Chapter 2: Background

The PFRA vision for the future goes beyond prevention of resource degradation; the vision is to improve land resources. Prairie agricultural landscapes can provide a healthy and productive land and water resource base through continued cooperation between government agencies and private landowners. The PFRA role is to work with Prairie people to support a sound rural economy, a healthy environment and a high quality of life.

The Bruntland Commission defined sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development 1987). The Government of Canada has integrated this definition into its legislation, policies and programs. The concept of sustainable development provides a framework for managing the environment while developing the agricultural resource base.

The* Prairie Farm Rehabilitation Act *provides Parliamentary authority to: ... secure the rehabilitation of the drought and soil drifting areas ... and to develop and promote within those areas, systems of farm practice, tree culture, water supply, land utilization and land settlement that will afford greater economic security ...

Agriculture in Western Canada must manage the balance between natural resource development and conservation, while providing products into a competitive world market. To assess whether Prairie agriculture is sustainable, the costs of agricultural production to current and future generations must be considered. These costs include the impact of agricultural production on the environment. This view of agriculture is consistent with the strategy for environmentally sustainable agriculture development in Canada, which states: *"Through national policies, programs, and services, we help the sector maximize its contribution to Canada's economic and environmental objectives and ensure a dependable supply of safe, nutritious food at reasonable prices to consumers, with equitable returns to producers and processors".* (AAFC 1997)

The desire of industry is for western Canadian agriculture to continue along a path of economic and sustainable development. Further increases in output must be generated by changes in farm practice and technologies that add to the profitability and the environmental performance of agricultural production. Prairie agricultural landscapes encompass the key natural resources required for agricultural production. Eighty-three percent of Canada's farmland is on the Prairies. Agricultural development in this region, along with new cropping patterns and farm management practices, will strongly influence the overall direction of change for issues of soil quality, water use and quality, biodiversity and greenhouse gas emissions. There are important links between these issues and the Prairie region's contribution to global agricultural trade.

In the long-term, farmers continually make cropping choices and adapt management practices based on changing economic conditions. While production systems employed on the Prairies have evolved with the primary objective of maximizing profits, other objectives, such as improved environmental quality, have grown in importance. Agricultural practices endure increasing public criticism for compromising public good objectives. However, the agriculture sector has little economic incentive to develop or adopt practices that produce habitat for wildlife, more scenic landscapes, or improved surface and groundwater quality, because market prices of agricultural commodities do not fully reflect societal desires for the provision of environmental amenities.

The management of Prairie agricultural landscapes must consider how management decisions can affect agricultural productivity, soil erosion, water quality, rangeland condition, riparian areas and other off-site

effects. For example, soil erosion can affect surface water quality with repercussions for recreational or domestic uses. Although there is a range of opinion as to the impacts of erosion to the nation, there are significant regional variations in soil and water degradation and off-site impacts of agricultural production. The following is a review of significant studies that have evaluated the state of the resources used or impacted by farming systems.

Past Assessments of Land Resources

Over the past 20 years several assessments of agricultural sustainability have been made in terms of the environmental condition of Prairie soils, economic impact, policy debate and proposed solutions. These reports give clear direction to the need for sustainable management of the Prairie agricultural landscape and the demands that society places on the management of privately owned lands. Also highlighted are the economic and public good benefits that go to society at large, rather than to producers. Progress in issue identification, management alternatives and the attainment of sustainability in land use can be tracked through the following assessments.

Photo by Dave Reede

The report *Soil Conservation Policy: A Backgrounder* concluded that vast areas of cultivated land in the Prairie provinces are affected by some form of land degradation, and that technical advances to improve crop yields have masked the inherent decline in the fertility of cultivated soils (Canadian Federation of Agriculture 1982). PFRA (1982), in the report *Land Degradation and Soil Conservation Issues on the Canadian Prairies, an Overview*, identified salinity, erosion and declining organic matter as major soil degradation issues. Salinity was estimated to affect approximately two million hectares of land. Resulting farm income losses were estimated at $257 million annually and were expected to increase at a rate of 10% per year. Losses due to wind and water erosion were estimated at $368 million annually. Excessive

Prairie agriculture is currently undergoing a major transition from bulk production of cereal crops for export toward a more diverse and integrated industry.

Healthy rangelands provide abundant quality feed for livestock while making a significant contribution to the Prairie economy.

tillage and cultivation of marginal lands were identified as major contributors to soil erosion. Losses of plant-available nitrogen due to organic matter decline were assessed at $121 million annually.

The Standing Committee on Agriculture, Fisheries and Forestry to the Senate of Canada (1984) reported that soil degradation was a problem for all of Canada. The conclusions and recommendations contained in the report were instrumental in bringing the issues of soil degradation and conservation before the Canadian public. In the same year, the book *Will the Bounty End?* was written for the Agriculture Institute of Canada, and reiterated similar conclusions to the earlier studies in terms of soil degradation requiring a national policy, research support, and effective awareness activities (Fairbairn 1984).

