SUSTAINABLE AGRICULTURE - ROLE OF THE AGRICULTURAL ECONOMIST

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INTRODUCTION

During the past thirty years of professional work, I have been involved in extension, teaching and research activities primarily in farm management, beef economics, irrigation economics and price and marketing outlook. One of the observations that I am now making is that some of the experiences and results from farm management extension and research projects have relevance to the current discussions on sustainable agriculture.

The purpose of this paper is to discuss the role of the agricultural economist in sustainable agriculture. First, a review of the literature will be completed for primarily United States authors, World Bank proceedings and Resources For the Future.

SUSTAINABLE AGRICULTURE - THE ROLE OF THE AGRICULTURAL ECONOMIST

The terms "*sustainable agriculture*" or "*sustainable development*" have many meanings to different people. The purpose of this paper is to explore the literature on "*sustainable agriculture and development*" and the role of the agricultural economist. First, a review of the literature will be presented.

Sandra S. Batie, a professor of agricultural economics at Virginia Polytechnic Institute and State University at Blacksburg presented a paper at the American Agricultural Economics Association Annual Meeting in 1989. This general session presentation focused on "*Sustainable Development: Challenges to the Profession of Agricultural Economics*". Professor Batie focused on "*Sustainable Development: What Is it?*"

> *There is consensus among its advocates that sustainable development is a concept based on intergeneration equity - that is, the current generation must not compromise the ability of future generations to meet their 'material needs' and to enjoy a healthy environment. Within this general consensual framework, there are different interpretations. Two general definitions encompass most interpretations: these are the constrained economic growth definition and maintenance-of-the resource definition. [Batie, 1989, p.1084]*

A constrained economic growth definition, according to *[Batie, 1989, p.1084-1085]* includes

> *... sustainable development as the pursuit of economic growth measured by gross national product subject to environmental constraints. The 'maximize-subject-to-constraints' criteria can be described as having two stages: First, the establishment of some contractual arrangement, incorporating ecological principle and enviromental ethics to establish the 'rules' applicable to the development policy. Second, within those rules, the utilitarian stance of economic maximization can be adopted [Pearce, 1987b]. This two stage perspective which many economists and some environmentalists hold, leads to advocacy for discovering the 'right' incentives to produce solution-oriented technologies and the 'right prices'*

Batie, *[1989, p.1085]* continues that

> *These diverse definitions about sustainable development pose a risk for any generation. However, sustainable*

that can be described through several general characteristics. Advocates of sustainable development:

- *perceive that the biosphere imposes limits on economic growth*
- *express a lack of faith in either science or technology as leading to human betterment*
- *are extremely adverse to environmental risks*
- *support redistributive justice and egalitarian ethics*
- *profess concern over population growth and have faith in the wisdom of human capital development, and*
- *have survival of species and protection of the environment of minority cultures, rather than economic growth per se, as goals.*

Not all advocates necessarily embrace all these beliefs, of course. Furthermore, these views are more accurately attributed to the 'maintenance' school of sustainable development thought than to the 'constrained growth school'. [Batie, 1989, p.1085]

Batie discusses some of the implications for the agricultural economics profession.

There are two broad sets of implications pertaining to the relationship between sustainable development concepts and the agricultural economics profession. The first set encompasses development concepts and the agricultural economics profession that is the contributions that agricultural economics can make to sustainable development concepts. The second set involves the contributions of the sustainable development concept to the agricultural economics profession. The first set requires a longer explanation; the second set is more fundamental. [Batie, 1989, p.1094]

Batie *[1989, p.1094]* continues in the December 1989 American Journal of Agricultural Economics to discuss how agricultural economics can contribute to the debate on sustainability. Batie states:

The concept of sustainable development and the goals it incorporates must be made more rigorous, systematic and consistent (if they are to be amenable to either applied economic analysis or policy-making. Too often moral convictions substitute for rigorous analysis.

Second, according to Batie *[1989, p.1095], Agricultural economists can assist in clarifying the concept of sustainable development. In such clarification economic analysis will illuminate some contradictions between sustainable development goals.*

Third, Batie *[1989, p.1096]* notes that economic analysis can be improved.

