THE ECONOMICS OF THE SUSTAINABLE AGRICULTURE MOVEMENT*

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Introduction

In one sense, events have overtaken the content of this paper in ways that were difficult to predict when I began thinking about this topic over a year ago. The concept of sustainable agriculture has become so popular that few departments or faculties of agriculture have been able to resist some form of affiliation with the idea of a sustainable food system. In one sense, then, it is difficult to speak of the Sustainable Agriculture Movement, without of necessity including most of the population in the western world as members.[1] Put another way, there are no recognizable voices within the agricultural community calling for the promotion of unsustainable agriculture.

In a second sense, however, the economics of the Sustainable Agriculture Movement remains a viable and important topic in that a distinct view of economic life has been articulated by many of the intellectual leaders that have been associated with the concept of sustainable agriculture. The purpose of this paper is to identify certain prominent aspects of the views of economics held by influential thinkers in the Sustainable Agriculture Movement, to assess the internal coherence and the empirical relevance of these views and also to evaluate the conceptual basis for the wide ranging policy recommendations that have been generated by the movement. This paper represents an exercise in economic anthropology in that no comprehensive and integrated statement of the economics of the Sustainable Agriculture Movement yet exists. As a result, it is necessary to construct a composite sketch from fragmented literary artifacts.

The source material for this exercise comes from a diverse range of published literature. The American Journal of Alternative Agriculture, the newly launched Journal of Sustainable Agriculture, Global Perspectives on Agroecology and Sustainable Agricultural Systems, the National Research Council's recently published book, Alternative Agriculture, Sustainable Agricultural Systems (Edwards

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1 Whether this development represents an unhealthy co-opting of the agenda of the Sustainable Agriculture Movement or whether it represents, as Francis and Sahs (1988) has suggested, a rediscovery of the intellectual roots of public agricultural research in North America remains to be seen.

et al, 1990), Marty Strange's Farming Farming: a New Economic Vision as well as publications of the World Resources Institute and the Worldwatch Institute, all offer important insights into the economics of the Sustainable Agriculture Movement.

I have chosen to view the concept of sustainable agriculture as an extension or an application of the concept of sustainable development. Sandra Batie (1989) has traced the intellectual origins of the concept of sustainable development to the emergence of the progressive conservation movement in the United States near the end of the 19th century. In my view, it would be unnecessary and perhaps would in fact be counter productive to attempt to separate the economics of the Sustainable Agriculture Movement from the economics of sustainable development generally.

Aspects of the Economics of the Sustainable Agriculture Movement

Seven themes which permeate writing on sustainable agriculture (Table 1) form an economic-theoretic basis for a diagnosis of what is wrong with human society[2] and for prescriptions of necessary corrective actions. I have chosen to identify these themes as Dynamic Utilitarianism, Gains from Diversification and Autarky, The Economy as a Zero Sum Game, Producers' Sovereignty, The Perversity of Raw Materials Markets, Decentralization, and The Control of Externalities. Advocates of sustainable agriculture frequently call for an alternative paradigm for the study of economic dimensions of human society. I would argue that the first four items on the above list represent an "Anti-Economics" and form an epistemological attack on a small number of theorems which enjoy widespread support among economists. That these ideas represent an anti-economics, as opposed to the basis for a new paradigm, is evident from the fact that they can be expressed in terms

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2 Kahn et al (1976, pp. 9-16) have described four characteristic views of global resource endowments, economic growth, quality of life, and future prospects for the evolution of human society. The views on economics frequently articulated by members of the Sustainable Agriculture Movement correspond, often quite closely, with what Kahn et al describe as the Convinced Neo-Malthusian and the Guarded Pessimist views.

