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Floods

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Introduction



Floods are among the most frequent and costly natural disasters in terms of human hardship, structural damage and economic loss.

Flooding has a variety of causes. Continuous rainfall over several days may cause rivers to overflow and cover their flood plains. Intense rainfall over a few hours may trigger a flash flood. An ice-fall or landslide may temporarily block a river and flood the land upstream of the blockage. Melting snow can combine with rain in the early spring; severe thunderstorms can bring heavy rain during hot weather; tropical cyclones can bring intense rainfall to coastal and inland areas.

Flash floods are the most dangerous to human life. They may occur within a few hours of intense rainfall, as a result of fast run-off of surface water. This effect is worse if trees have been cleared from upstream slopes, or if grass has been overgrazed by livestock. A dam or dyke failure may also cause a flash flood, as can the sudden opening of dam sluices to relieve pressure on the dam itself. A temporary upstream blockage, when cleared, will also release a large volume of water. Flash floods can catch people unprepared – usually there is no warning system.

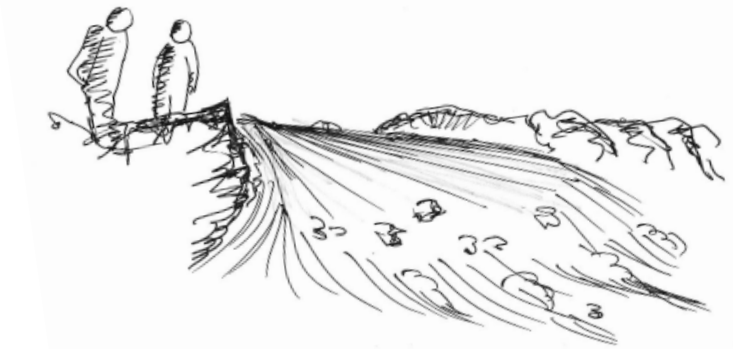
Floods can move boulders, tear out trees, destroy buildings, roads and bridges, and scour out new channels. Flood waters can reach heights of three to six metres and often carry a deadly cargo of tree branches and other debris. Extended periods of heavy rain can also trigger catastrophic mud slides.

In urban areas, much less water is absorbed by the land; surface run-off can be up to six times greater than in the countryside. During urban flooding, streets can become rapidly moving rivers, basements can fill with water, and culverts (roadside drains) can become blocked, creating lakes of water.

Increased threat of disease

Flooding also brings outbreaks of disease, and in particular, water-borne diseases such as cholera and typhoid. These can occur when sewage and general waste enter the flood waters and contaminate drinking water and food. In addition, in areas where there is malaria, stagnant water becomes a breeding ground for mosquitoes.

When floods strike, it is important not just to prevent death by drowning but also to reduce these threats from water-borne disease.



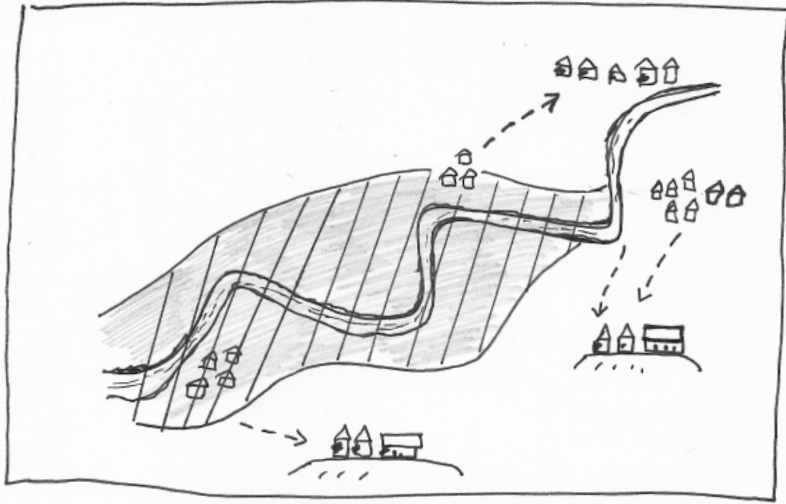
Preparing for floods

Floods often occur in the same place almost every year. The best way of reducing flood losses is to be prepared for them. These preparations can be at household, family and community levels, and can also involve the church. Increasing awareness of the risks, monitoring flood levels and a system for raising the alarm are essential steps.

