

***Future Challenges and Direction***

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***Abstract***

This paper tours briefly through the challenges of global water and the inter-related big issues (such as, population, resource depletion and climate change) and then explores water in the UK in relation to those same issues whilst juxtaposed with other big UK issues such as current economics, spatial planning, infrastructure, food and energy. This paper calls for a new literacy that recognises that *...at every level the greatest obstacle to transforming the world is that we lack the clarity and imagination to conceive that it could be different* [Roberto Unger, a Brazilian philosopher]. It is therefore proposed that a more urgent, and certainly more radical, basis for addressing UK issues is needed within the context of the global landscape. Things simply need to be done differently by calling on government, on the sector and on CIWEM to each play its part. And, it is a part that they must play: *...The greatest threat to our planet is the belief that someone else will save it* [Robert Swan the first person to walk to both Poles]. Ultimately though, it will be politicians who will decide and *...it is fair to say that trust in politicians is not something the public has in abundance* [Edward Davey, Secretary of State for Energy and Climate Change]. This paper concludes with a demand for serious and coherent leadership, from government, from the sector, from CIWEM and, importantly, from each of us.

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*"...water, water everywhere nor any drop to drink"*

The Rime of the Ancient Mariner by Samuel Taylor Coleridge (1798)

1. A seriously long poem that is open to several different interpretations. Upon its release, the poem was criticised for being obscure and difficult to read. It was also criticised for using archaic words. On the surface, the poem explores the violation of nature and its resulting psychological effects on the Mariner and his crew. Below the surface, it can mean whatever you want it to mean.... and so it is with today's reality. Today's challenges simply do not resonate with many, to some they are irrelevant and to others just jargon.

**Some global context**

2. We are all familiar with some of the headline global water statistics:
  - Approximately 40% of the world's population lives in a catchment that experiences severe water scarcity during at least one month of the year;
  - More than 1 billion people currently lack access to safe drinking water, and 2.6 billion currently lack access to basic sanitation<sup>1</sup>;
  - 1.8 billion who have access to a water source within 1 kilometre (though not in their house or yard) consume around 20 litres per day (UK average is 150 litres and US is 600 litres);
  - By 2025, 1.8 billion people will be subject to water scarcity and three-quarters of the world's population will be impacted by water stress<sup>2</sup>;
  - 1.8 million child deaths each year as a result of diarrhoea;
  - 443 million school days lost each year from water-related illness;
  - There is close to half of all people in developing countries suffering at any given time from a health problem caused by water and sanitation deficits; and
  - ...on and on and on.
3. **Global water demand** could increase by as much as half by 2050<sup>3</sup>. Groundwater depletion and pollution are likely to threaten agriculture and urban water supplies. It is anticipated that water may cause significant global instability and conflict in the coming decades. During the course of the next decade, water scarcity is expected to disrupt national and global food markets.

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<sup>1</sup> [http://www.un.org/apps/news/story.asp?NewsID=35456&Cr=SANITATION#\\_UUYjxTeQigI](http://www.un.org/apps/news/story.asp?NewsID=35456&Cr=SANITATION#_UUYjxTeQigI)

<sup>2</sup> [http://www.unep.org/geo/geo4/report/04\\_water.pdf](http://www.unep.org/geo/geo4/report/04_water.pdf)

<sup>3</sup> <http://www.oecd.org/newsroom/environmentactnoworfacecostlyconsequenceswarnsoecd.htm>

4. Beyond 2022, water will likely be used as a weapon of war or a tool of terrorism, water shortages will also cause instability that could lead to the failure of numerous states. Former US Secretary of State Hillary Clinton said<sup>4</sup>, “...these threats are real and they do raise serious security concerns...”
5. **Population growth** and climate change will exacerbate the problem of freshwater resources, with serious consequences for natural resources, people, and country economies. By 1999, world population had reached 6 billion, and then 7 billion a mere twelve years later in 2011. The net population growth (numerical difference between those born and those dying) is about 145 – 150 each minute. Not unreasonably, the increasing population will need and want all the things that we need and want: clean air, water, sanitation, food, energy, shelter, employment, health and education provision, and goods and services.