Even without a major epistemological reorientation, as agricultural economists we can use our analytical skills to trace out the implications of the adoption of sustainable development proposals on a variety of factors."

Fourth Batie *[1989, p.1096]* indicates that: *Agricultural economists can also assist in institutional design that incorporates sustainable development goals either by changing existing policies to remove policy incentives for non-sustainable actions or by designing new institutions that promote sustainable development.*

Batie comments:

The larger challenge to our discipline posed to the sustainable development theme is the reconsideration of the questions that neoclassical economists have tended to neglect. What are the fundamental causes and dynamics of economic growth in society? What are the relationships between growth, natural resources, environmental quality, and human welfare? Is discounting an appropriate means of analyzing resource use in the future? Do resources other than the human mind matter? What are the distributional implications of policies?" [Batie, 1989, p.1098]

During the literature review a book was noted by the author having relevance that is

published by the World Bank, *Sustainability Issues in Agricultural Development Proceedings of the Seventh Agricultural Sector Symposium* by Davis, Ted J and Schirmer, Isabelle A., Eds. 7th Edition 1987, 382 pages includes a number of excellent papers. A third presentation by Francis Idachaba, University of Ibadan, Nigeria, published in the Proceedings, points out the major policy issues for sustainability *[p.20-22]*. These institutional arrangements and policy environment issues are:

(1) Changing Perspective of the Role of Government in Agriculture;
(2) Parastatal Syndrome and the Plurality of Public Institutions in Agriculture. Three examples are cited:
    (a) Tanzania Cotton Authority;
    (b) National Milling Corporation; and
    (c) Tanzania Fertilizer Company;
and (3) Political Instability and Sustainability. *[Davis and Schirmer, Eds. Idachaba, 1987, p.20]*

Idachaba notes that the

> *... changing perceptions of the role of government in agriculture are a major cause of non-sustainable growth performance of developing agriculture. [Davis and Schirmer, Eds. Idachaba, 1987, p.20].*

Cocoa production was cut in half in Nigeria from 1965-67 to 1979-81. Groundnuts, cotton and palm oil production were adversely affected by taxation of agriculture. Agricultural parastatals in Tanzania in 1983 included 27 segments in:

(1) Agricultural Marketing;
(2) Agricultural Credit;
(3) Agricultural Production;
(4) Agricultural Inputs;
(5) Agricultural Research, Extension and Education; and
(6) Transport and Retailing.

Idachaba notes:

> *Public parastatals are often under pressure to produce physical results regardless of the economic profitability and have, therefore, gone through periods of false starts and dashed hopes. [Davis and Schirmer, Eds. Idachaba, 1987, p.22]*

Personal observations while travelling in India in the late 1960s and in Pakistan in 1986 and 1991 tends to support the challenges less developed countries face in dealing with parastatals in agricultural decision-making.

Idachaba notes the

> *High political instability has made sustained agricultural growth and development performance almost impossible in most African countries. Political instability results in four types of changes in the political environment of direct relevance for sustainability. First are the changes in programme priorities introduced by new regimes, civilian or military. Changes in priorities produce changes in public resource allocations which affect policy sustainability and growth performance. Second are policy or programme changes of largely a cosmetic nature, meant to give a semblance of change when, in fact, nothing has changed. Third are changes produced by changes in the public bureaucracy, the traditional source of policy advice. Fourth is the loss in sustainability caused by the 'learning lag', the time required by new political and bureaucratic leadership to study the files and get informed on policies and programmes of the previous 'discredited regime'. Examples of these types of problems are found in all parts of the world in developed and less developed countries government bureaucracies. [Davis and Schirmer, Eds. Idachaba, 1987, p.22]*

Idachaba also *[p.30]* lists six agricultural sector policy issues of sustainability:

(1) rural roads and water supplies;
(2) drought, irrigation and pest and disease outbreaks;
(3) agricultural pricing policies;
(4) producer price support schemes;
(5) farm input subsidies; and
(6) agricultural research and the generation of new technology. *[Davis and Schirmer, Eds. Idachaba, 1987, p.30]*

Idachaba concludes in the paper summary that:

