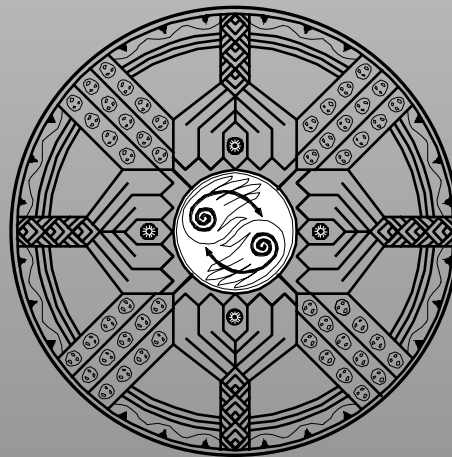


Focusing Sustainable
Development on
Agriculture

Sustainable Development for the Great Plains
Policy Analysis

Allen Tyrchniewicz
and
Art Wilson



IISD INTERNATIONAL INSTITUTE FOR
SUSTAINABLE DEVELOPMENT

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PREFACE

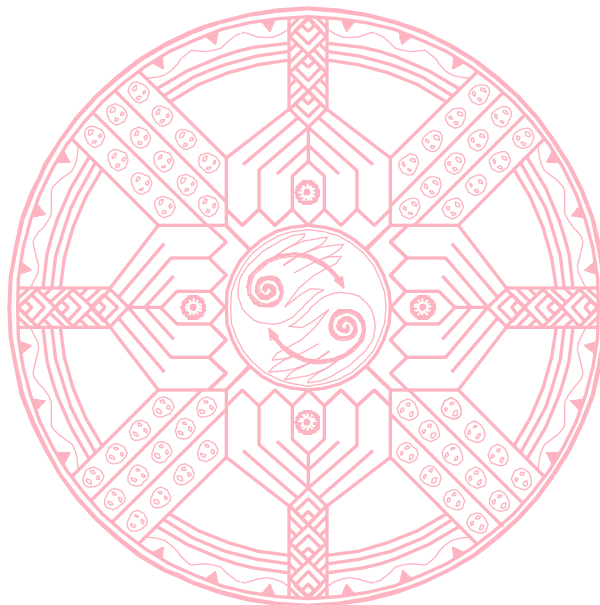
Sustainability within the Great Plains Region of Canada is in question for several reasons. The issues affecting sustainability include current patterns of land, water and biological resource use, the well-being of smaller communities, changes in international trade policies, and the approach of both public and private sector investment.

A redesign of policies which affect agriculture has a major role to play in the transition to sustainable development. These policies are already under intensive scrutiny. It is essential that current reviews be informed by principles of sustainable development if we are to link ecology, economics and social factors in a satisfactory fashion.

IISD believes the Great Plains is an ideal case for examining how government policies can work for or against sustainability. We are seeking relatively simple tools to understand and screen current policies and to assist in the identification of alternatives. This report is the first of efforts to examine agriculture and sustainable development. We hope to continue this work on both sides of the 49th Parallel, since the issues affect both Canada and the United States.

This study has benefited greatly from the efforts of our Great Plains Advisory Group and from inputs of many others. We look forward to building on this very collaborative effort.

Arthur J. Hanson
President and CEO
International Institute for Sustainable Development



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EXECUTIVE SUMMARY

Environmental law and regulation are important but cannot alone be expected to deal with the problems of environment and development. Prices, markets and government fiscal and economic policies also play a complementary role in shaping attitudes and behavior towards the environment.

United Nations Conference on Environment and Development

Today, the sustainability of agriculture is being questioned as a result of developments both within and outside the Great Plains region. These range from land use practices, chemical pesticide use, to waste management. Many of these developments result from the influence of government policy on agricultural practices. For this reason, government policies should be assessed with respect to sustainable development to ensure the sustainability of the Great Plains.

IISD establishes a framework to analyze the consistency of government policies and programs with sustainable development. The analysis leads to recommendations for change in policy where required. Application of the framework is intended throughout the Great Plains region and other similar semi-arid agriculture regions in the world.

Existing prairie agriculture has been molded by government policies. Development of the prairies reflects the national policy adopted following Confederation with its component parts of railways, tariffs and prairie settlement designed primarily to further national objectives. The course of development also was influenced by the physical environment. Major initiatives are required to overcome its effects and also those of the export markets to which much of the agricultural output of the region is directed.

Technology has increased the economic size of the farm unit and subsequently placed pressure on rural communities by reducing employment opportunities within agriculture. Those communities which survive are taking on some urban characteristics. Community development programs must therefore address both rural and urban concerns to be successful. These concerns include the availability of

quality education, health facilities, housing and other essential services. The major challenge arising for rural communities as a result of changes in technology becomes how the opportunities and challenges for growth can be met without losing the attractions which have led farm people and other rural residents to prefer country life.

Careful attention is given to the development of an analytical methodology for sustainable agriculture. The adopted definition of sustainable agriculture is "one that enhances environmental quality and the resource base on which agriculture depends, provides for basic human food and fibre needs, is economically viable and enhances the quality of life for producers and society as a whole." Measurement of sustainability is rendered complex by the differing views of economists and ecologists, though both professions are interested in achieving sustainability. Nonetheless, appropriate tools for measurement have evolved over time.

The relationship between the costs and returns of agricultural practices is important for sustainability. Resource prices determined in the market place as well as those which have to be derived by other means must be taken into account when determining production costs from the standpoint of sustainability. Techniques for estimating the values of resources not priced in the market, such as air and water, are put forward so that these values can be included when determining total production costs.

A definition of sustainable agriculture, while useful, is inadequate for evaluation of policies, because of its limited explanation. A set of principles for sustainability is, therefore, developed along with their associated criteria. The principles are categorized as those

regarding stewardship which include management, conservation and rehabilitation; those regarding economic viability which include market viability, internalization of costs, scientific and technological innovation, and trade policy; and social concerns including societal considerations and global responsibility. These principles and their associated criteria are cast into an evaluative framework.

Merits of the framework are evaluated by using it to assess the compatibility of four policies with sustainable development. In the case studies, the primary policy instrument adopted is evaluated according to its impact upon sustainable agriculture. The policies analyzed are those instituted under the *Western Grain Transportation Act*, the *Farm Products Marketing Agencies Act*, the *Prairie Farm Rehabilitation Act* and the *North American Waterfowl Management Plan*, the respective primary instruments being subsidy, supply management, contracts and financial incentives. Each of these policies are described in order to illustrate the application of the primary instrument utilized.

Each instrument and policy is assessed assuming all other current programs remain in effect. Subsidy as applied under the *Western Grain Transportation Act* is found to be inconsistent with sustainable development. While the proposed changes to the Act would render the application of this instrument more acceptable, the modified policy could not be considered consistent with sustainable development. Supply management as exercised under the *Farm Products Marketing Agencies Act* with respect to eggs is found neutral to or consistent with some of the principles of sustainability while being inconsistent with others and on balance is found not supportive of

sustainable development. The contract instrument as utilized under the *Prairie Farm Rehabilitation Act* with respect to the Permanent Cover Program is found to be consistent with sustainable development. The financial incentive instrument as used under the *North American Waterfowl Management Plan* is found to be consistent with sustainable development, this Plan being an illustration of what can be accomplished by international dedication to a common cause.

Many valuable suggestions were received during the course of the two workshops held in connection with this study. Submissions received from other commentators also added materially to the analysis. These inputs assisted in development of the framework as a powerful tool for the evaluation of existing or proposed policies from the standpoint of sustainable agriculture. This leads to the recommendation that the framework be applied when assessing policies or proposed policies for consistency with sustainable agriculture.

There is evident need for agriculture to become more sustainable. Government policies should encourage development of practices which are sustainable or lead to sustainability in agriculture. There is increasing interest in developing policy options which will maintain or improve ecological services, particularly in view of the perception that individual existing policies appear inconsistent with these objectives.

The adopted definition of sustainable agriculture is "one that enhances environmental quality and the resource base on which agriculture depends, provides for basic human food and fibre needs, is economically viable and enhances the quality of life for producers and society as a whole."

FOCUSING SUSTAINABLE DEVELOPMENT ON AGRICULTURE

Challenges to the sustainability of prairie ecosystems include a combination of ecological, economic and societal issues. The linkages between these issues are not fully taken into account in current decision making. The issues range from the impact of subsidy programs, uncertainty in international markets and future demand, the need for land and water conservation, the protection of habitat, and the potential for climatic change effects even greater than those experienced over the past hundred years.

Sustainability Concern: Land Use

While land is a critical resource for agriculture it is also a critical resource for the environment and for society. Settlement on the prairies substantially modified the prairie landscape as large areas of grasslands were cultivated, resulting in destruction of habitat for some wildlife, and creating new habitat for others. While the primary use of the land has been for grain, other pressures are now being exerted on the land base, arising from the desire for land to be used for recreational purposes and urban housing. Restoration of the land as habitat for wildlife can be complementary to agriculture. Diversion of some of the land now used for grain production into pastures for the production of livestock can also be positive for the sustainability of agriculture.

The Great Plains was chosen as a case study in sustainable development because it is on the front lines of the battle to reconcile agriculture, environment and rural well being. Agriculture is a primary factor of sustainable development within this region, supplying food to people in many parts of the world.

To examine agriculture without including other activities of the Great Plains, such as habitat for wildlife and social issues, would lead to incomplete conclusions about sustainable development. An appropriate focus therefore is sustainable development of the Great Plains. This includes land, water, ecosystems, rural communities, and the economic activities

which maintain their well being. This study is exploratory and selective, outlining how we might examine policies affecting development in the Great Plains from a sustainability perspective. We have restricted ourselves to Canadian policies in this preliminary analysis. The work is focused on creating a methodology applicable in Canada, the United States and elsewhere.

A number of problems regarding the sustainability of agriculture on the Great Plains have been identified. These include: land use; degradation of prairie soil resources; preservation of biodiversity; water use and quality; common property; economic situation; social problems on the plains; impacts of trade on sustainability; federal and provincial policies; and the potential impact of global change. These issues are outlined in further detail in the sustainability concern boxes within the text of this document. While the list of issues is not considered to be complete, it does contain those which are of major importance while also indicating their diversity.