Awareness-raising activities

One way to increase awareness of flood dangers is to involve the community in drawing a map of the affected area. This allows people with local knowledge to highlight the places and people at greatest risk. Maps can then be used to develop simple plans to reduce the risks. Here are a few suggestions.

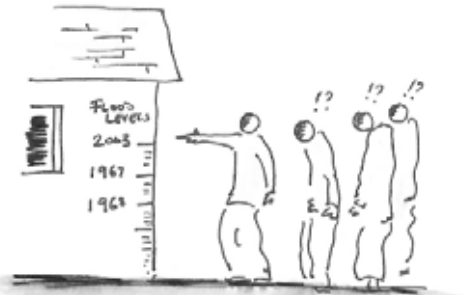
- Draw a map of your community. Show the rivers, roads, bridges, houses, other buildings, markets, water sources, forest, etc. (See also Chapter 3, pages 70–79.)
- Show the areas likely to be affected by flood water.
- Identify the people most likely to be affected and the facilities which will be damaged or lost.



- Identify areas of high ground where the community can go if evacuation is needed.
- Identify evacuation routes from the high-risk areas to the higher ground.

Another good way of raising awareness is to mark the heights of previous floods on public buildings or on trees or posts. This serves as a reminder of the seriousness of floods and the need to take preparatory action. These markings can be used as part of a community training programme on flood preparedness.

Awareness can also be increased by using posters or leaflets, often available from government officials or from NGOs. Schoolchildren also need to hear about floods and how to cope with them. This could be discussed with the local teachers, and classes arranged. Creative methods can be used – for example, songs, drama, poetry, making pictures.

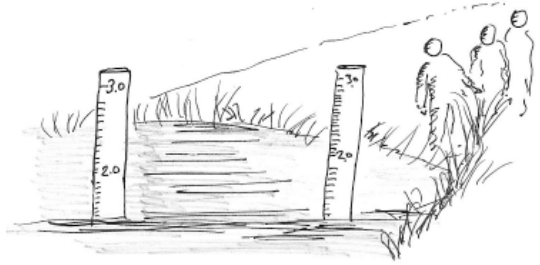


Monitoring and warning systems

In areas at risk of flooding, it is important to establish a simple method of monitoring the increase in water depth, so there can be some warning of an approaching flood.

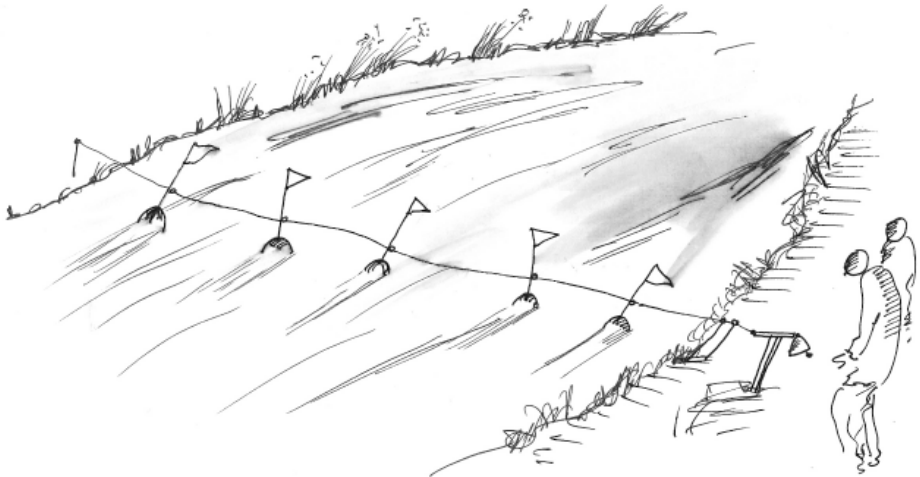
Depth marker posts

In some countries, communities place a series of bamboo poles in a river, with depth marks (as on a ruler) along the pole. Three colours are often used – green at the bottom, meaning 'safe', yellow in the middle, meaning 'be alert' and red nearer the top, meaning 'danger'. This gives an indication of how quickly the water is rising. During heavy rain, some community members should be given the task of monitoring the water level and warning the community if the water reaches the danger level (marked in red).



