

Sustainable Agriculture

Task Force Report

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Executive Summary

Chartered by the President's Council on Sustainable Development in 1994, the Task Force on Sustainable Agriculture was charged with articulating the key social, economic, and environmental challenges to be met in achieving a sustainable U.S. agriculture. The Task Force's mission was to identify and examine relevant issues and to make recommendations to the council for policy actions to be implemented by the public and private sectors.

To carry out its mission, the Task Force focused first on gathering information about barriers to and positive examples of sustainable agriculture-production practices and systems. At public roundtables in Chicago, Chattanooga, San Francisco, and Washington DC, and during field trips to farming operations, agricultural research facilities, and sustainable-farming demonstration sites, Task Force members sought comment from farmers, agricultural researchers, agricultural development and policy consultants, academics, natural resource specialists, agricultural extension personnel, agribusiness, state and federal agricultural agencies, and agricultural trade associations. The Task Force also sought assistance from an advisory panel, which was made up of experts from agriculturally related disciplines, backgrounds, and sectors.

The Task Force synthesized input from these sources into a set of four goals and nine policy recommendations. The first five recommendations are aimed at achieving environmentally sound and economically viable agricultural production; the sixth recommendation at revitalizing rural farming communities; the seventh recommendation at producing a safe and high-quality food supply; the eighth recommendation at encouraging research on integrating productivity, profitability, and environmental stewardship into the U.S. agricultural system; and the ninth recommendation at achieving international harmonization of intellectual property rights. These recommendations are designed to help achieve a sustainable U.S. agriculture.

Introduction

Agriculture is held in special regard by many Americans, because farmers, unlike other groups of producers, have played an integral role in the nation's development since its earliest days. Agriculture, of course, has value beyond that which people attach to it as part of the American heritage. The food and fiber produced by U.S. agriculture has contributed very significantly to the nation's economic growth. Agriculture's importance to the U.S. economy, as well as the special reverence in which family farms are held, suggest that agriculture's continued vitality is essential for the nation's future.

Because agriculture is so familiar a part of the American landscape and its products so abundant in the United States, we take the importance of its sustainability for granted. Whether agriculture will continue to meet the needs of present and future generations is not certain, however. It already faces several significant challenges.

Between 1950 and the early 1990s, the real (inflation-adjusted) prices of farm commodities dropped, while crop and animal production nearly doubled.[1] But the production of food and fiber has had negative impacts on the environment, including losses of plant and animal habitat and, as a consequence of runoff from farmers' fields, reductions in water quality. The costs of sediment damage have been particularly significant. A study conducted by the U.S. Department of Agriculture in 1989 estimated the annual costs of this damage to be between \$4-5 billion in the mid-1980s.[2] If these costs were charged against the farm income account, the performance of the agricultural sector would not appear as favorable as it now does. One major challenge for the U.S. agricultural sector, therefore, is to decrease environmental costs in ways that do not compromise productivity and profitability.

Another major challenge for the sector is to expand its markets so as to continue its growth and create greater wealth. To some extent, this expansion will depend on the design and development of foods with enhanced nutritional value as well as on the creation of new uses for agricultural products. But expansion also will depend heavily on global markets that are free from the influence of trade-distorting policies.

Agricultural research has played a major role in U.S. agriculture's increases in productivity and profitability. To meet demands for environmental protection and enhance its global competitiveness, U.S. agriculture will continue to need long-term, multifaceted, and interdisciplinary research. The

challenge will be to focus on public and private research, education, and technology development on integrating profitable agricultural systems and enterprises with stewardship of natural resources.

Yet another challenge is revitalizing the nation's rural farming communities. In recent years, the infrastructure of many of these communities has weakened considerably. Investments in this infrastructure and in rural enterprises that revolve around agricultural commodities that are produced in ways that protect and enhance the environment are needed to rebuild rural communities.

U.S. agriculture must be sustainable if the national goal of sustainable development is to be achieved. The importance of agriculture to this goal was recognized in January 1994, when the President's Council on Sustainable Development formed a scoping Task Force to identify issues relevant to a sustainable U.S. agriculture and to examine the best way of incorporating these issues into the council's national action strategy for achieving sustainable development.