Yet:

- Approximately half the world’s population now live in cities and towns with one out of three urban dwellers (about 1 billion) living in slum conditions. Lack of **clean air**, indoors, resulting from the use of traditional biomass (such as fuelwood, charcoal or animal dung) claims the lives of 1.5 million each year (about 4000/day of whom more than half are below the age of five). Death from poor air exceeds total deaths from malaria. In sub-Saharan Africa more than 80% of population depend on traditional biomass, as do more than half of India and of China;
  - As mentioned previously, more than 1 billion people lack access to **safe drinking water** and 2.6 billion lack access to **basic sanitation**;
  - Water shortages increasingly threaten the viability of **energy** projects from the U.S. to China<sup>5</sup>. The water requirements for energy production<sup>6</sup> are expected to grow at twice the rate of energy demand to 2035. The UN *Water Report* (2012)<sup>7</sup> surveyed 134 countries and found that 56% consider that the importance of water for energy has increased during the past 20 years, and 20% consider this as “significant.” Water is growing in importance as a criterion for assessing the viability of energy projects, as population and economic growth intensify competition for water resources. In some regions, water constraints are already affecting the reliability of existing operations and they will increasingly impose additional costs;
  - Global **agricultural** water (irrigation) is at record levels<sup>8</sup>. Predicted population increases will increase agricultural demand which will in turn increase the number of farmers tapping groundwater resources. This means that some aquifers are in danger of overuse. Even excluding climate change from the equation, water withdrawals for agricultural irrigation are expected to rise by 11% during the next thirty years. The irrigation sector claims about 70% of the freshwater withdrawals worldwide and it currently provides 40% of the world’s food from approximately 20% of all agricultural land. Although not all aquifers are being pumped at unsustainable levels, the world’s largest agricultural producers including India, China, and the US are also the ones with the highest levels of depletion. If groundwater resources are over-exploited, aquifers will be unable to recharge fast enough to keep pace with water withdrawals; and
  - Just one example: the Middle East is arid so it is alarming that the Tigris-Euphrates is becoming drier. Water Resources Research<sup>9</sup> reports that, between 2003 and 2009, the region that stretches from eastern Turkey to western Iran has lost 144 km<sup>3</sup> of freshwater (that is equivalent to the Dead Sea).
6. Continuing and growing requirements to satisfy all these needs resulting from a growing global population has placed, and continues to place, a huge drain on natural resources.
  7. For instance, in a recent *Happy Homes* survey<sup>10</sup> by Banner Homes, 2000 respondents said they wanted to live in a nice place in the countryside with nice neighbours, not far from the shops and with two TVs.

<sup>4</sup> <http://www.state.gov/r/pa/prs/ps/2012/03/186613.htm>

<sup>5</sup> <http://www.bloomberg.com/news/2012-11-12/water-scarcity-threatens-energy-plans-from-u-s-to-china.html>

<sup>6</sup> <http://globalwarmingisreal.com/2012/12/21/the-energy-water-nexus-in-a-climate-changed-world/>

<sup>7</sup> [http://www.un.org/waterforlifedecade/pdf/glaas\\_report\\_2012\\_eng.pdf](http://www.un.org/waterforlifedecade/pdf/glaas_report_2012_eng.pdf)

<sup>8</sup> <http://www.worldwatch.org/global-irrigated-area-record-levels-expansion-slowing>

<sup>9</sup> <http://onlinelibrary.wiley.com/doi/10.1002/wrcr.20078/pdf>

<sup>10</sup> <http://www.bannerhomes.co.uk/blog/2013/02/the-banner-happy-homes-survey/>