Perhaps one of the greatest effects on sustainable agriculture is government policy, since producers react to agricultural policies to ensure good returns from production. Some policies were developed for previous conditions on the prairies and are not practical today given the current concerns for the environmental and budget deficits of the federal and provincial governments.

Few agriculture policies have been assessed from a sustainable development standpoint. If more sustainable agricultural practices are to prevail, environmental, social and economic impacts must be factored in when formulating policy.

Producers face many challenges when modifying current production practices. Modification, however, becomes more feasible when there are tangible economic, social and ecological benefits. Change is essential, for example, if the soil resource is to be maintained and local business and the infrastructure supported. Desirable change can be advanced by national policies, “sustainability” budgets, and by trade agreements consistent with sustainable development on the Great Plains and elsewhere in the world. This is not an easy task as many policy makers are restricted in their ability to modify policies that are intended to reach over many ministries. It will require cooperation throughout all levels of government to reach the desired results. An understanding of the factors that affect economic viability, agricultural production practices, resource use, social well being and ecological resilience is a prerequisite to the design of policies, budgets and agreements for sustainable agriculture and rural development.

The intent of this report is to examine the cause and effect relationships in agricultural ecosystems and thereby act as a catalyst in the formation of policy consistent with sustainable development. What is required now is to focus on means by which they may be addressed. Guidelines are required for the formulation of policies to achieve this end and for modification of existing policies.

Given the diversity of the issues facing the Canadian prairies, it's necessary to develop a method to review these problems against the government policies and programs affecting this area. By evaluating and modifying the major

policies with respect to sustainable development, this problem of conflicting policies and programs could be eliminated. This would result in more sustainable signals being sent to producers as well as reduce government expenditures. The following section outlines a method that can provide policy-makers with a tool to help understand the impacts of the policies; and where these policies are promoting or working against sustainable development.

Sustainability Concern: Degradation of Prairie Soil Resources

Soils are degraded primarily by erosion, loss of organic matter, salinization and acidification. Soil erosion has taken place as a result of cultivation, and originates from two causes, wind and water. Both result in the removal of the finer soil particles leading to compaction and poor soil tilth while reducing productive capacity. The annual losses in productivity, due to soil erosion, are valued in the millions of dollars, while in aggregate the total loss in productivity on the prairies is valued in the hundreds of millions.

Another factor affecting productivity of the soil is the decline in organic matter, the primary constituents being carbon and nitrogen. In natural ecosystems the amount of carbon entering and leaving the soil is in balance. This balance has been affected by cultivation.

Salinization of dryland agricultural soil is a major problem in southern and central regions of Saskatchewan and Alberta with over 2 million hectares being affected resulting in production losses valued in excess of \$100 million annually. Soil acidification also reduces the productivity of the soil resource. Acidification becomes a factor where cultivation has been extended into previously forested areas and through heavy use of nitrogen fertilizer.

FRAMEWORK FOR EVALUATING SUSTAINABLE AGRICULTURE

The need for a framework within which to formulate policy has been identified as an important challenge by various stakeholders, particularly those involved in the policy area. Such a framework could contribute to the

development of policies that would promote sustainable development in the Plains and other regions. The framework proposed in this study is an attempt to respond to the challenge. The evaluative framework can be used to assess existing policies as well as provide guidance in the formulation of new policies and thereby avoid implementation of any policy not consistent with the sustainable development of agriculture. What is required for the framework to be operationalized, is principles for sustainable development and criteria for determining whether or not policies are sustainable.

To evaluate a policy or program's effectiveness for sustainable development, it is necessary to review the program. Figure 1 illustrates the evaluative framework in the form of a flowchart. Reviewing the program at the onset of the assessment allows the evaluator to understand which policy instruments are adopted and how they are used. It is important to understand the policy before preceding to the next step, as many of the features of the policy would not be evaluated correctly.

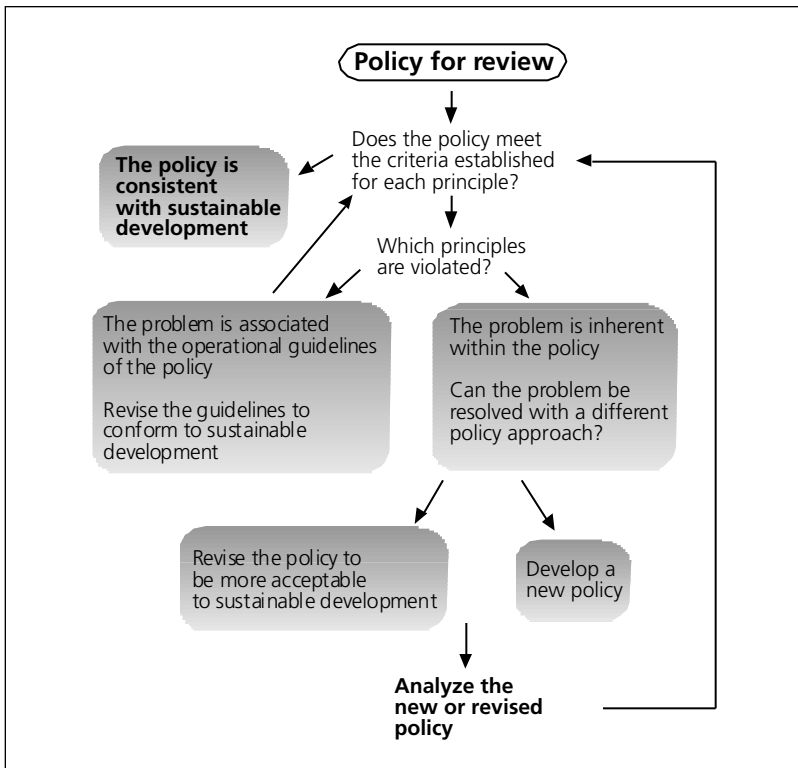


Figure 1. Evaluation Framework

Sustainability Concern: Preservation of Biodiversity

Biodiversity is an indicator of environmental health. It is not possible to ensure a constant level of biodiversity at a particular location over time. Biodiversity is considered essential for the resilience of ecosystems. Resilience enables ecosystems to return to a steady state after being subjected to an unusual event. Highly diverse ecosystems help maintain hydrological cycles, regulate climate, contribute to the process of soil formation and maturation, absorb and break down pollutants and provide sites for inspiration, tourism, recreation and research. While nature has built-in redundancy there is need to at least maintain biodiversity by maximizing the number of species conserved in sufficient numbers to assure survival. Conservation of biodiversity seeks to maintain the human life support system provided by nature and the living resources essential for development.

The factors contributing to the decline of biodiversity include: agricultural policies, regional development plans, institutional structures, world trade, characteristics unique to the rural economy and the world view prevailing in rural areas.

The next step is to evaluate the policy against each principle of sustainable development. This is accomplished by comparing the policy to each criteria within the principles. While it is unlikely that a policy can meet each criteria, this does give an indication of the policy's consistency with sustainable development. By having a good understanding of the policy, this evaluation can indicate whether a problem exists with the policy itself or the operation of the policy. This is critical to the assessment, as it suggests whether the operation of the policy can be modified to meet sustainable development guidelines or the policy needs to be changed. Reviewing the need for the policy is beneficial when the problem is the policy.

After making the necessary changes to the operation of the policy or the policy itself, the policy is reviewed again. This ensures that the changes are improvements. Ideally, this would repeat until the policy meets the criteria of all the principles, resulting in a policy which is consistent with sustainable development.

Selection of an appropriate instrument or instruments is critical to the effectiveness and success of any policy. Among the important factors to be considered when selecting are: economic benefits; environmental effectiveness; international competitiveness; distributional impacts; transition and adjustment costs; administration and compliance costs; jurisdiction; consistency with other government policies; and industry and public acceptability. In the past, it was difficult to include all of these factors in policy design.

The following section outlines principles for sustainable agriculture and why they are important.

Sustainability Concern: Water Use and Quality

Water is in short supply on the prairies since, on average, annual precipitation is less than the evaporation rate. Furthermore, surface water is unequally distributed. In addition, good quality water is only part of the total supply available and can be adversely affected by some agricultural operations.

Agriculture is the largest user of water in the prairie region. Approximately 88 percent of water used for agriculture is for irrigation with the remainder accounted for by livestock. The net pay-off from most water storage projects has been positive, many being multipurpose in nature and providing water supplies for power generation, municipal use, recreation, and wildlife habitat as well as for irrigation.

Sustainable agriculture depends upon an adequate supply of water. Greater scrutiny of water pollution by agricultural operations is required along with increasing concern for the maintenance of wetlands.

Sustainability Concern: Social Problems on the Plains

Rural communities are under stress. The substitution of capital for labour on the farms results in the out-migration of farm people. There are fewer potential customers to be serviced by local towns and hamlets. Improved roads have allowed rural dwellers to exercise their progressively urban tastes by traveling to larger centres having a greater variety of goods at competitive prices. This has major implications for the provision of local services. The decline in rural communities bears a relationship to the sustainability of agriculture. Continued depopulation of local communities can only be stemmed by greater opportunities for employment in rural areas.

PRINCIPLES FOR SUSTAINABLE DEVELOPMENT IN AGRICULTURE

Principles for Sustainable Development:

Management

Conservation

Rehabilitation

Market Viability

Cost Internalization

Scientific and Technological Innovation

Trade Policy

Societal Consideration

Global Responsibility

The discussion thus far has lent substance to the concept of sustainable development in agriculture but has not described the specific details of what constitutes sustainable agriculture. This requires the establishment of a set of principles which will create a better understanding of sustainable agriculture and bring the concept to a measurable state. These principles should have application as well to sustainable development of which sustainable agriculture is a component. The principles identified below have been vetted by professionals from the agriculture, environment, economic and social sectors. They address environmental stewardship, economic viability and social concerns. Figure 2 illustrates the process used to develop the principles and criteria.

IISD prepared a set of draft principles based on the research of the Great Plains project team. Key stakeholders of the

Great Plains then received these principles in the form of a discussion paper. IISD held a workshop to bring the key stakeholders together for a review of the discussion paper. The suggestions from the stakeholders were then incorporated into the working principles. The criteria for each principle were developed using the same approach.

