BEST PRACTICES

A comprehensive local plan

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Source: ICLR

A disaster is a serious disruption of the functioning of a community due to hazardous events. The definition of a disaster clearly establishes these events as issues confronting a community and best managed by local government. The provincial and federal governments and other stakeholders may be invited to assist in the response to and rebuilding after larger events, but local governments have lead responsibility for disaster management in Canada.

The experience in Canada is that local emergency response efforts have generally been managed well. A current challenge is the need to move beyond preparation to respond, and also to build communities that are disaster resilient and climate adapted. When extreme events occur they do not need to become a disaster if the community is resilient and adapted.

Comprehensive management of extreme events by local governments will result in fewer fatalities and injuries, and less risk of damage to property and disruption to the community. Most disaster losses are preventable through the application of existing risk reduction knowledge. Local governments should strive to build disaster resilient and climate-adapted communities.

Four critical elements that should be included in a comprehensive strategy to build a disaster resilient community are:

- Determine acceptable risk of loss
- Assess the risk of loss and damage
- Invest in risk reduction
- Plan for reconstruction

DETERMINE ACCEPTABLE RISK OF LOSS

If a community decides to invest in flood protection a taller barrier will bring greater safety but at a higher cost. The risk of loss can be reduced, but not eliminated, so community leaders need to determine the level of protection that is acceptable. In some instances the province provides guidance as to required minimums, but local governments may choose a higher level of protection.

In the private sector, such as the banking and insurance industries, organizations establish a risk appetite and a risk tolerance statement. The organization establishes the amount and type of risk they are willing to accept in order to meet their strategic objectives, and the nature and extent of risks that are tolerable. Risk appetite and tolerance vary considerably between organizations and over time.

The determination of acceptable risk is an essential foundation for effective risk management and risk reduction by local governments. Unfortunately, this approach is not often applied by local governments for disaster risk management. The experience in private industry, however, shows that determination of risk tolerance is a critical element in effective risk reduction.

The District of North Vancouver established a committee of local residents with a mandate to recommend a tolerable level of risk to life from natural hazards. The committee accepted testimony from hazard experts through public meetings, and from a comprehensive analysis of international precedents completed by staff. The Council determined that it would adopt risk tolerance criteria similar to those in place in the United Kingdom, Australia, and Hong Kong. For more than a decade now these choices have been successfully applied to local decisions with respect to reducing the risk of loss and damage in the community from flood, earthquake, wildfire, landslides, and other hazards.

The risk tolerance statement for the District of North Vancouver focuses on the maximum acceptable risk of disaster fatalities. The flood risk tolerance statements established by provincial governments focus on the likelihood of loss. In private industry risk appetite and tolerance statements can be complex documents and they often include a focus on the maximum dollar value of acceptable loss. Local efforts to champion risk reduction investments could include a requirement that each proposal must include an assessment of the cost and projected benefits, with an expectation that the benefits will exceed the cost.

Determination of acceptable or tolerable risk is an emerging element for local governments in implementing an effective risk reduction strategy.

ASSESS THE RISK OF LOSS AND DAMAGE

Every community in Canada conducts a hazard assessment and is required by provincial legislation to regularly update this analysis and file a copy with the province. Typically, these assessments are developed to support local preparedness to respond to future disasters and are not sufficient to support risk reduction. For example, a response preparedness assessment may identify the risk of flooding through a reporting of the frequency of past events and a count of the number of properties that may be affected. This is not sufficient information, however, to prepare a risk reduction plan.

Two critical elements of a comprehensive risk assessment involve a study of the local hazards and an analysis of the risk of loss. For example, a hazard assessment would map the specific locations where water may come into the community as a result of an identified event. A loss model would be used to estimate the direct and indirect damage expected if water flows into those locations. Local officials can use consultants or academic advisors to support their efforts.

The modeled events are often crafted to be as severe or more intense than the worst events ever experienced in the community or in neighbouring communities. Accordingly, the results from hazard and loss models should be contrasted with available knowledge about historic events. Growth in the local population, inflation, the high cost of reconstruction, and other factors have significantly increased the

losses from recent events when compared to historic damage. The presence of a community agreement on acceptable loss, when available, can provide a clear guide to the assessment process.

Change in the climate is contributing to an increase in the frequency and severity of extreme events in most communities across Canada. Given the long-term nature of investments that are made to reduce the risk of loss and damage, it is important to take into account anticipated change in the climate and plans for growth in the community. This analysis will add to the uncertainty of the assessment because future weather and growth are unknown, and often cannot be known at the local level. Nevertheless, the capacity of models to provide useful local advice is improving.

Ultimately, a hazard assessment to support risk reduction should result in the identification of priority hazards (e.g., flood, wildfire, severe wind) and specific risk reduction options (e.g. build a diversion, establish a firebreak, require tie down straps in new homes). It should be possible to develop a cost and benefit analysis for the most promising risk reduction options, including an estimate of prevented loss of life, property damage, and community disruption. Furthermore, the analysis should take into account change in the local climate, growth in the community, and other anticipated change.

INVEST IN RISK REDUCTION

The benefits to the community begin immediately when investments in risk reduction are implemented. Citizens will know that they are protected when construction of a floodway is complete, a storm pond is in place, or a firebreak is installed. Many disaster safety and severe weather adaptation features are highly visible evidence of community action to build resilience.

