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Re-framing Flood Control in England and Wales

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ABSTRACT

Traditionally floods have been understood to be acts of God or nature, with localised impacts afflicting those who choose to live or to invest capital in lowland and coastal locations. This central idea of causation, located outside human agency, survives somewhat precariously today, but is reflected in the lack of any right to protection from flooding in England and Wales. However in 1930 new legislation institutionalised a social framing of the impact of floods as part of a wider national problem. This related the interests of lowland agriculture and land drainage to the national economic and military interest. Modernising and expanding agricultural production was a political priority from the 1930s to the 1980s. The cost of preventing flooding and draining land was transferred from the affected landowners to the nation as a whole. River and coastal engineering was central to the new policy, and by the early 1970s much of the riverine and coastal environment was radically altered by flood defence structures and associated land drainage. As a result of food over-production and conflicts with conservation interests in the early 1980s, the emphasis has shifted from drainage to flood defence, while risk reduction and environmentalist values have also been promoted. The institutional arrangements from 1930 largely survive, however, and a new coherent social framing has failed to emerge. It is argued that for a risk-oriented framing to succeed, new assumptions about causation and a new ethical outlook are now needed. Emphasis on flood 'control' rather than 'defence', and a shift in priorities from economic benefits towards human rights and intrinsic value in nature are proposed as key elements in such a re-framing.

KEYWORDS

Flood risk, flooding, agricultural land drainage, social framing, intrinsic value in nature, human rights

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INTRODUCTION AND HISTORICAL OVERVIEW

Owing to its wet climate, its broad physical geography, and its slowly sinking east coast Britain once had very extensive 'wetlands'. This is a modern term, however, and as recently as 1927 a Royal Commission on Land Drainage referred to these areas as 'vast unhealthy washes' and 'swamps' that needed to be eliminated by draining (Cmnd. 2993, para. 7, quoted in Bowers 1998:75). Purseglove (1988) provides an overview of traditional attitudes towards wetlands in England held by people living on drier land: they were unfathomable, dangerous, disease ridden places, populated by backward peasants with a liking for drink and drugs. Samuel Pepys, a London diarist, wrote in 1663 of the 'most sad fennes' (now a rich agricultural area north of Cambridge – the Fens) and the 'sad life' of its people and their 'breedlings'. The people living in such areas took a different view: the wetlands were familiar and provided a livelihood in the form of seasonal grazing, hunting and fishing. To modern environmentalist sensibilities, their way of life appears preferable in many ways to the intensive arable agriculture that has replaced it.

Perhaps the first outsiders to perceive the richness of the wetland soils for cultivation (provided unwanted water could be removed) were the Romans: remains of their sea defences can be seen at Romney Marsh in Kent. It was here also that King Henry III issued a charter in 1252 allowing the 'Lords of the Level' to levy rates on land occupiers, to pay for collective provision of flood defence and drainage channels. In 2002 The Association of Drainage Authorities (ADA) commemorated the 750th anniversary of the creation of this forerunner of today's 'internal drainage boards' (IDBs) (ADA, 2002: 25). Before the sixteenth century the church and monasteries remained the major landowners and organisers of land drainage. Most wetlands survived as common land supporting diverse agricultural and fishing economies, despite regular inundation. In 1532 Henry VIII instituted the Commissions of Sewers to adjudicate on disputes between 'adventurers' wishing to drain an area (and profit from the increase in land value) and the commoners and small landholders living there. A hundred years later, Oliver Cromwell defended the commoners in a dispute with the Crown over drainage of the southern Fens. After the civil war (and Charles I's execution) he returned to the Fens to himself oversee completion, in 1653, of the major channels still used in the Ouse catchment. Windmills, and later steam power, were introduced to overcome the problem of land shrinkage, and dredging used to deal with channel siltation

The eighteenth and nineteenth centuries saw the rise of capitalism, British imperialist expansion, and widespread enclosure and drainage of common land by private interests. In the mid-nineteenth century, from a national position of wealth and security, the newly powerful industrialist class discovered the merits of free trade, and removed agricultural protection. This opened Britain's grain markets to cheaper foreign imports and sent its agriculture into a depression

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that lasted from 1870 until after 1945. Deterioration of drainage infrastructure and declining domestic food production during the agricultural depression were central to arguments for the new institutional arrangements for land drainage introduced in 1930 (Sheail, 2002). Food shortages became a serious threat when the Germans blockaded British ports in both World Wars. Flood defence and land drainage, paid for by general taxation and property rates, was to play an important role in raising agricultural production during and after the Second World War.

The legislative and institutional arrangements necessary for this were created in the Land Drainage Act 1930, discussed in more detail in Section 2. This created three types of drainage authorities with wide ranging permissive powers to build structures and install machinery for drainage purposes. Forty-six Catchment Boards were given powers to carry out 'arterial drainage' (flood defence) works on main rivers. Internal Drainage Boards (IDBs) were given powers on smaller rivers and drains in wet lowland districts. Local authorities dealt with other non-main rivers. A complex system of rating and levies between the drainage authorities was created to fund routine drainage works, and a system of grant aid for new capital works was also created, overseen by the Ministry of Agriculture. This three-way division of powers and funding system survived for 70 years, though it became progressively more centralised. Today flood defence is overseen by the Environment Agency, which is the sixth generation successor to the Catchment Boards. It operates in a legal and institutional framework that is essentially unchanged in key respects since 1930.

The 1930 arrangements proved highly successful. Initially the Catchment Boards concentrated on 'improvement' of 'arterial drains' (large rivers) by widening, deepening and straightening them, and removal of trees and other vegetation. Field drainage itself picked up a little later when it attracted direct subsidies, and once protected markets for the resulting agricultural produce had been re-established after 1945 (Bowers, 1998). In 1953 a tidal surge caused widespread flooding on the East Coast of England, with the loss of over 300 lives. Major coastal defence works were then also initiated, enabling land drainage for agriculture (and indirectly, property development) along the coast. By the 1970s grant-aided field drainage was proceeding at a rate of approximately 100,000 ha per year (Cole, 1976), and then began to come into conflict with amenity, landscape and wildlife protection interests. Grants for lowland field drainage were ended in the mid-1980s, and the emphasis shifted to flood defence.

In the 1980s and 1990s administration of flood defence became increasingly centralised, but with many local drainage boards and local authorities still retaining permissive powers until 2003. Directly promoting new field drainage ceased to be a policy aim in the mid-1980s, and was replaced with a broad flood risk reduction mandate in 1993. Efforts to manage risks other than by building physical barriers to flooding have progressed, and efforts are under way to understand catchment-scale processes and manage floods accordingly.