STEWARDSHIP

Management

Our sojourn here is limited. During this period there exists both an individual and a collective responsibility to sustain the environment for both our own and future generations. Economic and social activities should be undertaken in such a fashion as to maintain and preferably enhance the capacity of the resources available for the benefit of future generations as well as our own.

Conservation

The need to maintain biological diversity should be further explored while strengthening essential ecological processes. Non-renewable resources must be used wisely. A balance must be maintained between the use of resource and the economic and social effects on society. The major renewable resource in agriculture, the soil, must be protected so that its inherent productivity is maintained.

Rehabilitation

Where renewable resources such as the soil have been damaged, effort must be expended for rehabilitation, to the extent feasible, so that original productivity is restored or preferably increased recognizing that this may be possible only over the long term. It is recognized that lack of adequate care has contributed to soil degradation on the prairies. The destruction of habitat which has occurred

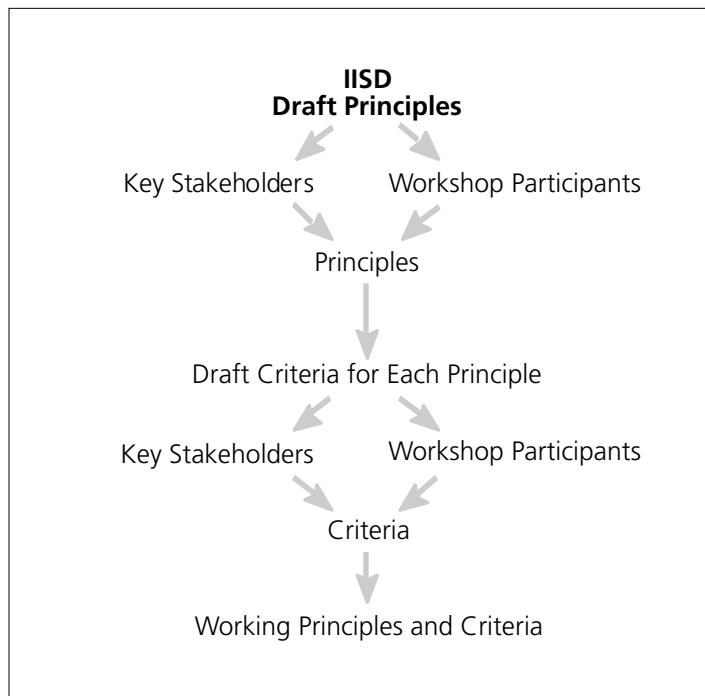


Figure 2. Principles and Criteria Design Process

must be mitigated. Where the quality of water has been impaired by inappropriate practices, the causes should be removed so that the original quality may be restored.

ECONOMIC VIABILITY

Market Viability

Production cannot be sustained unless it is economically viable. Such viability requires that the net returns from marketing are positive. Unless such returns are adequate within a region, producers cannot be expected to continue to utilize their available resources for this purpose. The net returns from production should enable an adequate standard of living to be maintained while at the same time being sufficient to continue to attract replacement operators.

Cost Internalization

In our society, certain production inputs and outputs are not priced in terms of their real value. Examples include the air we breathe and the carbon dioxide absorbed by plants. Furthermore, the by-products of production in terms of their environmental damage or enhancement are not necessarily subject to a monetary penalty or premium. What is required is that the real costs of both presently considered "free goods" or "undervalued goods" be incorporated into the total costs when determining the net returns of production. Such costing, for example, will include the value of any net loss or gain in soil nutrients as a result of crop production.

Scientific and Technological Innovation

Research to enhance the development of technologies which contribute to the maintenance of environmental quality and economic growth must be supported. Such support should extend to the

provision of educational services which will further the research program while at the same time maintaining social and cultural values. Coincident with this should be maintenance of human health. Improvement of the efficiency of production is now an objective of research, but the development of research institutions and markets in order to capture the externalities associated with production is required. Means to ensure that the results of the research are effectively communicated to farmers also are necessary.

Trade Policy

Barriers to trade can create impediments to the achievement of sustainability. Consequently, trade liberalization is an important component of progress toward sustainable development. In addition, such liberalization leads to greater international efficiency in production. As a result, true comparative advantage should be an objective of trade policy. This implies recognition of the real costs of production and therefore the maintenance of environmental integrity. For example, exports of wheat should be made only where the real costs of production are less than the prices available in the world market. On the other hand, unsubsidized imports of sugar from developing countries should not be reduced as a result of internal price support schemes. An open approach to trade is necessary. Such a stance requires a degree of international cooperation not yet experienced. Nonetheless, trade policy should support and augment the degree of cooperation achievable through international trade agreements.

SOCIAL CONCERNS

Societal Consideration

Economic activity should minimize social costs while maximizing social benefits. At

the same time, it should not detract from human health and cultural resources or the quality of land and water. Cultural and social diversity should be respected. In agriculture, a balance must be struck between the size of production units consistent with technology and a social structure acceptable to all stakeholders including those providing the infrastructure.

Sustainability Concern: Common Property

A number of “free” goods such as air and water are used in agricultural production. Misuse or abuse of these goods may arise because they are “free”. The impact of agricultural use of these public goods increases the tension between producers and other sectors of society. Unless values are attached to these “free” or public goods the true cost of production is not taken into account. For example, excess water may be used in irrigation as a result of government subsidies, which obscure the true cost of providing irrigation water.

Global Responsibility

Ecological interdependence exists among nations as there is no boundary to our environment. Stakeholders in the maintenance of the environment are therefore not necessarily local. How the local environment is treated ultimately impacts on other parts of the world and can be expected to haunt those guilty of its mistreatment. For example, excess use of fossil fuels with the attendant production of carbon dioxide and other contaminants, unless accompanied by appropriate means for their absorption, will impact unfavorably on the environments of other nations.

There is a responsibility on the part of all nations to “think globally when acting locally”. In agriculture, for example, cropping practices should be adopted which minimize the contaminants produced while providing sinks for those which are created.

There is a continuing need to merge environmental considerations with those of economics in decision making at the local, national and international levels in order to provide equitable solutions to problems. For agriculture, this implies provision of technology, where appropriate, to assist other nations in overcoming their problems.

At the same time, social and cultural differences must be respected while attempting to improve the human condition. There remains a moral responsibility to ensure developing nations have an adequate supply of food. This does not necessarily imply that they should be given food but rather that, they be enabled to produce their own supply, if possible.

The principles can serve as benchmarks for the evaluation of policies and the instruments used to render the policies effective. While other organizations also have provided principles to sustainable agriculture, none have gone the next step, which is to make them usable. Measurable variables are required so assessments of policies and their instruments can be undertaken.

CRITERIA FOR SUSTAINABLE AGRICULTURE

The usefulness of the principles is enhanced by identifying the criteria for sustainable agriculture inherent within each principle. A particular policy or instrument can be appraised according to whether it is consistent with these criteria recognizing that any particular policy or instrument will only satisfy a limited number of the criteria even though it may conform to the majority of the principles. The criteria will assist the undertaking of reviews of particular existing or proposed policies and instruments from a standpoint of sustainability.

The criteria for each principle are provided below.

Management

- maintain the integrity of ecosystems
- enhance the (quantity and quality) flow of services from the resource base for present and future generations
- provide for integrated (shared) resource management

Conservation

- promote efficient use (consumption) of all resources, both renewable and nonrenewable
- maintain biological diversity
- provide habitat for wildlife and plants both on land and water
- optimize use of land for sustainability

Rehabilitation

- restore the productivity of a degraded resource
- apply waste management principles (reduce, reuse and recover)
- promote complementary production systems
- promote closed production systems where appropriate
- replace degrading processes with others that are beneficial
- revitalize the resource

Market Viability

- reduce trade barriers
- ensure economically efficient use of resources
- assure a sustainable income
- promote sustainable human economic activity
- be sensitive to the supply and demand of the market
- remain unbiased to commodities and mode of transport
- enhance value added activity

Cost Internalization

- ensure full environmental costing
- include all costs associated with economic activity
- plan for contingent valuation where costs can not be internalized
- encourage use of natural system economic accounting (inclusion of resources and externalities in system of national accounts)
- encourage beneficiaries of externalities assessed appropriate costs

Scientific and Technology Innovations (R&D)

- enhance air, water and land management
- ameliorate waste management
- increase productivity
- reduce consumption of non-renewable resources
- promote technology transfer
- advance biotechnology
- promote technologies that utilize yet preserve native ecosystems
- promote technologies to further environmental quality including human health and economic growth
- develop industries benign to environment

Trade Policy

- maintain or enhance resource base of different trading regions
- apply true comparative advantage
- promote international market responsiveness

- increase value added exports
- ensure consistency with trade agreements
- support trade agreements which recognize externalities

Societal Considerations

- promote gender equity
- enhance human health & education
- preserve aesthetic values
- ensure water quality and quantity are available for alternative uses
- look at alternative options for employment (adjustment programs)
- maintain and/or enhance food quality, safety and quantity
- ensure societal neutrality (does not privilege one group over another)
- protect agriculture from urbanization
- increase productive capacity of the poor
- promote fairness and equity in resource allocation for commercial and recreational purposes
- provide an acceptable quality of life & livelihood
- be sensitive to objectives/goals of local people and communities
- respect human rights

Global Responsibility

- recognize interdependence among nations
- promote intra and intergenerational equity
- encourage food health and safety
- assist in emergency food aid programs
- technology transfer - research and development
- promote fairness and equity in income distribution and trade

Analyzing policies and programs using the framework along with the principles and the criteria established, provides the means for evaluation (Figure 3). The evaluation should provide the decision-maker with information about the effectiveness of the program and where improvement is required to be sustainable. The evaluation must supply the decision-maker with checks and balances to ensure the appropriate policy is implemented and the concerns about economic, environment and social aspects are considered.

