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Making water policy work in the United Kingdom: A case study of practical approaches to strengthening complex, multi-tiered systems of water governance

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ABSTRACT

We propose a suite of actions for strengthening water governance in contexts with complex, multi-tiered arrangements. In doing so, we focus on the collective water policies and approaches of the United Kingdom (UK), including those of devolved governments, which confront a host of serious water-related challenges—from massive flooding of urban areas and agricultural lands, to pressure on aquifers from rising water demand and drought. Further complexity in addressing these challenges has emerged in the wake of the June 2016 vote to leave the European Union (EU), so-called 'Brexit', and the ensuing 'separation process' with uncertainties for institutional and governance arrangements to follow. We make ten proposals for improving and reinvigorating water policy in complex, multi-layered situations, and comment specifically on their application in the UK setting. These are: put in place a system-wide water policy; fully embrace community-led nested river basin planning *and* management; fully fund river basin planning and management; re-focus the policy framing; use best-available data and information; create conversational spaces and become a more water-literate society; mobilise people; support and sustain core community networks; underpin river basin plans with regulatory provisions and effective monitoring and enforcement; and address systemic institutional amnesia. Individually and collectively, we contend that these actions will have a marked effect on transforming the planning and management of water resources. A system-wide water policy that maintains and builds on the substantive biophysical and socio-economic benefits delivered through implementation of the EU Water Framework Directive, together with the more recent Floods Directive, will galvanise stewardship of water in the UK. We urge more active engagement with and empowerment of the multiplicity of system 'actors', and highlight the role of non-government actors in a post-Brexit world as conduits for reaching out to and connecting directly with a wide range of water-related actors, especially across the EU. While attention to-date has focused on a plethora of specifically water-related projects, initiatives, plans and regulations, what is really needed is a systemic, long-term view of water resource management.

Water resource management[1] is integral to economic, ecological and socio-political sustainability; its management is complex and requires coordination across a range of institutions and stakeholder interests. For the United Kingdom (UK), this complexity extends to the European Union (EU) and its governing European Commission (EC), the UK Government (both central and devolved governments and administrations), water companies (public and private), local councils, non-governmental organisations (NGOs) (e.g. rivers' trusts), farmers, businesses and local communities. As for multi-tiered systems of water governance elsewhere (e.g. in the Mekong Region (Molle et al., 2010; Blake and Robins, 2016), in the USA–Canada Great Lakes Basin (Friedman et al., 2015), in Australia

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[1] By 'water resource management' (or 'water planning and management') we mean the organisation of policy and practice to equitably allocate water to satisfy all uses and demands, while optimising its use and minimising environmental impacts.

and New Zealand (Curtis et al., 2014)), the UK has a variety of plans, strategies and initiatives that focus on different aspects of managing water, each of which endeavours to balance the needs of people, the economy and the environment. But, do these elements fit together in a coherent way to form a system-wide approach to sustainable water resource management, and is there enough inbuilt resilience to cope with major disruptions? The UK 'Brexit' vote to leave the EU is one such disruption, with the UK Government set to trigger Article 50 of the Lisbon Treaty, which will formally initiate the withdrawal process over a maximum two-year negotiation period (Wheeler and Hunt, 2016). The implications of unravelling the plethora of water-related regulatory and institutional arrangements are profound, and compounded by renewed calls for Scottish 'independence' (e.g. Rankin et al., 2016) and Irish 're-unification' (e.g. O'Toole, 2016). In this paper, we outline key aspects of the current policy[2] system pertaining to water resource management in the UK context, and examine its efficacy in light of the challenges it was designed to tackle, together with the new Brexit-induced challenges ahead.

This article has four parts. To set the scene, we begin by providing a brief overview of the UK's water-related issues so that an international readership may appreciate the general nature and context of the issues that the system of governance is endeavouring to address. Then, we describe policies and governance arrangements for water resource management at different scales and with particular focus on river basin planning and management. Thirdly, we advance ten ideas for improving and reinvigorating water policy, which have applicability beyond the UK to other contexts with complex, multi-tiered governance arrangements. These ideas give weight to the concept of 'integrated catchment management'[3] and pay particular attention to addressing existing policy disconnects and inadequacies. Finally, we conclude with some specific reflections on the application of these ten points in realising post-Brexit transformative change in the planning and management of the UK's water resources.