Agriculture Canada (1985) assessed resource conditions and provided an outlook for the future in terms of soil, water and climate change issues. It concluded that the best lands were already in use, conversion to non-agricultural uses were significant in some areas of the country, overall land quality was expected to continue to deteriorate, and there would be continued pressure to convert unimproved lands to crop production. The Science Council of Canada (1986) provided a scientific evaluation of the issues and recommended actions for policy directions, research and public education and awareness. They stated that *"losses from soil degradation on the Prairies now exceed $1.0 billion annually, and could increase to $2.7 billion within 20 years. The cumulative cost to western farmers in terms of lost revenues and increased expenditures could be devastating if restorative action is not taken".*

Agriculture and Agri-Food Canada identified links between the health of the soil resources and the longer term health and economic competitiveness of the agriculture industry (Acton and Gregorich 1995). For the Prairie region, this report concluded farmers have adopted soil conservation practices which are reducing the risks of erosion and salinization, and providing an improvement in the health of the soil. However, the *Health of Our Soils* report did not make specific statements on the economic state of the soil resources. In terms of economic conclusions, the report's findings indicated that fertilizer use must increase, farmers must continue to adopt soil conserving technologies, permanent cover systems must be implemented on lands where erosion potential is most severe, and a range of conservation practices and technologies must be adopted where there is risk of soil erosion or degradation. The report concluded that *"New government policy for soil conservation is needed, aimed at achieving sustainable agriculture and*

built on the understanding that agro-ecosystems are part of the broader environment" and *"soil management programs are best designed at the farm level, integrating management practices to suit specific, local soil needs"* (Acton and Gregorich 1995).

The report *Agriculture and Sustainable Development: Policy Analysis on the Great Plains* discusses agricultural issues, policies and programs related to land use, water quality, use of common property, social problems, trade impacts, climate change and biodiversity. The initiatives of PFRA and the North American Waterfowl Management Plan were found to be consistent with the principles of sustainable agriculture (Tyrchniewicz and Wilson 1994).

Significant initiatives have been undertaken by the federal and provincial governments, wildlife agencies and producer organizations, specifically to address landscape management issues (Wettlaufer and Brand 1992). In addition, the policy focus shift away from income support, mainly in the grains sector, and changes in adoption of tillage technology has resulted in land use change which is generally viewed as positive to the environment.

From the numerous conclusions of these reports, it remains clear that the need for coordinated soil and water conservation programs across the Prairies, continuing education and awareness programs, improved extension and technical advisory services to producers, on-site demonstrations by local conservation associations, and continuing research in support of soil conservation initiatives are required. However, to ensure long term sustainability, the challenge is to improve the performance of the agricultural industry by responding to new environmental, soil degradation and land use issues. It is essential to continue public investment in Prairie land management programs to ensure continuation of the private benefits and to meet public good desires.

Adoption of Conservation Practices

In addition to profitability, a number of factors affect adoption of practices such as conservation tillage, nutrient management and grazing management. Structural barriers, such as farm size and ownership may discourage adoption. For example, farmers with off-farm employment may view fewer field operations as an advantage of conservation tillage. It should be recognized that the diversity of natural resources influences the adoption of practices and technologies. Also, the financial risk of adopting new technologies may inhibit the rate of adoption because the technologies may be dependent on site-specific conditions. Identifying constraints and barriers can reduce adoption costs and targeting public policy can improve sustainability.

In the past, government programs have encouraged private landowners to conserve soil and water resources. More recently, investment in environmental management technology has received attention because of the potential to increase farm profits and improve environmental performance of agricultural production. However, the simple availability of a technology does not necessarily mean it will be adopted by farmers. Until agricultural markets recognize the environmental benefits and costs associated with conservation practices, farmers will tend to under-utilize these farming systems.

Prairie agriculture is currently undergoing a major transition from bulk production of cereal crops for export to a more diverse and vertically integrated industry. Changes in grain transportation, and globalization of trade, and the advent of new technologies are the major factors driving this change. Current commodity and input prices and low profit margins are forcing many producers to farm more land more intensively simply to make a profit. Fewer and larger farms, larger equipment, larger fields and a trend toward more rented land point to a continuing need for the