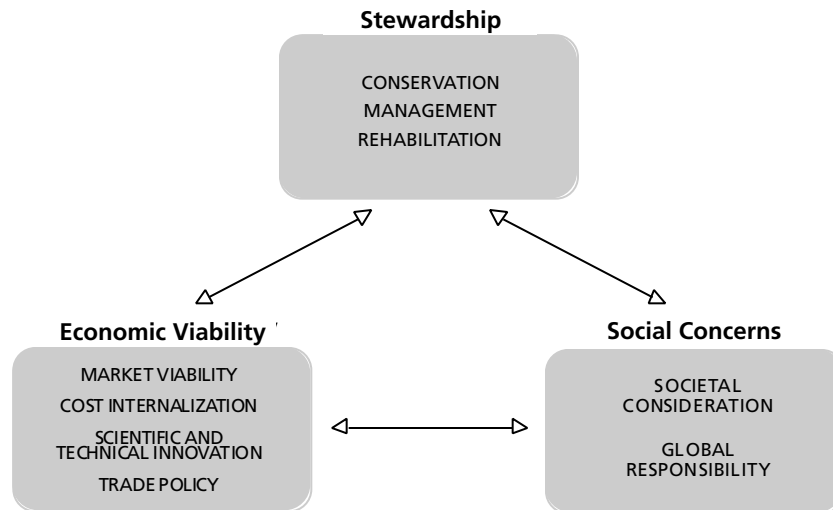


Figure 3. Interactions of Criteria

APPLYING THE FRAMEWORK

The effectiveness of the framework in the evaluation of policy was tested by applying it to assess the primary policy instrument used within each of four policies/programs. These included subsidy under the current Western Grain Transportation Act as well as the changes proposed; supply management as applied to eggs under the Farm Products Marketing Agencies Act; contracts as used in the Permanent Cover Program under the Prairie Farm Rehabilitation Act; and financial incentive as adopted under the North American Waterfowl Management Plan. Assessments of the use of each instrument for compatibility with sustainable agriculture follow.

The Western Grain Transportation Act

While the method of payment of the grain transportation subsidy inherent in the Act has been subjected to intensive economic analysis, its impact on sustainable agriculture has not received the same degree of attention. The subsidy is evaluated below in terms of its consistency with the principles of sustainability.

Management

The subsidy encourages the production of “grain” for export. It stimulates production of grain on both good and marginal land. The marginal land in grain production will degrade unless carefully managed. Good stewardship of large areas of marginal grain production land implies a return of the land to a permanent cover, such as grass. This could give rise to an increase in the livestock population with the benefit of returning additional nutrients to the soil. The subsidy, however, effectively promotes a grain monoculture which has a negative effect on resource management. The subsidy does not

encourage individual producers to adopt conservation practices consistent with good stewardship of resources for future generations.

Conservation

The subsidy does not encourage optimum use of land since the economics of production are distorted by decreasing the costs of grain transportation. The subsidy can be considered detrimental to the maintenance of habitat for wildlife and biological diversity of the region, because the land utilization is converted to a grain monoculture. Marginal land for grain production also requires a greater use of inputs such as fertilizer to provide a sufficient return to the producer. Since lack of moisture is one of the causes of land being marginal, cropping in moisture deficient areas is associated with summer fallow which can be detrimental to the land depending on the tillage program adopted. Summer fallow can also contribute to secondary salinity and to erosion by wind and water in the absence of careful management. There is nothing in the subsidy which can be considered positive for such land management.

Rehabilitation

The subsidy as applied does not promote rehabilitation of the land. Since a grain monoculture is encouraged, livestock production and other operations which could assist in rehabilitation is effectively discouraged. The subsidy does not promote a complementary production system, such as flour mills, ethanol plants or livestock operations, which adds value to the product. Instead, the subsidy promotes the export of grain as a raw material. Degrading practices are not replaced by those more beneficial as a result of the subsidy nor is there any policy incentive given to revitalizing a degraded resource such as the soil.

Overall Assessment of the Western Grain Transportation Act

The subsidy as presently directed under the Western Grain Transportation Act has been shown to have deleterious effects on sustainable agriculture. Its application is inconsistent with the principles for sustainability. There are major externalities associated with the present method of payment, such as the negative impact on other farm production and the overuse of the rail transportation system. Such externalities have stimulated a search for a method of payment which will support sustainability. The review underway is expected to result in legislative action which will render the method of payment of the subsidy more supportive of sustainable development.

The subsidy designed to support development has its roots in the political process. Gradual withdrawal of the commitment began with the passage of the

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Sustainability Concern: Impacts of Trade on Sustainability

Agriculture accounts for approximately 7 percent of the total value of Canadian exports, much of which comes from prairies. In recent years the prices received for grains and oilseeds in the export market have been depressed by the predatory tactics of other exporters. As a result of completion of the GATT negotiations, grain and oilseed producers will be slightly better off as predatory tactics of other exporters are suppressed to a degree. Dairy and poultry producers have lost the right to restrict imports other than by means of tariffs. The dispute settlement mechanism will be positive for trade as will the general reduction in tariffs and non-tariff barriers. Substantial change will be required in some agricultural policies. The relationship between trade and sustainable development is illustrated by grains and oilseeds. Trade and pricing practices of trading countries encourage exports with little regard for the attendant pollution and deterioration of the soil resource. If all the costs of production are taken into account including these externalities, the attendant reduction in trade would be beneficial to sustainable development in the exporting as well as in some of the importing countries. However, placing limits on trade is unlikely the most efficient means of addressing the externalities.

Western Grain Transportation Act, which provided for an increased contribution by producers to the cost for rail transportation of grain from the prairies. The current review process represents a continuance of this trend while promoting sustainability.

The returns from grain production on the prairies are being adversely affected by the agricultural and trade policies of other

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Market Viability

The subsidy as applied essentially promotes interprovincial trade by reducing the economic deterrent associated with the cost of movement of grain eastward as far as Thunder Bay. In addition, excess use of the transportation system is encouraged. This being made particularly evident by the degree of grain moving to one port and then to another as a result of the less than full cost rail transportation rates in effect. On the other hand, the subsidy can be said to enhance the incomes of those shipping grain for export since they do not pay the full cost of shipment.

The subsidy distorts market signals as it applies to a particular set of products and not to others. It does not contribute to an economically efficient use of resources since the economics of production are tilted toward “export grain”. Production of “export grain” is encouraged relative to

livestock and other products not falling within this classification. The subsidy is of course not transportation neutral with respect to all commodities. At the same time an increase in value added activity is discouraged for those processed products not qualified to move at “export grain” rates.

Cost Internalization

No provision is made under application of the subsidy to internalize costs. Significant externalities can be expected arising as the result of the continuation of grain production in otherwise marginal areas. Such externalities can include land degradation, loss of habitat for wildlife, an increase in the incidence of salinity, and erosion by wind and water.

Scientific and Technological Innovation

The subsidy can be considered neutral with respect to this principle. While much research has been conducted on the use of marginal land and much innovation taken place in equipment design and manufacturing for use on such land, this has not been motivated by the subsidy¹. Indeed, the effect of the subsidy has been to discourage the application of some research findings. The subsidy therefore has not been conducive to initiating research into alternative forms of production. Use of otherwise marginal areas for grain production gives rise to a greater handling and transportation requirement, because more infrastructure is required.

Trade Policy

The subsidy as applied is essentially an export subsidy on “grain”. While some “grain” used domestically moves at the reduced rates arising from the subsidy, the volume is minimal in relation to that moving for export. The subsidy is therefore not “green” (being an export

subsidy) in terms of the GATT and its application will have to be changed. It is inconsistent with comparative advantage between countries and indeed between regions within Canada. In the process, international market signals are distorted since the prices at the farm gate are increased as a result of the decrease in transportation costs.

The subsidy has the effect of deterring increased value-added activity on the prairies as it only applies to a limited number of products. The economics of production are biased toward grain rather than other farm products, such as livestock, the latter having the potential to add significantly to the export of value-added products. In fact, even with the deleterious effects of the subsidy, exports of livestock and livestock products are significant. In total, the subsidy must be considered negative with respect to current trade policy, as it is an export subsidy.

Societal Considerations

The subsidy has some social impacts. The funds represent a transfer of resources from general taxpayers to those shipping “grain” for “export”. Such a transfer gives rise to questions regarding both fairness and equity in income distribution. The subsidy appears to be based more on political considerations rather than on equity. Non-recipients of the subsidy can legitimately argue that the subsidy detracts from equity since it privileges by legislation one group in society over another and indeed one group in agriculture over another. At the same time, since grain production is encouraged, potential opportunities for employment in the production and processing of livestock are foregone. This has implications for the sustainability of local communities. The extensive form of agriculture encouraged by the subsidy can

be expected to affect the prairie landscape. Other issues of interest to society, such as the health and safety of the food supply, will not be affected directly. However, there will be a relatively greater availability of grain than other food products as a result of the subsidy. In the process of farming, the marginal areas encouraged by the subsidy, less habitat for wildlife is maintained and this detracts from the range of recreational opportunities available. The subsidy adversely affects employment opportunities on the prairies, value-added activities being effectively discouraged. This has a detrimental influence on rural development.

exporters. While a new GATT agreement has been reached, there is no guarantee that true comparative advantage in the world market will prevail in the short run. In the long run, an end to the so called “grain subsidy war” may occur because of the need to develop sustainable agriculture².

Sustainability Concern: Federal and Provincial Policies

Government agricultural policies are designed to address real or perceived problems in agriculture. Unfortunately federal and provincial legislation does not necessarily have a common thrust. Federal emphasis is on grain production in the prairies and livestock production elsewhere, while provincial emphasis is on local issues. Some income support programs are general in nature, covering a range of commodities, while others support one commodity at the expense of another, and therefore are at cross purposes. While much attention has been given to the impact of policy on sustainable agriculture, modifications remain slow.

