Letters

Avery's "Environmentally Sustaining Agriculture"

A contrast in belief systems

■ We cannot fault Avery ("Environmentally Sustaining Agriculture," *Choices,* First Quarter 1997) for telling those in the conservative agricultural establishment the things they want to hear. He works for the Hudson Institute, a conservative "think-tank." That's his job, and he does it well. But why are so many well-informed and intelligent people, including economists, willing to give serious consideration to Avery's concept of "high-yield" agriculture while avoiding the real issues of agricultural sustainability? Hitzhusen and Davis (response to Avery in same issue) provided a credible defense for the role of biodiversity in agriculture. But, they completely skirt a central issue of sustainability—the dependence of Avery's "high-yield" agriculture on finite, nonrenewable resources.

The real issue of agricultural sustainability is not just about the next fifty to sixty years, as Avery's article would imply. Sustainability is about forever. We have some clear notions of how we might develop a highly productive, solar-based agriculture that does not rely on nonrenewable resources, and thus, might be sustainable essentially forever. But, those notions will not be seriously pursued until we are willing to confront the very real possibility that our current agriculture is inherently unsustainable.

The sustainability controversy arises from a conflict in belief systems. If we believe (*a*) resources are finite, (*b*) humans are fundamentally interconnected with the global ecosystem, and (*c*) there are inviolate laws of nature, such as the laws of thermodynamics, then we must believe that our current "high-yield" systems of agriculture are inherently unsustainable. Such systems might well be sustained for another fifty years. But they rely on fixed stocks of nonrenewable resources—commercial fuels, fertilizers, and pesticides—and thus are not sustainable over the "long run." Fifty years may be the long run in matters of business, but it is but an instant in matters of society and culture.

No one is advocating a "low-yield" agriculture. The goal of sustainability is "high sustainable yields." High sustainable yields require an effective, efficient ecosystem, which in turn requires a high level of biological diversity. Biodiversity is not a luxury of affluence; it is an essential element of a sustainable agriculture. The only means known for capturing significant quantities of solar energy and transforming it into human-useful forms is through natural biological processes. The fundamental purpose of agriculture is to transform solar energy into food and fiber. Our current "high-yield" agriculture is dependent upon biological stocks that were built over eons by diverse biological activity. Those stocks are being rapidly depleted. When they are gone, we will again become dependent upon whatever biological diversity is left at that time.

Man does not live by bread alone. Quality of life over the long run is dependent on having space for biological activities that support a whole host of processes essential to human life—including medicines and natural landscapes. But, humans can be a positive part of that biological nature—if we are willing to accept our place within it. With Avery's "high-yield" agriculture, we may need to separate spaces for agriculture, wildlife, and people. But, sustainability may well require that we develop an ecosystem in which agriculture, wildlife, and people occupy the same space—living and working in harmony. People, agriculture, and wildlife once occupied the same land, and they may need to share the same space again if we are to ensure sustainability.

The next fifty years represents a window of opportunity for humanity to move from "high-yield" agriculture to "high-sustainable-yield" agriculture. But, at the same time, we must move toward a sustainable global society. We must recognize that population, production, and consumption are all parts of the same whole, and all three must be managed simultaneously to ensure long-run sustainability. If we follow the "high-yield" strategy—managing global production to meet unrestrained population and consumption demands—humanity might well survive, possibly prosper, for another fifty years. But then, or at some time thereafter, humanity will find itself with too many people consuming too much "stuff," with a depleted resource base, and "without a clue" as to how to sustain itself for another fifty years. We simply can't afford to wait fifty years to get serious about sustainable agriculture.

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Avery Responds

■ When a critic begins by hurling "conservative" as an indictment, the

professional arguments are usually weak. So it is with Dr. Ikerd.

In particular, he faults my emphasis on saving the world's wildlands from being plowed down *during the next fifty years*. However, this is the critical period. If we do not save the wildlands from low-yield farming during this transition period of still-rising population and diet aspirations, they *will* be gone forever.

Even anti-population activists now agree that human population will peak at about 8.5 billion and then slowly decline. How, then, will Dr. Ikerd get the authority to force abortions and vegetarian diets in a world that is finding democracy the ideal and dictatorship oppressive?

Nor does Dr. Ikerd give us any practicable approach for making his low-input "solar" farming hugely more productive in the next three decades.

Let's lay aside the myth about "finite resources" versus "unending solar power." All agriculture is solar powered already. All farming systems also rely on nitrogen (from the air) and phosphate and potash (abundant in the earth's crust). The cheapest way to capture nitrogen today is with energy from natural gas that would otherwise be flared off as an oil by-product. If we needed to use hydro-energy or solar energy to get farming's nitrogen, we could. If we must spend the capital for hydrogen-powered tractors, we can.

But shifting to a "solar-powered" farming system that gets its nitrogen by plowing millions of square miles of forests for legume crops, instead of capturing nitrogen industrially, would be an environmental disaster.