> *Sustainability has been viewed in terms*

of three sets of factors: national macroeconomic and political environment, the agricultural sector, the external sector as well as interactions between them. [Davis and Schirmer, Eds. Idachaba, 1987, p.47]

World Bank's Francois Falloux paper "*Land Management, Tilting and Tenancy*" focuses on the importance of secure tenure in the use of land. Seven proposed final recommendations summarize his comments:

(a) *The Bank should emphasize land issues in country dialogue;*

(b) *The Bank should continue increasing its land titling/cadastral projects;*

(c) *SAC/SALS should be used more and more as a vehicle to adjust land policy and to lead to land adjustment operations;*

(d) *The Bank should increase its land related sector work because of (a) and (b);*

(e) *The Bank should clarify its policy in land affairs and then disseminate it. In order to do so:*
   (i) *the sector policy paper on land reform should be updated and*
   (ii) *more seminars and training should be organized on land affairs for officials of our member countries;*

(f) *The Bank should continue enhancing its experience/expertise through:*
   (i) *internal training;*
   (ii) *better monitoring of its land portfolio; and*
   (iii) *better internal support for sector and project work in land affairs; and*

(g) *Sub-Saharan Africa deserves special attention because it is at a turning point in terms of land management between the traditional extensive systems and new intensive ones. Risks are probably higher than in other continents, particularly in terms of land degradation.*

Finally, I would like to make three remarks:

(a) *The above recommendations are not a panacea; it is necessary to look at land issues to remove constraints, (if any; but this is far from being sufficient. It only aims at improving the framework within which farmers can operate efficiently which in turn implies good technologies and adequate support services.*

(b) *I have dealt with land management and administration aspects mainly from a macro viewpoint because too often they are neglected. Land management at the farm level is equally important, but usually better known.*

(c) *Sustainability, the main thrust of our symposium is not a word that frequently appears in this paper. In fact, it is implicitly behind the main thrust of this presentation because providing increasing land security is a necessary condition to establish sustainable production systems. [Davis and Schirmer, Eds. Falloux, 1987, p.208]*

D.L. Winkelman, Director General of CIMMTY, Mexico in page 295 of his paper "*Diversification, Sustainability and Economics*" defines sustainability:

Well tended systems of farming and ranching can function without interrupting quality but, most believe, not at levels of production sufficient to maintain roughly current relative food prices for roughly current populations. To think of sustaining in the context of uninterrupted maintenance of quality and power is too exacting a standard. One more consistent with circumstance, especially as it is conditioned by dynamism of science, defines sustaining in terms of a natural endowment managed so as to permit the maintenance of yields through the application of relevant new science with roughly constant relative prices. [Davis and Schirmer, Eds. Winkelman, 1987, p.295]

Winkleman's concluding remarks focuses on the importance of various agricultural disciplines working together.

The connections among diversification, sustainable agriculture, and practice run through biology, economics, and institutions. We know much about

selected facts of those interactions, far too little about most. Much research needs to be reviewed, much research remains to be done, and a goodly portion of this research must have long horizons. Development assistance agencies concerned with sustainability should hasten to encourage faster and promote such research. [Davis and Schirmer, Eds. Winkelman, 1987, p.303]

G. Edward Schuh, Director, Agriculture and Rural Development, the World Bank, Washington, D.C. in a concluding paper "*Some Thoughts on Economic Development, Sustainability and the Environment*": *[p.371]*

I want to change this perspective and address a different set of issues, those having to do with economic development and its relationship to environmental and sustainability problems. First, it appears to be widely perceived by many that economic development is the cause of environmental damage and a reduction in sustainability. Proponents of this view tend to have an anti-development perspective in their rhetoric and to find the World Bank an attractive target for their political activities. It is most interesting that most of these people come from the developed countries. [Davis and Schirmer, Eds. Schuh, 1987, p.37]

The second reason this set of issues is important because of its relevance to our lending program, the Bank has properly, in my judgement, given increased attention to population problems, especially in Africa. My concern is that we do not take a sufficiently broad perspective to our population work. I will argue below that we should significantly broaden our perspective from population to a greater emphasis on investments in human capital. If we do that, we will give more attention to improving the quality of the population by investing more in nutrition, in health, in education and training in the production of new knowledge - science and technology, and in the maintenance of the stock of human capital. These are the fundamental things that are needed to accelerate economic growth, to deal effectively with the problem of poverty, and in the longer run deal with environmental problems. [Davis and Schirmer, Eds. Schuh, 1987, p.371]