Global Responsibility

Since the subsidy encourages greater production of grain than would otherwise be the case, the increased volume has to be marketed. This affects grain producers in other parts of the world. Any reduction in price arising from the greater supply on the world market (ignoring of course the distortions caused in the international market arising from the export subsidy activities of others such as the European Economic Community and the United States) can be expected to be a disadvantage to producers in other parts of the world. Furthermore, grain is often used as a component of Canada’s food

Sustainability Concern: Global Change

The accumulation of radiatively active gases (greenhouse gases) in the atmosphere, such as carbon dioxide, has the potential to cause global warming. Uncertainty prevails as to what climate changes will result as the concentration of these gases from the combustion of fossil fuels increases. While agricultural operations contribute to the production of these gases, their contribution to total output is minimal. Plants respond to the increase in these gases with higher rates of photosynthesis and lower evapotranspiration rates. The effects of the potentially higher temperature on prairie crops and rangelands remains a matter of debate. The unfavorable effects of these temperatures on other agricultural areas of the world could be expected to increase the demand for prairie products thereby minimizing any adverse effects on prairie agriculture.

aid. While gifts of food in the form of grain can be useful in offsetting famine, some gifts of grain can be detrimental to producers in the recipient countries. Consequently, the subsidy has implications for fairness and equity in trade and indeed indirectly for income distribution on the world scene. On the other hand, the transfer of Canadian grain technology to other parts of the world can be said to be independent of the subsidy.

The Proposed Modified Western Grain Transportation Act

Support for the subsidy as presently applied has not been unanimous on the prairies. Livestock producers in particular have recognized its detrimental effects on their industry. As a result of their agitation and the need for more efficient use of government funds, the Minister of Agriculture initiated a review with the objectives of removing the biases in the Western Grain Transportation Act and introducing efficiency measures. Such measures include:

Lifting prohibition orders on abandonment of high cost, low-volume grain dependent branch lines. National Transportation Agency approval will still be required before lines are abandoned. Lines, which were only protected until 1999, will

now be eligible for alternative service funding until 2001 or 2003. The freight-rate provisions will be changed to remove biases and encourage port neutrality. Other freight rate changes will also help Canadian railways and ports compete with other grain carriers.

Maximum freight rates will continue to be regulated by the National Transportation Agency but railways will be allowed greater flexibility to offer incentive rates to producers, which will improve efficiencies and reduce costs.³

The producer panel established will make recommendations for a modified program under the Farm Income Protection Act whereby payments would be made to producers of grain and other agricultural products produced in the designated (Canadian Wheat Board) area who would be affected by the proposed amendments to the Western Grain Transportation Act and the Canadian Wheat Board Act.

When developing the program the Panel is to take into account the following principles:

1. The program should be compatible with Canada's international obligations.

Overall Assessment of the Proposed Modified Western Grain Transportation Act

The changes in the method of payment of the subsidy inherent in the proposed changes in legislation would render the subsidy more consistent with the principles for sustainable agriculture. However, payment of a subsidy has negative

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2. The program should encourage long-term environmental and economic sustainability.
3. The program should not unduly influence the decisions of producers of agricultural products with respect to production or marketing.
4. The program should encourage adjustments with respect to production or marketing so as to improve the effectiveness of the responses of producers to market opportunities.
5. The program should provide for the allocation of funds in a manner that takes into account the effect of the higher freight rates resulting from transferring funds from the railways to producers, within an up-dated pooling regime on producers of grain and other agricultural products.
6. If program funds transferred from the Western Grain Transportation Act are distributed in a broader fashion than just to prairie grain producers for higher freight rates, the program should become part of the national safety net programming for agriculture, treating producers across the country in a similar manner.⁴

The changes in the method of payment of the subsidy arising under the proposed modified Act, would render the subsidy more consistent with sustainable agriculture.

The ultimate package of the changes which are made will be based on political as well as economic and other considerations. It is nonetheless assumed for purpose of analysis that all the changes necessary to conform to the principles established will be made. This includes the introduction of cross compliance in the interest of “long term environmental and economic

sustainability” and a phase-in of the new method of payment of the subsidy. Cross compliance requires producers to meet certain environmental guidelines in their production practices before they can receive payment from the program. Given the above assumptions the impact of the subsidy on sustainable agriculture will be briefly reviewed below. It should be recognized that the politics of the issue may give rise to a method of payment of the subsidy significantly different from that proposed.

Management

Management of the resources used in agriculture can be expected to improve particularly with the introduction of cross compliance. It can be expected that there will be greater integration in the use of resources. For example, marginal lands now used for grain production can be expected to be converted to some form of livestock production, given the improvement in the economics of livestock production versus that of grain production. Retirement of land to grass in the marginal areas will contribute to the maintenance and indeed the enhancement of the resource base for future generations.

Conservation

The modified subsidy should promote a more sustainable use of land as a result of the assumed change in the method of payment. With lands now marginal with respect to grain production being sown to grass or other forms of permanent cover and with the associated encouragement for greater livestock output, the potential for preservation of soil and water quality is greatly increased. At the same time, the additional acres in grass and wetlands can be expected to improve wildlife habitat. There is no inherent encouragement from the subsidy for maintenance of the genetic stock or biodiversity other than

connotations for sustainability.

While the method of payment issue is expected to be settled in a manner consistent with sustainability, continuance has been shown to depend on politics. Payment on an annual basis will incur substantial administration costs. This raises the issue, particularly in the light of recognition by the government of an obligation, of why this obligation (or so-called Crow Benefit) would not be discharged by a lump sum payment, such as represented by a bond, in which the value of the subsidy is capitalized⁷. If the obligation is real, then it appears reasonable that it be paid out as a lump sum to avoid future administration costs.

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The argument that the deficit would be increased by such a course appears speculative since the bonds could have alternate maturity dates. Payment in such a fashion would greatly encourage adjustment in prairie agriculture and render it more sustainable while at the same time providing the means for producers to be sustainable.

that associated with increased acreages in grass.

Rehabilitation

The increase in grassland is expected to increase livestock production on the prairies and will lead to enhancement of existing soil quality. There is no assurance that the assumed method of payment of the subsidy will have any impact on whether proper management is adopted in dealing with the increased output of animal waste. Grain and livestock production on the prairies have been complementary from the time of settlement and the initial degree of complementarity may be restored. Thus any soil degradation associated with a grain monoculture will be somewhat mitigated, but it does not necessarily mean that rehabilitation of the land will occur in all areas.

Market Viability

The long term viability of any industry cannot depend on continued provision of subsidies regardless of how judiciously applied. The assumed method of payment will, however, encourage a more efficient use of resources even though the full impact is to be delayed for five years. Responsiveness to the market will be restored as the subsidy becomes one of income rather than export support. In addition, the former bias between transportation modes will be greatly reduced and also the bias for the movement of the different products produced on prairie farms. At the same time, the bias against value-added activity is removed. There will be no impact on existing barriers to interprovincial trade.

Cost Internalization

There is nothing in the method of payment which will lead to internalization of cost. The externalities associated with increased livestock

production may merely offset the forecast reduction in the externalities associated with grain production.

Scientific and Technical Innovation

The more diverse nature of agriculture encouraged by the assumed method of payment of the subsidy may not necessarily encourage greater innovation. However, researchers in the field of sustainable agriculture on the prairies will be encouraged to see greater adoption of the practices so long proposed but discouraged by the current method of payment. As a result, they can be expected to redouble their efforts in this regard.

Trade Policy

The assumed method of payment of the subsidy qualifies for “green” status under the GATT agreement. While the funds distributed actually become additional income to producers on the prairies there will be a modest, if any, impact on true comparative advantage in trade. Market prices at the farm level will directly reflect those attainable in the world market for those products exported. Consequently, there can be expected to be greater responsiveness to the world market on the part of producers. The increased livestock output arising from the assumed method of payment will lead to an increase in the volume of value-added exports.

Societal Considerations

Greater value-added activity implies that opportunities for employment will increase to the benefit of local communities. Nonetheless, the subsidy is not neutral between members of society as it applies only to prairie agricultural producers. There will be little if any effect on the incidence of poverty since the payment is related to the productivity of land and not to particularly needy

individuals. It should be recognized, however, that diversion of the subsidy away from a reduction in the rates charged for moving grain to a general payment not directly related to grain movement, will have a major impact on land values. The associated reduction in the returns from grain can be expected to cause a fall in land values. This will be borne by the owners of land. Since this is the case, the subsidy should be paid to land owners, the inference being that land rents will fall accordingly⁵. From society's point of view, payment of the subsidy assumes those in agriculture have particular needs. This continues to raise questions as to the impact on the fairness and equity of income distribution because of the payments of tax dollars to selected producers. No impact on food, health, or safety can be expected even though the balance between the supply of livestock products and that of grain will be affected.

Global Responsibility

In a global sense, the assumed method of payment will have negligible if any effect on income distribution nor will there be any contribution to food, health and safety or intergenerational equity. To the extent that the supply of grain may be reduced, there will be less pressure to sponsor aid shipments where these would be detrimental to producers in the recipient countries⁶. A degree of fairness in world trade in grain would be restored, the extent of which is predicated on the actions of other exporters. The method of payment has no impact on the transfer of grain technology to other countries.

Supply Management for Eggs

Before proceeding to an assessment of supply management as an instrument affecting sustainable agriculture, some

general comments on the effect of supply management and its associated components is useful. Given that the opportunity to exercise supply management under legislation is unique to "agriculture", it is not surprising that this has been subject to intensive scrutiny. Initially, marketing board legislation designed to redress the perceived imbalance in bargaining power between producers and subsequent operators in the marketing chain was the prerogative of the provinces. Since the legislation did not allow producers in a province to extend control to the national market, they agitated for the control made available under the Farm Products Marketing Agencies Act. In theory, the desire was to maintain the operators of "family farms". However, the reduction in the risk associated with production arising as a result of the legislation, in combination with the economies associated with size, has resulted in a decline in the number of participating producers. This has been confirmed by statistics.

Several authors have commented on the operation of agencies exercising supply management. Typical of their comments are those published by Forbes et al⁸ and those published by the Growing Together exercise⁹. The regulation applied is said to render production of the supply managed commodity a profitable venture, whereas previously returns were either inadequate or depressed. In addition, returns have been rendered more stable. While the decline in the number of producers has continued, production and marketing systems remain firmly in the control of producers. Vertical integration of the processing industry and production has been thwarted. Production remains primarily a "family farm" enterprise.