Table 1

Aspects of the Economics of the Sustainable Agriculture Movement

Anti-Economics

Dynamic Utilitarianism

Gains from Diversification and Autarky

The Economy as A Zero Sum Game

Producers' Sovereignty

Conventionalist Economics

Perversity of Markets For Raw Materials

Decentralization

Control of Externalities

of the same phenomena and in fact using the same symbols employed in the conventional approach. I will return to this point later but the epistemological challenge raised by these propositions is a serious one. Refutation of the interpretation of events reflected under the headings of Dynamic Utilitarianism, Gains from Diversification and Autarky, The Economy as a Zero Sum Game and Producers' Sovereignty relies on the recapitulation of a number of statements that economists generally hold to be true but whose veracity often seems inscrutable to the uninitiated. The final three elements in the economics of the Sustainable Agricultural Movement, that is, the Perversity of Raw Materials Markets, Decentralization, and the Control of Externalities, are empirical propositions which can be readily accommodated within the conventional paradigm.

Dynamic Utilitarianism

The term utilitarianism and the name of Jeremy Bentham have often been associated with the idea that an optimal allocation of resources within a society should satisfy the condition that the greatest amount of good be done for the greatest number of people. The qualifier "Dynamic" refers to the inter-temporal extension of this optimality condition. Gordon (1958) identifies Gifford Pinchot as the father of the conservation movement in the United States. He is attributed as having said that "conservation means the greatest good of the greatest number and that for the longest time". Gordon's attribution of this remark is dated 1910. Seventy-seven years later Our Common Future, describes sustainable development as development which ensures "that it meets the needs of the present without compromising the ability of future generations to meet their own needs."

Gains from Diversification and Autarky

Since at least the publication of Adam Smith's Inquiry into the Nature and Causes of the Wealth of Nations, economists have generally argued that expansion of opportunities for voluntary exchange among individuals and the subsequent specialization of production activities according to

individual, regional and even national comparative advantage has been an important engine powering improvements in a material well being of human societies. Many proponents of sustainable agriculture reject this view and some (Henderson, 1988) have gone as far as to reject the monetization of exchange relationships generally. The integration of primary agriculture into the exchange nexus of the modern industrial economy is seen by advocates of the Gains from Diversification and Autarky as a critically unfortunate development. In contrast, primary production in the agricultural sector in the early decades of the twentieth century is viewed as a largely self-sufficient process in the sense that few purchased inputs originate off the farm. One of the most frequent themes appearing in the literature of the Sustainable Agriculture Movement is the notion that trade per se is inherently environmentally degrading. One of the gains, therefore, from the lack of trade, that is autarky, is a reduction in stress on the long run productivity of top soil and on other dimensions of environmental quality. In addition to this sweeping statement about the environmental consequences of interregional and international trade, one frequently encounters statements about the farm level advantages of non-conventional approaches to agricultural production. Alternative Agriculture (National Research Council, 1989) as well as Growing Together (Agriculture Canada, 1989) reflect a widespread perception that production systems exist at the present time which are both more ecologically sound and at the same time have a comparable or a superior level of income performance and a lower level of income risk for farm operators. Failure of farmers to adopt such production systems is frequently linked to the undesirable environmental consequences of farm policies and also to the operation of "Producers' Sovereignty" in the input supply markets serving agriculture.

The Economy as a Zero Sum Game

Few concepts from the jargon of modern economic theory have enjoyed the popularity of the phrase "Zero Sum Game". The concept refers to the characterization of exchange relationships as

a situation where acquisition of more of some scarce commodity by one individual implies a diminution in the holdings of that commodity by some other individual. The concept of human society as a zero sum game finds expression in a number of ways in the economics of the Sustainable Agriculture Movement. A recurrent theme is the observation that the raw material endowments, in particular the mineral and fossil fuel endowments of the planet, are finite. Clearly, the use of a barrel of oil today precludes the use of that same barrel of oil tomorrow. This concept of finiteness has been related to the physicist's concept of entropy. Several analysts have described the earth as a system subject to the second law of thermodynamics and concluded that depletion of finite endowments of metallic resources and fossil fuels will lead, inevitably, to declining standards of living in the future (Rifkin, 1980, Georgescu-Roegen, 1971). Several policy prescriptions have been built on this conceptual foundation. Perhaps the most common is the proposition that steps should be taken as soon as possible to minimize the use of non-renewable resources. Frequently, growth controls and some form of centralized redistribution of assets, wealth or income are recommended. Writing in the 1970's typically was much more dogmatic on this point (see Ehrlich et al 1977) whereas Our Common Future is somewhat more equivocal in its accommodation of the desirability of economic growth.