Co-chaired by council members John Adams of the Natural Resources Defense Council, Rominger, Deputy Secretary at U.S. Department of Agriculture, and Richard Barth of Ciba-Geigy Corporation, the seven-member scoping Task Force sought advice from other council members and outside experts in carrying out this mission. On April 28, 1994, it held a symposium in Washington, DC, to develop a shared base of ideas and information for the group's recommendations to the full council. This meeting featured presentations by six experts from various disciplines related to agriculture who were asked to address the following questions:

What are the defining principles of sustainable agriculture?

To what degree has U.S. agriculture met, or failed to meet, sustainability as measured by its defining principles?

What is the importance of sustainable agriculture to sustainable development in the United States?

In what ways, if any, might the President's Council on Sustainable Development address sustainable agriculture?

The experts' responses to the third question confirmed that agriculture deserves prominence in the national discussion of sustainable development. On July 22, 1994, the President's Council on Sustainable Development unanimously voted to create a Task Force to find constructive ways to address

sustainable agriculture issues. The council chartered the Task Force on Sustainable Agriculture to develop a vision of agriculture that focuses on sustainable production practices and systems. The Task Force's mission was to identify and examine relevant issues and to make recommendations to the council for policy actions to be implemented by the public and private sectors. These recommendations were presented to the council for inclusion in its national sustainable development action strategy, which was forwarded to President Clinton in February 1996.

To carry out its mission, the Task Force focused first on gathering information about barriers to and positive examples of sustainable agricultural-production practices and systems. At public roundtables in Chicago, Chattanooga, San Francisco, and Washington DC, and during field trip to

farming operations, agricultural research facilities, and sustainable-farming demonstration sites in western Indiana, Task Force members sought comment from individuals-including farmers, agricultural researchers, agricultural development and policy consultants, academics, natural resource specialists, and agricultural extension personnel-and from organizations including agribusiness, state and federal agricultural agencies, and agricultural trade associations. The Task Force also sought assistance from an advisory panel, which was made up of experts from agriculturally related disciplines, backgrounds, and sectors.

To complete its mission, the Task Force synthesized the input from roundtable discussions, field visits, and its advisory panel, as well as from the April 28, 1994, symposium, into a set of goals and policy recommendations.

Chapter 1

Goals

The 1990 Farm Bill defined sustainable agriculture as "an integrated system of plant and animal production practices having a site-specific application that will, over the long term, satisfy human food and fiber needs; enhance environmental quality and the natural resources base upon which the agricultural economy depends; make the most efficient use of nonrenewable resources and on-farm/ranch resources; and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm/ranch operations; and enhance the quality of life for farmers/ranchers and society as a whole." [3]

The Task Force recognized sustainable agriculture as agriculture that combines modern technological innovation with proven resource conservation and food and fiber production practices to protect environmental quality, maintain and enhance profitability, preserve rural communities, and produce a safe and adequate supply of food for all members of the current and future generations. This definition is reflected in the goals that the Task Force articulated for a sustainable U.S. agriculture. These goals are set forth for the following four areas:

Stewardship

Management of agricultural activities to protect air, soil, and water quality, and to conserve wildlife habitat and biodiversity, thereby increasing agriculture's long-term productivity and profitability, as well as enhancing human health and well-being.

Farmers and Farming Communities

Achieve viable farmers and farm communities.

Food Supply

Production of a safe, high-quality, and affordable supply of food and fiber in a manner that protects and conserves natural resources.

Agricultural Research and Education

Creation of institutional incentives and funding arrangements that focus public and private research, education, and technology development on integrating agricultural productivity and profitability with environmental stewardship.

As these overlapping goals suggest, environmental quality, natural resource conservation, profitability, preservation of farming communities, productivity, and human health are all interrelated aspects of sustainable agriculture.

Chapter 2

Policy Recommendations

The Task Force reached consensus on nine recommendations. These recommendations are designed to achieve the goals that the Task Force outlined for a sustainable U.S. agriculture. Thus the first five recommendations are aimed at achieving environmentally sound and economically viable agricultural production; the sixth recommendation at revitalizing rural farming communities; the seventh recommendation at producing a safe and high-quality food supply; the eighth recommendation at encouraging research on integrating productivity, profitability, and environmental stewardship into the U.S. agricultural system; and the ninth recommendation at achieving international harmonization of intellectual property rights. The recommendations do not address all aspects of the stated goals; they are, however, bold first steps in accomplishing these goals.