If Dr. Ikerd is putting his faith in hunger to force minimal human lifestyles, be aware that experience shows that emerging societies will sacrifice their wildlands instead. If he is betting that farmers and researchers can somehow fulfill his fondest wish-dreams regardless of the constraints he applies, the rest of us should understand that his search for perfection is playing Russian roulette with our irreplaceable wildlife.

I am particularly distressed by Dr. Ikerd's wish-dream of crops, people and wildlife "harmoniously sharing the same space." I have thirty bluebird nesting boxes on my pasture fences, and five new Canada goslings on my pond. But, most of the world's declining species live in competition, not with high-yield farming, but with slash and burn subsistence farming. Ask the low-land gorilla if hungry people make good neighbors.

Wild creatures need and deserve to be wild. We now have the ability to protect the world's wildlands, but so far only with high-yield farming and forestry. Let's make sure we have Dr. Ikerd's high-yield, low-input, forever-sustainable farming system fully in hand *before* we throw away the most productive and sustainable farming system in history. As Hitzhusen and Davis correctly noted, saving wildlands from plowdown won't, by itself, preserve *all* of the earth's species. But what biodiversity conservation plan should not *start* with saving 20-30 million square miles of wildlands from low-yield farming?

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Hitzhusen and Davis Respond

■ Ikerd raises important questions of agricultural sustainability: the dependence of Avery's "high-yield" agriculture on fixed stocks of nonrenewable resources, primarily petrochemicals, and the potential segregation of agriculture, wildlife, and people in the proposed "high-yield" agricultural landscape. In general, we are sympathetic to Ikerd's concerns but are not convinced that he provides clear answers. Ikerd argues that the current sustainability controversy reflects conflicting belief systems, but it is more than beliefs. As evidence of this, Dixon and Fallon have counted twenty-six peer reviewed definitions of sustainability and group them into three categories: (1) a purely physical concept for a single resource such as a fishery where the rule is to use no more than the annual sustainable yield, (2) an ecological concept for a group of resources or ecosystems where individual resources can be enhanced, maintained, or degraded as long as ecosystem integrity is maintained, and (3) an environmental economic concept with emphasis on economic rationality and some minimal level of environmentally sustainable economic growth.

Ikerd raises an important issue regarding limitations imposed by Avery's dependence on petrochemicals, which will become increasingly scarce and costly in the next century. The other extreme, primary dependence on natural biological processes and animal power, also has major limitations, including draft animal consumption of food, which Ikert does not address. A key fact is that modern agriculture is not the primary culprit in fossil fuel consumption; 1984 use accounted for a mere 5 percent of global commercial energy use. Even as a minor consumer, high-yield agriculture will be increasingly impacted by the continued high consumption in other sectors. The challenge, therefore, is to find ways to utilize fossil fuels more efficiently in agriculture (52.4 percent is used to run farm machinery and 44 percent is used to make fertilizer) and elsewhere; encourage the development and use of alternative energy sources, preferably renewable sources, in all sectors; and develop integrated agricultural/ecological systems that make more use of natural forces and cycles. A key policy issue related to the first two challenges is marginal social cost pricing, that is, the internalization of externalities from fossil fuels as well as consideration of future user costs.

Ikerd also raises the question of time frame: "sustainability is about forever." While this "in perpetuity" time frame is generally accepted by ecologists, it does raise a problem for economists in determining discount rates. Is a private rate-of-time preference appropriate, and if not, how is social time preference to be determined? Norgaard and Horwarth argue that much of the confusion can be avoided if we separate intertemporal equity from efficiency concerns in discounting. The conclusion is that one does not discount where intergenerational transfers are made in

the name of equity.

Ikerd's suggestion that "sustainability may well require that we develop an ecosystem in which agriculture, wildlife, and people occupy the same space..." is appealing, but poses significant ecological, psychological, economic, political, and, of course, agricultural challenges. Space limits us to pointing out two ecological challenges: scale and pattern. At large scales such integration already exists; all three occupy North America, Ohio, even Franklin County, Ohio. But Ikerd is thinking about smaller scales. At what scale would Ikerd's system best function? And what about pattern? What should go where and who will make those decisions are important unanswered questions.

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A Return to the Land

■ I am heartened by Dennis T. Avery's article "Environmentally Sustaining Agriculture" and Fred Hitzhusen's and Craig Davis's response (*Choices* First Quarter 1997) followed by Avery's second quarter letter. Their exchange of views represents to me a desirable movement toward broader understanding and application of resource, environmental, and ecological economics than is usually seen. In its "big picture" breadth, their exchange has one of the chief virtues of the field of study known for many years as land economics, and this is a highly encouraging departure from the more recent trend toward overly specialized analysis of natural resource problems and policies.

