the flood is likely to exceed the height of the dykes protecting a town, evacuation may be necessary. The forecasting and warning system must be geared to predicting when these alarm levels will be exceeded so that the required actions may be set in motion in plenty of time.

The system used in the Netherlands for storm surge warnings illustrates how these warning levels are used. The system uses two warning levels and an information level which are set at several sites along the coast. At the Hook of Holland, for example, the first level is set at 2.2 m above mean sea level and is reached in most years. The second level, 2.8 m above mean sea level, is reached every five to ten years. When the first warning level is expected a "limited dyke watch" comes into force and the forecasting of the second warning level being exceeded triggers an "extensive dyke watch" and major preparations for handling the emergency. The Royal Netherlands Meteorological Institute (KNMI)

North Dakota suffers baffling double disaster-floods and fires, April 1997.
Sipa Press. T. Korol

is responsible for forecasting sea levels under surge conditions and alerts the Storm Surge Warning Service when the information level, set 40 to 50 cm below the first warning level may be reached. This first alert is usually issued at least 10 hours before the astronomical high tide. KNMI continues to monitor developments and to keep the Storm Surge Warning Service informed. When it becomes clear that the information level will be exceeded at high tide the officer in charge of the Storm Surge Warning Service has to decide whether to call out his staff. As the weather deteriorates further KNMI and the Storm Surge Warning Service confer by a telephone hot-line and, if appropriate, order a limited dyke watch. The telegram announcing this is usually sent out six hours before high tide to the agencies involved including the Army, the Navy and the Civil Defence organizations. The limited dyke watch involves mobilizing a small corps of dyke patrols. It does not imply any immediate danger, but a limited number of precautionary measures are taken.

When an extensive dyke watch is required telegrams are sent to the same agencies who now have to take firm action. These actions include:

1. The Works Department and local water boards call out the personnel and volunteer, locally-recruited auxiliaries; emergency building materials (sandbags, timber, brushwood, etc.) are prepared and trucks loaded; sea dykes are continuously patrolled by staff equipped with radios.
2. The Civil Defence mobilizes its staff; communications centres are manned; ambulances, mobile kitchens and field hospitals are readied for immediate departure.
3. The armed forces are brought to a state of alert and all leave cancelled. Helicopters, trucks and boats are readied with special emergency equipment.
4. Road and railway cuttings through dykes and embankments are closed.

This warning also goes out to burgomasters and police and fire stations in the affected area. Emergency routes, to be kept clear in case of actual flooding, are designated. The extensive dyke watch is also announced every hour by radio.

The system has the advantage that once a warning has been issued there is an automatic sequence of actions for each participant to follow. Some form of warning is issued in most years, so participants become familiar with their roles. The system also offers a graduated response. The limited dyke watch calls out only a small group, but informs all organizations that a dangerous situation is possible. The full mobilization is ordered only when there is a real risk of flooding.

The organization of storm surge warning in the Netherlands illustrates the need for the different authorities concerned to know what actions they have to take in an emergency. This requires regular practice either in simulated exercises or as in the Netherlands by frequently putting the system on a low level of alert.

The general population also needs to know how to respond in case of an emergency and this is a more difficult matter. In Bangladesh, the Meteorological Department forecasts tropical cyclones in the Bay of Bengal with considerable success. The warnings are disseminated to the population by radio and television and through official channels. In addition the Bangladesh Red Crescent Society Cyclone Preparedness Programme uses a network of 21,000 volunteers organized in teams of ten to disseminate the warnings. Response to these warnings