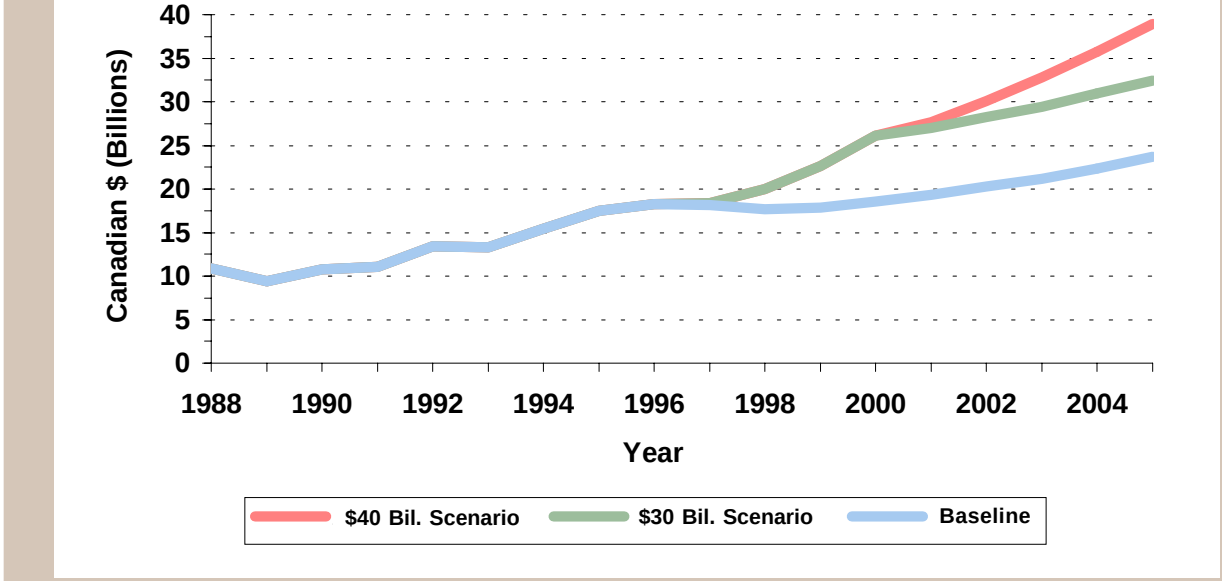
adoption of conservation practices to offset the potential for increased soil degradation on the Prairies.

Growth Objectives

The foremost challenge facing agriculture today is to find the balance between economic viability and managing the land to ensure long-term resource conservation. The interrelationships of economic, environmental and social concerns are complex. In the future, these forces will have a dramatic influence on how farmers decide the best use of their land base. Since business viability is critical to any operation, farmers' land use decisions may not always be optimal for the long term, from a societal and environmental standpoint.

In the end, economics will drive change for both primary and processed goods. The Canadian Agri-food Marketing Council (CAMC), a group of leaders from the agriculture, food industry and market sectors, has set an aggressive target for the agricultural industry. CAMC has challenged primary producers, processors and governments to significantly increase Canadian agriculture and agri-food exports to about 4% of the world market, up from the current 3%. This aggressive growth target may be slowed by current low prices for many commodities, but it is expected that the drive for growth will continue.

CAMC's target would also require a shift in Canada's agricultural exports away from primary bulk commodities in favour of a significantly greater proportion of processed products. This target would see 40% of Canadian agricultural exports in primary commodities and 60% in processed goods. Figure 2.1 illustrates the growth targets for Canadian Agriculture and Agri-food exports set by CAMC, as compared to the baseline Agriculture and Agri-Food Canada (AAFC) projections.



Source: Statistics Canada Merchandise Trade Database Calculations by AAFC.

Figure 2.1 Projected Canadian agriculture and agri-food exports.

Much of the growth needed to meet the trade target will come from the Prairie land base. The increase in production and processing of goods in the Prairie region means greater pressure on the sustainability of land and water resources. An increase in annual cropland and improved forage to meet these targets is forecast to come from new breaking and reduced areas of summerfallow, and may result in increased pressure to cultivate environmentally sensitive lands (AAFC, Policy Branch, Economic and Policy Analysis Directorate 1998).

One of the environmental pressures on the agricultural landscape will come from an expanding agriculture sector which expects to increase the area seeded to a more diverse mix of annual crops. It is estimated that one million hectares of new land in Canada will have to be broken and brought into production to meet identified agriculture and agri-food export targets (AAFC, Policy Branch, Economic and Policy Analysis Directorate 1998). In comparison, the Canadian Wheat Board (CWB) forecasts that 400 000 hectares of land will have to be brought into production in Western Canada to meet world grain market demands by 2007 (Brewin 1998). Increasing the area seeded to annual crops by cultivating marginal soils currently in grassland has the potential for significant environmental costs, which include reduced soil quality, loss of wildlife habitat and reduced biodiversity. The CWB and AAFC both estimate that the summerfallow area in Western Canada will have to be reduced by approximately two million hectares.

There are also plans to significantly expand the livestock sector in the Prairie region. The Environmental Policy and Analysis Directorate projects that the number of hogs could increase by 5.5 million head (30%) and cattle could increase by 700,000 head (15%) to meet the export target identified by CAMC (AAFC, Policy Branch, Economic and Policy Analysis Directorate 1998). These aggressive growth targets for the livestock sector are echoed by provincial governments, processors and producer associations. For example, the growth of hog production and processing in Manitoba is expected to exceed the national projections with additions to the breeding herd and marketings growing more than 5% per year (Manitoba Agriculture and Food 1999). The magnitude of the growth and benefits of the development depend, in large part, on whether such trends are sustained over time, soil and water conservation practices are used and inherent soil and landscape capabilities and limitations are respected. The Canadian Cattlemen's Association also indicates that the current areas in forage and pasture, while adequate today, will not support the base cow herd necessary for significant livestock expansion (Strankman 1998).

Significant land resource pressures may also arise in other areas. These include ongoing urbanization, production of feed grains for livestock versus crops for processing and export and marginal and better quality lands vying for pasture or annual crop production. Irrigated lands support intensive crop and livestock production and resultant value-added industries. However, expansion of irrigated lands requires significant capital output and will have perceived environmental consequences.

