

SECTION 1

Introduction

1.1. Aims

Canada was a logical choice as one of the cold-margin case studies for the climate impacts project of the International Institute of Applied Systems Analysis (IIASA) because it is a cold country with an agricultural industry that is quite sensitive to climatic fluctuations and has considerable experience in analyzing that sensitivity. It was considered impractical to use the whole country for this analysis, however. Instead, the province of Saskatchewan (*Figure 1.1*) was selected as the Canadian case study area. This province is a major agricultural producer in Canada, and its agriculture has been, and is likely to continue to be, particularly sensitive to climatic fluctuations. For example, it was estimated that nearly nine-tenths of the difference between the 573 kg/ha Saskatchewan wheat yield in 1961 and the 1861 kg/ha yield in 1966 was due to differences in the climate of the two years (Williams, 1973). The degradation of agricultural soils, a major problem in the province (Rennie and Ellis, 1978), is also quite sensitive to climate. Saskatchewan's markedly continental climate, with agriculture strongly constrained by moisture limitations as well as by cold, is in contrast to the situations in case study areas such as Iceland and Finland. In this respect the province is fairly representative of the northern part of the North American Great Plains.

Within the context of the IIASA/UNEP climate impacts project, the objectives of this case study are:

- (1) To illustrate the applicability of several models to the analysis of the impacts on Saskatchewan agriculture of climatic changes or fluctuations implied in historical climatic data and in general circulation model (GCM) simulations.
- (2) To attempt to quantify the impacts of specified climatic changes or fluctuations.

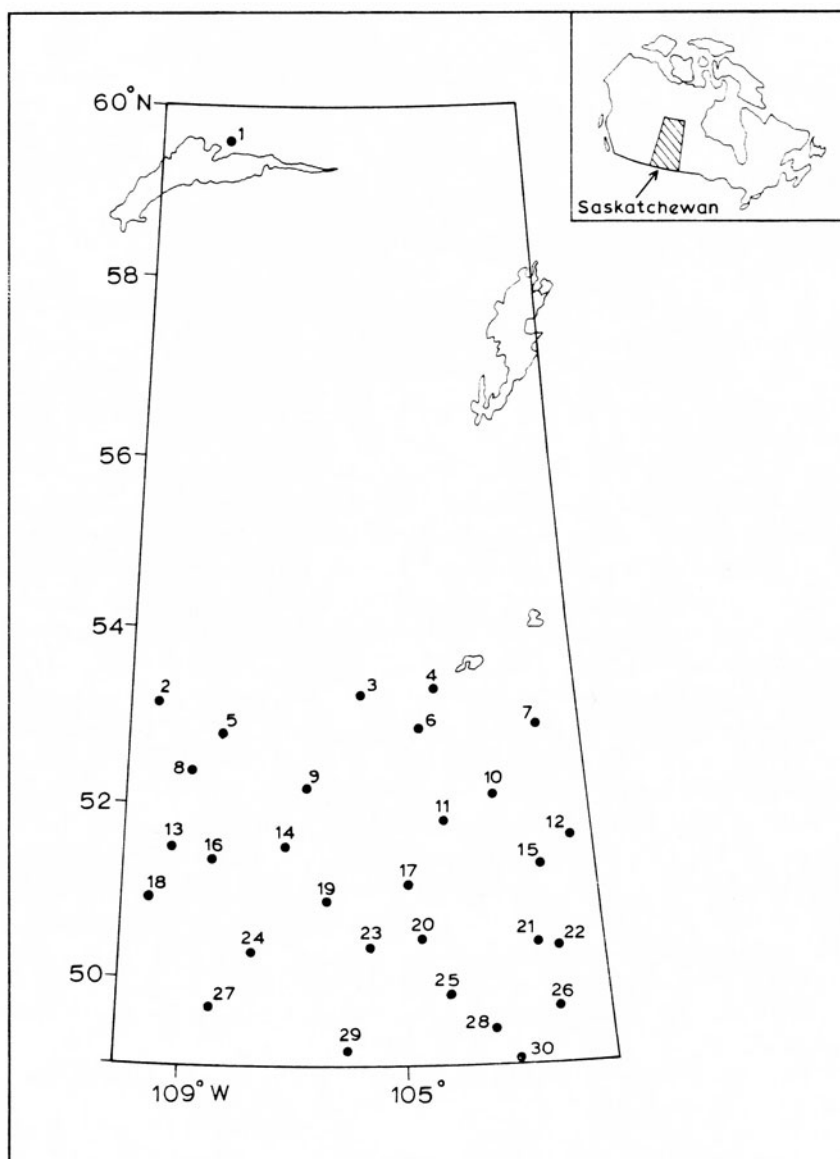


Figure 1.1. Saskatchewan, climatological stations. Station numbers: (1) Uranium City, (2) Waseca, (3) Prince Albert, (4) Lost River, (5) North Battleford, (6) Melfort, (7) Hudson Bay, (8) Scott, (9) Saskatoon, (10) Lintlaw, (11) Wynyard, (12) Kamsack, (13) Kindersley, (14) Outlook, (15) Yorkton, (16) Bad Lake, (17) Strasbourg, (18) Leader, (19) Tugaske, (20) Regina, (21) Broadview, (22) Whitewood, (23) Moose Jaw, (24) Swift Current, (25) Yellow Grass, (26) Carlyle, (27) Shaunavon, (28) Midale, (29) Rockglen, (30) Estevan.