Schuh's comments on the importance of investment in human capital has direct application as the Eastern Caribbean is viewed. It appears as I have studied Antigua, Barbados, Montserrat, Nevis, St. Kitts, Dominica and Trinidad that literacy rates of 70 to 98 per cent attest to this investment. Concerted efforts are being made in these locations to make sure the young children are attending school. Increased mobility of the population is the result. Better decisions related to all aspects of economic development will be made in the future.

Kenneth E. Boulding in a 1966 book *Environmental Quality in a Growing Economy* published for Resources for the Future, Inc. by the Johns Hopkins Press [p.9] noted that:

The closed earth of the future requires economic principles which are somewhat different from those of the open earth of the past. For the sake of picturesqueness, I am tempted to call the open economy the 'cowboy economy', the cowboy has been symbolic of the illimitable plains and also associated with reckless, exploitive, romantic and violent behaviour, which is characteristic of open societies. The closed economy of the future might similarly be called the 'spaceman' economy in which the earth has become a single spaceship, without unlimited reservoirs of anything, either extraction or for pollution, and in which, therefore, man must find his place in a cyclical ecological system which is capable of continuous reproduction of material form even though; it cannot escape having inputs of energy. The difference between the two types of economy becomes most apparent in the attitude toward consumption. In the cowboy economy, consumption is regarded as a good thing and production likewise; and the success of the

economy is measured by the amount of throughput from the 'factors of production', a part of which, at any rate is extracted from the reservoirs of raw materials and non-economic objects, and another part which is output into the reservoirs of pollution.

By contrast, in the spaceman economy, throughput is by no means a desideratum and is indeed to be regarded as something to be minimized rather than maximized. The essential measure of the success of the economy is not production and consumption at all, but the nature, extent, quality and complexity of the total capital stock, including in this the state of the human bodies and minds included in the system. In the spaceman economy, we are primarily concerned with stock maintenance, and any technological changes which results in the maintenance of a given total stock with a lessened throughput (that is less production and consumption) is clearly a gain. this idea that both production and consumption are bad things rather than good things is very strange to economists, who have been obsessed with income flow concepts to the exclusion almost of capital-stock concepts. [Boulding, et al, 1966, p.9]

Later in this paper, Boulding raises a question regarding the spaceman economy in 1966.

It may be said, of course, why worry about all this when the spaceman economy is still a good way off (at least beyond the lifetimes of any now living), so let us eat, drink, spend, extract and pollute, and be as merry as we can, and let posterity worry about the spaceman earth. Unless the individual identifies with some community of this kind, conservation is obviously 'irrational'. Why should we not maximize the welfare of this generation at the cost of posterity? The only answer to this, as far as I can see, is to point out that the welfare of the individual depends on the extent to which he can identify himself with others, and that the most satisfactory individual identify is that which identifies not only with a community in space but also with a community extending over time from the past to the future. If this kind of identity is recognized as desirable, then posterity has a voice, even if it does not have a vote; and in a sense, if its voice can influence votes, it has votes, too. This whole problem is linked up with the much larger one of the determinants of morale, legitimacy, and nerve of a society, and there is a great deal of historical evidence to suggest that a society which loses its identity with posterity and which loses its positive image of the future loses also its capacity to deal with present problems and soon falls apart. [Boulding et al, 1966, p.11]

Boulding appears to be expressing the idea that in the year 1966 we should be concerned with questions of pollution and irresponsible use of resources.

Rene Dubos, a microbiologist and experimental pathologist and a professor of the Rockefeller University in New York City in the 1960's expressed some interesting ideas in a paper entitled "*Promises and Hazards of Man's Adaptability*" *[p.24]*

Today as in the past, man can adapt to environmental pollution; to intense crowding; to deficient or excessive abundant diets; to monotonous, ugly and depressing environments. All over the world the most polluted crowded and traumatic cities are also the ones which have the greatest appeal and where population is increasing most rapidly. Furthermore, conditions that appear undesirable biologically need not be a handicap for economic growth. Economic wealth is produced chiefly by men and women working under high nervous tension in atmospheres contaminated with chemical fumes and in crowded offices polluted with tobacco smoke.