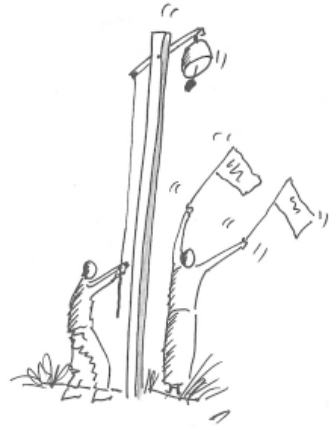
Rope and bells

One community in the Philippines ties ropes over the rivers, with flags and small bells attached. If the river level rises, the bells ring, alerting people to the danger.



Raising the alarm

Once the water has risen above the danger level, all members of the community must be alerted, and those in danger must be asked to move to higher ground. Many communities have developed ways of passing on warnings: these include drums, school bells, church bells, mosque loudspeakers, gongs, mobile phones, bicycles and megaphones. In flash floods, the water rises very quickly. Where mobile phones are working, messages can be passed by mobile from upstream to downstream locations, alerting people of approaching floods.



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Preparing at family level

Families in flood-prone areas can make some simple plans to help them cope with floods.

- Where possible, keep a small stock of dry food that requires no cooking or refrigeration – dry fuel and electricity may become unavailable.
- For emergencies, keep a portable radio, some cooking equipment, a torch and spare batteries. Matches and candles should be included and stored in a plastic bag to keep them dry. These items should be kept ready to be carried, in case you need to evacuate the house during floods.
- Fill water containers with clean drinking water and cover them.
- Family members who cannot swim should be encouraged to keep things which will enable them to float, eg banana tree trunks, plastic bottles or coconuts.



- Keep First Aid supplies and any medicines the family may need readily available.
- Store some essential items (such as sandbags or plastic sheeting) to protect your house and to make emergency repairs. If money permits, some wooden boards and a hammer and nails would also be useful.
- Seed should be double-wrapped in plastic bags or sealed in clay pots and buried in the ground, at a location which can be easily identified later.
- Valuable items, such as papers, money, jewellery or livelihood tools, should be made ready (preferably in plastic bags) to be carried with the family.

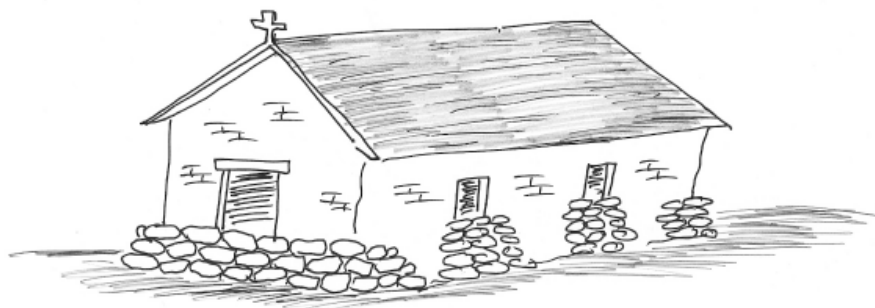


Preparing at community level

There are also actions which the community can take to reduce the risk of loss and damage. The church may be able to help with some of these.

- Everyone in the community should be aware of areas that are at risk of flooding, especially their own homes and assets (see awareness-raising activities above).
- Everyone should know the flood warning signals and the evacuation routes to higher ground. They should also know the location of community shelters, and which one they should go to in an emergency.
- The evacuation routes should be checked to see if everyone can use them, including disabled people. Place white wooden posts along the evacuation route. This will help people to see the pathway, even when flooded or at night.
- Community members should listen to radios for emergency instructions and pass on the information to others who might not have radios.
- Consider recruiting and training a team of volunteers to help with the evacuation and managing the evacuation centre. This was considered in Chapter 2, pages 41–45.
- There should be clear leadership (see Chapter 2, pages 39–41). Keep the phone numbers of government officials.