8. So, it is not surprising that *Towards a Green Economy* (UNEP, 2011)<sup>11</sup> concluded that: “over the last quarter of a century, the world economy has quadrupled....in contrast 60% of the world’s major ecosystem goods and services that underpin livelihoods have been degraded or used unsustainably.”
9. Yet we appear to be unable to slow down our consumption. As the middle classes of China and other countries grow and emerge, their more than 1 billion middle class consumers will behave increasingly like the majority within Western societies. Much of that consumption requires water. Worldwide, industry accounts for about 20% of all water consumption with a tendency in industrialised countries to consume more than half of the water available for human use. Belgium, for example, uses 80% of the water available, for industry.
10. To the dilemmas posed by the sheer numbers of the human population and its insatiable demand for natural resources, we have to add the near-overwhelming challenge posed by climate change. Whilst climate change will have a profound effect on natural systems, the impact on the human population would be less if it were not for the sheer mass of humanity many of whom live in dense concentrations, on coasts, and on marginal lands; challenging conditions increasingly exacerbated by climate change. The essential problem is one of too many people in absolute terms, and millions of us living in the wrong place.
11. Yet even population is not the real key, there is another dimension that is the fatal flaw ~ it undermines all good intentions at global level, at national level, at local level, in organisations and institutions worldwide and that is...governance.
12. The recent UN Rio + 20 meeting could have had just one agenda item. One item that could un-lock the problems of climate change, of resource depletion and of population. That agenda item would be, simply, governance and its current mediocrity. That is the root cause and that is what we have to fix.
13. No longer should we stand by while apparently earnest people (our world leaders) fritter away at the legacy we leave for the future.
14. At the Copenhagen climate summit, it was widely believed, initially, that if we assembled around 198 heads of state together, they would all agree to do the same thing because everyone thought it was the right thing to do. Our leaders could barely agree on anything worthwhile. And so it continued through Cancun (2010), Durban (2011) and Doha (2012). The latter really did excel and, at most, achieved an agreement simply to continue negotiating. Data<sup>12</sup> from more than 22000 residents in 22 countries revealed that concerns about natural resource depletion, air pollution and climate change are at their lowest level for twenty years and since Copenhagen those who view climate change as “very serious” has plummeted from 60 % to 49%.
15. Will Warsaw at the end of this year bring any real change of prevarication? The omens are not good since the worldwide economic uncertainty appears to constrain long term decision-making. Yet, having said that, the US President has recently vowed in his State of the Union address<sup>13</sup>: “...if Congress won’t act soon to protect future generations, I will. I will direct my cabinet to come up with executive actions we can take now, and in the future, to reduce pollution, prepare our communities for the consequences of climate change, and speed the transition to more sustainable sources of energy.” Let us see...
16. Yet there may be some signs of good governance:
  - Bolivia enacted an expanded version of its 2010 *Law of the Rights of Mother Earth*, entitled the *Framework Law on Mother Earth and Integral Development for Living Well*; and
  - Malta has passed a *Sustainable Development Act* (2012).
17. It remains to see, of course, how these aspirations are implemented.
18. So, the issues of water scarcity, population increase, natural resource depletion and climate change are massive geopolitical problems that need to be addressed. We shall see what this year brings since it has been designated by UNESCO as the *International Year of Water Cooperation*<sup>14</sup> which will be focussing

<sup>11</sup> [http://www.unep.org/greeneconomy/Portals/88/documents/ger/GER\\_synthesis\\_en.pdf](http://www.unep.org/greeneconomy/Portals/88/documents/ger/GER_synthesis_en.pdf)

<sup>12</sup> Source: Global Scan Radar

<sup>13</sup> <http://www.whitehouse.gov/the-press-office/2013/02/12/remarks-president-state-union-address>