Each recommendation is followed by a brief discussion of the concerns that inspired it and by yardsticks for measuring progress in meeting a particular goal. These indicators are not intended to be mandates for specific actions or policies.

Goal

Management of agricultural activities to protect air, soil, and water quality, and to conserve wildlife habitat and biodiversity, thereby increasing agriculture's long-term productivity and profitability, as well as enhancing human health and well-being.

POLICY RECOMMENDATION 1	
<i>Integrate pollution prevention and natural resource conservation into agricultural production</i>	Harmonize the pollution prevention and natural resource conservation policies of various federal, state, and local agencies to minimize conflicts among the policies that could undermine environmental protection. Link technical and financial assistance to farmers and ranchers to their voluntary implementation of farm- and ranch-specific plans for integrating pollution prevention and natural resource conservation into agricultural production. Renew and refine land retirement program to improve their cost-effectiveness, increase their conservation of natural resources, and enhance their ability to prevent agriculturally related pollution.

Discussion

Of the 1.9 billion acres of U.S. land, excluding Alaska, approximately 907 million acres are croplands, pastures, or rangelands.[4] The management of these agricultural lands can affect the quality of ecosystems and the condition of natural resources over a significant portion of the U.S. land base. For this reason, farmers and ranchers should be encouraged to control sediment carried in runoff from farms and ranches, use environmentally sound pest and nutrient management techniques, reduce consumption of nonrenewable energy, and take other actions that would preserve the health of ecosystems and conserve natural resources.

Because some federal, state, and local policies and programs relating to agriculture conflict with one another, they may actually undermine efforts to attain national and local environmental objectives and sustainable development goals, as well as inefficiently use public resources. To eliminate this conflict, all levels of government should review these policies and programs and work together to coordinate them. In doing so, they should invite nongovernmental organizations, such as university research institutions and agribusinesses, to help

identify policies that potentially hinder farmers and ranchers from protecting natural resources and preventing pollution. Successful collaboration will depend on the forging of strong partnerships among the U.S. Department of Agriculture (USDA), the U.S. Department of Interior, the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, state agriculture and environmental protection agencies, farm groups, universities, agribusinesses, producers' organizations, and other entities.

The USDA, in particular, should take several actions to promote environmentally sound agricultural practices. In addition to assessing whether its policies encourage sustainable agriculture and revising or eliminating those policies that do not, it should direct additional technical and financial resources to meeting natural resource and environmental protection goals, strengthen its soil and wetlands conservation efforts, and link participation in its farm programs to farmers' voluntary implementation of integrated farming systems (that is, systems that integrate pollution prevention and natural resource conservation into agricultural production). USDA also should develop projects to demonstrate integrated farming systems on both small- and large-scale farms and direct its research efforts toward promoting environmental protection and conservation of natural resources.

The government has an important role to play in resource conservation efforts relating to land retirement programs, through which agricultural lands are managed for environmental benefits by contracts or purchase of easements--with federal, state, or local funds, or some combination of these funds. These programs generate economic and environmental benefits for farmers and society as a whole. The economic benefits include reducing crop surpluses and federal budgetary outlays for crop subsidies. The environmental benefits--which derive from the restoration of wetlands and grasslands--include increased recreational opportunities, improved water quality and carbon sequestration, and the provision of habitat for wild plant and animal species. The Conservation Reserve Program, an existing land retirement program with enrollment at 36.4 million acres, has been credited with generating approximately \$8.6 billion in wildlife-related benefits alone.[5]

In the past, federal and state governments have designed many resource conservation programs from the top down, with inadequate local involvement. As a result, community priorities often are not heard or understood. To take these priorities into account in the implementation of conservation programs, the USDA has established state technical

committees. These committees--which include federal, state, and local agency representatives--provide an opportunity for stakeholders to establish environmental protection and natural resource conservation goals and criteria for meeting them, as well as an opportunity to develop guidelines for target cost-share payments. The USDA should encourage local environmental, consumer, agricultural, and other groups to contribute input to state committees' implementation of conservation and the environmental programs.

Indicators

The Task Force identified the following indicators of progress toward integrating natural resource conservation and pollution prevention into agricultural production.