The development of irrigation has had a long and diverse history, beginning with some of the first land settlements in the driest areas of the Canadian Prairies. Irrigation works were primarily developed in southern Alberta and southwestern Saskatchewan with significant additional developments over the past thirty years in central Saskatchewan and southern Manitoba (PFRA 1982; Shady 1989). Currently more than 630 000 hectares are developed for irrigation across the Prairies, using a range of intensive and non-intensive technologies, and a range of private and organized project schemes (Statistics Canada 1997). There is significant interest within the three Prairie provinces for the continuation of irrigation developments and water efficiency improvements to meet expected market demands for the grain exports and domestic livestock feed requirements (Sask Water Corporation 1995; Gaia Consult-

ing and Werner Research 1999; Alberta Agriculture Food and Rural Development 1999).

Social Influences

Global Influences

The issues facing agriculture are both national and international. As an export-dependent industry, the sector needs to remain competitive on an international scale.

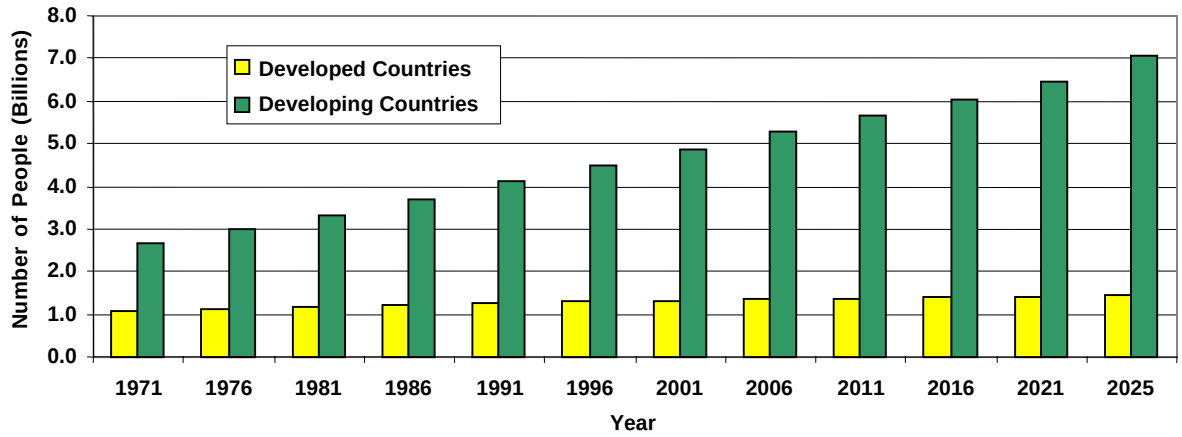
Population trends, (Figure 2.2) will have a significant impact on Prairie agriculture. The global issues of poverty, health, shelter, malnutrition, education and food security will place ever-increasing pressure on both prime and marginal agricultural lands. In addition, population growth continues to add pressure to cultivate more marginal lands in all areas of the world for food production. Housing and infrastructure tend to use the better agricultural land adding additional pressure to cultivate marginal lands.

While environmental sustainability is desired around the globe, mounting pressures for food production, increased housing and infrastructure encroachment on agriculture soils and overgrazing by livestock in many areas of the world combine to pose significant negative influences on land use. While the impact of these trends is generally greater in developing countries than on the Canadian Prairies, there is none-the-less increased pressure to use our own land base more intensively.

Prairie Population

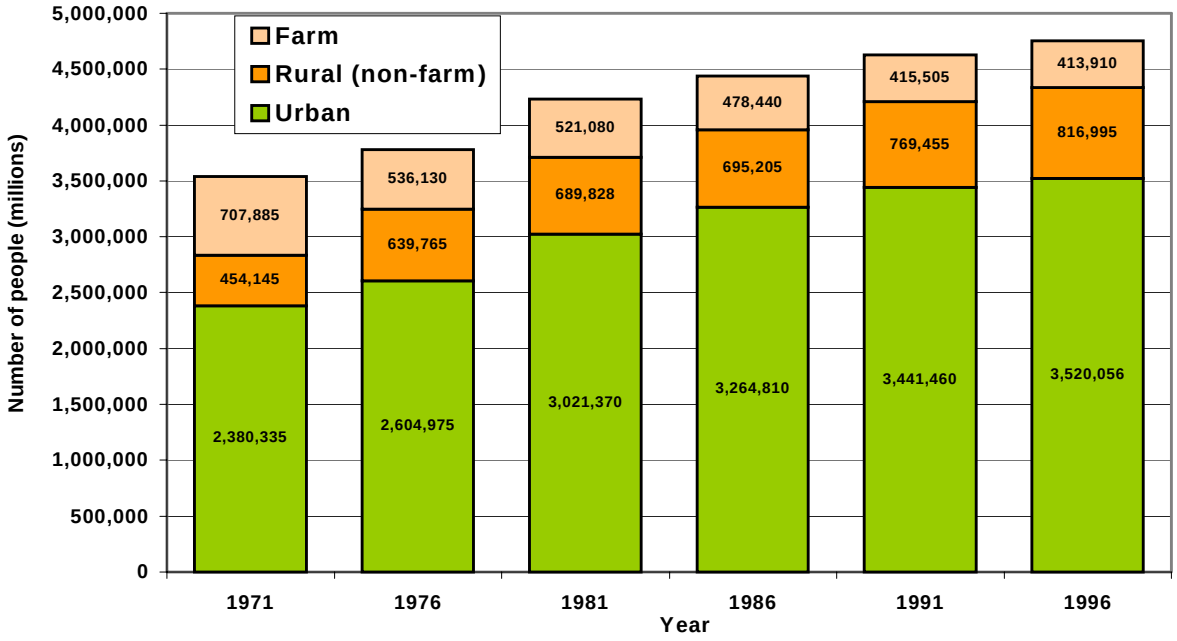
Rural, urban and on-farm population trends are shown in Figure 2.3 for the period 1971 to 1996. These trends are the result of economic and technological changes, and have resulted in several issues of concern for the Prairie region. The number of farms and the on-farm population have been in decline for many decades. This trend is expected to continue, dictated by increasing economies of scale in input supply and farm production, and associated restructuring of the grain handling and transportation system.