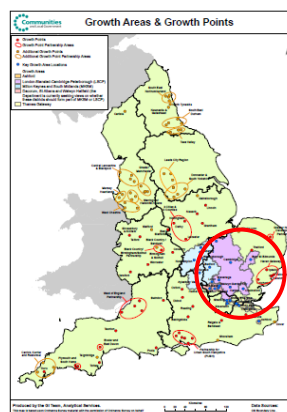
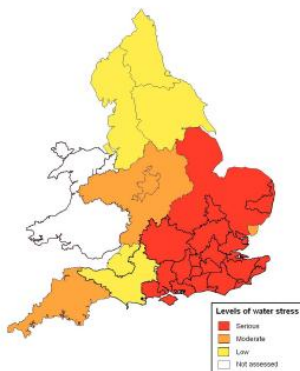
<sup>14</sup> <http://www.worldwaterforum6.org/en/news/single/article/2013-international-year-of-water-cooperation>

on water education, water diplomacy, transboundary water management, funding, and the issue of jurisdiction.

**Some UK context**

19. The same issues of water scarcity, population increase, natural resource depletion and climate change are also manifest in the UK, and just as seemingly intractable.
20. By mid April last year (2012) half of Britain was in drought and the country was facing its most severe water shortage since 1976. More than 35 million people were living in drought-affected areas. Parts of the country were already drier than they were in the summer of 1976, when Britain experienced its worst drought for more than 100 years. That drought of 1976 led to standpipes being installed in residential streets, water supplies to businesses were rationed and schools were closing early. Yet, a short while after the heaviest “April showers” since records began in 1910, combined with a similarly sodden beginning to May, allowed the official drought status to be lifted for 19 counties in the south-west, the Midlands and Yorkshire. Much of eastern and southern England was still in drought after two extremely dry winters, while hosepipe bans that had been imposed recently remained in place, for a while, just in case. The downpours restored flow levels in many rivers though of course it would take much longer for groundwater levels to respond accordingly.
21. There is an expectation (almost a birthright) that in the UK we should have some of the highest quality water in the world with an almost endless supply, for brushing our teeth, filling a glass to drink, taking a shower in the morning or preparing food. Of course, we also use this water to heat our homes and offices, clean our clothes, water our gardens, wash our cars and in thousands of industrial processes. Much of the water we use is then disposed of through sewers. We demand safe bathing water and good public health, so we clean sewage to high standards. Though, along with direct pollution, for example from agriculture, sewer discharges continue to cause problems for the natural environment of our rivers, lakes and seas.
22. The challenge we face is this; because of our need to adapt to climate change, our water intensive lifestyle, and other pressures such as changing land use, we need to find ways of using water much more efficiently and within limits if we are to continue to enjoy high standards and a constant supply.
23. Currently, there are about 60 M people in the UK. Is that the problem or is it simply that there are too many people, and their facilities, living in the wrong place? The carrying capacity of the UK in terms of population is around 30 M, half of what it is today. With less people and more space and with the right governance, we could lessen the economic and social impact of climate change. But we have gone so far into the southern-England-development cul-de-sac that it seems hard to do anything other than engineer bigger open drains, have some stand pipes ready, and hope.
24. Yet, the writing has been on the wall for years, so we cannot say we did not know. At a CIWEM conference in 2008: *Developing Sustainably ~ Drivers, Techniques and Case Studies*, we were shown the following two slides:

Areas of relative water stress



25. On the left hand slide the red shading indicates where water availability should not be taken for granted. So where do we want to build houses (on the right hand slide)...precisely where water availability should not be taken for granted.