- Conflicts in government policies relating to sustainable agriculture are resolved, and policies that discourage sustainable agriculture are revised or eliminated by the year 2005.
- By the year 2000, government agencies (particularly the USDA) implement programs to encourage the voluntary implementation of plans for integrating natural resource conservation and pollution prevention into farm and ranch operations.
- The interests of a broad range of stakeholders are represented on state technical committees.
- Violations of drinking water, surface water, and soil quality standards by agricultural practices decrease.
- Land retirement programs target environmentally sensitive, marginal croplands--including riparian corridors and wetlands--so that these lands can be set aside or managed primarily to preserve their environmental values.

POLICY RECOMMENDATION 2	
<p><i>Increase the flexibility for participants in commodity programs to respond to market signals and adopt environmentally sound production practices and systems, thereby increasing profitability and enhancing environmental quality.</i></p>	<p>Harmonize the pollution prevention and natural resource conservation policies of various federal, state, and local agencies to minimize conflicts among the policies that could undermine environmental protection. Link technical and financial assistance to farmers and ranchers to their voluntary implementation of farm- and ranch-specific plans for integrating pollution prevention and natural resource conservation into agricultural production. Renew and refine land retirement program to improve their cost-effectiveness, increase their conservation of natural resources, and enhance their ability to prevent agriculturally related pollution.</p>

Discussion

Commodity programs--through which the federal government supports prices for some crops--can distort market signals and prevent farmers from making the most efficient use of agricultural inputs and the natural resource base. As a result, the programs impose economic costs on farmers and environmental costs on the rest of the American public.

One restriction of commodities programs illustrates how these costs arise. "Base acreage" requirements, which specify the minimum number of acres that must be planted in one of the price-supported crops, encourage intensive monoculture. Therefore, the requirements discourage farmers from diversifying their crops in response to market demand and from optimizing their use of resources, which would promote environmental stewardship.

If commodity programs gave participants greater flexibility in their production decisions, farmers would be better able to manage their crops in ways that increase both profitability and environmental protection. Past experience indicates that farmers will take advantage of opportunities to do so. In 1990, Congress passed legislation that allowed farmers who had

signed up for a particular commodity program--for example, the wheat program--to plant some of their land in a crop other than that specified by the program. In response, farmers reduced the number of acres under monoculture and diversified their crops. By 1994, approximately 42 percent of the land on which farmers were allowed to grow whatever they chose was planted in crops other than those specified by the commodity program in which the farmers were enrolled.[6]

Congress should continue to enhance the flexibility of commodity programs.

Indicators

The Task Force identified the following indicators of progress toward increased flexibility in commodities programs:

- Congress continues to legislate reform of commodities programs to give farmers flexibility to manage their lands in ways that will increase both profitability and environmental protection.
- Farmers diversify production and optimize their use of resources--including land, water, fertilizers, pesticides, energy, labor, and equipment--in environmentally beneficial ways.
- Negative agricultural impacts on the environment lessen.

POLICY RECOMMENDATION 3	
<p><i>Expand agricultural markets</i></p>	<p>Pursue efforts to expand agriculture markets in order to increase demand for agricultural products, returns farmers and ranchers, investments in environmental protection, and conservation of natural resources. Support continued negotiations on international agreements that encourage more open global markets.</p>

Discussion

If farmers' revenues increase, they will have greater resources to invest in their farms, ranch and communities and in environmental protection and natural resource conservation. The keys to increasing revenues are controlling production costs and expanding agricultural markets.

Farmers already are highly motivated to control production costs, but they could use the assistance of the federal government in expanding agricultural markets. Working with the private sector, the federal government should explore the feasibility of revolving loans, repayable grants, or matching grants to conduct market research on, demonstrate the acceptability of, and promote the expanded use of agricultural commodities in existing domestic markets; find new uses for these commodities; and encourage the creation of businesses that utilize agricultural commodities as raw materials in new products.

The federal government also has a role to play in opening up global agricultural markets to U.S. farmers. As the global population grows and as demand for higher-quality diets increases in developing countries, American farmers must be in a position to compete for additional food-supply business. The government can help them by supporting continued negotiations on international agreements that discourage trade-distorting policies.

Indicators

The Task Force identified the following indicators of progress in expanding agricultural markets:

- Farmers' market share of commodities that are produced in an environmentally friendly way increases in international markets.
- New uses for agricultural commodities are found.
- Value-added, environmentally-sound agricultural industries and entrepreneurial initiatives increase.
- International treaties eliminate trade-distorting policies.