It is increasingly difficult to define an average farm. The gross trends show that average farm size is consistently increasing, but Figure 2.4 shows that medium size farms are in rapid decline. This, in turn, has an impact on the restructuring taking place in rural communities that have direct economic and social ties to agriculture. The reduction in farm numbers has affected critical population levels required to maintain desired services in many rural communities on the Prairies.



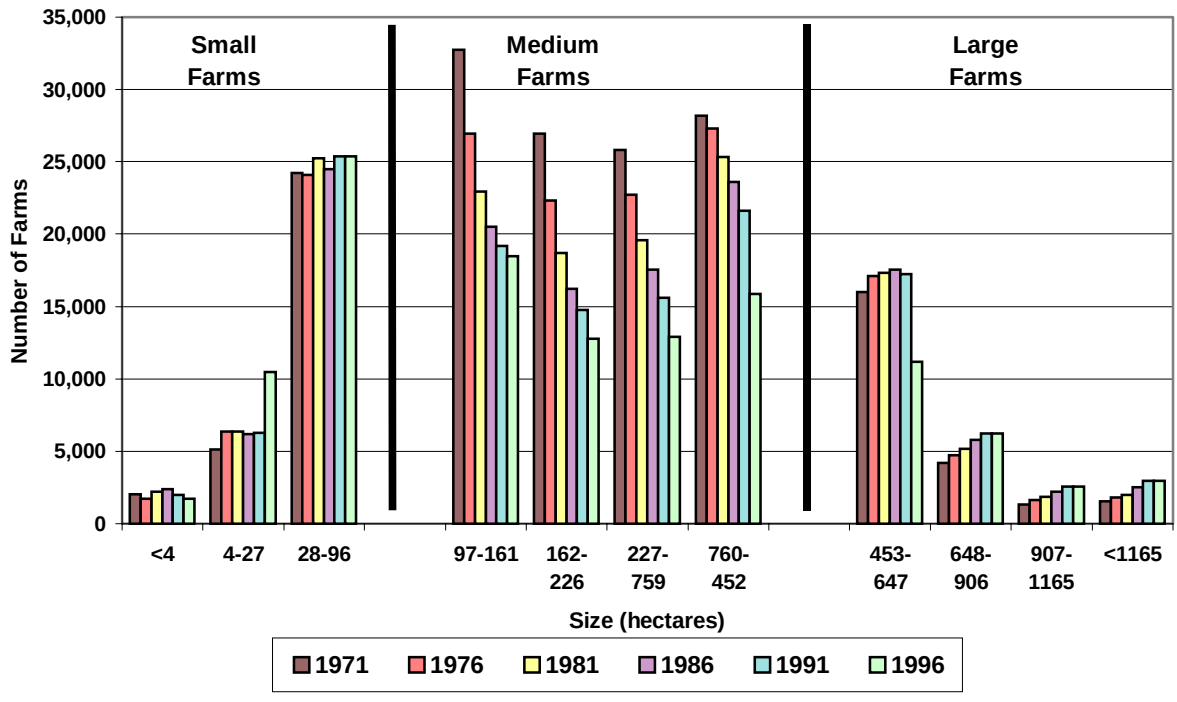
Source: FAO Database, UN Population Division

Figure 2.2 World population.



Source: Statistics Canada, 1996 Census of Agriculture

Figure 2.3 Prairie population.