Overall Assessment of Supply Management for Eggs

In summary, supply management of itself has a limited impact on stewardship, including management, conservation and rehabilitation. The effect on market viability is mixed, being positive to producers and negative to consumers raising the question of whether supply management is sustainable over the long term. There is little or no influence on internalization. Certain features of supply management do provide an impetus for technological innovation. With respect to trade policy, supply management must be considered detrimental. Benefits are provided to a limited number of producers whereas the costs are spread over society, inflicting an added burden on the poor. With respect to global responsibility, supply management has a negative influence. On the whole, supply management is not

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consistent with sustainable agriculture.

This assessment points to the dilemma faced by policy makers with respect to supply management. There are benefits to the few drawn from the revenues provided by the many. Some less interventionist means should be developed to accomplish the stability of returns provided by supply management. To accomplish fairness and equity, an income policy is suggested and this should be sustainable.

Warley¹⁰ has expressed concern over the implications for international trade because of supply management regulations. He argues that the regulatory process should be made more accountable through transparent decision-making and by provision of policy directives written specifically for regulatory agencies. These should make the local industry more competitive. He also suggests that quotas be transferable by auction, that individual production quotas be increased to capture economies of scale, and that dual quotas be established to permit efficient producers to produce at lower or unregulated prices for competitive markets.

Particular attention has been focused in the past on how the cost of production formula is derived. The existing process is said to require upgrading to approximate more closely the real costs of efficient producers. The existing formula appears to indicate costs in excess of those actually incurred. Furthermore, higher than justified prices reduce consumption, thus deterring achievement of economies of scale. All improvements in productivity should be recognized and at least some of the benefits allowed to accrue to society generally.

Veeman¹¹ outlined consumer concerns with respect to supply management. She presented data to support the premise that the prices established exceed the operating costs of efficient producers. In addition, consumer subsidy equivalents as a result of supply management are substantial. Since the supply managed commodities are basic foods not luxuries, the artificial price increases arising from supply management represent a regressive tax on consumers. People in the lower income groups are more adversely affected than those in the higher income groups. She also expressed concern over

both the production quota levels and the import quota levels. Furthermore, rigidities in the pricing procedures adopted are not in the interest of consumers. Rigidities in the adjustment of quota allocation between provinces balkanize provincial production and limit interprovincial trade. She argued that supply management systems should emphasize management rather than restriction.

The various critiques provided concerning supply management emphasize the desirability of enhancement of productivity and the allocation of quotas consistent with the principle of comparative advantage between provinces. Some provincial commodity boards are much more forward looking in this regard than others. The Manitoba Egg Producers Marketing Board, for example, has fostered development of a highly competitive processing industry and supports reallocation of quotas in relation to comparative advantage.

The above discussion provides background which should be of assistance when assessing supply management as an instrument affecting sustainable agriculture. Some of the procedures adopted to support this concept appear inconsistent with the principles for sustainability. These are identified in the assessment provided below.

Management

Supply management has little if any influence on maintenance of the resource base for future generations or indeed the maintenance of genetic diversity. Any impact on land, water or air quality must be considered minimal. Any large scale units which develop under supply management can have a negative impact on soil, air and water quality but this is

not directly related to this instrument. On the other hand, the restraint on output may provide a greater impetus for minimizing use of inputs in order to maximize net returns. The supply managed commodities in Canada are those which involve limited use of land since they are normally produced in a closed environment. Poultry production largely has become a housed enterprise, whether for broilers, turkeys or eggs. Such commodities lend themselves to integration directly, such as broiler and egg operations combined into one production process or by contract, where an egg producer might supply a broiler operation with chicks. Consequently, efficiency in use of resources is expected.

Conservation

Any influence of supply management on conservation largely relates to the limitation on output. When comparing supply management production of a commodity with the same commodity under the “free” market, less is liable to be wasted with supply management. Since production of these commodities occurs within a restricted area using a limited land resource, preservation of air quality in the microclimate becomes difficult with the concentration of waste. The manure produced when spread can preserve the soil. However, this activity does not necessarily arise from supply management. Likewise, land is used sparingly but this is more a function of production process than supply management. Any impact on maintenance of the genetic stock and biodiversity will be minimal. This instrument can be said to be neutral with respect to provision of habitat for wildlife.

Rehabilitation

Supply management as an instrument has little to offer in terms of rehabilitation.

On the other hand, the methods of production followed for the currently supply-managed commodities support the principle of rehabilitation. Integration in some poultry production plants is effectively complete. About the only inputs from the outside, other than labour, is a portion of the feed supply. Some operations have become so integrated that all the product produced, broilers for example, is so processed that all items other than the dressed bird are recycled for use in production process of subsequent generations. The concentrated nature of production requires use of good waste management, if only for the control of disease. Other aspects of the rehabilitation principle are not impacted, including restoration of degraded resources. Producers need to apply new technology to the production processes, to ensure that any degrading processes previously adopted are replaced with those more sustainable.

Market Viability

Several aspects of supply management are not compatible with this principle. While the stated intent of the Act is that there will be free movement of the products regulated across provincial borders, this has not in fact occurred. Supply management has given rise to a lack of responsiveness to market needs. One of the criticisms of supply control expressed during the Growing Together exercise was that the agencies exercising this power failed to take advantage of new market opportunities. In addition, quality of product was said to suffer due to lack of outside competition. The pricing arrangements of agencies engaged in supply management have been such as to account for transportation costs between markets. These differentials apply between the provinces which are in deficit and those which are in surplus. Therefore, at least in theory, pricing is

neutral with respect to transportation. Efficient use of resources is encouraged due to supply management. The objective being sought is maximization of net returns. Waste generation should also be expected to be kept to a minimum. Supply management is not conducive to value-added activity since producers obtain their returns essentially from the raw product.

One of the objectives of supply management is an acceptable level of income to the producer. This objective has been attained only for a limited number of producers. Since this is artificially obtained (rather than through the free market), the long term sustainability of such income can be questioned. On the other hand, stability of income has been enhanced under supply management.

Production of the products now under supply management would be sustainable regardless of whether it is in effect. For those benefiting it appears more sustainable with control present. However, much more could be done to render production more competitive in the world market.

Cost Internalization

Supply management of itself does not encourage internalization of cost. The pricing formula merely incorporates the costs actually experienced by the producer and does not account for any externalization costs. As a result of supply management, there are additional costs imposed on those who have no quota to produce as well as on consumers, the latter aspect being discussed in terms of another principle.

Scientific and Technological Innovation

Improvements in air, water and land management that have occurred in supply

managed production result more often from the adoption of new techniques as in disease control and feed preparation than from supply control. The same applies to advances in waste management. In poultry production, one of the main forms of waste is the dead birds which must be disposed of with minimal impact on the environment.

The factor of production on which the quota is based to control output can have a major impact on animal (bird) productivity. Eggs provide an excellent example. The quota for eggs is based on the number of hens. Consequently, above average output per hen effectively increases the quota for the producer by whom this is achieved.

The concentrated production units in the poultry industry under supply management have an incentive to increase labour productivity since labour in addition to feed is a prime source of expense. As a result, production units are highly mechanized with new applications of automation continuing to be developed. Supply management does not encourage technology transfer to other areas, though producers of the same product emulate the innovators and early adopters.

Trade Policy

Supply management may be judged inconsistent with the principle of trade policy. It is in this area that much of the criticism of supply management has been focused. Regardless of the terms of the Act which call for the application of true comparative advantage in trade, support for this concept is neither uniform nor general among the agencies. In fact some provincial agencies actually endeavour to thwart, through legal action, achievement of comparative advantage. Agencies which have comparative advantage are therefore not in a position to capitalize

on their position. Increasing pressure is being applied to give greater recognition to comparative advantage when allocating provincial quotas. Further progress along this line is anticipated. With regard to international trade, the exercise of true comparative advantage is thwarted by the high domestic prices resulting from supply management.

One of the major criticisms of supply management is that it has fostered inward looking industries. In no case has this criticism been more real than during the Growing Together exercise. Under supply management the export market is used only as a safety valve to absorb excess supply at the world price. Since prices at which the product is sold in the export market have to be competitive, sales into the export market are subsidized.

Amendments to the Farm Products Marketing Agencies Act support promotion of products into the export market and encourage local production to be more competitive. It is said that the quality of product desired in the export market has not been forthcoming due to complacency brought on by favourable returns from the limited domestic market.

Supply management has not lent itself to the export of valued-added products. One reason for this is that agencies have not usually engaged in processing. For years processors have contended that if they are to compete in the export market they must have access to raw material at the same price as their competitors. Only reluctantly have some agencies responded to this request while others have been supportive.

An exception was made under the previous General Agreement on Tariffs and Trade (GATT) for the use of import restrictions for a product subject to within-country supply management.

Much attention was given to Article XI of the agreement during the Uruguay Round with Dunkel proposing to have it replaced by tariffication which will occur in 1995. Provision in GATT also is made for application of supply management under the Canada United States Trade Agreement (CUSTA), although the gradual removal of duties on processed products weakens supply management as presently exercised.

Societal Considerations

Due to the predisposition of agencies adopting supply management to be inward looking, many opportunities for expansion in trade are overlooked and in the process potential employment lost. The restriction on the quantity available to the market directly affects consumers, even though food health and safety are not influenced. Under the Act, producers of supply-managed commodities are given immunity from legal action under the Competition Act, a privilege not extended to any other group in society. The additional farm income generated provides the means whereby producers of the product can bid for land on a competitive basis with others in society, thereby providing some degree of control over urban encroachment.

The elevated prices in the domestic market serve to increase poverty among the poor who require these basic products in their diets. At the same time, the incomes of producers are increased. This raises questions concerning equity in the distribution of income. Are a few producers to benefit at the expense of others in society less favourably situated than themselves?

Global Responsibility

Supply management is not consistent with global responsibility. Intragenerational equity is affected due to

the need for quotas to produce, the cost of this being high. Capitalization of the benefits into the value of quota increases the costs of production of new entrants. Over time this increases prices given application of the formula. For the supply managed products little surplus is available to provide international food aid. This instrument also has detrimental effects on world income distribution since trade is largely thwarted at present. Developing countries who could export similar products are largely unable to compete in countries where supply management prevails and their attempts in this regard are thwarted. Supply management is therefore found wanting in the global context.

