LAKE DIEFENBAKER IRRIGATION BENEFITS EVALUATION

Introduction

Lake Diefenbaker was created by the construction of the Gardiner Dam on the South Saskatchewan River by the Prairie Farm Rehabilitation Administration as a response to the decade of drought and rural agricultural and municipal collapse in the 1930s. The two hundred kilometer lake was intended to provide the foundation for an irrigated agriculture economy that would be less vulnerable to the recurring droughts of the region. In the forty years since the opening of the Gardiner Dam in 1967, there has been some slight progress in irrigating from the Lake. Today there are just over 100,000 acres of irrigated farmland using Lake Diefenbaker waters and thousands of visitors to the Lake for the environment, the fishing, the sailing, the beaches and the boating. However, the true potential for irrigation development has never been fully realized.

The Saskatchewan Irrigation Projects Association has commissioned this evaluation of the benefits of irrigation in the Lake Diefenbaker area to both document the wide range of benefits that have developed in the area and to evaluate the future potential of expanding the irrigated acreage in the region. The study has been undertaken with the financial support of the strategic studies program of the federal provincial National Water Supply and Expansion Program administered by the federal Department of Agriculture and Agri-Food Canada and its Prairie Farm Rehabilitation Administration.

Over the past three years major evaluations were undertaken of the potential for expanding the irrigated acreage in five areas around Lake Diefenbaker. These were:

- The South Saskatchewan River Irrigation District Expansion and Infill Project
- The Luck Lake Irrigation Infill and Expansion Project
- The Riverhurst Irrigation Infill and Expansion Project
- The Westside Irrigation Development Project
- The Qu’Appelle Irrigation Development Project

Together these five projects hold the capacity to expand the irrigated acreage around Lake Diefenbaker to over one half a million acres with the addition of some 435,000 to 500,000 new infill and expansion acres available for irrigation. This study examines the benefits that have already occurred from the existing irrigation developments in the area and evaluates the costs and benefits that could be realized from developing all of the projects. While these benefits are founded in the increased agricultural productivity that is associated with irrigation, they also include the benefits for value added processing, population growth, municipal stability and expansion, tourism and the environment.

In addition the study has evaluated the benefits of a large-scale irrigation development for Saskatchewan’s cities and its effects to protect the province from many of the adverse effects and costs of drought and global warming.
Map 1 - Irrigation In The Lake Diefenbaker Area

LEGEND
- South Saskatchewan River Irrigation District
- Macrorie Irrigation District
- Thunder Creek Irrigation District
- River Lake Irrigation District
- Hillcrest Irrigation District
- Luck Lake Irrigation District
- Riverhurst Irrigation District
- Grainland Irrigation District
- Brownlee Irrigation District
The report is organized into ten sections. The first section of the report examines the role of irrigation in the World and in Saskatchewan. The second reviews the emergence of irrigated agriculture around Lake Diefenbaker and outlines the scope of the five projects under consideration. Sections Three and Four provide the conceptual framework used for the economic analysis of the impact of irrigation development. Section Five builds a development scenario, including value added processing opportunities that might reasonably be expected to evolve with investment in the expanded irrigated acreage. Section Six measures the economic costs and benefits of making the irrigation investments and identifies the larger scope of impacts on the environment and society that would be expected from the water investments.

Section Seven undertakes a sensitivity analysis to measure how the benefits from irrigation would be expected to change under a different pace of irrigation investment or global warming scenarios with increased drought. Section Eight completes a review of the opportunity costs of water to compare the returns from irrigated value chains with other potential uses of the resource. Section Nine provides an assessment of major irrigation issues and knowledge gaps that can form constraints to the development of an irrigation economy in central Saskatchewan. Finally, Section Ten provides a strategy for implementing expanding irrigation development, including the institutional financing requirements that might be expected to sustain the development over a long period of time.

This study of the benefits from irrigation in the Lake Diefenbaker area has been based upon the latest available data and studies completed on Saskatchewan, North America and the World. Data from the Saskatchewan Watershed Authority, Statistics Canada, the Saskatchewan Bureau of Statistics and the provincial Department of Agriculture have all been accessed to develop a comprehensive statistical basis to evaluate the irrigation development opportunities. These sources of data and information are provided in Annex A – Statistical and Bibliographic Information Sources. Data has been updated wherever possible to 2007 as the base year for evaluation.

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an annual inflow from Alberta of some 5.5 million cubic decameters and a live storage of some 4.3 million cubic decameters. At the 90% probability of water supply some 3.0 million cubic decameters could be available for irrigation development in a dry year. Today these waters are accessed by only a little over one hundred thousand acres. In contrast, over 1.5 million acres in southern Alberta have been irrigated on a combined storage of about 3.0 million cubic decameters of water.

Irrigation development in Saskatchewan has seen a chequered past. In spite of the periodic droughts and the huge losses imposed on dryland agriculture, irrigation projects have been abandoned and there have been actual declines in irrigated acres. These developments have occurred in spite of conditions to the east and west that saw irrigation development form the basis of highly valuable agricultural value chains in Manitoba and Alberta with clear benefits for the sustainability of rural employment and the municipal community structure.

The projects under evaluation in this study represent a major agricultural development opportunity for Saskatchewan - perhaps the largest since settlement. By adding nearly half a million acres at the centre of Saskatchewan’s dry heartland around Lake Diefenbaker and fully utilizing an available and sustainable water resource, huge benefits can be generated for generations of Saskatchewan residents in small towns and large cities throughout the province.

Some benefits from the irrigation economy are already apparent in the changes that have occurred on the 100,000 acres now irrigated around the Lake in twelve irrigation districts. The Lake created for agricultural production has however, yielded far higher benefits to the people of Saskatchewan from hydropower production, tourism and the ecological yields of the Duck Unlimited marshes, fishing and other non-monetary aspects of the Lake.

Comprehensive irrigation development of the potential that the Gardiner Dam was built to create and capture social, economic and environmental benefits for the province that will more than outweigh the public and private billion dollar investments already made. Irrigation development can become the catalyst to trigger generations of sustainable agriculturally led value added, environmental and consumer benefits for Saskatchewan and Canada. It holds the prospect of restoring agriculture as a leading dynamic in the continued growth and diversification of the provincial economy.

Construction of the Gardiner Dam to Create Lake Diefenbaker

Photo Credit: Agriculture & Agri-Food Canada, Prairie Farm Rehabilitation Administration