Meanwhile European environmental legislation presents a real challenge to the principles institutionalised in 1930, and environmental bodies regularly call for a 'paradigm shift' in national thinking about floods and wetlands (e.g. Wildlife Trusts and WWF-UK, 1998). This paper draws some conclusions concerning contemporary policy debates, but the central focus is on the process by which the prevailing paradigm or social 'frame' was created and institutionalised before it began to be deconstructed in the late 1970s.

POLICY PARADIGMS AND SOCIAL FRAMING

The 1930 Land Drainage Act was a pivotal point in a major re-shaping of the collective lens or world-view through which the concepts of flooding and 'flood defence' were given meaning. A new set of ethics, ideas and assumptions were being institutionalised as a new social framing, and brought to bear on collective action. The concept of framing relates to Kuhn's (1962) work on scientific revolutions, and the concept of 'normal science' that dominates periods of scientific stability (paradigms). In these phases science is characterised by puzzle solving, and the central axioms or value judgements regarding scientific method are unquestioned. Hall (1993) provides an account of policy change in terms of 'normal' policy learning and more radical shifts in policy 'paradigms'. Hall argues that such a major change in policy direction is marked by a broad public debate involving politicians and the press, and is linked to electoral competition. This is in contrast to more incremental policy change, relating to the choice of policy instruments and their application. This takes place within bureaucracies, presents a largely technical rather than political face, and may not promote learning at the level of the policy paradigm. However both processes (paradigm shifts and incremental policy change) are characterised by Hall as examples of policy learning, stressing the common role of ideas, experimentation, past experiences and facts in all cases. Majone (1989) developed a similar concept, with a slowly evolving policy 'core' of values and assumptions, put into effect and defended by day-to-day policy making in the policy 'periphery'. Ideas and discourses are central to Majone's model of policy change. Concepts such as 'advocacy coalitions' (Sabatier 1999), and 'discourse coalitions' (Hajer, 1995) have been developed to provide explanations of the role of ideas in political action.

These concepts of policy learning have been developed as a reaction to theories of the policy process that stress the centrality of actors' economic interests, whether derived from neoclassical or Marxist theory. Other critics of economics-based policy theories have stressed the centrality of institutions (rather than ideas), defined as sets of rules and norms that articulate certain duties and values. March and Olsen (1984) stressed that within institutions people are more concerned to act 'appropriately' than to pursue short term economic gain. In terms of social alliances, the policy network approach (Marsh and Rhodes, 1992)

stresses coalitions based on resource dependencies rather than around a set of ideas. Where idealist conceptions of the policy process stress agency, pluralism and free competition of ideas, institutionalist conceptions tend to stress structure and less open political processes. For example Pierson (2000a, b) explored the mechanism of institutional 'path-dependence' that can prevent innovation and limit the capacity to design policies in line with new thinking.

The concept of social framing relates to these idealist and institutionalist conceptions of policy processes. In the words of Jasanoff and Wynne (1998: 5), such approaches to policy analysis seek answers to the following types of questions: 'Why do some issues come to be expressed as matters of policy concern in particular ways, at particular times, in particular locations, and through the efforts of particular groups or cultures? What makes problem formulations change over time or, alternatively, cohere across different historical periods and political systems? How do issues come to be perceived as natural or technical rather than social, as public rather than private, or as global and universal rather than local? And what roles do science and scientists play in these processes of definition and change?'. Referring to the increasing use of risk analysis and related concepts in environmental policy making Jasanoff (1999: 140) states that a 'policy shaping framework such as risk builds upon underlying social models of agency, causality and responsibility. Such frames are in turn intellectually constraining in that they delimit the universe of scientific enquiry, political discourse, and possible policy options'. Frames mobilise the values against which 'risks' and policy 'problems' are judged to exist.

The question then arises as to the genesis and reproduction of these frames. Schön and Rein (1994: 29) argue that focusing on policy actors' interests is misleading in understanding policy disputes, because 'it is the frames held by the actors that determine what they see as being in their interest and, therefore, what interests they perceive as conflicting. Their problem formulations and preferred solutions are grounded in different problem-setting stories rooted in different frames that may rest, in turn, on different generative metaphors.'. They thus stress the role of metaphors and story telling in framing, which they define as the 'operation of selectivity and organisation' in 'the task of making sense of complex, information rich situations'. Miller (2000: 218) also stresses the importance of story telling as a source of meaning in frame formation, 'as a counter to the traditional emphasis of science on getting the facts straight. People tell stories to attach meaning to events going on around them, to fit their observations to their values, and to relate that meaning to particular contexts of social behaviour or action'. Some powerful narratives may become 'canonised' by institutions if they serve a particular social order, such as the story that links small farmers to deforestation in Africa. Hardin's (1968) 'tragedy of the commons' is a strong candidate for an example of a canonised narrative, using fears of resource degradation to serve the interests of privatisation of common property.

Miller suggests two further mechanisms of frame formation. Firstly framing can be likened to a scientific modelling exercise: complex systems are simplified to draw out their 'essential' characteristics, and general normative principles are specified to contextualise these elements. These models are then elaborated and tested in a variety of policy contexts. Secondly frames may become 'normalised, backgrounded, or 'black-boxed' in the normal routines of everyday institutional practices' and associated data sets (Miller, 2000: 226). Thus assumptions and value judgements slip out of view and become unquestioned, since they are part of activities that are considered normal and legitimate. In the words of the Environment Agency's Chief Economist, '[s]ome ideas may be too novel or different to be accepted readily. Equally there may be some ideas already embedded within the organisation that are so fundamental that they may be hard to identify or articulate as being anything other than common sense or 'natural'' (Palmer 2000: 413). For example in flood defence policy few people ever question the application of cost-benefit analysis, which is essentially a test for national economic efficiency, in a context that was once framed as one of unpredictable and local risks.

The concepts of framing as canonisation and normalisation serve as a reminder that institutional practices as well as ideas are central to the policy process. Some institutional practices emerge from the dominant frame, while others, such as environmental impact assessment, are deliberately introduced with a view to frame change. Miller (2000: 228) suggests that if the original motivations for practices become obscured, then changes in those practices could unintentionally introduce gradual frame change. Conversely institutional practices could persist 'long after the assumptions and value judgements on which they were based have lost credibility'.