Producers' Sovereignty

Few ideas in economic theory possess the prestige or influence of the concept of Consumers' Sovereignty. As far as I am aware, it is the only concept that economists commonly refer to as a "doctrine". The idea extends at least as far back as the writing of Adam Smith, who affirmed that the end of all production was consumption, meaning that production for its own sake had no economic merit. More recently, the concept has come to mean that, ultimately, the consumer determines the scope and nature of goods and services offered in exchange. The view of economics articulated by members of the Sustainable Agriculture Movement affirms a contrary view. In this tradition

producers exercise sovereignty over consumers and ultimately determine the nature and character of goods offered for exchange in markets. Rather than being voluntary associations of individuals banded together to facilitate the identification of consumers' needs and preferences and subsequently to undertake the production of commodities compatible to those revealed tastes and preferences, firms are seen as manipulators of preferences and as institutions which seriously constrain the freedom of choice of individual consumers. Consciously or subconsciously, this tradition draws strength and perhaps inspiration from the writings of John Kenneth Galbraith and even earlier economists such as Veblen. Although the discussion rarely takes this form in the writings of Sustainable Agriculture Movement, the essence of the notion of Producers' Sovereignty, goes to the nature of our understanding of the process of competition in a market economy.

Perversity of Raw Materials Markets

The first four propositions of the economics of the Sustainable Agriculture Movement challenge some of the foundations of orthodox economics. The remaining three propositions are empirical hypotheses which could be tested within the existing protocol for economic analysis. This certainly includes the idea that markets for minerals, fossil fuel resources, and primary commodities produced in the agricultural sector are qualitatively subject to higher levels of error and are characterized by higher levels of price and quantity instability than others types of markets. Although it is rarely put in this way, one could interpret this view as a suggestion that both supply and demand in raw materials markets are price inelastic and as a consequence small shocks on either the demand or the supply side result in erratic price behaviour. A second manner in which the perversity of raw materials markets is expressed, and this is most often related to markets for petroleum and for farmland, is the notion that current markets discount events in the distant future and, as a result, fail to reflect the needs and wishes of future generations. All of this, however, is extremely conventional in the sense that these views can be found in most freshman textbooks in the principles of economics.

Decentralization

Schumacher's Small Is Beautiful tapped an undercurrent of concern about the behaviour of large organizations, whether those large organizations represented agencies in the public or in the private sectors. Large organizations, in general, are thought to make choices with respect to production plans, marketing, resource use and environmental protection which are contrary to the best interests of the majority of individuals affected by these decisions. Economists generally have supported the concepts of decentralization and individual choice, and much of their support for these ideas has been expressed as an appreciation for voluntary exchange relations in markets as the embodiment of individual choice and decentralized decision making (see Mises, 1949, Hayek, 1945 and Kirzner, 1973, 1985). Sustainable agriculturalists, however, introduce a new spin on the meaning of the notion of decentralization. They are not libertarians. A co-requisite to the promotion of decentralized decisions is the transformation of values of producers and consumers (See Ornstein and Ehrlich, 1989). Apart from this transformation of values, often to be achieved through the use of force, the type of decentralized decisions preferred by members of the Sustainable Agriculture Movement are unlikely, in their judgment, to take place.

Control of Externalities

The seventh proposition in the economics of the Sustainable Agriculture Movement is so close to economic orthodoxy that the very language used to express concern for the problem is drawn from the language of the professional economist. The notion that certain production and consumption activities create extra-market effects that economists have called externalities has received widespread attention in the Movement. External effects of leached crop nutrients and off-site effects of pesticide products have received extensive attention. Less emphasis has been placed on the off-site effects of eroded sediment and the discharge of waste from livestock operations. The preferred policy response in the face of the existence of externalities has tended to be a regulatory

one. The most common expression of the form of the regulatory response has been the enforcement of some type of zero tolerance standard. The effects of externalities, particularly from commercial agricultural production systems, is seen as pervasive, serious, and an immediate threat to the health and safety of human beings generally, including consumers and farmers, and to the well being of other organisms in the rural ecosystem.