Dubos cautions that an environment of tranquillity may not stimulate the human being to great accomplishments. Dubos completes his

discussion by saying:

> *A highly structural and unified environment may be desirable for the sake of order, efficiency and peace. But diversification of the environment is needed to bring out the unexpressed potentialities of mankind, and allow the unfolding of civilizations. [Boulding, et al, Duhl, 1966, p.42]*

Leonard J. Duhl, an M.D. psychiatrist in New York City, New York, in "*Mental Health in an Urban Society*" discusses Rene Dubos paper in regard to the complexity of society *[p.42]*.

> *This complexity is being forced on us for many reasons. A psychiatric reason is that we are suddenly at that point in time where all input of information, of ideas, of conflicting values, as aspirations, and what you have is pounding in on us, and the individual is faced with a tremendously difficult problem of how to put this together and how to find some identity from it, and I don't think we can any longer be in the position of asking an individual or even any one institution to take all this tremendous input and put it all together. A number of institutions will have to be created to put this information together for us in a different way and we will have to train professionals that will help in the process of integration.*

Allen V. Kneese, in 1966 was the Director of the Resources for the Future research programs in water resources and in quality of the environment. Dr. Allen V. Kneese received his Ph.D. in economics from the University of Indiana. Kneese, in his essay "*Research Goals and Progress Toward Them*", notes: *[p.69]*

> *Useful study of environmental quality problems requires a wide understanding of the physical and social worlds and their interrelationships. As man's ability to work vast changes on particular aspects of his environment becomes greater and people are more and more strongly and directly affected by the activities of others, the need for comprehensive understanding becomes more critical. But striving for broad understanding is not a substitute for immediate efforts to illuminate particular aspects of the problem. Such clarification is perhaps most urgently needed in the social and biographical sciences. My main object is to report on research in one of these areas - economics.*
>
> *Economic studies of environmental quality have a short history and perhaps it is too early for formal assessment. Nevertheless, I think there are enough results to support some opinions on the direction and scope of work done so far, on strong points and gaps in current research, and on the bearing these efforts have on appropriate public policy and techniques of planning toward optimum environmental quality.*
>
> *In commenting on some of the important economic studies which are completed or in progress, I shall divide them into four categories: (a) conceptual and methodological studies; (b) empirical evaluation studies; (c) studies of control systems; and (d) studies bearing upon desirable institutional changes [Boulding, et al, Kneese, 1966, p.69].*

It appears that if you compare suggestions made in the World Bank proceedings on "*Sustainable Issues in Agricultural Development*" of 1987 and those in the 1966 essays in "*Environmental Quality in a Growing Economy*" that they are not far different in the logic pursued. However, recognition was made by Kneese in the conclusions of his essay.

> *Three major conclusions arise from this review of economic studies on environmental quality*
>
> *(a) Optimum rules, standards or other techniques for controlling environmental quality must result from analysis of values, contrary to the usual approach which is narrowly focused on physical effects and objectives. Research in the economic values associated with environ-mental management has made signifi-cant progress along some lines, but barely begun to shed light on many difficult problems.*

(b) *Even carefully determined value-based rules and regulations governing individual, industrial and local government decisions cannot achieve optimal environmental quality management; more direct and explicit collective acting on a regional scale is often indicated.*

(c) *We are ill-equipped institutionally to implement those management systems and procedures which economic and engineering analysis suggests; and appropriate research on how to design suitable institutional and organizational arrangements has hardly begun [Boulding, et al., Kneese, 1966, p.87].*

CARIBBEAN OBSERVATIONS

A report entitled "*Caribbean Basin Initiative, Impact on Selected Countries*" by United States General Accounting Office, Report to the Chairman, Sub-Committee on Western Hemisphere and Peace Corps Affairs, Committee on Foreign Relations, US Senate GAO INSLAP-88-77, July 1988, suggests ingredients of making sound decisions on foreign and domestic investments in the agricultural sector of the Caribbean. This report suggest various ingredients (1) infrastructure, (2) trained and skilled labour force, (3) credit availability, (4) export investment capacity, and (5) a favourable investment climate that includes a stable government, reasonable import and export requirements, ability to repatriate profits, access to foreign exchange and rationalized exchange rates and investment incentives such as free trade zones and tax holidays *[Erickson, 1990, p.2].*