POLICY RECOMMENDATION 4	
<i>Revise the pricing of public natural resources</i>	Continue to move the pricing of public natural resources and their use toward market pricing, recognizing that there may be circumstances when investments are warranted for the public good

Discussion

Getting the prices of resources right is a fundamental tenet of sound resource management, yet policies that result in subsidies for the use of natural resources can provide decision-makers and resource managers with the "wrong" information regarding the value of those natural resources. Leases for the use of public natural resources--such as water, grazing lands, and forest lands--and sales of such resources, both of which sometimes amount to subsidies, illustrate one of the consequences of this wrong information. In drawing up contracts for these leases and sales and in calculating lease rates and sale prices, the government often neglects to include the full costs of making the resources available to the private sector or to consider the market prices of the resources. As a result, the government fails to recover the costs of resource use from the user.

Policies that result in subsidies for the use of natural resources can undermine sustainability because they can incorrectly signal that supplies of the resources are larger than is actually the case and because they do not reflect the rising demand for environmental values as per capita income increases. As a result, they often have supported overconsumption or low-value uses of natural resources.

To prevent natural resource policies from undermining sustainability, the government should identify and revise, where appropriate, those subsidies that encourage the use of renewable resources at a rate greater than is sustainable over the long term. In addition, in drawing up new contracts for the lease or sale of public natural resources, the government should consider the market prices of the resources and the full costs of making the resources available to the private sector. Finally, the government should recognize rising environmental values by conserving the use of public natural resources.

Indicators

The Task Force identified the following indicators of correct prices for public natural resources:

- The pricing of public natural resources moves toward market pricing.
- Long-term investments in conservation and stewardship increase.

POLICY RECOMMENDATION 5	
<i>Keep prime farmlands in agricultural production</i>	Keep prime farmlands in agricultural production by implementing (at the appropriate levels of government) rational land-use policies such as easement, zoning, taxation, financial incentive, transportation, and land development policies that reduce the encroachment of urban sprawl on prime farmlands and that otherwise seek to preserve the prime land base for U.S. agriculture.

Discussion

Highly productive or versatile farmlands are an important part of the natural resource base upon which the production of food, feed, fuel, and fiber depend. Stewardship of these prime farmlands, which include both croplands and grazing lands, is critically important to the country's economic, environmental, and social health and well-being. Yet several pressures, both internal and external to agriculture, threaten to convert prime agricultural lands to nonagricultural uses.

One of these pressures is urban sprawl. More than half of U.S. agricultural production, measured in dollars at the farm gate, comes from counties where the expanding urban fringe threatens prime farmland. Moreover, 30 percent of the nation's agricultural production comes from so-called Metropolitan Statistical Areas, where the human population exceeds 197.7 million, and 26 percent comes from adjacent counties with a population density of at least 25 people per square mile.[7]

Another pressure derives from the fundamental disconnection between the best use of land resources and the best use of

certain lands for agricultural production. As a result of this disconnection, the prime cropland is sometimes converted for housing and other uses, leaving less productive land to support future agricultural production, as well as supply certain aesthetic, cultural, and other values.

To prevent the loss of prime agricultural lands to nonagricultural uses, states and localities should make these lands the objects of farmland protection programs.

Indicators

The Task Force identified the following indicators of progress toward reserving prime farmlands for agricultural production:

- By the year 2010, states and localities identify their most strategic agricultural lands.
- By the year 2025, farmland protection programs protect these lands.

Goal

Achieve viable farmers and farm communities.

POLICY RECOMMENDATION 6	
<i>Invest in rural communities' infrastructure</i>	Help rural communities to capitalize on the economic benefits of sustainable agriculture by giving priority in rural business development and marketing programs to investments in enterprises associated with the products of sustainable agriculture. In addition, invest in rural communities' infrastructure.

Discussion

The economic viability of many rural counties and that of farms and ranches are closely tied. Main street businesses in rural communities depend on the spending power of nearby farms and ranches. In turn, these operations often depend on the services of local agricultural-input suppliers and local agricultural processing, distribution, and marketing

enterprises. Therefore, investments that support enterprises associated with the products of sustainable agricultural systems will help farms and ranches as well as rural communities to capitalize on the economic benefits of these systems.

