



Keeping the water away

New approaches to flood control

- A. Recently, winter floods on the rivers of central Europe have been among the worst for 600 to 700 years, and dams and dykes (protective sea walls) have failed to solve the problem. Traditionally, river engineers have tried to get rid of the water quickly, draining it off the land and down to the sea in rivers reengineered as high-performance drains. But however high they build the artificial riverbanks, the floods keep coming back. And when they come, they seem to be worse than ever.
- B. Engineers are now turning to a different plan: to sap the water's destructive strength by dispersing it into fields; forgotten lakes and flood plains. They are reviving river bends and marshes to curb the flow, and even plugging city drains to encourage floodwater to use other means to go underground. Back in the days when rivers took a winding path to the sea, floodwaters lost force and volume while meandering across flood plains and inland deltas, but today the water tends to have a direct passage to the sea. This means that, when it rains in the uplands, the water comes down all at once.
- C. Worse, when the flood plains are closed off, the river's flow downstream becomes more violent and uncontrollable; by turning complex river systems into the simple mechanics of a water pipe, engineers have often created danger where they promised safety. The Rhine, Europe's most engineered river; is a good example. For a long time engineers have erased its backwaters and cut it off from its plain. The aim was partly to improve navigation, and partly to speed floodwaters out of Alps and down to the North Sea. Now, when it rains in the Alps, the peak flows from several branches of the Rhine coincide where once they arrived separately, and with four-fifths of the Lower Rhine's flood plain barricaded off, the waters rise. The result is more frequent flooding and greater damage. The same thing has happened in the US on the Mississippi river, which drains the world's second largest river catchment into the Gulf of Mexico. Despite some \$7 billion spent over the last century on levees (embankments) the situation is growing worse.
- D. Specialists in water control now say that a new approach is needed - one which takes the whole landscape into consideration. To help keep London's feet dry, the UK Environment Agency is reflooding 10 square kilometres of the ancient flood plain of the River Thames outside Oxford. Nearer to London, it has spent £100 million creating new wetlands and a relief channel across 16 kilometres of flood plain. Similar ideas are being tested in Austria, in one of Europe's largest river restorations to date. The engineers calculate that the restored flood plain of the Drava River can now store up to 10 million cubic metres of floodwater, and slow down storm surges coming out of the Alps by more than an hour, protecting towns not only in Austria, but as far downstream as Slovenia and Croatia.
- E. The Dutch, for whom preventing floods is a matter of survival, have gone furthest. This nation, built largely on drained marshes and seabed, has had several severe shocks in the last two decades, when very large numbers of people have had to be

evacuated. Since that time, the Dutch have broken one of their most enduring national stereotypes by allowing engineers to punch holes in dykes. They plan to return up to a sixth of the country to its former waterlogged state in order to better protect the rest.

- F. Water use in cities also needs to change. At the moment, cities seem to create floods; they are concreted and paved so that rains flow quickly into rivers. A new breed of 'soft engineers' wants cities to porous, Berlin is one place where this is being done. Tough new rules for new developments mean that drains will be prevented from becoming overloaded after heavy rains. Architects of new urban buildings are diverting rainwater from the roofs for use in toilets and the irrigation of roof gardens, while water falling onto the ground is collected in ponds, or passes underground through porous paving. One high-tech urban development can store a sixth of its annual rainfall, and reuse most of the rest
- G. Could this be expanded to protect a whole city? The test case could Los Angeles. With non-porous surfaces covering 70% of the city, drainage is a huge challenge. Billions of dollars have been spent digging huge drains and concreting riverbeds, but many communities still flood regularly. Meanwhile this desert city ships water from hundreds of kilometres away to fill its taps and swimming pool. Los Angeles has recently launched a new scheme to utilise floodwater in the Sun Valley section of the city. The plan is to catch the rain that falls on thousands of driveways, parking lots and rooftops in the valley. Trees will soak up water from parking lots; houses and public buildings will capture roof water to irrigate gardens and parks, and road drains will empty into old gravel pits to recharge the city's underground water reserves. Result: less flooding and more water for the city. It may sound expensive, until we realise how much is spent trying to drain cities and protect areas from flooding, and how little this method achieves.



Questions 1-6

Reading Passage 2 has seven paragraphs, **A-G**,

Which paragraph contains the following information?

Write the correct letter. A-G, in boxes 1-6 on your answer sheet

- 1..... how legislation has forced building designers to improve water use
- 2..... two reasons why one river was isolated from its flood plain
- 3..... how natural water courses in the past assisted flood control
- 4..... an example of flood control on one river, affecting three countries
- 5..... a country which has partly destroyed one of its most typical features in order to control water
- 6..... the writer's comment on the comparative cost effectiveness of traditional flood control and newer methods

Questions 7-8

Choose **TWO** letters **A-E**.

Write the correct letter, in boxes 7-8 on your answer sheet

According to the article, which **TWO** of these statements are true of the new approach to flood control?

- A It aims to slow the movement of water to the sea.
- B It aims to channel water more directly into rivers.
- C It will cost more than twice as much as former measures.
- D It will involve the loss of some areas of land.
- E It has been tested only in The Netherlands.

Questions 9-13

Complete the sentences below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer. Write your answers in boxes 9-13 on your answer sheet.

9. Some of the most severe floods for many centuries have recently occurred in parts of 9.....
10. The Rhine and the 10..... rivers have experienced similar problems with water control

11. An area near Oxford will flooded to protect the city of **11**.....

12. Planners who wish to allow water to pass more freely through city surfaces are called **12**.....

13.A proposal for part of the city of **13**..... could show whether small-scale water projects could apply on a large scale.