A desk study of the history of flood defence in England, and interviews with individuals involved in the sector (many over several decades), suggests that the concept of social framing can provide rich insights into development of the policy sector. This paper explores the process from the turn of the century to the mid-1970s. At that time wetlands were being rapidly lost, and rivers canalised and stripped of vegetation, with very little concern for wider gains or losses, certainly in terms of the natural environment. In the words of one interviewee '...you know, things needed to be done, so you got on with it', and even today cases arise where '...basically you identify a local need and you meet it' (Borrows, 2003: interview).

The reconstruction here begins with the assumptions and value judgements at the core of the frame, and some of the generative metaphors and narratives used to justify policy based around certain ideas and institutions. With these fundamentals in place it is then possible to explain how problems, experiences and policies were given meaning in the policy sector. For example in 1974 the Water Authorities were instructed to collaborate with drainage boards and local authorities to draw up maps of 'problems that might be tackled' (MAFF, 1974:

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1) through flood defence and land drainage. A little over a decade later many of these ‘problems’ were protected nature conservation sites, or the subject of management agreements with farmers for landscape protection

The Land Drainage Act

Prior to 1930 flood defence and land drainage was predominantly a profit-seeking private enterprise, and was financed by the direct beneficiaries. The ‘no benefit, no rate’ principle was laid down in the sixteenth century. A duty to accept whatever amount of water entered one’s land goes alongside riparian owners’ common law rights regarding use of the river and its banks, including the option (but not duty) to prevent flooding. Floods were acts of God or nature, and in a rule apparently going back to Roman law (Howarth, 2001) a riparian owner has a right to protect their land from flooding, with the sole proviso that this does not flood the opposite bank. No responsibilities or duties applied regarding flooding elsewhere on a river. The 1930 Act gave drainage authorities permissive powers to enter and carry out channel works on land owned by others. Again these imply no duty or responsibility to provide protection, and contravene traditional riparian rights. Therefore landowners are compensated financially if any of their land is used in providing defences, even where they are the sole beneficiaries. The concepts of flooding as a local concern and the ‘no benefit, no rate’ principle were also undermined by the 1930 Land Drainage Act.

The repeal of the Corn Laws in 1846 opened British markets to imported agricultural produce, and contributed to an economic depression and low investment in the sector that endured from the late 1870s until the Second World War. During the First World War German submarines made reliance on imported food strategically risky. Price guarantees and government intervention were introduced to increase domestic food production. After the war the government initially continued with a policy of agricultural support and reconstruction, only to return to its *laissez faire* policy in 1921. This move appears to have been part of a deal with the National Farmers Union to remove wage controls for agricultural labourers, and can be understood in the context of the government’s support for coal mine owners in their dispute with their workers over pay (Penning-Rowsell, 1997).

Given the financial constraints on government, and its inability to support industry, it was not politically viable directly to support agriculture between the wars. Experience during the first war with attempts to increase agricultural output, however, had revealed the limitations imposed by the poor state of land drainage. The Land Drainage Act 1918 relaxed the rules allowing the formation of local Drainage Boards, and led to the creation of the catchment-wide Ouse Drainage Board (in the Fens) in 1920. An effort to pursue the principle of organising and paying for flood defence and drainage on a catchment basis had

been attempted in the late 1870s, but failed in the face of opposition from land owners situated outside the benefiting area (Sheail, 2002).

The Ouse Catchment Board ran into similar problems. Initially land up to 8 feet (2.4 metres) above the highest recorded flood level was included in the rateable area, but it proved impossible to collect rates from landowners who perceived that they derived no benefit from the works. Sheail (2002) relates how the political process of finding a way to finance works in the Ouse catchment in the southern Fens set the pattern for the whole of England and Wales after 1930. A Ministry of Agriculture commission was set up to look at the problem, and reported in 1926 that the need for engineering works was urgent or this once rich agricultural area could be permanently lost and return irretrievably to its original condition of 'swamp' (Sheail, 2002: 259). They prescribed levying rates on all property owners within the catchment for half of the cost of engineering works, and for Treasury grant aid to cover the remaining 50%. The new rates were to be based not on land area (with its clear relationship to total rainfall received and to be conveyed through the lowlands to the ocean), but on the value of property owned. This would transfer much of the financial burden on to urban ratepayers, and sever any logical connection to derived benefit for those living outside drainage board areas.

A Royal Commission report in 1927 (Cmnd 2993, quoted in Bowers, 1998: 75) echoed many of the 1925 report's findings, and extended similar recommendations to the whole of England and Wales. It argued that lowlanders had reclaimed 'swamps' and 'vast unhealthy washes' to create the 'most valuable lands in the kingdom' but that since then increased development and field drainage in the uplands had created a greater burden in terms of water flow for the lowlanders. An ulterior motive is identified by Sheail (2002: 262): it was politically difficult to provide direct support to agriculture at this time, but Lord Bledisloe, the Royal Commission's chairman, had noted that financing river engineering could more easily be justified. In 1929 local government rates on the value of agricultural land and buildings were abolished. In 1930 The Land Drainage Act created 46 Catchment Boards with powers to levy local governments and permissive powers to carry out engineering works on main rivers. Given the 1929 reforms, by far the greatest part of the financial burden was to fall on urban property owners.

The 1930 Land Drainage Act also gave IDBs powers to levy rates on land within their wet lowland areas, and permissive powers to enter land and carry out works on any 'non-main' channel in their 'drainage district'. In 1933 the Ministry of Agriculture, which was to oversee the new institutional arrangements, clarified the boundaries of these districts. They were to follow the 1918 ruling, i.e. the benefiting area was defined as extending 8 feet (2.4 m) above the highest known flood level. Local governments were given similar powers for non-main channels where such districts did not exist. Exchequer grants for capital investments by Catchment Boards were also instituted in 1930. In negotiations prior

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to the legislation, the Chancellor of the Exchequer had objected that such grants would be 'a sheer gift to the landowners' (quoted by Sheail, 2002: 265). However the Chancellor was convinced by the argument that central government should contribute to the capital cost of works, provided it retained a veto and control over the rate at which grants would be offered in each catchment.

The arrangements described above remained largely unchanged into the twenty-first century. For over 70 years financing was by a combination of exchequer grant aid, and rates on landowners (only ever exercised by IDBs and the Anglian catchment body) and property owners, with a complex system of levies between the catchment organisation, the IDBs and local authorities. The system of rates and levies originated with the principles of local decision making and beneficiaries paying, but in later years it served to conceal the fact that in most instances all of the money in fact came from the Treasury, via reimbursements to rating authorities. Each of the three types of drainage authority (or 'operating authority' since 1989) had permissive powers to carry out works on certain watercourses, but the Ministry of Agriculture retained central control on new investment through the allocation of grants for capital works.