26. Not only does the relentless intention to build houses to the south appear to be designed to exacerbate future risk but also the new National Planning Policy Framework, with its peculiar definition of sustainable development, seems designed to create problems. Already we are seeing planning decisions<sup>15</sup> that seem to make little rational sense to those who know the local carrying capacity.
27. Only recently<sup>16</sup>, we heard from the Institution of Mechanical Engineers that in the UK as much as 30% of vegetable crops are not harvested due to their failure to meet retailers' exacting standards on physical appearance. Of course those "exacting standards" reflect what their customers want (and that is us). Putting aside the ridiculous wastage of un-harvested food there is also the waste of food after we have bought it and, in essence, the waste of water that went into preparing that food.
28. It seems bewildering therefore (and not a little ridiculous) that between April and September 2012 more than 100,000 people in the UK were fed by food banks<sup>17</sup>.
29. Enough has probably already been said about climate change and its critical importance, so it is surprising that the UK government is proposing to cut out climate change teaching within the national curriculum for children under the age of fourteen<sup>18</sup>. Sir David King, a former chief scientific adviser to the government, was reported as saying that he suspected political interference with the curriculum, adding, *"It would be absurd if the issues around environmental pollution weren't core to the curriculum. I think we would be abdicating our duty to future generations if we didn't teach these things in the curriculum."* John Ashton, a former Special Representative for Climate Change to the Foreign Secretary, insisted, *"Climate change should have as much prominence as anything in teaching geography in schools."*
30. Surprisingly, the proposed changes were not universally opposed, notably not by the Royal Geographical Society. Yet teaching about climate change in schools has helped mobilise young people to be among the most vociferous advocates of action concerning climate change.
31. The economic and electoral imperatives in the UK have downgraded all these issues. The experience of UN climate change negotiations suggests that the political elites are now content to shelve even the most apocalyptic scientific research. This **problem of governance is universal, pervasive, self-serving and the key danger to all issues**, wherever we are, right now. From illegal logging in Sierra Leone to inappropriate planning near Swindon, the problem of governance is all around. Yet each government maintains its actions are sustainable. Paraphrasing Abraham Lincoln: nearly all people can stand adversity but if you want to test a person's character, give him power...
32. Before the credit crunch and the onset of austerity, the message of population growth, water scarcity, renewable energy, local food, and action on climate change was gaining some serious traction, both nationally and locally. That is now history. Of course the rhetoric of government still continues but where is Big Society, where is Localism ~ nowhere.
33. These big issues have been endlessly articulated and the arguments for change are compelling yet, in the absence of, say, a nuclear conflict, a pandemic, or an economic meltdown our elected representatives will not take action that will change our lives and lifestyles fundamentally. They will simply argue that they do not have permission to make those changes.

### Something for the government

34. Interestingly, one of the observable facts that has become increasingly obvious from the recent financial challenges is that central government is able to respond quickly and fundamentally. But only when three conditions are met:
  - When it is safe to do so;
  - When the prevailing situation is blindingly, obviously bad; and
  - When there is absolutely nowhere else to go.
35. When governments look into the abyss they do act.

<sup>15</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/28657/12-11-26\\_Comb\\_Ridgeway\\_Farm\\_DL\\_IR.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/28657/12-11-26_Comb_Ridgeway_Farm_DL_IR.pdf)

<sup>16</sup> <http://www.imeche.org/knowledge/themes/environment/global-food>

<sup>17</sup> <http://www.guardian.co.uk/news/datablog/2012/oct/16/food-banks-trussel-trust-uk-data>

<sup>18</sup> <http://ncse.com/news/2013/03/climate-education-to-be-axed-britain-0014770>



36. The abyss currently contains, at least, population growth, resource depletion, climate change and economic instability. All of these imperatives need long-term decisions (i.e. greater than an electoral cycle) if they are to be addressed sustainably. Currently, only economic stability is the one that receives relentless attention because largely, and without being cynical, it is related to votes, and, arguably the more important, maintenance of the existing power relationships between government and corporate elites.