The Permanent Cover Program (PCP)

The purpose of the PCP is to reduce soil deterioration on high risk lands presently in annual cultivation. These lands are not suited for the growing of annual crops and should be permanently converted to forage and/or tree cover. The program is directed toward lands where annual cultivation is causing long term soil damage and where special farming practices cannot reduce the ongoing deterioration. By maintaining these lands in permanent cover, the soil resource will be conserved while providing feed for livestock and habitat for wildlife.

An assessment of the contract instrument, as used in the PCP, in terms of its consistency with the principles for sustainable agriculture appears below. The PCP is a program of the Prairie Farm Rehabilitation Administration (PFRA).

Management

The contract instrument of the PCP promotes enhancement of the resource base for intervening years. The time

horizon is however limited to either 10 or 21 years. There is no provision for an extension of these time periods at present though retirement to forage or trees for either of these periods may be expected to result in a permanent change in production practices. The instrument as used in the program can be expected to contribute to biodiversity and preservation of the land and water resource particularly in combination with other programs such as those of Prairie CARE (Conservation of Agriculture, Resources and Environment) under the North America Waterfowl Management Plan (NAWMP) and Ducks Unlimited. To this extent there is provision for shared resource management.

Conservation

The intent of the program is to preserve the soil resource for the future. In combination with other PFRA programs, water quality and quantity also will be conserved. The impact on air quality will be positive since the potential for dust storms is reduced as a result of the associated retirement of land to forage. As indicated above, the additional forage area will increase habitat for wildlife, this accentuated by complementary programs. Biodiversity can therefore be expected to be maintained. The program assists in the restoration of the land through diversion into grass and trees, its pre-cultivation use. This appears to be the optimum use of the land at the present time.

Rehabilitation

The retirement of the degraded lands to grass or indeed to trees as enabled by the instrument should over time restore at least part of their original productivity. Perlich evaluated the PCP in terms of the increased potential yields which would occur if the land was later returned to grain production¹². However, much of the land retired should remain in forage

Overall Assessment of the Permanent Cover Program

The contract instrument as applied in the PCP appears consistent with sustainable agriculture. There are certain shortcomings which should be addressed. The length of period to which the instrument applies is too short since there is no guarantee the land may not again be used for annual cultivated crops. It has been suggested that some longer term benefit could be ensured by

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and/or trees. While retained in forage the land will be revitalized as the organic material produced, directly or indirectly, is returned to the soil. The program in conjunction with other programs helps restore the wildlife population while rendering the prairie landscape more appealing.

Market Viability

Using contracts to restrict the enrolled lands for even a limited number of years has been shown to result in a more economically efficient use of resources. Furthermore, it is obvious that participating land owners believe that entering into a contract will be positive with respect to their net returns from the land. While the high benefit/cost ratios are predicated upon payment of other subsidies there is reason to believe that even in the absence of these subsidies there would still be a net benefit from the contracts on the land enrolled in the PCP. This indicates that a sustainable income could be expected. In addition, the artificial encouragement of grain production on these lands arising from subsidies would be removed. To the extent that forage replaces grain on the land there will be less pressure on the grain handling and transportation system. The contracts on these lands which give rise to additional forage production can be expected to enhance value added activity as a result of the associated greater livestock production. Effectively, the current bias toward grain production is removed. The program, on the other hand, is neutral with respect to reduction of interprovincial trade barriers.

Cost Internalization

The contract instrument as applied in the PCP has no direct impact on the internalization of costs. There is an indirect benefit since the costs in terms of soil degradation attached to grain

production on the lands involved will be removed. There also will be some unmeasured benefits through improvement in the prairie landscape.

Scientific and Technology Innovation

This instrument has little, if any, direct impact on technological innovation, although the change in land use may stimulate a degree of research into the development of more suitable classes of forage for the land. While research into various aspects of livestock production is already underway, additional pressure for research may result from the increased population of animals. In addition, since producers who previously produced grain on these lands have to reorient themselves to production of forage and animals, significant innovation can be expected to occur in farm equipment. Existing technology also can be expected to be more fully utilized. There is no direct link between the restriction on land use arising from the contracts as applied in the PCP and the development of biotechnology.

Trade Policy

The change in land use resulting from use of the instrument has implications for trade policy. The increase in forage and the associated expansion in livestock output enhances the resource base. The increase in livestock production also is consistent with demand in the world market, where there is greater demand for livestock products than for grain at unsubsidized prices. This is particularly evident on the prairies where a ready market exists for beef in the western United States. At the same time, there is increased value-added since a large proportion of the beef moves as cuts rather than as live animals. Since livestock production, cattle in particular, is largely unsubsidized, it can be construed that the effect of the instrument as applied is to

planting trees on the land. Restrictions on the amount of land which can be retired on one farm (as reflected by the ceiling on the amount of money which can be paid to an individual land owner) augurs against retirement of contiguous units. Restoration of the land is more effectively accomplished in large blocks. The amount of funds devoted to this instrument is far too limited given the large areas of Class 4, 5 and 6 soils which have been degraded by cultivation. The degree to which the funds have been restricted is surprising as there is such a large benefit/cost ratio for the government. Action to overcome these shortcomings will render use of the instrument in the PCP even more supportive of sustainable agriculture.

move toward true comparative advantage in trade.

Societal Considerations

The change in land use associated with this instrument has a positive effect on the rural landscape as degraded environments are rehabilitated with grassland. Some of the land may even be available for recreational purposes. A more natural environment can be expected to attract wildlife. At the same time, there is the potential for increased employment opportunities in livestock management and in processing and a more stable form of agriculture results. Increased areas of grassland can be expected to reduce the siltation of water courses, while provision of retention ponds for livestock will provide additional habitat for wildlife. The instrument as used has no impact on food, health and safety. While grain production declines, livestock production increases. The application of subsidies moves toward neutrality. As indicated earlier, the drain on the public purse is reduced, thereby reducing unfairness in income distribution.

Global Responsibility

Intergenerational equity may be said to be increased as a result of the application of the instrument. The soil resource will be preserved or enhanced during a 10 or 21 year period. However, there is no guarantee that this will continue for a longer term. Furthermore, as presently applied, the areas restored to forage are only blocks limited in size, whereas larger area blocks may be necessary to address the problem of soil degradation. There is a positive effect on the distribution of income among producers, although not appreciable for the world at large. Any effect on food, health and safety in a global context is minimal as well as is any effect on the distribution of technology

on a global basis. Since livestock production is relatively unsubsidized there is movement toward greater fairness in income distribution and trade. On the other hand, those who have “mined the land” appear to benefit while those who adopted land preserving practices must rely on the market place and such other largesse as may be provided by government.

The North American Waterfowl Management Plan

The overall objective of the North American Waterfowl Management Plan (NAWMP) is to enhance and protect high quality wetland habitat in North America that supports a variety of wetland-dependent wildlife and recreational uses. The Plan emerged in 1986 after a two-year gestation period during which a number of public and private agencies designed in detail a comprehensive land use and waterfowl habitat program. The program arose in response to the decline in waterfowl numbers and the degradation of wetland habitat. The plan was signed in May 1986 by the Secretary of the Interior for the United States and the Minister of the Environment for Canada. The plan was extended to Mexico under a tripartite agreement among the three countries signed in 1988.

The Plan is a broad policy framework that describes its scope and goals, identifies problems facing the waterfowl population, sets general guidelines for addressing problems, and establishes population and habitat goals for waterfowl in North America. The Plan is a partnership effort involving private, state/provincial and federal interests. The Plan focuses on many ongoing and planned waterfowl management efforts continent wide and also stimulates new

Overall Assessment of The North American Waterfowl Management Plan

Use of the financial incentive instrument under the Plan is found to be compatible with, and also to promote sustainable agriculture. The above assessment of the financial incentive instrument under the Plan indicates that it is compatible with and also promotes sustainable agriculture. Enhanced stewardship of both the land and waterfowl resources arises. Beneficial externalities replace negative externalities such as land degradation. The international nature of the Plan, combined with the large number of participating organizations,

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efforts. One of the 14 joint ventures established under the Plan is the Prairie Habitat Joint Venture which covers parts of the three prairie provinces.

Canadian partners in this joint venture include the PFRA, Ducks Unlimited Canada, Environment Canada (Canadian Wildlife Service), Wildlife Habitat Canada, and provincial organizations. Under the Plan, the objective is to have 75 percent of the funds provided by the United States, divided equally between federal and non-federal sources, and 25 percent provided by Canada, the federal government contribution being 10 percent, the contribution of the three prairie provinces being 10 percent with the remaining 5 percent coming from private sources. In practice, these shares have varied somewhat. Approximately two thirds of all Plan expenditures are spent in Canada and these are delivered through the Prairie Habitat Joint Venture.

The Plan coordinates the management and planning of the waterfowl conservation efforts of the three countries. Desirable goals are identified, recommendations are made for the development of government and non-government programs for the protection of waterfowl and habitat, and the efforts of private and public organizations in waterfowl conservation are coordinated, these culminating in maintenance of an adequate database.

The financial incentive instrument is used to lease or purchase land for waterfowl habitat. It is worthy of note that the cost of application of the instrument is impacted by the municipal taxes imposed on the land used for habitat.

Management

The purpose of the financial incentive

instrument as applied under the Plan is to preserve and expand habitat for wildlife, particularly for waterfowl. While some land is purchased and therefore habitat will be maintained over the long term, other land is leased. The expectation is that the change in land use arising from the leases will persist after the leases expire. Therefore at least some of the additional habitat resulting from the instrument will be maintained for future generations. While this habitat is useful for the production of the waterfowl resource, it also is conducive to maintenance of other birds and animals, thereby contributing to biodiversity. The changes arising from use of the instrument are also supported by a wide range of other activities associated with the Plan. In reality, there is a sharing of responsibility for the maintenance of waterfowl habitat.