Source: Statistics Canada, Census of Agriculture

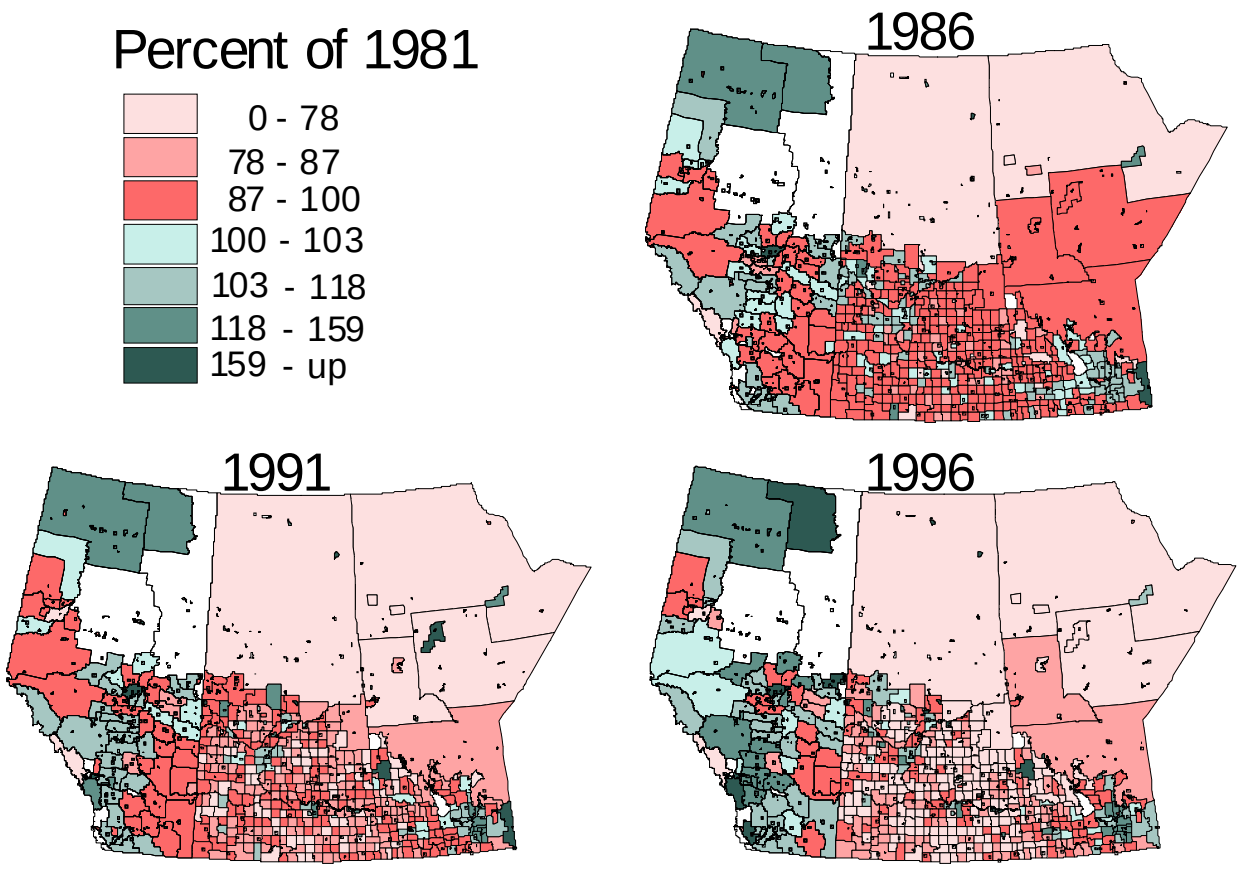
Figure 2.4 Prairie farm size.

The three maps in Figure 2.5 vividly illustrate the population shifts that have occurred in the Prairie region from 1981 to 1996. There has been a rapid exodus from rural areas of Saskatchewan to urban areas in Alberta. This impacts the tax base needed to support existing infrastructure. Community consolidation with associated reductions in schools, health care and government services make it more difficult to maintain the critical mass necessary for viable communities. Rural trading centres are serving larger geographic areas, and with an aging rural population, the forecast for the short term remains for further declines in rural communities. In fact, dramatic declines are forecast in some areas. Rural areas near larger urban centres are an exception, as urbanites increasingly seek a rural lifestyle within commuting distance of the cities.

The relative stability in the small farm category may be due to increases in intensive operations, retiring farmers retaining some ownership and residency, and acreage operations in proximity to urban employment centres.