*“...at every level the greatest obstacle to transforming the world is that we lack the clarity and imagination to conceive that it could be different*

Roberto Unger, a Brazilian philosopher

37. We have become accustomed to an almost endless supply of water.
38. Certain parts of the UK (such as the south east and east of England) already face increasing demand on a finite water supply. The drought of 2004-06 was only managed through controls on what we were allowed to use. This was not a one-off; indeed droughts are likely to be more common. By 2080, some long term climate projections forecast half as much rainfall in summer (nothing like fully offset by 30% more rainfall in winter) in the south east for instance. We have, of course, not only to cope with too little water. Recently there has been too much water with serious flooding in many parts of the country.
39. So there is a job for government to do. Can we trust them to do that? As Edward Davey, Secretary of State for Energy and Climate Change remarked: *“...it is fair to say that trust in politicians is not something the public has in abundance.* Just as an aside, it is the labile nature of trust that makes many people nervous with the concept of valuing nature. Especially when we tend to reward those who use most of the free natural resources and who pollute our environment, when we should be rewarding the organisations that protect our dwindling natural resources and these costs need to be reflected in what we buy and consume. That of course is a very Eurocentric view; much of the rest of the world sees things very differently.
40. Decision-makers see things through a very special prism or, rather, two prisms. One prism where a decision provides final end-result. It is finite. Consider a game such as a card game, or chess, or *Monopoly*, or games such as football, or cricket, the game ends when someone wins. The other prism is one where there is no intention to produce a finite result, rather a decision is made to keep the process in play. It does not terminate because there is no winner.
41. In finite decision-making there are rules that need to remain constant. The decision cannot be made if the rules change during the process. Altering the rules during the process creates chaos. So substantial effort is taken in a finite game to spell out the rules beforehand and enforce them during the process. The process must have boundaries -- spatial, temporal, or behavioural.
42. In an infinite decision-making, the process relies on continual rule changing to maintain open-endedness, with no boundaries. The American theologian James Carse<sup>19</sup>, who developed these ideas in his treatise *Finite and Infinite Games*, observed that *"Finite players play within boundaries; infinite players play with boundaries."* Infinite players play with intentions to keep the game going, to keep all participants playing as long as possible. They do that, as all infinite games do, by playing around with the rules of play. The climate change summits are expected to be finite with definite outcomes yet while some world leaders attend and play as if it is a finite game, the reality is that more leaders go with the intention of playing an infinite game.

### **Something for the sector**

43. We still have lessons to learn as a country about defending ourselves from, and learning to live with, floods. One particular issue is how we cope with ‘surface water’ flooding. Just as climate change seems likely to mean less water on average, it is also likely to mean more extreme weather events, with more inland and coastal flooding. Urban design will have to take into account monsoon-like deluges of water perhaps with open waterways rather than the block-prone pipework on which we currently rely.
44. Other practical steps that we need to take will include: improving the supply of water; agreeing on important new infrastructure (e.g. reservoirs); proposals to time-limit abstraction licences, and severe penalties for non-reduction of leakage. We will have to reduce demand, through better building design, more efficient appliances and improving industrial processes, and ensuring that as we move increasingly towards water metering in areas where supplies are under pressure, this is done in the fairest and most

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<sup>19</sup> [http://www.glg.net/pdf/Finite\\_Infinite\\_Games.pdf](http://www.glg.net/pdf/Finite_Infinite_Games.pdf)

effective way. Of course, we need to build houses (the people inside precipitate the demand for water) in sensible places. In parallel, we also need to change our behaviour in the way we view and use water.

45. An area of CIWEM policy that is being examined is how the sector could contribute towards the emissions reductions targets established under the Climate Change Act (80% by 2050).
46. Changing behaviour is hard: small actions can often seem futile. The cost of water at the tap is still affordable. Whilst austerity does not exactly compare with war, it is clear that people are more inclined to change their behaviour during a time of crisis. In addition, if the change message can have resonance with saving money and resources perhaps that is an opportunity. In times of austerity saving money becomes top priority. This could be a powerful driver for getting people to think about changing the way they travel, shop and use water or energy. Yet, the biggest challenge to changing behaviour is getting people to take the first step.
47. Perhaps this is something for the sector as a whole. Certainly, the private sector has woken up. Water-related issues such as drought and flooding have adversely affected more than half the world's largest listed companies during the past five years<sup>20</sup>. This represents an increase of 15 % over 2011 when 38 % of the world's largest listed companies indicated that they had been negatively impacted by water issues.
48. The *Carbon Disclosure Project's Global Water Report (2012)*<sup>21</sup> surveyed 185 of 318 companies listed on the *FTSE Global Equity Index Series (Global 500)* and revealed that more than two-thirds view water as a substantial risk to their business. The business community is responding to the risks associated with water-related issues and several are looking at water issues as they impact their supply chain. The report indicates that 40 % of companies now require their key suppliers to report on water-related risks.
49. To assist, an on-line risk evaluation tool has been launched<sup>22</sup> by WWF and the German development finance institution DEG<sup>23</sup> which identifies and mitigates water risks in businesses. For a long time, financial institutions have focused on climate change as the factor with the most material impact on loans, investments and insurance products. That landscape is changing quickly, with water emerging beyond reputational risk and now holding the potential of affecting debt-servicing and the creditworthiness of clients.