A number of questions can be raised regarding the Caribbean islands in regard to sustainability. Perhaps the priority questions that can be raised are: *[Erickson, 1990, p.2]*

1. What is the infrastructure in terms of roads, storage and loading facilities?
2. What are the characteristics of the labour once related to age, education and training?
3. Is credit available on a reliable and trustworthy basis?
4. What products are being exported and imported?
5. What are the rates of return currently obtained from agriculture, tourist, commercial and governmental sectors.
6. *What are the long-term potentials for* agriculture, tourism, commercial and *government sectors.*

The final two questions are perhaps the most important regarding the sustainability question in the Caribbean. A number of strategies perhaps need to be developed in meeting the challenges in the future. The Caribbean islands of Antigua, Barbados, Dominica, Grenada, Montserrat, Nevis, St. Kitts, St. Lucia and St. Vincent are primarily the ones were soil testing facilities are needed to monitor soil fertility levels as the fertilizer applications are made for the various crops. Use of chemicals for weed and insect control will need to be monitored closely to prevent the use of chemicals that build up and cause problems for the human water supply. Travel through the islands suggests monitoring of the use of weed control and insect control sprays is necessary to reduce environmental hazards and encourage sustainability.

The financial results of the various farming systems need to be monitored. Ideas on this topic were pursued in a paper presented at the Association of Farming Systems Research and Extension Symposium, Michigan State University, East Lansing, Michigan in October 15, 1990. *[Erickson, 1990, pp.5]* Mentioned in the paper were the process of sondeo or needs assessment, island by island, country by country sondeo reporting, extension plans of work, developing educational programs to provide information on questions raised, conducting farm management enterprise analysis and whole farm analysis. Agricultural programs in marketing and farm management need to be considered. Farm record education programs can be a final stage that will help in determining the sustainability of agriculture from the financial position.

Pemberton and Erickson in Agricultural Diversification: Policies and Strategies:

Proceedings of the 19th West Indies Agricultural Economics Conference paper, "*The Approach of the Caribbean Agricultural Extension Project*", [pp.111-112] note that :

> *It is the contention of this paper that diversification efforts must be market led. A process of farm level diversifications would thus involve both a macro and micro perspective. The macro perspective would consist of: (1) the identification of market opportunities and (2) the development of market mixes in terms of product, price, distribution and promotional strategies for the sector as a whole. At the micro level, farmers have to become responsive to diversification stimuli coming from the macro perspective. The major and orderly stimulus is price and pricing strategies that could establish price relatives which favour a range at diversification alternatives for farmers. Farmers could then organize their product mixes to include a more diversified pattern in concert with the price relatives, individual resource constraints and personal preferences.*

Diversification is an essential ingredient of financial sustainability in the Caribbean.

Research activities are currently being carried out by The University of the West Indies and the Caribbean Agricultural Research Extension Programs organization and other local and international groups. The work on crop varieties, fertility, weed control and insect control, livestock breeding, nutrition and health are all important activities requiring country by country priority setting. Use of longer term leases for land are needed in those islands where government owns the land. Development of long-term management ability requires the security of tenure of the land resource.

Ministries of Agriculture are encouraging training of staff through workshops and graduate work. Higher job entrance requirements are also needed to improve the overall staff research and extension capacities. Caribbean agricultural economists have made outstanding contributions to the training and upgrading of staff in the Ministries of Agriculture, trade associations such as *in bananas, nutmeg and coconuts; credit* institutions and agribusiness organizations and private sector businesses.

At the beginning of this paper, Batie was quoted on the two roles of agricultural economists in sustainable development. First, reemphasis of the importance of the *encouragement of sound economic* analysis that is rigorous, systematic and consistent. Second, agricultural economists can assist in clarifying the concept of sustainable development by tracing out the implications of adoption of sustainable development goals and assisting in the design of research and extension work.

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