CHAPTER 5

A Saskatchewan Irrigation Evaluation Scenario

Evaluating the social and economic impacts of irrigation expansion in Saskatchewan requires the preparation of an irrigation development scenario based upon current prospects for existing and future irrigation in the province. There are wide variations in the federal and provincial estimates of the amount of existing irrigation in Saskatchewan.[50] For the purposes of evaluation a future development scenario was created from existing provincial estimates of existing irrigation and the most likely irrigation expansion opportunities defined by the engineering project estimates that have mostly been completed in recent years. The irrigation acreage estimated from this scenario is summarized below in Table 35 for the four provincial irrigation development areas for both existing and future irrigation.

Table 35 An Irrigation Development Evaluation Scenario from Existing and Expansion Irrigation Acres and % Regional Distribution, Irrigation Development Areas and Saskatchewan

Irrigation Development Area	Existing Irrigation [1]		Expansion Irrigation		Total Irrigation (Existing Plus Expansion)	
	Acres	% Distribution	Acres	% Distribution	Acres	% Distribution
LDDA	106,623	31%	496,529	91%	603,152	68%
NDA	47,139	14%	24,660	5%	71,799	8%
SEDA	39,758	12%	5,000	1%	44,758	5%
SWDA	145,974	43%	19,900	4%	165,874	19%
Saskatchewan Projects	339,494	100%	546,089	100%	885,583	100%

1. Provincial Estimates of Irrigation 2003.

The irrigation acreage outlook represents only about one quarter of the total irrigation development potential identified earlier in Table 34. The projects identified are those judged as most likely to proceed over the next twenty years. While other projects may proceed, any major dam for water storage as proposed for Meridian on the South Saskatchewan River or Highgate on the North Saskatchewan River could expect to take decades before development would proceed. Such projects have therefore been omitted from the evaluation scenario.

The development scenario provides for a 160% increase in provincial irrigation acres to reach nearly 886 thousand acres. In addition, the scenario involves the restructuring of federal irrigation in the southwest from flood irrigation towards pivot irrigation at different locations but on the same total acres. The largest growth in irrigation would be around Lake Diefenbaker and as a result the evaluation scenario involves a restructuring of the regional distribution of irrigation in Saskatchewan. Today the southwest is the largest irrigating region in the province. Following expansion, the Lake Diefenbaker area will become the largest with nearly 70% of all provincial irrigation.

[50] These differences are discussed in more detail in Chapter 8.

Irrigation acreage expansion will take years as regional water supply systems are built. Following off-farm water investments there will be a take up period as farmers make on-farm irrigation investments and cropping patterns shift to irrigated agriculture. The process of both off-farm water construction and related uptake by farmers can take many years. The Westside Lake Diefenbaker project takes 20 years to complete the off-farm water construction. Uptakes by farms are assumed to proceed at a rate of between ten and twenty thousand acres per year, depending on the number of projects in completion. It will take as long as forty years to see the full agricultural effects of the irrigation expansion.

Irrigated agriculture for both existing and expansion acreage forms the foundation for forward and backward economic linkages and the creation of a value added chain of investment, employment and production. These take the form of a set of irrigation building blocks for an irrigation value chain based on an assessment of similar successful value chains that have developed in Alberta, Manitoba and the United States. The combined effects of both the irrigated agriculture and the value added building blocks create the full evaluation scenario.

Building Blocks in an Irrigation Value Chain

Five value chains were developed as a basis for evaluation. These were:

- A Beef Cattle Livestock Value Added Chain developing on a growing forage acreage to support initially cow-calf operations, small and large feedlots and eventually meat packing plants.
- A Hog Livestock Value Added Chain evolving from hog barns to slaughtering and meat processing.
- A Dairy Value Chain to produce fresh and industrial milk and cheese.
- A Vegetable Value Added Chain built around potato production, storage and processing.
- An Energy Value Added Chain based upon the supply of crop and livestock products and bi-products into ethanol facilities.