Implementing the Act

Arguments relating to the creation of employment were influential in the successful passage of the 1930 Act through parliament (Sheail, 2002), particularly since many jobs had been lost in mining. As the economic depression of the 1930s progressed the system of grant aid was extended to IDBs and county councils (in 1937). Initially, however, farmers did not welcome the investment made on their behalf. In order to benefit they needed to make their own investments in field drainage. Given the depressed state of the agricultural economy they saw no financial benefit in expanding production (Bowers, 1998). The Catchment Boards went ahead with works on main rivers, but the impact on food production was small. In the late 1930s the government experimented with financing programmes of drainage 'winter works', ostensibly to relieve seasonal unemployment in agriculture (Bowers, 1998). With the onset of the Second World War, grants for field drainage itself were introduced, making the general taxpayer the major contributor to upgrading every part of the drainage system from fields to the coastline.

Food production was clearly a high priority during the Second World War, and was managed on a centralised planning basis by the Ministry of Agriculture. During the war most major capital works on rivers were suspended, but field drainage was promoted, and Catchment Boards carried out some arterial drainage in the upper reaches of main rivers. The Royal Commission on Land Drainage report of 1927 had recommended that 'the first requirement is to clear the main stream of the river beginning with the outfall and working up to the source', but

the move inland was necessary with the coastline vulnerable to attack (Cmnd. 2993, para. 61 quoted in CAWC, 1951:7).

After the war the political landscape had changed, and it now became possible to support farmers' incomes directly through price guarantees. Coupled with the system of grant aid for field drainage, this successfully stimulated conversion to arable production, capitalising on the Catchment Boards' arterial drainage work. Land drainage had demonstrated the benefit of catchment based planning, and other river management functions were progressively added. In 1948 the River Boards Act added fisheries, pollution control and some navigation functions to the remit of the new River Boards. In 1951 the Central Advisory Water Committee of the Ministry of Agriculture and Fisheries reviewed the achievements under the 1930 Act, and set out on a 'search for authorities to exercise control over all watercourses' (CAWC, 1951: 3). Despite the difficulties caused by the war, many main rivers were now in 'a condition fit to receive without detriment an increased flow of water from the uplands' (CAWC, 1951:7). The report recommended a three-fold increase in the length of 'main river' channels to be engineered by the River Boards, and extension of institutional arrangements for works on smaller rivers and field drainage. The report recommended elimination of remaining Commissions of Sewers (which was put into effect) and elimination of local authority drainage functions (which was not).

The 1951 report also recommended, for the first time, a form of catchment-wide planning based on a survey and preparation of maps. These would allocate responsibility for 'watercourses' to River Boards, 'drains' to IDBs and 'ditches' to individual landowners. The 'complete scheme' should be drawn up in consultation with farming and landowning interests and then presented to the Minister of Agriculture for approval (CAWC, 1951, para. 47). The 1951 report includes some interesting recommendations for new definitions of 'watercourses' in terms of institutional capacities (and ambitions): 'Watercourses should include all those channels which it would clearly be unreasonable to expect to be maintained by ordinary agriculture using hand tools...' (para. 42.1: 20); urban watercourses would be 'those whose upkeep cannot reasonably be secured except by bringing them under the control of river boards' (para. 42.2: 20). The latter refers to removing responsibilities from local governments, and into the ambit of the Ministry of Agriculture. In order to finance the expanded role for the River Boards the 1951 Commission recommended a new 'drainage charge' on all agricultural land (para. 148). In the event landowners in upland areas resisted this return to agricultural land rating, and the River Boards accepted only a more modest and selective increase in their responsibilities.

The Land Drainage Act was unusual in the history of river engineering not only in that it was a major overhaul of institutional arrangements, but also in that it was not prompted by any major *flooding* event. The Act defined flood defence as one aspect of land drainage, but from the 1950s flooding began to command more attention in its own right, as a threat to property. In January 1947 rapid

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snow melt caused widespread flooding in the Fens. In August 1952 Lynmouth in Devon was flooded with the loss of 33 lives. Fallen trees blocking bridges in the steep valley river were blamed for causing the flood, and according to Purselove (1988) this prompted widespread upland tree clearance on rivers. On lowland rivers tree clearance in the interest of creating better drains, and even for 'amenity' reasons was already advanced. In 1954, in a paper presented to a meeting of the Hydraulics Engineering Division of the Institution of Civil Engineers, MAFF's Chief Engineer Johnson (1954: 607) wrote that 'So much tree clearance work was done during the first 10 years of the existence of the Catchment Boards that it is now difficult to get a complete picture of the derelict state of rivers before the passing of the Land Drainage Act, 1930'. However he noted that the loss of shade had led to growth of weeds that had become a serious obstruction themselves. At the time of writing mechanical weed control was used, but chemical control looked promising for the near future.

For Johnson (1954: 604-5) '[t]here can be no dispute about the amenity value of rivers and the consequent need to keep them tidy, but there is a tendency for attention to be focused too much on the state of the river channel and perhaps on its capacity to take flood flows than on the results of any flooding that may arise and on the real value of any improvements in terms of food production and the like.' He also argued that agriculturalists often do not know or cannot agree as to what should be achieved, and therefore 'engineers must frequently be prepared to take a lead...' and also ensure that the economic benefits of works justified the costs. Johnson (1954: 628) stated that in the preceding decades there had been 'enormous advances in the design of machines for excavation and bank building and in the science of soil mechanics', but he doubted that there had been any equivalent advance in knowledge and practice of water control.

One could add that in the 1950s there appears to have been very little understanding or concern for the natural environment. In the report of the discussion following Johnson's paper a Mr. J.V Spalding expanded on the issue of weed control in rivers. Apparently the US and Australia 'led' in this field, using either 'hormone type chemicals based on variations of phenoxy-acetic acid' which are sprayed on weeds, or 'chlorinated benzene and aromatic solvents' that can be added directly to river water' (Anon., 1954: 630) but noted that these are lethal to fish and poisonous to livestock. He recommended that river engineers seek the help of mechanical engineers, physicists, chemists, biologists 'and perhaps even the zoologist and the entomologist. He mentioned the last two in all seriousness. No avenue, however unlikely it was, should be left unexplored' (Anon., 1954: 631).