Preparing the church



The church can take action to protect its buildings and assets. It can also become an important resource for the whole community. Here are some ideas:

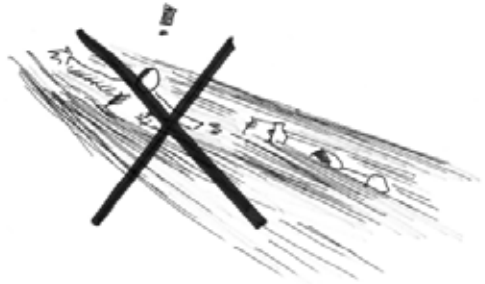
- If sandbags are available, use them to create a barrier around the building or across doorways and exits.
- If you are building a new church in a flood-prone area, build it on higher ground or on a raised platform.
- Strengthen the structure of the church with extra pillars and good foundations, so that it can withstand the pressure of flowing water.
- Dig a small ditch around the building to divert the flood water.
- Raise all important furniture above the threatened height of flood water, or keep things on the roof, protected by plastic sheeting.
- Put all important documents in big plastic bags and seal them tightly.
- Consider whether or not to allow the church building to be used for emergency shelter or storage. Take a decision on this before the flood season. If this is not allowed, consider keeping some tents or plastic sheeting to provide shelter. Allow people to camp in the church compound.

Some other suggestions for church involvement in floods are given in Chapter 2: 'Organising ourselves' (eg training and deployment of volunteers), in Chapter 3: 'Risks, needs and capacity assessments' (eg making lists of useful skills and resources in the church), and Chapter 4: 'Displaced people' (eg emergency shelter, water and sanitation arrangements).

Emergency response – saving and preserving life

Here are some basic tips on the immediate response needed when flood warnings are given. These ideas may save the lives of people caught up in flood waters.

- Flood preparedness plans (family, community and church) should be activated as soon as news of rising flood waters is received. Use the agreed methods of raising the alarm and encourage people, especially the most vulnerable, to go to flood shelters.
- Volunteer teams, if trained and prepared earlier, should be activated for immediate work, to prepare evacuation sites and assist the more vulnerable people to reach those sites.
- Check that all church/community members are safe. Some may still be trapped on the roofs of buildings or in trees.
- Do not enter fast-moving water to rescue people unless you are secured by a rope to a tree or a group of rescuers. It may also be useful to have some form of buoyancy aid, such as sealed plastic containers, a bunch of coconuts or banana tree trunks.
- Be aware of collapsing banks, which create extra risk when people are entering or leaving the water.
- If canoes, rafts or dugout boats are available, use them to reach people who are trapped in buildings or trees or on isolated areas of high ground.
- If the church is being used for shelter, church members may be able to lend some blankets or dry clothes, especially for elderly people or young children.
- Remind church/community members that flood waters can be contaminated with sewage and with dead bodies of animals. Flood water should not be drunk unless it is first purified by tablets, filtration or boiling (if fuel is available). (See also Chapter 4: 'Displaced people', pages 109–111.) After flooding, all exposed food should be thrown away to prevent the spread of disease.



Discussion questions

After you have read the material so far, discuss these questions with your co-leaders and church members:

- *Where can you obtain reliable information about approaching floods? Is this available from government officials? Or from local radio stations? How could this information be improved?*
- *What could your church do to pass on warnings about floods? (For example, use bells.) Are there any sounds/noises that are already used in your community to call people together or to give warning? What other sounds or noises could be used?*
- *Can you think of other ways in which flood awareness and flood preparedness information could be passed on through the various groups within the church? How could the church help the community to make flood contingency plans?*
- *Some people choose to build in flood-prone areas. Are there ways that such people could develop relationships with people living on higher land, so that families can evacuate to these areas during times of flooding? Can the church help to set up these relationships?*
- *How can communities ensure that everybody knows the safest route to high ground and the location of emergency shelters? What could the church do to contribute to this?*
- *Can the church building be made available as an evacuation centre? What are the points for and against using the church in this way? What would need to be done to prepare the church building for use as a flood shelter?*
- *What could the church do to make sure that the weakest people in the community (elderly people, pregnant women, young children and people with disabilities) are helped to safety?*
- *Floodwaters can be very powerful and wash away roads and bridges. Sometimes, vehicles as well as people may be washed away in strong water currents. How can roads be made safer for use during times of flood? (One possible answer may be to plant trees along the edges of roads to help mark their position, or to put a line of posts or poles alongside the road with their tops painted white.)*
- *What materials are available to build rafts or boats to help evacuate people? (For example, banana trees.) What materials could be used to make personal life-saving floats? (For example, coconuts, empty plastic bottles and barrels.)*

- *What methods could be used to mark the location of the more vulnerable people in the community? (For example, flags on houses.)*
- *What can the church do if some people, especially elderly people, refuse to leave their homes after a severe flood warning is given?*

Flood mitigation

Communities can undertake a number of low-cost activities in the longer term to reduce the impact of floods. These are called *mitigation*: some ideas are suggested below.

Tree planting

In flood plains, trees help to absorb the water and reduce the speed of water flow during flooding. They also provide protection from floating debris, which can cause further destruction as it gains speed across the flooded area. Setting up community plantations or 'wood-lots' may also provide a source of income for funding small community projects and other flood protection initiatives.

Before planting trees, obtain expert advice on the most suitable ones to plant. Avoid trees that draw up excessive amounts of water, and do not plant trees close to houses.



Raised roads

Roads provide a vital form of communication and often a major route of evacuation for people affected by a flood. In low-lying areas, it is good to raise the height of roads, using soil from the surrounding area. This also acts as a flood barrier and can help slow down the spread of a flood. In addition, trees can be planted along the roadside to protect the road from being washed away. Culverts should pass under the road to allow drainage afterwards.



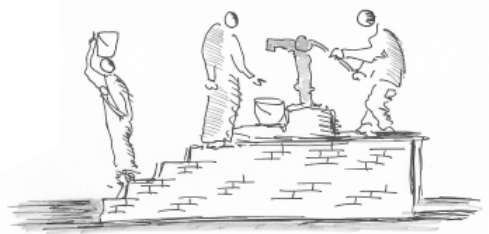
Ditches and dykes

Ensure that ditches and dykes are well maintained and free of debris. Dykes should be checked during heavy rain for cracks or breaches. Culverts/drains under the dyke are a good idea, but there should be some system for closing them to keep water out when levels are rising. When flood water is receding, water should pass freely through the culvert and drain away from the flood area. As water run-off is more rapid in urban areas, ensure culverts and drains are also clear of rubbish and well maintained. Ditches can sometimes be used to channel water away from key buildings, homes and farming areas.



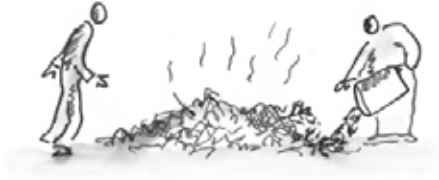
Raised water pumps

In flood-prone areas it is important to raise the height of the water pump above the threatened level of a flood. This will prevent the water source being contaminated by flood water containing sewage and the dead bodies of humans and animals. These raised pumps should be located near to areas of high land, where evacuated people will congregate.



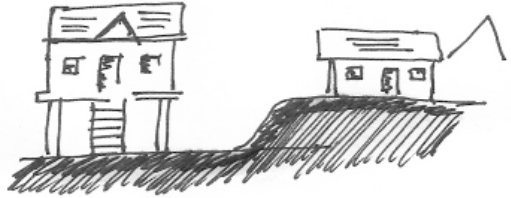
Removal of rubbish

Where possible, encourage the community and/or local authorities to have all rubbish either removed on a regular basis or contained or buried, so that it doesn't contaminate the flood water.

