoln identifies "outcomes" Needed from an Education-to Benefit Students, Potential Employers*. Agricultural Engineering, 74, 21-3+.
- Vierich, H. I. D., & Stoop, W. A. 1990. *Changes in West African Savanna Agriculture in Response to Growing Population and Continuing low Rainfall*. Agriculture, Ecosystem and Environment, 31, pp. 115-132.