Appendix B:
Seasonal Hazards – Frost, Hail, Drought and Flood

**Frost**
Corn is usually safe from frost up to the two-leaf stage (V2) because the growing point is below the soil surface. Soil temperatures can be different than air temperatures. Soil water content and residue cover affect soil warming and cooling. Damage can occur if temperatures dip below freezing. If frost damage is suspected, an assessment can be conducted by slicing the plant in half vertically. If the innermost part of the plant (the area with the newest growth) appears mushy or discolored (brown and/or black), the plant will likely not recover. An assessment for frost damage should not be attempted until at least 3 days of warm temperatures following a frost event. Warm temperatures encourage the plant to resume growth, but cool temperatures will not. If an attempt at damage assessment is made before the plant has had time to recover, the assessment may not be accurate. Assessments conducted 3 to 10 days after frost are common. Frost damage can be spotty in a field, with the most severe damage in low-lying areas of fields and little to no damage in even slightly higher elevations.

**Hail**
Hail can defoliate the crop and cause breakage or bruising of the stalk, creating entry sites for insects and diseases. The severity of the damage caused by hail is related to the size and duration of the hail. In most hail cases, the crop will recover; yield loss depends on the growth stage at the hail event and the
severity of the damage. A hail event occurring when the growing point is belowground may only strip the emerged leaves. As the crop develops, it becomes more vulnerable to leaf stripping. Damage to leaves and stalks can reduce yield if the movement of sugars from the leaves to the ears is restricted. Hail during ear development may result in a barren crop.

**Flooding and Drought**

Water is essential to crop growth and development, but it must be available within an optimal range. Too much water can kill plants from lack of soil O₂ or can result in disease problems. As with frost, flooding may be site-specific in the low-lying areas of a field. Drainage may be an option for frequently flooded areas. However, to determine the legality of drainage, local USDA-NRCS offices must be contacted prior to installing artificial drainage systems.

Drought also restricts corn yield. Dry conditions during silking will reduce kernel set and pollination. In a field that has both high and low landscape positions, drought will be noticed on hilltops and summits before the lower-lying areas are affected.

Weather conditions such as frost, hail, flood, or drought can severely reduce yields. Effects from these events are manageable to a certain extent, but loss can be expected when these events occur. The degree of loss depends on the severity of the event. Crop insurance has become a common component of corn production in the U.S.; the insurance provides the producer economic protection for uncontrollable events. Producers should consider crop insurance based on the consequences of crop loss.

More information on South Dakota climate and weather information is available from the South Dakota Office of Climatology (http://climate.sdstate.edu).
Acknowledgements
Support for this document was provided by South Dakota State University, SDSU Extension, and the South Dakota Corn Utilization Council.


The preceding is presented for informational purposes only. SDSU does not endorse the services, methods or products described herein, and makes no representations or warranties of any kind regarding them.

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA’s TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by:

(1) mail: U.S. Department of Agriculture
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, SW
Washington, D.C. 20250-9410;

(2) fax: (202) 690-7442; or

(3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.

SDSU Extension is an equal opportunity provider and employer in accordance with the nondiscrimination policies of South Dakota State University, the South Dakota Board of Regents and the United States Department of Agriculture.