Investments that directly support sustainable agriculture are not, by themselves, sufficient to curtail the exodus of residents from rural communities. To be healthy, rural communities must have at their base a solid infrastructure to support economic development. Therefore, federal and state rural business development programs and marketing programs should make investments in infrastructure that will help revitalize many rural communities--for example, investments in upgrades of bridges and roads and in modernization of medical, communication, and capital-lending systems.

Indicators

The Task Force identified the following indicators of increased investment in rural communities' infrastructure:

- The number of rural-based, value-added businesses that utilize the products of sustainable agricultural practices increases.
- Fewer unsafe bridges and roadways are found in rural areas.
- Local tax revenues and per capita incomes increase in rural areas.
- Unemployment rates decline in rural areas.

Goal

Production of a safe, high-quality, and affordable supply of food and fiber in a manner that protects and conserves natural resources.

POLICY RECOMMENDATION 7	
<i>Continue Improvements in Food Safety and Quality</i>	Assure continued improvements in the safety and quality of U.S. food products. Pursue international harmonization of food standards while maintaining the right of the United States to pursue its own high standards for food safety and quality.

Discussion

U.S. food products have long been among the safest and highest-quality food products in the world. Technologies that are being developed to reduce microbial contamination and to better monitor, sometimes on a continuous basis, the threat of microbial and bacterial contamination should enhance prospects for maintaining the safety of food products. Other technologies are improving food quality by making possible the development or design of food products that are more closely suited to the dietary needs of domestic and foreign consumers. These technologies could, in the future, lower the fat content of meats and increase the nutritional protein content of grains and the vitamin content of fruits and vegetables.

But food safety and quality does not hinge on technological advances alone; it depends significantly on government oversight of the U.S. food complex. To ensure continued improvement in food safety and quality, the USDA should assess grading and testing standards, monitoring mechanisms, and safety standards for their effectiveness in protecting public health. It also should expand programs that educate consumers about safe food-handling practices, strengthen programs that ensure the safety of food for children and other vulnerable subgroups of the population, and increase opportunities for a more varied and healthy diet -- especially for low-income families. Finally, the USDA should encourage the development and use of quick field tests for food safety and quality that can be used to assess compliance with microbial contamination and chemical residue tolerances.

Efforts to enhance food safety cannot be limited to the U.S. food system because the system operates in a global market

where the safety standards of some countries are lower than in the United States. Given this reality, the federal government should reinvigorate existing efforts to strengthen food safety programs in foreign food-exporting countries. In addition, as food standards worldwide are harmonized, they should be based on a scientific process that is transparent.

Goal

Creation of institutional incentives that focus public and private research, education, and technology development on integrating agricultural profitability and productivity with environmental stewardship.

POLICY RECOMMENDATION 8	
<i>Promote the research needed to support a sustainable U.S. agriculture.</i>	Develop institutional incentives and funding arrangements to promote research that shows how to integrate agricultural productivity and profitability with environmental stewardship. Where necessary, increase efforts to convey the latest research findings to local farmers and to educate them about the most promising new technologies and management strategies for achieving efficiency.

Discussion

Agricultural research has been responsible for substantial efficiency gains in agricultural production. Major advances in agricultural science and technology have helped farmers double and even triple and quadruple the per-acre yields of some crops since the mid-1930s. They also have assisted farmers in increasing the productivity of farm animals. For example, at the beginning of this century, a milk cow produced approximately 4,000 pounds of milk each year, whereas today it can produce more than 15,000 pounds over the same period.[8]

Looking ahead to the future, the need is for research that helps farmers and ranchers to be good environmental stewards while

they are increasing their productivity. In short, a sustainable U.S. agriculture will require research that focuses on integrating productivity, profitability, and environmental stewardship.

While both publicly funded and privately funded research have greatly enhanced the performance of agricultural producers in the past, two tendencies may diminish the potential contribution of research to the sustainability of U.S. agriculture in the future. First, agricultural research is often narrowly focused. Second, publicly funded research is conducted within the constraints of brief budget cycles.