Assessment of the Economics of the Sustainable Agriculture Movement

In a previous incarnation of the subdiscipline of welfare economics, utilitarianism was given extensive and serious consideration as a normative criterion to be used in the assessment of the performance of economic institutions. This extensive and serious consideration revealed the fatal flaw in the slogan "the greatest good for the greatest number of people" and subsequently led to the abandonment of the concept. Utilitarianism fails to recognize the implicit conflicts inherent in its performance criterion. In its strongest and most naive expression, utilitarianism hinged on the idea that utility was an objectively measurable quantity that could, in concept, be used to calibrate interpersonal differences in levels of satisfaction. Were such measurements and comparisons possible, it is conceivable that redistribution of assets or income could be undertaken so as to maximize the sum of these individualistic utility measures. In the absence of objectively quantifiable, interpersonally meaningful measures of the satisfaction of individuals, the idea of utilitarianism becomes at best unworkable and at worst nonsensical. These difficulties are in no way diminished by the addition of the prefix dynamic which implies the addition of an inter-temporal dimension to the problems of utility comparison across individuals. Our Common Future in fact expresses a more sophisticated view of dynamic utilitarianism than that attributed to Pinchot. A critical passage in that book (pp.45-46) and is worth quoting in its entirety.

> Economic growth and development obviously involved changes in the physical ecosystem. Every ecosystem everywhere cannot be preserved intact. A forest may be depleted in one part of a watershed and extended elsewhere, which is not a bad thing if the exploitation has

> been planned and the effects on soil erosion rates, water regimes and genetic losses have been taken into account. In general renewable resources like forests and fish stocks need not be depleted provided the rate of use is within the limits of regeneration and natural growth. But most renewable resources are part of a complex and interlinked ecosystem, and maximum sustainable yields must be defined after taking into account the system wide effects of exploitation.
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> As for non-renewable resources, like fossil fuels and minerals, their use reduces the stock available for future generations. But this does not mean that such resources should not be used. In general, the rate of depletion should take into account the criticality of that resource, the availability of technologies for minimizing depletion, and the likelihood of substitutes being available. Thus land should not be degraded beyond reasonable recovery. With minerals and fossil fuels, the rate of depletion and the emphasis on recycling and economy of use should be calibrated to ensure that the resource does not run out before acceptable substitutes are available. Sustainable development requires that the rate of depletion of non-renewable resources should foreclose as few future options as possible.

The recognition of both and intra- and inter-temporal trade-offs implicit in resource use decisions is clear in these two paragraphs. What Our Common Future lacks is an unequivocal statement of how these trade-offs should be measured and what steps need to be taken, particularly in the form of public policy, to ensure that they are recognized. The economics profession has in fact been generally divided on its assessment of Dynamic Utilitarianism. Pigou, who could be seen as the intellectual ancestor of the conservation movement, viewed the very phenomenon of discounting of future events is symptomatic of a form of moral weakness and even irrationality on the part of human beings. Milliman (1962), Gordon (1958) and Block (1990), among others, have argued that the evolution of markets as social institutions can, in fact, deal with the inter-temporal trade-offs which are of central concern to supporters of dynamic utilitarianism.

The wording of the phrase "Gains from Diversification and Autarky" was chosen deliberately, to highlight the contrast between this concept and the notion of the gains from specialization and trade. The integration of primary production in agriculture with the rest of the modern industrial economy is widely perceived by economists as both a natural and a desirable development. The emergence of manufactured inputs originating off the farm as either substitutes for inputs which had

been manufactured on the farm or as inputs which were previously unavailable is linked by many (see Ruttan, 1982) as critical to the global post-war trend of increasing per caput availability of food.[3] The predisposition of advocates of sustainable agriculture toward a system of individual, regional and national self-sufficiency in the production of food commodities does not sit well with most economists. It runs contrary to the long standing intellectual tradition of emphasizing the bilateral gains from voluntary exchange and the welfare enhancing possibilities inherent in the opportunities for specialization that monetized exchange relations facilitate. The origins of the Gains from Diversification and Autarky rest on the idea that the diversified farm firm operating with minimal use of inputs purchased off the farm is less vulnerable to production risks and price risks and faces improved average profits. In a sense both of these claims have a high level of empirical content and are measurable and testable. Recent work by Fox et al (1990) suggests that self-sufficient farming systems, that is farming systems which use relatively low levels of inputs purchased for cash off the farm, do not dominate either in an income sense or in an income risk sense the more conventional approaches to agricultural production, at least in so far as evidence of comparative performance is reported in the literature. This would lead one to the conclusion that the proposition that there are substantial Gains to Diversification and Autarky is an untested hypothesis rather than a well documented and supported conclusion.