In the 1930s defences against sea flooding had been stepped up to facilitate agricultural drainage, but the most significant period of sea wall construction began after the 1953 East Coast Flood, which claimed over 300 lives in Britain, and many more across the Channel. A commission led by Viscount Waverley reported in May 1954 on recommendations for coastal defence (Waverley Com-

mittee, 1954). It was noted that the 1953 floods were not the worst floods possible, and that similar or worse flooding could be expected. The cost of complete protection for all of the coastline would be prohibitive, and even protecting all human lives was not seen as realistic: 'We think that for the protection of human life reliance must be placed on an effective warning system...In considering the margin of safety for sea defences we have, therefore, had the protection of property mainly in mind...' (Waverley Committee, 1954: 4) and '[t]he natural and indeed inevitable course in these circumstances is to relate the standard of defence to the character and amount of property to be protected...' (Waverley Committee, 1954: 40).

The emphasis on protection of property reflects recommendations in evidence to the inquiry presented by the Institute of Civil Engineers. This stated that 'In considering the necessity and desirability of protective measures it is felt that...to guard against a given risk, consideration should... be given to the comparative importance and value of agricultural land of various types, urbanised development, heavily developed areas containing factories and warehouses, communications and other services....due regard should be given to the user of the land in question and to the national economy' (ICE, 1954: 3). At this time the use of cost-benefit analysis to justify flood defence projects had become standard practice in the US Army Corps of Engineers (Porter, 1995).

Waverley recommended that the water level reached in 1953 should serve as an upper limit for defence design standards, though proposals must be made locally, subject to Ministry of Agriculture veto via the grant system. As a minimum, existing defences should be restored and maintained, as people had 'developed their properties with these defences in view' and there was a need to 'avoid any breach of public faith' (Waverley Committee, 1954: 13). Waverley also noted that 'much of the damage done by the 1953 floods was the result of sporadic and ill-considered development along the coast...' and urged local authorities to make full use of their powers under the Town and Country Planning Act, 1947, to prevent further development in flood prone areas. Planning Policy Guidance discouraging urban development in flood plains has been issued roughly every 10 years since, with increasingly strong wording but always stopping short of allowing the institution responsible for flood defence a veto on development proposals. Such a veto has been resisted by Local Authorities in order to retain democratic control over land use planning. The idea is not entirely welcomed by flood defence authorities either, as it could introduce liabilities for damages, should flooding occur where they had accepted a planning proposal as safe (Newbold, 2003: interview).

The role of natural defences such as salt marshes, sand dunes and shingle ridges was noted by Waverley, who raised the question of 'action that can be taken to assist nature in their formation and preservation' (Waverley Commission, 1954: 9). This advice fell on deaf ears however, and two decades later MAFF's Chief Engineer wrote that after 1953 there had been a 'realization that plants

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are no solution in severe hydraulic conditions' (Cole, 1976: 355) and 'in the sand dune areas reinforced concrete wave return walls and stepwork, bearing on steel sheet piled cut-offs, were constructed' on the east coast (Cole, 1976:354). Waverley stated that it was not the place of the inquiry to comment directly on the technical design of defences, as this should be left to the Institute of Civil Engineers. However he noted that use of groynes could result in depriving the foreshore of beach material further along the coast, and recommended that when building a new defence structure the existing line should be retained, creating two 'lines of defence'. Such military metaphors are perhaps unsurprising with two World Wars fresh in the memory. The sea appeared as another aggressor to be kept out of the national territory. In the event many of the sea defences were actually built not only to defend existing land. The 'line' was pushed outwards, so as to enable the creation of new agricultural land from the wetland coastal margins (Bowers, 2003: interview).

The 1953 flood led to the construction of 'hard flood defences' and creation of a warning system for the east coast. On rivers, flood warning schemes did not even attract grant aid until widespread flooding was experienced in 1960 and 1968. Meanwhile land drainage was progressing rapidly: Cole (1976) reports that grant-aided field drainage proceeded at a rate of 113,000 acres (45,000 ha) per year in 1966-67, rising to 250,000 acres (100,000 ha) per year by 1974-5. This was largely in the east of England, for conversion to arable crops that commanded artificially high market prices, particularly after Britain's accession to the European Economic Community in 1973. The financial returns to farmers formed the basis of the 'economic' benefit to the nation underlying the case-by-case reasoning for funding by the taxpayer.

In 1961 MAFF set out to demonstrate that there were similar 'economic' benefits to be gained in the wetter west of England and Wales through drainage of pasture land and increased beef yields. Trafford (1971) reports on MAFF experiments at Langabeare in Devon. The conclusion of the experiments was positive: the income from beef production would be raised from £20 per acre to nearly £30 per acre, raising the farmer's profit from £1.62 per acre to £8.20 per acre. It is interesting that in this 'economic appraisal' (Trafford, 1971: 310) the 50% grant for drainage operations is excluded from costs, while the market price of beef (including supports) is used for the returns. MAFF saw its role as one of bringing the benefits of agricultural science to bear on the modernisation of British agriculture (Bowers, 2003: interview). The real 'economics' of doing so in each instance was not going to get in the way.

In 1968/69 a survey of the 'need' for further field drainage was carried out by MAFF, based on an assessment of a 5% sample of the total 27.2 m acres (10.9 m ha) of agricultural land in England and Wales (Belding, 1971). It concluded that: 1.7 m acres had been adequately drained with the help of grant aid since 1939; 10.5 m acres were naturally free draining; 5.3 million acres had old drainage systems which were in working order, mainly in the north and west of

England; 2.6 m acres were poorly drained but were unlikely to be drained for economic reasons; and 7.1 m acres were in need of new field drainage works. Only about 1% of this land was estimated to be in need of further main river works, reflecting the high level of investment in arterial drainage after 1930. Though 7 m acres is a large area, Belding (1971: 250) compared the survey's result with an unpublished MAFF study from the late 1950s which concluded that 14 m acres were 'in need' of drainage improvement.

By the late 1960s the impact of drainage and agricultural intensification on wildlife started to become an issue. The Council for the Preservation of Rural England had presented evidence to the Waverley Commission in the early 1950s, and now wildlife interests in the form of the Royal Society for the Protection of Birds joined the debate. In July 1969 a conference was held at the National Institute of Agricultural Engineering at Silsoe in Bedfordshire, bringing together farmers, agricultural advisers and conservationists. The conference report was published by the RSPB as *Farming and Wildlife: A Study in Compromise* (RSPB, 1970). Unfortunately it was a question of compromise from highly unequal positions in terms of institutional resources. Wildlife interests subsequently gained ground through institutional changes, and by challenging the ideas underpinning the cost-benefit justification of drainage schemes.