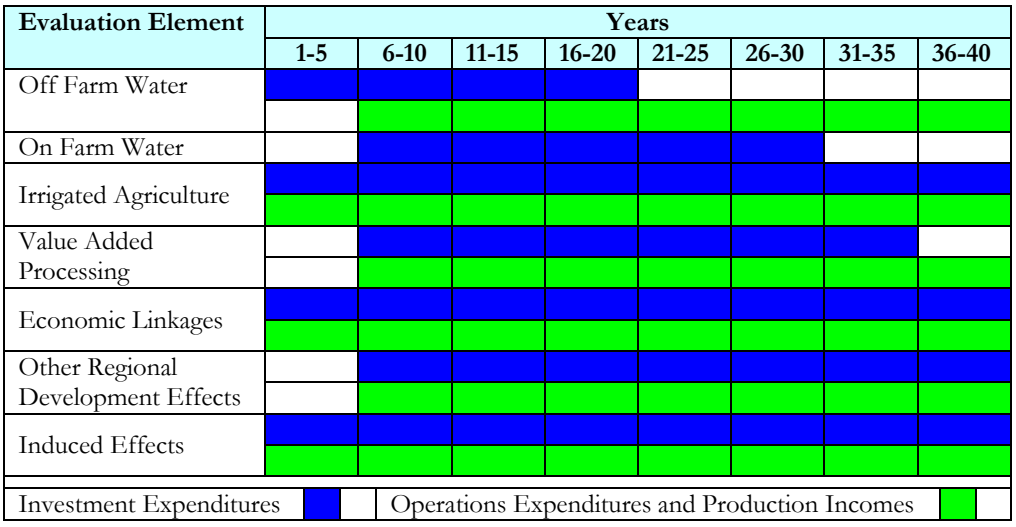
The capital costs associated with the some of the central building blocks associated with each of these value chains are summarized below. In total these value added building blocks will add to both the capital investment and the annual operating costs of the project.

Table 36 Irrigation Value Added Building Blocks

Irrigation Value Chain	Number	Estimated Capital Costs	Estimated Annual Operating Costs
Beef Livestock	Producing 420,000 new cattle annually Capacity to Process 544,000	$233M $80M	$341M $388M
Pork Livestock	Producing 186,120 hogs annually Capacity to Process 500,000 annually	$50M $23M	$26M $60M
Dairy	Producing 17,344,800 liters of milk annually producing 25 mil pounds/11.3 mil kg's cheese and 1.65 mil lbs/0.74 mil kg's whey protein products	$33M $19M	$18M
Vegetable	Processing 1,242,000 cwt's potatoes annually	$30M	$13M
Energy	Producing 20 million litres of ethanol annually	$25M	$3M

Irrigation value added building blocks are phased into the economy after the completion of regional water works and the expansion of irrigated acreage and the related increase in agricultural production. The full impact of the irrigation acreage expansion and the irrigation building blocks is not experienced until forty years, well after the commencement of investment and construction on the initial irrigation project. The full project sequence for the full evaluation scenario is shown schematically below. Water investments off farm are followed by operating expenditures off farm and on-farm investments in equipment. As farmers irrigate operating expenditures will be incurred and as yields increase so do incomes. In time, the expansion of production is sufficient to support processing plants who initially invest and once operating increase expenditures and create new sources of production, income and employment. The cumulative effects of all of these activities create a complex web of forward and backward economic linkages, other regional development effects and induced effects.

Figure 21 Schematic Representation of the Irrigation Development Process for the Irrigation Evaluation Scenario



The Market Opportunity

Irrigation development potential is far more than hydrological and agronomic estimates of water availability and soil suitability for irrigation. In addition, the technology of irrigation and water conservation and the economics of agriculture and irrigation are critically important. One central foundation of any irrigation development opportunity lies in the existence of a reasonable market opportunity for the increased production that will come from irrigation expansion.