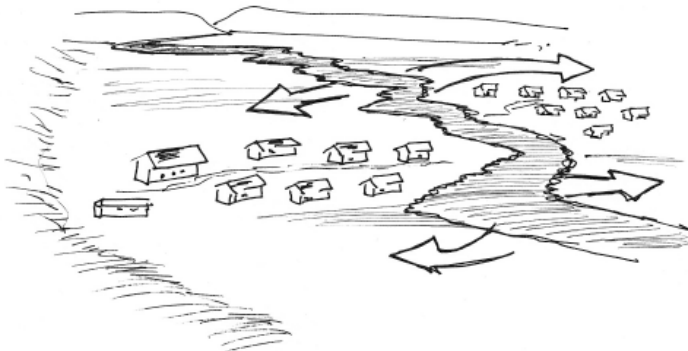


Areas prone to frequent flooding

In coastal areas, a major problem is the deposit of sand and silt into houses and buildings. It is important for the community to adapt new housing to the risk of flooding, for example, by building houses on stilts, or by creating mounds of earth on which houses can be built.



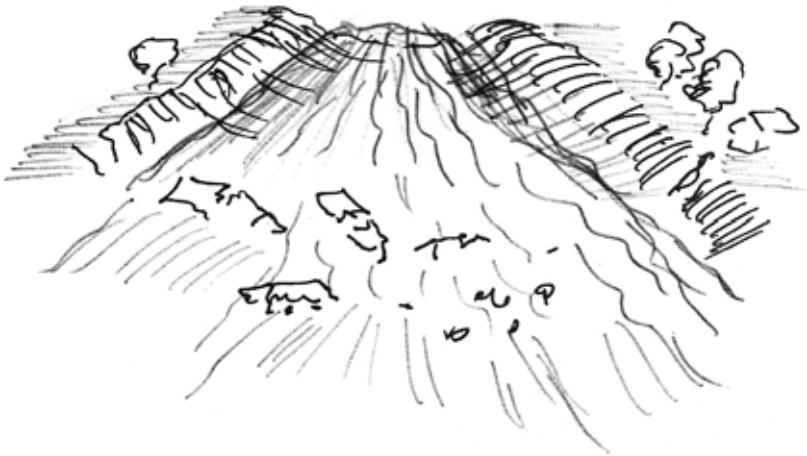
River banks can erode rapidly during floods, especially if the banks are near vertical. Any buildings – and people in them – can fall into the river with little or no warning. Houses built near the rivers are often on cheap or unwanted land and occupied by poor families who have nowhere else to build. The church can highlight the risks and advocate on their behalf for new housing in safer locations.



New settlements should not be built on river flood plains which have a continued risk of flooding – this would put lives and property at risk. These are often in areas of low-price land, and the government may have little or no interest in providing any form of flood protection.



Houses built in or near to dry river valleys are at risk from flash floods. These floods may have been rare events in the past, but could become more frequent and more serious in future. Climate change is likely to create more extreme weather, such as heavy storms which trigger flooding. The church can use risk mapping to show people these dangers and to suggest moving to safer areas (see pages 70–79).



Case study

The church prepares for annual floods in north-east India

The Brahmaputra River floods every year, from June to September, and can become up to 45km wide. Tens of thousands of communities live along a 500km stretch and become surrounded by water. When there is particularly heavy rain, it erodes the higher land and destroys infrastructure.

Scattered Christian communities live throughout this area, a small minority in a predominantly Hindu population. These local congregations became the focal point of a disaster management programme that tried, for the first time, to reduce the destructive power of this mighty river and protect people's lives and property. At the same time, it challenged unhelpful worldviews – people's thinking was dominated by negative views of the river.

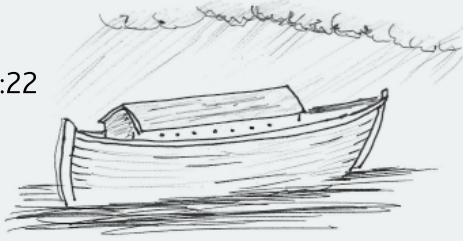
This initiative included practical activities such as extensive tree planting, improved and protected wells and water sources, and improved roads and bridges. In addition, there was leadership development and community organisation in preparing local disaster plans, and training teams of volunteers. Boats were provided in communities where there were none.