1. An overview of the UK's water woes

Water issues are headline news in the UK, highlighting a broad spectrum of challenges from droughts, catastrophic floods, major landslides, tidal surges to eutrophic water bodies (e.g. Watts et al., 2015). The UK Government's climate change risk assessment for 2017 gives a stark prognosis (Committee on Climate Change, 2016). Marsh et al. (2013) examine drought and subsequent extensive flooding in the 2010–12 period arising from exceptional departures from normal rainfall, runoff and aquifer recharge patterns across much of the UK. More recently, in December 2015, 'Storm Desmond' flooded 5200 homes in the counties of Cumbria and Lancashire in northern England, with rainfall breaking all previous UK records (BBC News, 2015), and followed serious flooding in previous years (Krause, 2016). In contrast, in the south-east of England, below-average aquifer recharge meant that hosepipe bans and other water restrictions were anticipated for the 2016 summer (Vidal, 2016). Along the coast, soils are decanted into the sea at a rate of up to seven metres a year (Duck, 2011) and, with this, houses, livestock and associate infrastructure are lost. This was starkly illustrated in December 2013 when tidal surges flooded 1400 homes in Hemsby in eastern England, some of which were lost to the sea, and in February 2014 when the main railway link to Cornwall, at Dawlish, fell victim to marine erosion (Muchan et al., 2015; Sibley et al., 2015). Adverse impacts extend to natural environments and wildlife habitats (e.g. The Wildlife Trust no date). Following heavy rains in 2011, tens of thousands of fish were killed in the River Thames when 450,000 t of raw household and industrial sewage was discharged into the waterway (Vidal, 2011). For many inland lake systems, aquatic life is threatened by climate change, pollution and land use change (Spears, 2014).

The UK's water challenges extend beyond those related to environmental processes and impacts on infrastructure to the supply of water to both domestic and business markets, and to the treatment of wastewater (e.g. Everett et al., 2016; Rowley et al., 2016; Thames Water no date). *Water UK*, a membership organisation representing all major statutory water and wastewater service providers, describes the main challenges faced in balancing future supplies against future demands in terms of environmental drivers behind abstraction changes, demand growth, climate change and resilience to drought (Water UK, 2016). In August 2015, the residents of 300,000 homes in Lancashire were advised by United Utilities, a private water supply company, to boil their tap water following contamination at the water treatment facility with the parasitic *Cryptosporidium* bug (Davies and Brignall, 2015). In Northern Ireland (NI), there have been widespread street protests over water charges, especially in areas where the water supplied has been unfit for consumption (McDonald, 2014). Groundwater is a significant source of domestic and industrial water supply, with overall UK usage rates surging since 1948 when data first became available (e.g. Environment Agency no date; RGS, 2012; BGS, 2016). Areas like south-east England are highly dependent on groundwater with the Chalk aquifer contributing up to 70 percent of public water use (BGS, 2016). Abstraction pressures put 25 percent of England's groundwater bodies and four percent of those in Wales at risk of failing environmental objectives under the EU Water Framework Directive (Environment Agency no date). Pollution of groundwater is an ongoing issue that complicates treatment processes and adds to the cost of water supply (Howden et al., 2010; Burt et al., 2011; Rivett et al., 2012). Climate change adds further pressure to groundwater resources through both increased abstraction and reduced recharge (Committee on Climate Change, 2016) – in central England, 14 of the 24 warmest years between 1659 and 2008 have occurred since 1988 (Muchan et al., 2015; BGS, 2016).

The costs incurred from water-related incidents are borne by a range of stakeholders from individual home and property owners to insurance firms and government bodies at different levels (Penning-Rowsell, 2015). The Association of British Insurers estimates £1.3 billion in costs from almost 15,000 claims from December 2015's trio of storms ('Desmond', 'Eva' and 'Frank') for damage to homes, businesses and vehicles (BBC News, 2016). Flood costs in that December alone are expected to exceed £5 billion, of which about 20 percent will be borne by families and businesses without insurance or inadequately insured (Taylor et al., 2015). In London, the Thames barrier costs around £6 million per annum to operate and maintain (RGS, no date), and this value is expected to increase with heightened flood risks from climate change and rising sea levels. The barrier has been closed 176 times during its 34-year history (Gani, 2016), of which 89 were to protect against tidal flooding and 87 against both tidal and fluvial flooding (Environment Agency, 2016). According to Hall (2015), there is "a strong, overall upward trend: it was closed four times in the 1980s, 35 times in the 90s, and 75 times in the 2000s. There have been 65 closures since 2010." In the case of water-quality issues, water

[2] We use 'water policy' in a broad sense as the suite of strategies, plans and formal statements developed or agreed by governments that relate to water. In the case of 'a system-wide water policy', we are referring specifically to a single, high-level policy on water with nation-wide applicability.

[3] "Integrated catchment management (ICM) is a process through which people can develop a vision, agree on shared values and behaviours, make informed decisions and act together to manage the natural resources of their catchment. Their decisions on the use of land, water and other environmental resources are made by considering the effect of that use on all those resources and on all people within the catchment" (Murray-Darling Ministerial Council, 2001: 1).