

Norway and global warming

Teachers' Notes

When considering global warming, Norway is probably not the first country to come to mind. It could, however, see significant changes, mainly in the north and especially in the islands of Svalbard.

The case study explores some the current and possible future effects of global warming on the country. It should be borne in mind that the whole subject is surrounded by doubt. There is, for instance, uncertainty about the rate at which warming is taking place, though predictions suggest that it is increasing. There is even more doubt about its consequences, but it is becoming clearer that more is involved than just a rise in temperature. All aspects of weather and even the circulation of ocean currents are likely to be affected.

Pages A and D are concerned with the trend towards warming and, briefly, with its causes. The causes are dealt with in many textbooks and although it is not thought necessary to duplicate them here, it is important for students to research them in order to answer some of the questions. In relation to warming in the Arctic, the importance of albedo should be emphasized since there is positive feedback that surface changes contribute to a faster rate of warming in the Arctic.

The polar bear seems to be the main loser. Problems associated with its loss of habitat are aggravated by long-range pollution, which is brought by air and sea from industrial countries farther south. Loss of food supply is less certain, but could depend on the fate of polar cod – the main food for seals and an important link in the food chain – which live in very cold water. The rate at which water warms up may decide whether it can adapt, migrate, or survive but in a reduced range.

Pages B and E deal with the effects of warming on land, mainly in the north. The melting of the permafrost may have less serious repercussions in Norway than in Alaska, where oil drilling and transport are important economic activities. It does, however, present dangers to structures of all kinds. A rise of 2°C has been estimated to cause a 50% fall in the load-bearing capacity of the earth beneath buildings. There could also be danger to the pylons that support ski lifts.

Hydrology would change, too. Extra water cannot drain easily through soil that may still be frozen at depth, and this water would increase river volume and cause greater erosion. Students should be aware that anything, such as slumping or erosion, which exposes soil to the air would release greenhouse gases and add to global warming.

As temperatures rise, the growing season increases with consequences for forestry and for farming. Exercises are devised to show the tendency for vegetation belts to move northward, as well as upslope. Crop distribution is less likely to change – topography may prevent it – but yields may increase. Both forests and crops will suffer more disease and insect damage.

Students should understand the relationship between temperature and precipitation. There is unlikely to be increased precipitation in all parts of Norway. The west is most at risk. Snowfall amounts are imponderable but less frequent, nonetheless heavier snowfalls are expected. This is of particular concern to tourism and transport and the construction

industry, which has to ensure the safety of buildings under heavier weights of snow.

Pages C and F look ahead to possible dangers. Norwegians are fairly relaxed about the rise of sea level because of the nature of their coastline. Two factors may change this reaction. First, predictions for the scale of rise in sea level are growing. Secondly, the number and intensity of winter storms are expected to increase. These events occur with a steep gradient between low pressure over Iceland and high pressure over the Azores in winter, and it is thought that global warming has helped to accentuate that gradient.

Economic activity on the west coast is important to the Norwegian economy, especially oil and gas. Fish farming is less valuable, but more vulnerable. Warmer water will help the fish to gain weight more quickly, but severe storms may wreck the installations.

The possibility that the North Atlantic Drift might be weakened or even diverted seems unthinkable. However, there is evidence that the flow of cold water to the south has reduced and further melting of the ice can only reinforce that trend.

Apart from cooling Norway, there will be a serious impact on fish stocks if the stirring up of nutrients from deep water is reduced. The process will be slow, but it has been suggested that effects could be felt in thirty years. It cannot be emphasized too strongly that global warming will affect all aspects of the weather cycle, not just temperature.

CREDITS

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