Although the idea of the zero sum game is a concept borrowed originally from economic theory, the use to which the concept is put in the present context is unlikely to receive widespread support among economists. Julian Simon (1980), Kahn et al (1976), Kirzner (1985) and many others have emphasized the pivotal role of human innovation as the critical scarce resource underlying both economic growth and long term advancement of human well being. The evolution of knowledge is

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3 The emergence of a science based commercial farming sector is also frequently linked to the secular decline in the agricultural labour force, the increase in average farm size, and trends towards decreasing numbers of farms, although Kislev and Peterson (1982) and Bergen (1989) have produced evidence to suggest that the availability of purchased inputs off the farm may have had less of an effect on farm structure than is commonly believed.

qualitatively quite different, both as a stock and a flow, from the use patterns associated with finite endowments of non-renewable resources. Knowledge can be seen as an example of the economists notion of the pure public good, that is a good which is non-rival in consumption.[4] Proponents of a zero sum or entropy based view of economic relations have typically underemphasized the role of human knowledge, particularly the role of innovation in resource discovery, in the identification of substitution possibilities and in the generation of technological change. Furthermore, growth accounting exercises have typically failed to attribute a significant portion of either the level of economic activity or the rate of economic growth to the availability of raw materials, particularly energy. Coupled with the long standing observed downward trends in primary commodity prices, the available empirical evidence casts considerable doubt on the prospects of future scarcity predicted by the entropy view.

The alleged perversity of the performance of markets for raw materials is an empirical proposition about the performance of particular economic institutions. In fact considerable evidence has been compiled on price movements and trade volumes in markets for minerals, petroleum, internationally traded grains and in selected countries, transactions in farmland. Identification of apparently erratic performance of these markets, however, is inadequate in and of itself to serve as the basis for a general theoretic statement about the economic performance of these markets or to serve as the basis for policy to intervene in both price formation and trade flows in these markets. A significant tradition in modern economic thinking (see for example, Friedman and Friedman, 1980, and Maurice and Smithson, 1984) argues that much, if not most, of the price instability in resource markets is attributable not so much to the inherent characteristics of demand and supply relationships per se, but in fact derives from interventionist actions on the part of governments. It could be argued

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[4] My knowing the Pythagorean Theorem does not diminish the amount of Pythagorean Theorem available for you to know. This is a quite different consumption situation than arises in the case of non-public goods.

that these primary commodity markets are among the most extensively regulated in the modern industrial economy, with the possible exception of markets for money and other financial assets. With regard to the question of the failure of markets for durable assets such as farmland or depletable resources such as petroleum to reflect the demands of future generations, few analysts within the Sustainable Agriculture Movement have exhibited an appreciation for the relationship between discount rates and prices in durable asset markets and the incentives facing owners of durable assets in those markets to consider future demands in the development of their production, extraction and marketing strategies.[5]

Advocacy of decentralization in decision making is likely to receive a favourable hearing among economists. It has often been argued that the very origin of economics as an intellectual pursuit arises from a curiosity regarding the aggregate consequences of apparently uncoordinated decentralized decision making. The extent to which the concept of decentralized decision making, however, is linked to some notion of a need for the alteration of the values and preferences of the individuals making the decisions is not generally well received by economists. The notion that, left to their own devices, individuals might consume too much or save too little or place too high or too low a value on future events or purchase too few opera tickets and too many baseball tickets has generally been regarded by economists as ground upon which they were fearful to tread. Many claims of this sort are met with a challenge to put the claim to the test and earn profit from arbitrage based or the apparent lack of accurate knowledge held by others.