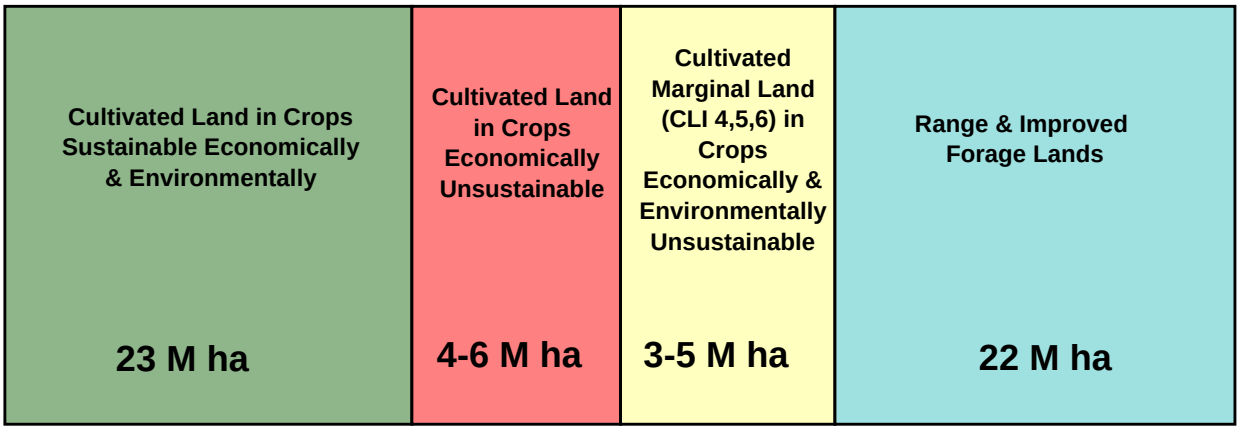
Economic/Policy Influences

Society expects Prairie farmers to meet the competitive demands of the world market while providing a safe, secure and nutritious food supply for both Canadians and the world. At the same time, farmers are expected to manage their land base, livestock and production inputs, and outputs of manure and other residues in a manner that serves society's interests in



Source: Statistics Canada

Figure 2.5 Percent change in population 1986-1996 (1981 base year).



Source: Adapted from Saskatchewan Agriculture and Food and PFRA 1995.

Figure 2.6 Prairie agricultural land base total 52 M ha.

respecting the environment. For the most part, private landowners bear the costs of these *public good* aspects of Prairie land use.

Figure 2.6 illustrates the sustainability of the Prairie land base in terms of its inherent quality, current use and the economic influences on its use. Figure 2.6 is based on the assessment of the Prairie grains and livestock sectors of the early 1990s. The left and right bars represent sustainable land use, as defined by land use for particular soil qualities. This includes 23 million hectares of cropland on the better classes of soil and over 22 million hectares of range and forage lands generally on the poorer land classes (Saskatchewan Agriculture and Food and PFRA 1995).

The centre sections are the marginal lands which are defined by economic and environmental parameters. Economically marginal lands include about 4-6 million hectares which do not produce a long-term net income. The area included in this definition can change dramatically from year to year, depending on prevailing commodity prices and input costs. Many would argue that for 1998 and 1999, the area of economically unsustainable annual crops is much larger. The current farm income situation will likely affect land use decisions over the next several years.

Most significant for this study, and from the perspective of sustainability, are the 3-5 million hectares of marginal land currently in annual cultivation, which are neither environmentally sustainable nor economically profitable under current uses. These lands are comprised mainly of the Canada Land Inventory (CLI) classes 4, 5 and 6. A more detailed estimate of the 3-5 million hectares considered to be environmentally sensitive in annual cultivation was done in 1997 and is contained in Table 2.1.

Although the estimated extent of the problem varies, it is the environmentally marginal land classes which have been targeted for conversion from annual crop production to more appropriate land use such as forages and pasture. This movement is evident in the Permanent Cover Programs (PCP) of the late 1980s to early 1990s. Benefits of the PCP include reduced soil degradation, improved water quality, enhanced wildlife habitat, increased carbon sequestration, reduced off-site costs of soil erosion and reduced government payments from acreage-based programs.

Through the PCP, about 500 000 hectares were converted to more appropriate land use under various contract options. About 80% of the PCP lands are now in hay production, and in most cases there is a strong link to

local cattle operations. A 1994 survey of participants indicated that 80% of the PCP lands would remain in permanent cover after the term of the contract expired (Vaisey et al. 1996). However, with these contracts now maturing, it will be interesting, given generally poor commodity prices, to see what land use changes occur.

Prairie producers contend with a range of domestic and global policies that influence markets, commodity prices, trade and environmental issues. In terms of world trade, it is generally accepted that Prairie agriculture has enjoyed a net benefit from international agreements, such as the General Agreement on Tariffs and Trade (GATT) and the North American Free Trade Agreement (NAFTA), which have dismantled many restrictive trade policies. These policies had primarily been in the form of income supports that often masked market signals, and hindered the ability of producers to react and take advantage of market opportunities.

In addition to trade agreements, environmental conventions have been signed in recent years which oblige Canada, and other signatory nations, to implement environmental strategies and action plans. Two examples are the Convention on Biodiversity and the Protocol on Ozone Depletion. This environmental thrust is also reflected in the world trade responses – environmentally targeted interventions are rated as more acceptable than programs which are commodity targeted. It is becoming more likely that the next round of world trade negotiations will find environmental issues at the forefront.

Until recently, agriculture policy in most industrialized nations, and to some extent in Canada, had evolved into a complex mix of support and stability mechanisms for the industry. Income support programs are declining in response to requirements under the GATT and due to fiscal constraints. Federal government support now emphasizes income stabilization through programs such as Crop Insurance and the Net Income Stabilization Account. As a result of this shift, federal government expenditures on agriculture have declined significantly. This shift in policy focus ensures market signals are not distorted by support programs.

Transportation policy changes of the mid 1990s are expected to create significant production shifts as well as new opportunities for value-added production. The elimination of the Western Grain Transportation Act (WGTA) in 1995 has reduced Prairie farm receipts by approximately $577 million per year. Efficiency gains in the transportation and grain handling systems are expected to partially offset these losses in the longer term. An added pressure for eastern Sask-atchewan and Manitoba is the change in the Canadian Wheat Board pooling. Over time, this policy change may shift the production emphasis from export grains to grains for livestock feeding and forage for grazing.