Agricultural research tends to focus on individual aspects of agricultural production—for example, pest control, soil management techniques, or development of new crop varieties—rather than on whole production systems, including the ecological systems that are the settings for farming and ranching operations. Moreover, agricultural research tends to emphasize the insights of single disciplines rather than combining the expertise of multiple disciplines, including biology, chemistry, ecology, and economics. This narrow focus, which has evolved in response to institutional pressures for specialization, impedes the acquisition of knowledge that would enhance the sustainability of U.S. agriculture, particularly where environmental costs and values are concerned. To remedy this problem, the U.S. Department of Agriculture (in cooperation with the U.S. Environmental Protection Agency and the U.S. Department of the Interior) should take the lead in developing a plan to focus agricultural research on multiple aspects of agricultural production from the perspective of multiple disciplines. In doing so, it should seek input from universities, scientific societies, agribusinesses, grower organizations, and other organizations.

Agricultural research programs often operate on an annual budget cycle, requiring researchers to submit grant applications each year to continue projects. Because projects often require more than one year's work, they could lose funding before they are completed. To remedy this situation, the USDA should revise grant programs to make provisions for financial commitments of terms longer than one year. Moreover, when administrators of grant programs are deciding which projects merit such commitments, they should give priority to projects that include on-farm demonstrations of promising new technologies and management strategies for enhancing the sustainability of agriculture.

Of course, research serves little purpose unless it reaches the hands of those in a position to use it. The implication is that agricultural extension agencies should improve, if necessary, their efforts to convey to local farmers the latest findings of

sound, publicly funded agricultural research. In addition, agricultural research institutions that receive public funds should educate agricultural producers, to the extent that they are not already doing so, about the latest technological advances and most efficient management practices.

Indicators

The Task Force identified the following indicators of progress in generating the research needed to support a sustainable agriculture and in promoting education about promising technologies and management strategies:

- By the year 2000, USDA develops a plan to overcome institutional and funding barriers to multifaceted and multidisciplinary research.
- By the year 2000, USDA develops criteria to ensure that agricultural research proposals simultaneously address issues of profitability, productivity, and environmental protection.
- By 2010, a significant portion and, by 2020, a majority of publicly funded research administered by USDA addresses issues of profitability, productivity, and environmental protection.
- All applied research has a strong technology transfer and demonstration component.
- Research grants administered by USDA are allocated on a competitive, merit basis.
- Consumers, conservation groups, and other public interests are involved in USDA's decisions about which research to fund.
- USDA substantially increases its funding of research, including on-farm studies of sustainable production systems.
- USDA expands its cooperative research with academic institutions and nongovernmental organizations on perennial polyculture systems modeled on natural ecosystems.
- Non-USDA programs that provide federal funding for agricultural research and extension programs begin assessing proposals for their relevance to sustainable agriculture.

POLICY RECOMMENDATION 9	
<i>Pursue international harmonization of intellectual property rights.</i>	Pursue international harmonization of intellectual property rights in order provide incentives for the development of new agricultural technologies. Support the objectives of the International Convention on Biological Diversity in order to conserve genetic resources and protect intellectual property rights.

Discussion

Given the food and fiber demands projected for the 21st century, development of ever more advanced technologies for increasing agricultural productivity is critical. But this productivity cannot jeopardize biologically diverse ecosystems. In the long term, the sustainability of U.S. agriculture depends on both new agricultural technologies and efforts to conserve biodiversity and genetic resources globally. Intellectual property rights are key to the development of these technologies and the success of these efforts.

Recent trade agreements, notably NAFTA (North American Free Trade Agreement) and those agreements reached during the Uruguay Round of GATT (General Agreement on Tariffs and Trade), have imposed new guidelines for the protection of intellectual property rights. As these guidelines are implemented and adopted by additional countries, the U.S. government should work to ensure that they maximize benefits for genetic resource conservation and sustainable agriculture. In addition, the U.S. government should help to structure and implement the intellectual property provisions of trade agreements and other international treaties in ways that protect the interests of indigenous peoples whose long-standing knowledge of biodiversity resources has helped fuel innovation and development in multibillion dollar industries, including agriculture, but who often have not been compensated for sharing this knowledge.

Indicators

The Task Force identified the following indicators of the influence of intellectual property rights:

- A plan providing incentives for the countries to adopt genetic-resource conservation provisions is developed by the end of 1996 and reflected in U.S.

agricultural, trade, and foreign policies shortly thereafter.

- The United States ratifies the Convention on Biological Diversity and leads efforts for its implementation worldwide.

Endnotes

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