Before 1981 the Nature Conservancy Council was understaffed and had negligible powers to protect Sites of Special Scientific Interest, whereas drainage authorities were well financed and enjoyed permissive powers to enter and drain land. Carter (1972:27), an Agricultural Development Advisory Service officer, wrote: 'If possible some of the natural vegetation should be left...[and] Trees can almost always be left standing on one bank. If these points are discussed well in advance, the River Authority may well agree...'. Over the next 15 years it became increasingly clear that wildlife and land drainage interests in wetland areas were not going to be reconciled on the basis of discussion and goodwill.

In 1973 land drainage came close to becoming part of the remit of the new super-ministry, the Department of the Environment (DoE). The DoE's predecessor, the Ministry of Housing and Local Government (MHLG), was concerned to rationalise sewage treatment, in the interest of improving water quality. At MHLG's request the Central Water Advisory Committee initiated a major review of water policy in 1969 and reported in 1971 (CAWC, 1971). MAFF was concerned that land drainage risked becoming sidelined as a government priority, and fought hard to keep it out of the terms of reference of the CAWC inquiry (Richardson *et al.*, 1978). MAFF had considerable experience in fighting off periodic attempts by MHLG to take over land drainage functions, and had a powerful ally in the Association of Drainage Authorities (ADA). In negotiations leading to publication of the Water Bill (in January 1973) the ADA threatened to scupper the bill by fighting for complete separation of land drainage from the new Regional Water Authorities (WAs).

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When the River Authorities were replaced by the ten WAs in 1973, responsibility for land drainage was nominally transferred to the WAs, but with powers delegated to the local and regional Land Drainage Committees, with strong representation by MAFF appointees. The political battle for this compromise took place before publication of (and consultation on) the Water Bill, and thus land drainage appeared a rather uncontroversial issue: however the real political battle was fought before the official consultation. MHLG still wished to see all matters relating to rivers under one administrative system, but in the end it appears that the cabinet allowed MAFF and its very vocal clients to win because they were running out of parliamentary time to debate the Bill. Richardson *et al.* (1978) concluded that MAFF's actions were taken to defend its policy territory, and it used pressure groups successfully to achieve its goals of thwarting radical policy change in the land drainage policy sector.

SOCIAL FRAMING OF LAND DRAINAGE IN THE MID-1970S

The 1973 Water Act included the lame injunction that WAs should 'have regard to the desirability of preserving natural beauty, flora and fauna...'. Until the Wildlife and Countryside Act 1981 strengthened the legal protection for Sites of Special Scientific Interest, and with high wheat prices under the European Common Agricultural Policy, land drainage enjoyed an unprecedented period of activity in the mid-1970s. In 1976 MAFF's chief engineer was moved to state baldly: 'Land drainage is the first function of a river...' (Cole 1976: 347). According to Purseglove (1988: 87-89) under the WAs 'gangs of unsupervised maintenance engineers' inherited from the River Authorities went about removing trees and dredging rivers with heavy machinery. In 1954 MAFF's chief engineer (Johnson, 1954) had complained about the (financial, rather than environmental) cost of over-zealous maintenance work. By the early 1980s little had changed, and cost control in maintenance operations became an urgent issue in some WAs. Before systems were rationalised, there were cases where workers 'went out every year and they cut the bushes along a particular reach of river, and no one knew why, and no one knew what the benefit of doing it was, and it wasn't controlled. There were guys who were going out into the countryside on a nice summer's day...and they'd return to the depot at four in the evening, and no one had a clue what they'd been doing all day' (Borrows, 2003: interview).

New river engineering and land drainage schemes were promoted under Sections 24 and 25 of the Water Act 1973, which required WAs to draw up comprehensive surveys and plans for their areas. The 'section 24 surveys' were the subject of MAFF guidance issued in 1974 (MAFF, 1974). The surveys were not to be confined to main river works: 'Problems that might be tackled by local authorities or Internal Drainage Boards should also be identified and outline remedial measures suggested'. For some critics the surveys thus provide a 'source

book' for grant funding to eliminate all wetland habitats in England and Wales. Bowers (1983: 228-9) wrote: 'The comprehensiveness of these surveys is such that there is probably little or no agricultural land in England and Wales of more than 20 or 30 ha in extent subject to fluvial or tidal flooding with a return frequency of greater than 1 year in ten that is not listed as a "problem" in a section 24(5) survey and for which a solution is not proposed.' Penning-Roswell *et al.* (1986) concluded that the surveys were far less comprehensive than this, and that they were carried out in an inconsistent and haphazard manner, limiting their usefulness for gaining a national overview of flood hazards.

In a section on 'identification and evaluation of problems' WAs were required to define the location and extent of each flood or drainage 'problem', analyse the flood flow hydrology, and provide an assessment of benefit or damage. This last was to be expressed as an average annual benefit or damage using discounted cash flow analysis with the public sector test discount rate of 10%. The 'need' to act in the face of a drainage 'problem', or where existing defences were in an 'unsatisfactory condition' (MAFF, 1974, paras. 7-8: 2) would be self evident. However it would need to be justified in economic terms, to secure Treasury funding. In 1977 Penning-Roswell and Chatterton (1977) published *The Benefits of Flood Alleviation: A Manual of Assessment Techniques*. In the foreword by Gordon Cole, then Chief Engineer at MAFF, the report was welcomed: 'As schemes have become more complex and more marginal the techniques [for benefit assessment] have had to be improved for the results to remain credible'. The report's generalised figures for damages according to property type and flood depth would make the justification process 'more scientific, largely by increasing the database' and less of a 'discouragingly laborious exercise'.

Food production remained a high priority in the mid-1970s, despite accession to the European Economic Community, as Britain faced a balance of payments crisis prior to exploitation of North Sea oil. In 1975 the government white paper 'Food from our own resources' (MAFF *et al.*, 1975) confirmed this priority, and land drainage continued apace. Disquiet among environmentalists was growing and calls for a duty on MAFF to promote conservation were growing louder. In May 1978 MAFF's Advisory Council for Agriculture and Horticulture (ACAH, 1978) suggested that in return for MAFF accepting a responsibility to promote conservation and amenity, other public bodies should accept a responsibility to promote food production on all land in their ownership. Specifically the report recommended that 'it would be feasible for Water Authorities to accept a food production obligation. This would entail purposive agricultural management of the water-gathering grounds...' and '...the present statutory duties of Water Authorities could be extended to include an obligation to develop the optimum agricultural potential on their land...' (ACAH, 1978, paras. 211 and 212). Such a deal was not forthcoming, and the search for compromise continued.