Conservation

Application of the principle encourages optimum use of the land from an economic standpoint while promoting preservation of the soil and other attributes of the environment. Producers have the option of whether or not to participate. Those who choose to participate through either selling or leasing their land indicate that this is to their economic advantage. Habitat for waterfowl is preserved along with the soil and water resources. The additional habitat provided serves to enable the maintenance of existing species, particularly birds and animals preferring a water environment. These are desirable externalities to a program of action which promotes conservation of waterfowl for the purpose of bird watching and sport. The instrument is used as a tool to conserve a rural landscape which is productive for both agriculture and wildlife.

necessitate a complex organizational structure to accomplish the objective of an enhanced waterfowl population, particularly in view of the need to manage the substantial sums of money involved. On the other hand, the degree of cooperation which is apparent by the success achieved in enhancing a particular resource provides an illustration of what can be accomplished by dedication to a common cause.

Rehabilitation

The thrust of the entire Plan is to rehabilitate the waterfowl population which has declined primarily because of the destruction of habitat originating from current farming practices. Such practices reflect the farm policies in effect and technology. These practices also give rise to degradation of the soil resource. The instrument is used to convert some of the most degraded lands into waterfowl habitat. This will result in at least a degree of rehabilitation. The lands most affected are those which formerly provided nesting cover and contained numerous small wetlands or sloughs. Use of the financial incentive instrument is accompanied by a host of other supporting activities from other organizations. In other words, rehabilitation is a joint effort. The rehabilitation of the waterfowl resource remains far from complete, but substantial progress has been made.

The financial incentive instrument has enabled a large number of organizations and individuals to assume a stewardship role in the maintenance and enhancement of the waterfowl resource. The associated benefits indicate the instrument is being used in a manner consistent with sustainable agriculture.

Market Viability

The financial incentive is applied on the basis of net returns to encourage producers to participate in the Plan. Consequently, it can be said that the resources diverted under the Program are being utilized in an economically efficient manner. Producers appreciate the income provided, this being evident in their willingness to see the land diverted and also confirmed by opinion research. This income can be considered more sustainable than that previously received from grain since enhancement and

protection are being encouraged in contrast to the degradation of the environment which otherwise occurred. Furthermore, the financial incentive instrument engenders responsiveness to the market as well as an increased return on the land. Any bias attached to use of the instrument relates to its purpose which is to provide more waterfowl for hunting purposes, other desirable effects being the result of externalities. At the same time, value-added activity will be increased as land retained for waterfowl purposes ultimately expands tourism. Certain market viability attributes such as transportation nonetheless remain unaffected by the instrument. Trade barriers are not affected. However, the Plan is a tripartite one involving national governments which recognize that migratory birds are not influenced by national boundaries.

Cost Internalization

In general, all the costs incurred can be expected to be included when applying the instrument. One significant cost, the externality of increased crop destruction, is compensated by using the instrument to offset this cost. The instrument can be said to reduce the externalities associated with grain production and replace these with externalities more consistent with sustainable agriculture.

Scientific and Technology Innovations

Several technological innovations have resulted because of use of the instrument. Research has been directed toward determining the most appropriate forage crops to use as nesting cover, the type of artificial nests which are most effective and the control of predators. Water and land management techniques also have been subject to scrutiny. The thrust is toward increasing the productivity of waterfowl in the prairie region. Associated with this, there has been an

investigation of farming practices which are not detrimental to the environment and maximize waterfowl output. Management of the waterfowl resource stimulates a whole range of scientific analyses. This encourages the transfer of technology from other areas and also the modification of some of this technology to be compatible with local conditions. Any impact on development of biotechnology is minimal.

Trade Policy

While the financial incentive instrument has no direct effect on goods traded, it does increase services available in the region. Use of the financial incentive instrument results in increased north-south "trade" in bird watching and hunting. The Canadian prairies have the potential to become one of the most productive waterfowl areas on the continent and to hold a comparative (and even absolute) advantage in this capacity. The fact that the United States is willing to support production in Canada reflects a demand and the Plan as applied in Canada acknowledges this demand. Waterfowl production is a value-added enterprise particularly evidenced when land otherwise not utilized is purchased or leased for waterfowl production.

Societal Considerations

Application of this instrument can be considered positive with respect to sustainable agriculture. An enhanced prairie landscape adds to personal enjoyment. There are limited additional employment opportunities as a result of the associated resource conserving activity. It could be argued that society becomes privileged because of the increase in wildlife habitat and the opportunity to enjoy the increased wildlife, particularly waterfowl.

Certain members of society have, however, indicated its willingness to pay

for the privilege of increasing the availability of recreational land. There can be said to be little impact on regional poverty, any impact being related to the increase in returns from directing land formerly used in grain production into waterfowl habitat, one of its original uses. At the same time there is little, if any, real impact on fairness and equity in income distribution. Other concerns of society such as food, health and safety or indeed waste management are not directly influenced by the application of the instrument.

Global Responsibility

The Plan including its primary instrument represents an interesting example of international cooperation in the management of a resource valued for recreational purposes. The resource is primarily located in Canada while the demand for the resource largely occurs in the United States, and therefore private and public sources of funds in the United States provide about two thirds of the funds spent on the resource in Canada. Expansion of the waterfowl resource will enhance intergenerational equity. Since the instrument encourages improved land management, although the leases only cover a limited period of time, intergenerational equity in use of the resource will be improved. The instrument has no impact on food health and safety. Income can be said to be transferred from those who want increased wildlife habitat to producers who use the land to make a living. Since only three countries are involved, other parts of the world will be largely unaffected, other than to the extent that the technology developed under the Plan can be applied elsewhere. No emergency food aid can be expected to be provided by the Plan.

ASSESSMENT OF THE FRAMEWORK

These assessments show how the framework can be applied to existing agriculture policies. While only Canadian policies were evaluated by the framework, it could be applied to any policy to determine its consistency with sustainable development. In each case, it was possible to determine the merit of a particular instrument as adopted under an individual policy or program. The framework is therefore one which policymakers usefully can apply to evaluation of current policies and to guide the development of future policies with respect to their compatibility with sustainable development.

Of the four policies evaluated using this framework, PCP and NAWMP were considered consistent with sustainable development while WGTA and Supply Management were not. It should be noted that the PCP and NAWMP were designed to promote a more sustainable form of agriculture and promote a more diversified use of the land, while the WGTA and Supply Management were developed before there was a recognized concern about sustainability. The WGTA and Supply Management are concerned with the income of the producer, while the other matters of sustainable development were not addressed.

The framework was able to distinguish between policies designed with sustainable development in mind and those which were not. While this is not absolute proof of the robustness of the framework, it does indicate that the framework is able to identify the policies designed with sustainability in mind. This will help policy-makers ensure their policies have included sustainable development in their design.

While the framework indicates which policies are more likely to be consistent with sustainability criteria than others, it

does not provide a system to measure how sustainable the policies are. This is important during policy design as many policies can be recommended, and while each can be good there is no clear way of determining which is the best. This will require more research in measuring sustainability.

The framework was designed to examine policies in the resource sectors, with agriculture being used as the case study. This framework should be able to analyze policies in other resource sectors such as the logging industry. The analysis need not be restricted to the Great Plains, it could be used in developing countries which want to include more sustainability in their policies.

The framework has potential in the budgetary process because of its ability to determine non-sustainable policies. The work conducted in IISD's Government Budgets Program indicated that "greening" the budget would reduce the deficit and provide a healthier environment¹³. To accomplish this a twofold approach is suggested. "The first step is to stop sending producers and consumers the wrong signals through environmentally-damaging subsidies. The second is to start sending positive signals by incorporating environmental considerations ..." ¹⁴. By using the framework to evaluate policies, and modifying them accordingly, the appropriate signals would be sent to the producers and consumers.

WHERE DO WE GO FROM HERE

Applying the framework and receiving views from key stakeholders and participants in workshops provided valuable information. The framework in view of its robustness should be used to assess existing policies for consistency with sustainable agriculture and to guide development of alternative or new policies. It is important to take this new process for policy evaluation and apply it. By evaluating policies at the federal, provincial and municipal levels of government, a more cohesive form of policy development will occur.

Evaluation is not restricted to government policies, since businesses also would benefit by evaluating their current and future programs with respect to sustainable development. Consumers are placing more pressure on businesses to produce products and services which are more environmentally conscious.

Government regulation is also moving in this direction. Using this framework for policy evaluation, businesses have the opportunity to assess their practices and ensure that they meet the needs of sustainable development before forced to by regulation. Therefore, it is necessary that decision-makers of businesses be informed of this new approach to policy and program evaluation.

IISD's goal for this project is to have a wide variety of assessments conducted, with the results of each adopted. To accomplish this, governments and businesses must be made aware of this document. This will be partially accomplished through the publication of the document and continued contact of key stakeholders in the Great Plains. With governments and businesses conducting their own assessments, there is a potential for many evaluations, but

more importantly, the results would have more meaning to the organization and be adopted more readily.

In keeping with the terms of reference for the Great Plains Project, it is recommended that a study be undertaken comparing the impacts of U.S. and Canadian policies upon sustainable agriculture. In order to be manageable, the differential effects of policy on two contiguous areas of these countries could be determined, i.e., the Red River Valley and Southwest Saskatchewan/Montana. Application of the framework to the policies of these regions would determine which are consistent with sustainable development. This also provides an idea of the applicability of the framework to different regions, and could lead to possible changes to ensure it remains robust.

The framework provides a valuable normative assessment of policies and would be made more objective by development of a sustainability index. It is therefore recommended that attention be given to development of an index in which individual principles and their associated criteria are placed in a hierarchy relative to their importance to sustainable agriculture. While it is recognized that more research is required to understand and provide measurement for sustainability, this collaborative effort is an appropriate start. The normative nature of this analysis, while providing guidelines, does not offer the option of empirical measurement. For policy-makers and other decision-makers to fully realize the benefits of such a tool, a detailed comparison is necessary. The measurement of sustainable development is an important concept because without clear guidelines on what is sustainable

and what is not, it is difficult for policy-makers to understand what is required of them.

Many organizations, government and private are working on environmental, economic and social indicators to provide a measure of progress in each division of sustainable development. By combining

the efforts of these projects, there is good potential for the development of a sustainability index. This sustainability index would give decision-makers tools to rate policies and programs against each other. The value added for this project would be immense, because of the direct assistance of a sustainability index.

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