Four broad risk reduction strategies are typically implemented by local governments:

- Avoiding the risk of loss through planning
- Reducing the risk of loss through building codes
- Preventing minor losses through defensive infrastructure
- Empowering widespread action through public awareness

International research, as set out in the Sendai Framework for Disaster Risk Reduction, has identified growth in the number of people living at risk as one of the most important drivers contributing to the increase in disaster loss and damage. Presently, local governments in Canada typically prohibit new development in zones of identified high flood risk. This approach can be applied to all hazards. Planning decisions can be used to stop the growth in the number of Canadians living in areas of high risk for hazards beyond flooding, such as wildfire, landslide, avalanche, and tsunami. Moreover, structures found to be located in zones of high risk should be relocated or removed.

Figure 24: *Perhaps the most important disaster management tool involves empowering the public to participate in risk reduction through increased knowledge.(Source: Adobe Stock Photo)*

Most disaster damage in Canada involves private homes and public infrastructure. Significant increases in disaster resilience can be added to homes and infrastructure for little if any additional cost if they are included during initial construction. Building codes, standards, and financial incentives are powerful tools to enhance the resilience of buildings and infrastructure. Local government officials are responsible for helping local builders and construction companies to understand and for enforcing compliance with provincial building codes and standards. Many communities impose requirements beyond the provincial minimums.

Engineered structures, like dams, levees, and berms have often been used to prevent frequent but moderate flood events. Local communities are increasingly seeking to reduce the risk of flooding by investing in green infrastructure, like wetlands and storm ponds. These approaches are effective up to the design level event. However, rare but very large hazards will overtop the protection and can result in extensive disasters.

Perhaps the most important disaster management tool involves empowering the public to participate in risk reduction through increased knowledge. These efforts can focus on better educating the public about local hazard risks. Communities that have not recently experienced a disaster are often unfamiliar with the alarming losses that are possible. The public also need to learn about effective risk reduction alternatives. Local governments will find that other stakeholders may be willing partners to help share this knowledge, including the provincial and federal governments, non-governmental organizations, and private industry. The insurance industry, for example, has a long tradition of encouraging loss prevention.

PLAN FOR RECOVERY

One of the best opportunities to promote disaster resilience for your community is during the reconstruction that follows a disaster. The Canadian Disaster Database shows that hundreds of communities in Canada have experienced a disaster over the past twenty or thirty years, but the Institute has found that very few had a disaster recovery plan. Most communities failed to realize the opportunity to build back better after they were confronted by an extreme event.

Communities should plan now for recovery following possible future disasters. There is a twelve to eighteen month period after a disaster when public support for risk reduction investments is very high. As time passes, public interest is diverted to many other issues and support for risk reduction action fades. Implementation of significant and effective resilience and adaptation initiatives over a twelve to eighteen month period typically requires planning that takes place before the disaster strikes.

A comprehensive hazard and risk assessment can be adapted to be included in a recovery plan that includes a vision to build back better. For example, the cost of moving critical infrastructure out of harms way may appear high relative to the expected benefits when the facility is operating, but if the facility is destroyed by a disaster the additional cost of relocation may become trivial when funds must be found for reconstruction. The important element of recovery planning is to anticipate and evaluate options for reconstruction, options that may be applied before or after a disaster strikes.

A window of opportunity involves disaster risk financing. Private homeowners and businesses make extensive use of insurance to finance rebuilding and recovery following a disaster. Residential flood insurance is a new coverage introduced in 2015, and it is not yet well established, but cover for most other perils is widely used. Insurance coverage is available for local governments but most governments do not choose to purchase insurance protection. Insurance coverage can be designed to rebuild to current, higher building code standards than were found in the structure that was damaged or destroyed. Exploring the idea of buying more extensive private insurance coverage is a recovery planning and financing opportunity for local governments.

The Disaster Financial Assistance Agreement (DFAA) between the federal, provincial, and territorial governments includes a provision to build back better. Federal payments to the provincial and territorial governments can include up to 15 percent additional funding if they are used to invest in disaster risk reduction. Since most of the DFAA payments are triggered by provincial support for damage to municipal infrastructure, local governments should press the provinces to direct these federal funds to support well designed municipal initiatives located in zones of low risk. Recovery planning is essential if municipal government are to be effective in securing access to these funds.

ABOUT ICLR

ICLR is a world leader in disaster risk reduction research and outreach. Thousands of hazards strike in Canada each year. The Institute works to understand when buildings and communities are vulnerable and at risk to experience loss from natural hazards. We use this knowledge to identify and champion actions to reduce the risk of damage and increase resilience. ICLR's research team believes that most disaster losses can be prevented through the application of our findings to reduce vulnerability and promote resilience. Our knowledge about reducing the risk of loss from extreme rainfall, wind, wildfire, hail and other severe weather hazards also contributes to the national and international discussion about adapting to climate change and the promotion of sustainability.

The Institute was established by Canada's property and casualty (p&c) insurance industry more than 20 years ago as an independent, not-for-profit research institute affiliated with Western University in London, Ontario, Canada. Institute staff and research associates are international leaders in wind and seismic engineering, atmospheric science, risk perception, hydrology, economics, geography, health sciences, public policy and a number of other disciplines.