Resource, environmental, and ecological economics devolve from the land economics of Richard T. Ely, George S. Wehrwein, Leonard A. Salter, Jr., Marion Clawson, and other formerly active economists of like mind. *Land* was the term used by early economists to refer to the totality of nature. Land economics placed broad emphasis on natural resources allocation to improve social welfare. Today's resource, environmental, and ecological economics too often tend to focus narrowly on environmental degradation and protection, with scant attention to resource allocation.

Ely conceived the field of land economics as "the relation of the different kinds of natural resources to the distribution and movement of population, standards of living, industrial development, distribution of wealth, property rights, national policies, and international relations." He urged integrated policies by national, state, and local governments, and business interests, based on facts supplied by scientific research, to maintain the proper balance between competing uses of natural resources.

Personally I'd prefer a return to Ely's concept of land economics, to regain the valuable breadth of this field of study. I hope that resource, environmental, and ecological economics will again become land economics in scope and practice, and perhaps even in name. Avery, Hitzhusen, and Davis have made an important contribution, and I congratulate *Choices* for publishing such a fine dialogue.

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Schmitz et al.'s "Canadian Wheat Board"

A comment

■ It's comforting to know that, in an era of increasing uncertainty, some things are still fully predictable. Double-breasted suits will cyclically come in and out of fashion, MASH reruns will be somewhere on TV daily, Larry Brown will change coaching jobs, and Andy Schmitz will periodically offer an analytically questionable apology for the Canadian wheat marketing system. In so many ways, Andy is among our profession's preeminent thinkers and writers. But this most recent *Choices* offering, "The Canadian Wheat Board: How Well Has It Performed?" reconfirms that when it comes to Canadian grain trade policy he remains an unrepentant neomercantilist.

I'll resist the temptation to nit-pick the specific findings of the Schmitz et al. analysis. Rather, I'll simply note that the Schmitz gang assumes that all relevant "performance" measures related exclusively to impacts on Canadian farmers. Their assessment judiciously avoids any discussion of international market distortions, benefits from competition, equity considerations, or resource allocations within and beyond Canada. It simplifies matters considerably when one understands that with sufficiently narrow definitions every trade-distorting arrangement can be declared a good performer.

I am also going to resist the temptation to note that Schmitz himself, as a Saskatchewan wheat farmer, has a financial stake in CWB and its performance with respect to price premiums, farm gate prices, market share, etc. To do so might lead some to suspect a mild case of conflict of interest, so I won't.

I read this *Choices* on a cold February day in Minnesota when winter seemed endless. After finishing the Schmitz et al. piece, I knew spring would indeed come. In fairness, I'll also thank Andy for his numerous contributions, which have clarified complex issues and contributed to our scholarly dialogue. While I don't think this latest effort meets his self-established standards, even Andy should be forgiven a bit of parochialism.

Thanks to Andy et al. for reminding us that in a world of variables there are events on which one can rely.

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"Economics and Pesticide Regulation"

Moore & Villerejo comment

■ In their article in this issue, Lichtenberg et al. defend their use of subjective estimates (see "Kentucky Windage," *Choices* Third Quarter 1996) to create a data base for economic analysis of pesticide regulation. Subjective data, they argue, is acceptable in scientific research because it reduces costs and allows for quick response time. We feel there is no place in scientific investigations where expediency and economy are more important than accuracy. A model cannot be validated if the data base is only per-

sonal judgment.

Lichtenberg et al. miss our point concerning the impact of industry structure on the flexibility to adjust to pesticide cancellations. The California/Arizona lettuce industry is ologopolistic. A very few large grower/shippers own or contract lettuce production in all the climatic zones of the region. They are diversified over time, place, and commodity; thus, they can shift production within and among production areas based on comparative advantage, minimizing the impact of any technological constraints.

The third area is the impact of pesticides on the environment. First, they state that no information is available on target pests. All applications for restricted pesticide use permits in California require reporting the commodity, pesticide, and the target pest. Second, they claim that "pesticide poisonings of farmworkers are rare." Doctors first reports of pesticide illness in California for the six years prior to cancellation of parathion averaged over twenty-two cases per year. Rareness is in the eye of the beholder. If you are working in a lettuce field when the crop duster comes over, you don't think in terms of "rare."

The statement, "partial information is clearly better than none" is also raised in defense. We would respond that partial information is valuable but only if it is accurate. In this case, we have demonstrated that it is not. What is the value of erroneous information?

The topic of EPA contracting only for analysis of impacts on food and fiber markets requires researchers to ignore the nonmarket impacts of the cancellation decision. This creates an ethics problem for the profession. Should we accept research funds knowing there are serious economic impacts to farm workers and the environment which we are not allowed to investigate? Is this a politicization of the academic research agenda?

In summary, our colleagues have attempted to justify use of an erroneous subjective data base, ignoring the original pesticide efficacy studies mandated by EPA which are a matter of public record. A wise person once said, "If you don't have time to do the job right the first time, when will you have time to correct it?"

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Findings Citations

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