In 1977 the Conservation and Land Drainage Working Party of the Water Space Amenity Commission was formed in order 'to reconcile, where possible,

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the execution of land drainage works with the interests of conservation, amenity, landscape, fisheries and recreation' (WSAC, 1977: 10). Three (conflict-ridden) years later, guidelines were produced that aimed less at reconciling these interests, and more at mitigating some of the worst effects of land drainage (WSAC, 1980). The report also includes a refreshing illustration of the way different social groups see the world through different frames, conditioned by their relationships with other social groups. A series of three identical drawings is presented, showing a meandering rush- and tree-lined river running through rough grazing land. 'To the land drainage engineer, this is an interesting design problem and represents next summer's work for the direct labour gang'. Equally 'to fish, plants animals and birds this represents food, shelter from predators, and breeding places. A network of habitats of an increasingly scarce type' (WSAC, 1980: 68). Finally 'To the general public this is a pleasant scene and a favourite walk in summer. To the fisherman, this would be a good spot if the trees could be cut down and the general public kept out' (WSAC, 1980: 74). Within the report various interest groups were given space to state their case, and the agricultural section asserts: 'It is important to note that the world's area of land with well-controlled water conditions, i.e. drained or irrigated accounts for only 26% of the total cultivated land, yet it produces more than 50 % of the food. It is truly a case of two ears of corn where there was merely one before.' (WSAC, 1980, para. 91). This reference comes from Jonathan Swift's 1726 *Gulliver's Travels* (Part 2, Chapter 7) in which the King of Brobdingnag advises Gulliver 'that whoever could make two Ears of Corn, or two blades of Grass to grow upon a Spot of Ground where only one grew before, would deserve better of Mankind, and do more essential Service to his Country than the whole Race of Politicians put together'.

In the MAFF (1974) survey guidance WAs' attention was directed, in particular, to areas of agricultural land over 250 acres identified by the Ministry as in need of main-river works in 'a preliminary assessment of areas of agricultural land adversely affected to a major degree by arterial conditions' (MAFF, 1974: 3, para 11). These were areas where '...inadequacies of arterial drainage, including flooding, are such that cropping or stocking to normally accepted standards is not possible' (MAFF, 1974: 3, para. 12). Maps of these areas were sent to each WA so that they could be investigated further and drainage works justified in cost-benefit terms. One such area was at Amberley Wild Brooks on the River Arun in Sussex. Accordingly, in 1977 Southern Water Authority submitted a grant aid application to MAFF for arterial works to facilitate pumped drainage of the wetlands. Local residents campaigned successfully for a public inquiry into the proposals (provision for which was provided in the Land Drainage Act 1976). The Countryside Landowners Association argued that the scheme should go ahead 'with as much sensitivity to conservationist needs as was compatible with adequate drainage' (Marsden, 1978, para. 19.3). In the event the scheme

was stopped, and the hegemony of the land drainage mind set began to look less secure.

Details of the unique historical, ecological and amenity value of the site, presented by The Sussex Trust for Nature Conservation and the RSPB (among others), were important in persuading the Inspector (Marsden, 1978) and the Minister (Longworth, 1978) to reject the proposals for grant funding. The Chairman of the Amberley (West Sussex) Society, who was a chartered accountant with experience of farm accounts, presented a detailed attack on the financial calculations in the benefit appraisal. CPRE also presented a critique of the benefit appraisal, attacking the methodology from an economist's perspective (Bowers, 1978). These criticisms convinced the Inspector and the Minister that the economic case for the scheme had not been proven. In hindsight, however, the public inquiry at Amberley Wild Brooks was something of a 'false spring' for the conservation movement (Purseglove, 1988: 233). A less destructive gravity drainage scheme went ahead, and the WAs became more secretive about their plans elsewhere. Nonetheless it set the pattern for an (eventually successful) series of pitched battles between conservationists and the WAs in the early 1980s. In 1981 at West Sedgemoor in Somerset efforts by the Nature Conservancy Council to protect an area of wetland culminated in effigies of conservationists being burned by farmers, and the sacking of the head of the NCC by the Secretary of State for the Environment, ostensibly for doing his job (Purseglove, 1988).

In each conflict, the economic justification of the proposed scheme provided the 'battleground' (Bowers, 1993: interview), and absence of national economic benefit was 'the crux of the public case against land drainage' (Purseglove, 1988: 89). On 17 March 1984 a leader in the Times newspaper described the conflict over Halvergate Marshes (in the Norfolk Broads), as 'the Flanders of the great war between farming interests and the objectives of nature conservation' (quoted in Purseglove, 1988: 269). It culminated in direct intervention by Prime Minister Thatcher to prevent a particular farmer from ploughing his land, initiation of the 'Environmentally Sensitive Areas' scheme, and the end to grants for lowland field drainage.

By the mid-1980s the Conservative government was keen to privatise the water supply industry. Initially the plan was to privatise the Water Authorities with all of their functions intact, including regulatory powers. This provoked strong opposition and led to the creation of the private water companies plus the National Rivers Authority (NRA) and the Office of Water Services (OFWAT) in the Water Act, 1989. A 1985 Green Paper on Financing and Administration of Land Drainage (MAFF, 1985) had recommended simplification of the institutional arrangements, and aimed to strengthen application of the 'beneficiary pays' principle. However farming and landowning interests re-used the tactic deployed in 1973, and threatened to wreck the process of privatising water supply if there was any attempt to reform land drainage (Buisson, 1991: 10). In

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December 1989 the industry was successfully floated on the stock market, and the Land Drainage Committees continued to function under the NRA, renamed Flood Defence Committees.

The antipathy between conservation and landowning interests that developed over land drainage in the 1980s was reflected in the re-organisation of British conservation authorities in the 1990 Environmental Protection Act. In particular the NCC's opposition to afforestation in ecologically rich locations in Scotland provoked the government to devolve responsibility for conservation to Scotland and Wales (Reynolds and Sheate, 1993). In the Environment Act 1995 the NRA was merged with the waste authorities and the air pollution inspectorate to create the Environment Agency. The Association of Drainage Authorities objected vociferously to the change in name, and argued successfully for 'the Flood Defence Committees retaining their executive powers and the funding raised for flood defence being ring-fenced for that exclusive purpose' (ADA, 1995: 11). Once again the institutional arrangements for land drainage created in 1930 were left largely unchanged in order that a more pressing aim could be pursued by the government. Today flood defence accounts for approximately half of the Environment Agency's expenditure.