Review of North American and global trends in the supply of irrigated acreage and production suggests there will be room for a significant expansion of irrigation in Saskatchewan. Volume I of this study noted that the scale of these developments is considered reasonable in the context of both current market conditions and future development prospects. In particular, the growth of the domestic market, expansion in offshore food requirements in Asia and North America and the need to replace over one half a million irrigated acres that will be taken out of production over the next twenty years in the United States makes the expansion of the Lake Diefenbaker a real market opportunity.

The long term prospects for agricultural demand and prices remain strong for the forecast period[51]. As a result of these dynamics in supply and demand, the FAO May 30th, 2008 Outlook suggests that *commodity prices – in nominal terms – over the medium term will average substantially above the levels that prevailed in the past 10 years. When the average for 2008 to 2017 is compared with that over 1998 to 2007, beef and pork prices may be some 20% higher; raw and white sugar around 30%; wheat, maize and skim milk powder 40 to 60%; butter and oilseeds more than 60% and vegetable oils over 80%.*

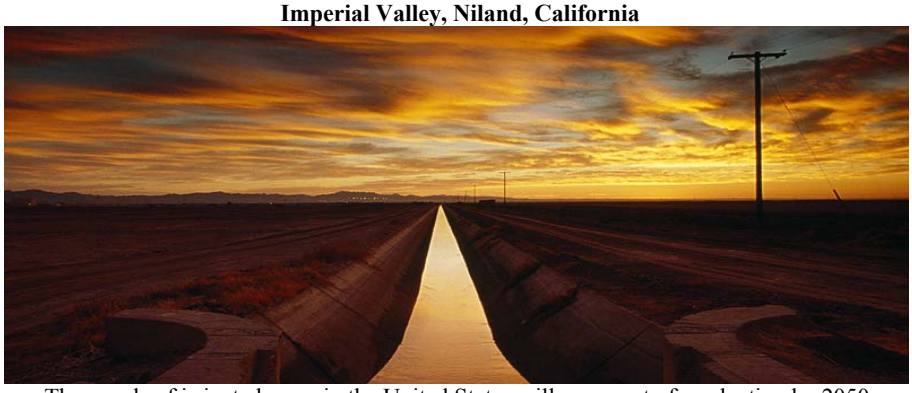
The June 3rd United Nations summit on resolving the world's food crisis led to a call from the Secretary General of the United Nations Ban Ki-Moon for world farm production to rise by 50% by 2030 to meet growing demand.

The market for irrigated production cannot be forecast with any degree of accuracy over a forty year period. However, the underlying trends with respect to the regional and global supply of irrigated acreage, the requirements for irrigated and processed foods from the Prairies, North America, Asia and the rest of the world suggest market conditions are reasonable to accommodate the incremental production that will arise by expanding irrigation in Saskatchewan.

Saskatchewan's market location at the centre of the Prairies places the province within one day's delivery of 3.8 million people living in 21 major urban centres in Manitoba, Saskatchewan and Alberta who are expected to grow to nearly seven million by 2050. Exports into the central and western United States are possible based on reversing the flows of delivery that already come into Saskatchewan from irrigation districts in California that will no longer operate during the study horizon. The growth in Asia Pacific Trade, incomes and population will further expand the basis for Saskatchewan irrigated exports.

It is important to note that the irrigation evaluation scenario is not a forecast of future crops or agri value added products. The outlook scenario combines a set of reasonable expectations to evaluate the impacts of the developments on producers and the regional, provincial and national economies. It has been based on experience in Alberta, Manitoba and the United States and with projects and commodities that are already a part of the economy. The scenario provides an insight into the scope of benefits that can develop around an irrigation economy and the geographic distribution of the benefits.

Imperial Valley, Niland, California



Thousands of irrigated acres in the United States will come out of production by 2050
Photo Credit: National Geographic.com

[51] Parsons, G. (2008); Food & Agriculture Organisation, (2008)