The seventh proposition of the economics of the Sustainable Agriculture Movement, the need to mitigate the effects of externalities, represents a major component of modern environmental and resource economics (Baumol and Oates, 1988, Dales, 1968, Hahn 1990). As I mentioned earlier, the very language used by the Sustainable Agriculture Movement to talk about this issue has been

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5 This theme has been developed with regard to land markets and soil conservation by Fox and Taff (1990).

borrowed from the jargon of the professional economist. The existence and importance of externalities, expressed as degraded water, degraded air and associated human health risks and other effects is not a matter of much debate. The focus of economists' discussions on these matters, particularly in recent years, has shifted to explanation of the origin of such effects and the enduring failure of rational individuals to strike bargains with one another to mitigate these effects, and on the formal and empirical analysis of policy alternatives available to control externalities. The thrust of thinking in the Sustainable Agriculture Movement on the matter of externalities, in contrast, focuses almost exclusively on a zero tolerance based regulatory approach. This represents but one option in the policy toolbox available to deal with the external effects of agricultural production systems, and it represents arguably the least attractive option within that toolbox. A conventionalist economic critique, then, of this seventh plank in the economics of the Sustainable Agriculture Movement should take the form of a commendation for the identification of an important issue coupled with an encouragement to delve more deeply into the nature of the causes of externalities and a more comprehensive consideration of the range of potential remedial action.

Conclusions

Certain important thinkers affiliated with the Sustainable Agriculture Movement have consistently and repeatedly affirmed that there is both something wrong with the nature of economic relations in human society and that there is simultaneously something wrong with the intellectual capital of economics as a discipline. Upon closer examination, however, many of the propositions articulated by these writers can be seen as statements of empirical hypotheses which are quite meaningful within the context of the mainstream economic paradigm. Certain other statements constitute not empirical hypotheses within the existing paradigm but rather propositions challenging the fundamental theorems of that paradigm. There is a difference, however, between affirming the

negation of a proposition held by orthodox economists and proposing a distinct and different paradigm. In this sense, then, even the views of writers within the sustainable agricultural tradition are conventional in their economics, in the sense that operating within the conventional paradigm they simply argue that economists have got certain things wrong. The above assessment of economic aspects of the Sustainable Agriculture Movement confirms this notion in that many of the views on economics held by writers affiliated with the movement can be expressed in the language of a very conventional approach to the study of economics. In this sense then, Hazel Henderson's (1988, pp.181) contention that economics is a form of brain damage is apparently a diagnosis that applies equally well to the patient, that is the practitioner of economics, as it does to the physician.

The challenge to economists' treatment of the subject matter of welfare economics, of the gains from trade, of the concept of the consumer as a prime mover in markets for goods and services and the widely held perception that the economy is an open non-finite system can only be met with epistemological arguments. Unfortunately, in an environment whether neither the professional training nor the research activity of most economists deals seriously with matters of methodology, prospects for a meeting of the minds on these subjects are not good. The conventionalist and empirical statements on the performance of raw material markets, on externalities and on certain aspects of the nature of decentralized decision-making processes represent familiar ground to the economics profession and the extent to which the Sustainable Agriculture Movement has had an impact on the research agenda of the agricultural economics profession, it has had an impact in these areas.

Postscript

After having now spent several months studying statements concerning economics made in the literature on sustainable development and on sustainable agriculture, I am puzzled by its lack of

a balanced perspective. Much is said about the history of thought of the discipline of economics and much is said about the current methodological orientation and policy conclusions arising from that discipline. The overwhelming thrust, however, is critical of that perspective within the economics profession which has shown a sensitivity to the positive functions of markets as institutions within human society and as expressions of freedom of choice and individual autonomy within that society. It is generally the case, however, that the views of the classical economists, particularly Karl Marx, are accepted without substantive criticism. I have yet to find a serious and compelling explanation for this imbalance. I am certainly at a loss to explain how the considerable critical literature that has identified the shortcomings of Marxian Theory and also how the unenviable track record on environmental protection of national economies organized ostensibly along Marxist lines can be ignored.

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