

## **Long term problems caused by coastal erosion**

I should like to thank Lord Bridges for introducing this timely debate. This gives me the opportunity to make my maiden speech on a topic that could hardly be more important for this House, namely the future of our coast and of the endangered communities which reside there. My great grandfather built a home in Seagrove Bay, Isle of Wight on clay foundations - it slipped into the sea 40 years later! I am sure that the new Baron Oakshott of Seagrove Bay whose home is nearby will be more fortunate.

I was trained as an engineer specialising in hydrodynamics which led on to a career in universities, industry and consulting. I worked on practical and research problems concerned with the environment, meteorology and climate. I developed an interest in coastal problems and sea level rise when, for five and a half years, I was responsible for climate change research at the Hadley Centre which is part of the Meteorological Office. As Chief Executive of a trading fund agency of the Ministry of Defence, I oversaw more than 30 contracts with departments and agencies of government. I concluded that Government can deal efficiently with complex problems through well constructed devolved arrangements between responsible agencies.

I should like to raise a few points about how Government and other responsible organisations can best manage the effect of climate change on coastal erosion. It is, I believe, a custom that a maiden speech is not controversial. Therefore, it is fortunate that in this country global warming is an accepted fact. International research has concluded that as a result of human emissions of greenhouse gases, averages of ground level air temperature will rise between 2 to 3°C over the next hundred years and this will produce average rises in sea level between 0.3 to 0.5m over that time. One hopes that the efforts of the international community, in which the U.K. plays a leading role, will be successful in reducing emission of carbon dioxide and other greenhouse gases. But even then the sea level would continue to rise for another 100 years or so.

Another consequence of climate change is the likelihood in increasing floods driven by high winds and bigger ocean waves reaching the coast.

The forecasting of coastal floods are now generally reliable thanks to the computer models developed by the Proudman Oceanographic Laboratory and the Meteorological Office. These enable warnings to be given up to five days in advance in some situations. They are used in the operation of the Thames Barrier and for flood warnings to communities. But such forecasts and warning procedures and complementary to the long term measures that have to be introduced for managing these coastal areas over the next hundred years. These will be also very expensive and may involve communities in considerable upheaval. The government has a particular responsibility to explain these developments and to ensure that appropriate investigations and basic research are undertaken now to ensure that the right decisions are taken.

I was interested to read that in 1998 the Agriculture Committee and the speakers in the following debate, in the other place, all agreed about the progressive worsening of coastal flooding problems, and that climate change would further exacerbate them. They and the government have agreed that flexible approaches are needed, with 'hard' engineering solutions in some areas, but 'adaptive' solutions in other areas, to allow for controlled flooding of salt marshes and to develop the agriculture and landscape appropriately. It may even be possible to develop new economic activities, such as fishing and tourism from rising sea levels, as some coastal areas return to the forms they had hundreds of years ago. Historians have noted that there was as much employment in East Anglia before the fens were drained as afterwards. This brings me to the first of my three points.

Choice of appropriate technical, economic and ecological long term solutions are at this stage of our knowledge quite uncertain. Despite the recent advances in the subject based on the contributions of the great Victorian giant of hydrodynamics, Lord Kelvin who was in this House and Sir George Gabriel Stokes who was M.P. for Cambridge University in the other place, there are still major uncertainties in how large waves and current interact in coastal waters. In geology there are uncertainties about how coastal sediments will move as the sea level rises. Engineering predictions can be at fault. There have been recent examples of sea defence works that have damaged the local environment and deterred tourism.

Not surprisingly, local communities now want to know more about these and all other environmental developments, what to expect and with what confidence technical solutions are being proposed. So it is essential that there be no further reduction in the research budget of MAFF. The research results must be widely published as they become available. The Royal Society has made this point in recent submissions to the Government's Chief Scientist.

Next, as the Agriculture Committee indicates, there should be international comparisons, and I would add collaboration, in dealing with these problems. As Chief Executive of the Meteorological Office I was the U.K. representative at the World Meteorological Organisation, which is the United National technical agency responsible not only for meteorology and climatology, but also the practical aspects of flooding and water resources. However, despite the huge economic and social importance of operational hydrology this activity receives within that organisation about 20% of the funds received for meteorology. I called attention there and in Whitehall to this anomolous situation, which is based on the misguided distinction between meteorology as being international and hydrology as national because flooding and water movement is local, whereas the wind blows across continents. The fact is that coastal problems and rising sea levels is also a huge international problem. Our European neighbours in the Netherlands have much to tell us; their research and practical experience is second to none. I believe the U.K.'s work should be developed in an international context. Meteorology greatly benefits from regular international comparisons, in which incidentally the Meteorological Office does very well; hydrology should be moving in the same direction.

In my last point concerning the question of leadership in this field, I welcome the emerging consensus that the Environment Agency should be more emphatic in its technical and administrative roles for coastal and flooding problems. Therefore it would be natural if it becomes the lead agency for representing the U.K. or the World Meteorological Organisation in operational hydrological matters, and contributing to the costs of these activities. Currently this position is held by an excellent research establishment, the Institute of Hydrology, but they cannot provide the requisite funding.

I should like to thank the House of Lords Library for their help with background material. I thank your lordships for your patient attention to these important technical and administrative issues. I hope I may be able to return to them in later debates.