Table 2.1 Environmentally marginal land in annual cultivation by soil zone (1996 ha).

Province	Black	Brown	Dark Brown	Dark Gray	Gray	Total
Manitoba	218 000	0	0	41 000	20 000	279 000
Saskatchewan	319 000	897 000	615 000	105 000	79 000	2 016 000
Alberta	185 000	293 000	234 000	93 000	135 000	939 000
Total	722 000	1 190 000	849 000	238 000	234 000	3 234 000

Source: PFRA 1998 (Unpublished analysis)

Recent changes to trade and transportation policies are expected to foster growth in the livestock sector.

Trade and transportation policy changes are expected to have an environmentally positive impact in the long term, while the removal of export grain-based policy is expected to benefit the livestock sector. This should, in turn, result in a more sustainable use of environmentally sensitive lands for forage or livestock grazing. The long-term shift from grains to forage, pasture and livestock production is dependant on relative profitability and on-farm infrastructure.

The international trade of beef and pork is very important to the Prairie provinces. The beef and pork sectors rely heavily on the export of live and slaughtered animals, since the domestic market is small relative to the output of the sector. In the longer term, it is expected that there will be increased feeding of animals on the Prairies due to the comparative price advantage of feed grains and elimination of the WGTA. In particular, the pork industry is currently in a rapid expansion phase, with significant increases projected in each of the Prairie provinces over the next five years.

Environmental Influences

An issue that is creating significant interest in the Prairie provinces is climate change, specifically the recent discussion leading to the Kyoto Protocol. There is potential for the agriculture industry to be affected by changes to climate, and at the same time there is an opportunity to form part of the mitigative solution (Environment Canada 1997; International Institute for Sustainable Development 1998; and AAFC, Research Branch 1998).

The balance of evidence suggests that the climate is changing due to the burning of fossil fuels, deforestation and industrial and agricultural processes. The result is increased concentrations of greenhouse gases (GHG), mainly carbon dioxide, methane and nitrous oxide. Overall there is a gradual warming of the atmosphere, and an expected rise in the average global temperature of one to four degrees Celsius over the next century.

Agriculture is responsible for 9.5% of the GHGs produced in Canada, including less than 1% of the carbon dioxide, 38% of the methane and 61% of the nitrous oxide. Nitrous oxide has 310 times the impact that carbon dioxide has as a greenhouse gas, while methane has 21 times greater impact than carbon dioxide (AAFC 2000). The Kyoto Protocol states that Canada must reduce its GHG emissions to 6% below 1990 levels by 2010 (AAFC 2000).

Agriculture is a source for several GHGs, and is a potential sink for CO_2. The Kyoto Protocol does not currently recognize soils as a GHG sink but, Canada is negotiating to have soils formally recognized.

Carbon is an area where the sink potential is likely greatest and an area where scientists feel that significant progress can be made. Carbon is still being lost from agricultural soils, but changes in soil management practices have progressively reduced these losses. Management practices to reduce carbon loss include reduced tillage systems, reduced summerfallow, marginal cropland conversion to permanent cover and riparian grazing management. It is predicted that in the near future, Prairie soils will no longer be a source of carbon loss, but a net sink (Bruce et al. 1998).

The livestock industry is the primary agricultural source of methane. Methods of mitigating methane production include increased feed efficiency in ruminant animals and improved manure management.

Nitrous oxide is potentially agriculture's greatest contributor to the GHG problem. Reduced emissions could be accomplished through optimal application, timing and placement of fertilizer and through improved handling and storage of manure.

Climate change and its possible effects on Canadian Prairie agriculture are of increasing concern. Forecasts indicate that as a result of climate change, the southern Prairies may experience more warming than the global average, with longer, warmer and drier summers. While increases in temperature will lengthen the growing season, the lack of moisture and more severe insect infestations may reduce potential yields by 10-30%. There will be a commensurate increase in demand for irrigation and water management. Depending on the quality of soils, agriculture may be able to expand to the north. However, the soils on the northern agriculture fringe are inherently more fragile.

While society, governments and international forces can influence the decisions of individual landowners, they do not have the final say. Those decisions are generally made by private landowners who, while influenced by the larger picture, will ultimately act in the best interests of their own farm and on the basis of shorter term considerations. Again, the basic dilemma of the landowner is balancing the pragmatism needed to stay in business with the altruistic expectations of society at large.

The strong forces driving change and PFRA's ongoing commitment to sustainable development clearly emphasizes the need for appropriate action by farmers, ranchers, industry and government to ensure that land resources are cared for. Public and private interests must work together to ensure that environmental considerations are integrated into all aspects of public and private decision making within the agriculture and agri-food sector. A suite of policy, program and technical options needs to be available so farm operators can make selections that match their resource and economic situations.

Conversion of marginal cropland to perennial cover improves soil fertility, reduces the potential for erosion and reduces organic matter losses from the soil.