RELEVANCE TO CURRENT DEBATES

The disputes over land drainage in the early 1980s appear at first glance to contain many of the features Hall (1993) associated with a shift in policy paradigm. Issues spilled out of bureaucratic confines and into a debate involving politicians, the press and the wider public. Whereas in 1974 the central questions were technical puzzles about how to solve drainage 'problems', in 1984 drainage itself appeared to be the problem, even to the Prime Minister. However given a real paradigm shift one would expect to see 'new over arching goals', and associated change in core values and assumptions and also in the underlying rules of the game (the institutional structure). Looking at the subsequent development in land drainage policy it would appear that something less fundamental than a shift in policy paradigm has taken place. In fact one could argue that land drainage as a whole was merely one policy instrument at the disposal of MAFF in pursuing its overarching goal of modernising and expanding food production. From this perspective the paradigm survived into the 1990s when it resulted in the sheep and cattle disease tragedies of the 1990s that brought the demise of MAFF itself. The concept of policy paradigms thus appears relevant to a longer time scale and broader political processes than are at stake here.

The related concept of social framing, however, provides valuable insights. 'Working with the environment' and reducing risk have emerged as potential core concepts in the 'flood defence' framing, but neither has been as successful in defining an agenda for action as the concept of rivers as drains. Regarding

the former, environmentalists appear to be at loggerheads over the best way to capitalise on powerful European legislation protecting habitats and species, while their opponents exploit the perception that birds are given more rights than people in relation to flooding. Since 1993 the official aim of flood defence policy has been 'to reduce risks to people and the developed and natural environment from flooding and coastal erosion *by encouraging the provision of...defence measures*' (MAFF and the Welsh Office, 1993: 3, emphasis added). Agreement on a workable conception of flood risk remains elusive (Meadowcroft, 2003: interview), and its measurement dubious and controversial (Brown and Damery, 2002), yet the *means* for addressing its reduction is clear in the policy aim.

The aim to provide and maintain defence measures lies at the heart of the powers created for land drainage in 1930 resting on the assumption that water is a common enemy to be excluded and repelled like an invading force. This puts the 'institutional action frame' (Schön and Rein, 1994) of the policy sector in direct conflict with contemporary ideas in ecological management regarding the merits of diversity in ecological niches and gradients (e.g. Ward, 1998). For many ecologists today, maintaining existing flood defences, and the agricultural monocultures and urban sprawl they sustain, is a serious risk to the natural environment. However at the coast the ideas of 'managed retreat' or 'managed realignment' often appear as a weak and defeatist element in the dominant discourse, and one only entertained to save money or to comply with European legislation.

Perhaps the problem with the current policy aim lies not only with its specification of the means. There is a need to challenge the assumptions behind the framing that includes 'the developed and natural environment' among entities that can experience risk. In the MAFF (1974) guidance in the mid-1970s, floods and poor drainage were presented as depriving *the land itself* of economic opportunity in some way. Now floods are conceptualised as putting the 'developed and natural environment' at risk, thus legitimising existing land uses however inappropriate they may be for their location. The challenge is to reconnect the concept of risk that informs flood defence decisions with deep-seated human values rather than economic interests.

The concept of intrinsic value is central to environmentalist thinking, and can be mobilised effectively in policy arenas if we treat 'value' primarily as a verb (Callicott, 2002). Thus we value our family and friends intrinsically. What harms them harms us, because we share a community with them. We wish to see people treated as ends rather than merely as means, and therefore believe they have certain rights. Since Darwin most people accept that humans are part of a wider community of nature. People (particularly the 5 million members of environmental NGOs in the UK) *can* therefore value nature intrinsically and see promotion or protection of the interests of other life forms as being in our own interest. In the case of cultural heritage, one can even value inanimate objects intrinsically, for instance where there is a temporal sense of community

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with its creators and with future generations: for example we would like our grandchildren to be able to see Stonehenge and wonder about its creators. Cultural heritage may also be located in the living, farmed landscape. A particular composition of flora and fauna adapted to some relic agricultural practice may be highly valued for its cultural significance. In such a case the *composition* of the flora and fauna is critical, and a preservationist stance is appropriate (implying that existing water regimes may have to be maintained). However, when considering the interests of nature (rather than heritage), such as space to flourish in a diversity of ecological niches, flood defences present more of a risk than floods themselves.

Some flood defence structures themselves are national assets but others are liabilities when considered in relation to human rights and intrinsic value in nature. Where defence structures protect elements of the 'developed and natural environment' that hold only (dubious) instrumental value, such as heavily subsidised crops or inappropriately located buildings, perhaps existing defences should be encouraged to deteriorate, and allow room for development of low impact agriculture and nature appropriate to each location. Allowing land to flood and wetlands to regenerate should reduce flooding elsewhere (by flattening flood hydrographs) and also contribute to aquifer recharge, and thus reduce low flow problems in summer.

Funds could then be transferred from maintenance into providing flood protection to an agreed standard where human rights or protected nature sites are at risk, and into a fund to compensate victims of flooding. Traditional defence structures might be appropriate where population density is above some threshold, with damage mitigation measures for individual houses elsewhere. Development in flood plains might be permitted, provided buildings are flood-adapted, and developers contribute to the fund for compensating flood victims. One element of the dominant social framing of flood risk that would *not* have to change is the Treasury's desire to save money: it is difficult to conceive of a more expensive option than the continued escalation of flood defence costs in the face of climate change.

Such a reconceptualisation of risk and opportunity in relation to intrinsic value and human rights could serve as the foundation for a new, coherent social framing of relations between society, nature and floods. Under the current social framing any deliberate flooding of land must be justified in terms of cost savings within flood defence budgets. Under a framing focused on intrinsic value the entire budget would be devoted to furthering the interests of that which we value intrinsically: it would become relatively easy to provide complete protection for people living at some minimum population density and for sites valued for their ecological composition. Outside these areas the burden would fall on those desiring protection for their assets to prove some community of interest between wider society and the values to be defended, such that it outweighs the case for deliberately allowing the land to flood and the intrinsic value in

nature to assert itself. As Howarth (2001) has noted only the most severe floods are now routinely considered to be 'Acts of God', and with climate change implicated in extreme weather conditions even this appears questionable. This notion of the causation of floods underpins the system of permissive powers for investment in flood defence, and the principle that people enjoy no right to any standard of protection.

Perhaps the time has come to accept responsibility for flooding, and also reap the opportunities in terms of reducing risks to that which we value intrinsically. Flood risk management requires new legislation that removes it from the context of land drainage and 'defence against water', in order to change the way subsidiary problems are framed: '...the most important function of both public deliberation and policy-making is defining the norms that determine when certain conditions are to be regarded as policy problems' (Majone, 1989: 23-24). However it is doubtful that such a re-framing will ever be possible if debate and policy reviews are only attempted in the wake of major flooding events or when some wider policy goal is at stake.

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