The local government recognised this initiative as an example which could be replicated in other areas of the Brahmaputra river basin.



BIBLE STUDY**The Flood** Genesis 6:9–8:22**Background**

Constant rain for 40 days caused a total flood of the world's surface to a minimum depth of seven metres (Genesis 7:20) for 150 days. The flood completely destroyed the human and animal populations (except those with Noah).

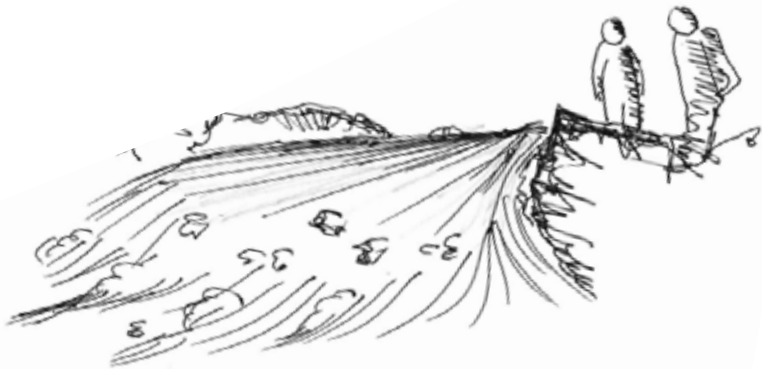
**Key points**

- Noah was warned by God that a flood was going to take place, and he responded by making a preparedness plan and assembling the necessary resources. Churches can play a key role in bringing communities together to prepare for the threat of disaster.
- Noah's preparation included making provision for the duration of the flood (food) and the period after the flood (male and female animals). Churches and communities should also be careful to prepare for possible disasters, including planning for the days during the disaster and for the recovery period afterwards.
- Noah used appropriate methods to monitor the flood situation (sending out a bird), so as to know when to move from survival activities to the rehabilitation phase (resettling on the land). It is important to keep the changing disaster situation under constant review and to adjust our activities accordingly.
- Following the flood, Noah and his family resettled in a less flood-prone area – the mountains of Ararat (Genesis 8:4) and resumed their livelihoods. Disasters should be used as an opportunity to reduce vulnerability, as people are often more open to change at this time.

Questions

- 1 *This particular disaster was the result of widespread disobedience to God's laws. Is this true for other disasters? What passages in the Bible suggest that disasters are not the result of sin?*
- 2 *Noah was warned by God about the approaching flood. What warnings are available to tell us that floods are coming? What traditional methods do you know, as well as the weather forecasts?*

- 3 *Noah was given very precise dimensions by God for building the ark, a very large wooden boat. Engineers tell us that the proportions (the ratio of length to width to height) are about right for a vessel of this size. What other instructions did God give Noah to ensure that air-breathing animals survived the flood and were able to repopulate the earth afterwards? What are some of the things we must do to prepare for a flood?*
- 4 *The Genesis account says very little of the reaction of other people to Noah's boat-building activity. How do you think they felt? What comments might they have made to Noah, given that the boat was far from the sea? What opposition might face us if we try to make preparation for a disaster, and how can we overcome that opposition?*
- 5 *In what ways can churches build a good relationship with their community, so that the church is able to take a lead in preparing for a disaster?*
- 6 *How can we learn from previous disasters to prepare for future disasters?*



Review of this chapter

- *What are some of the main causes of flooding?*
- *Describe some of the ways of raising awareness of flood risks in a community.*
- *Describe some of the early warning systems which can be used by local communities.*
- *Why are women sometimes at greater risk than men during floods?*
- *In areas of frequent flooding, what can families and communities do to prepare for them? What can the church do to prepare?*
- *What are some of the mitigation measures that communities can take to reduce the losses during future floods?*
- *How can we protect churches and other buildings from flood damage?*