### **Something for CIWEM**

50. Recently, CIWEM completed a report, *Re-Framing Sustainable Development: a critical analysis*<sup>24</sup>. Weaved into this was the concept of resilience explaining how individuals, communities, institutions or countries are able to withstand and respond (including by behavioural change) to shifting circumstances and shocks while continuing to function and prosper, though within constraints.
51. Put simply, resilience is the ability to survive, recover from, and thrive in changing conditions (which could be major flooding, prolonged drought, energy and food price hikes, natural disaster, conflict and so on) over foreseeable timescales.
52. This assumes that quality of life and resilient planetary systems are inextricably linked and can only be achieved through a different societal and economic system predicated on the principles of nature, nurture, replenishment and resilience. In other words:
  - The economy should work with and reinforce planetary systems;
  - Economic growth should stay within planetary limits; and
  - Building resilience is the key to withstanding shocks whilst moving towards a sustainable and meaningful human society.
53. It has been apparent for some time that the concept of sustainable development has been undeliverable in any sense, anywhere. This is partly because its definition (Brundtland and the myriad variations), requiring an equitable balance between economic, social and environmental aspects, is (and has been) abused through a predominance of favouring economic aspects over social and/or environmental ones. Sustainable development is also partly undermined by unpredictable and relentless external variables causing imbalances which overwhelm and distract from such development.

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<sup>20</sup> <http://www.environmentalleader.com/2012/10/23/most-big-companies-hurt-by-water-problems-cdp-survey-finds>

<sup>21</sup> <https://www.cdproject.net/CDPResults/CDP-Water-Disclosure-Global-Report-2012.pdf>

<sup>22</sup> <http://www.thegreenmarketoracle.com/2012/03/new-tool-helps-companies-with-water.html>

<sup>23</sup> Deutsche Investitions-und Entwicklungsgesellschaft mbH

<sup>24</sup> To be launched formally on World Earth Day – 22 April 2013

54. Resilience is the ability to withstand and respond (including behavioural changes) to shifting circumstances and shocks while continuing to function and prosper during foreseeable timescales and whilst supportive of longer term sustainable development.
55. Resilience and sustainable development are complementary: sustainable development being the successful outcome of resilience. Whereas sustainable development seeks a balance between economic, social and environmental constraints, resilience recognises the constant disequilibrium and deals with this through trying, failing, adapting, learning, evolving and finding a way through the unpredictable externalities. Sustainable development is an absolute; development is either sustainable or it is not. Sustainability requires resilient systems which enable adaptation, learning, and evolving, providing the policy platform supporting the transition from here to sustainability.
56. A key question is: can strategies for resilience be delivered successfully under current political and economic models? This is the beauty of resilience. It allows political (social), economic and environmental strategies to develop which deal with unpredictable externalities. However, resilience only has value provided that there is political will to achieve an end state of sustainable development within meaningful timescales. Therefore, a twin-track approach is required; one which builds resilient systems incrementally, whilst at the same time seriously examining whether mainstream political and economic models are able to deliver the desired outcomes of sustainable development.
57. To a certain extent, a resilient community may be dependent on technological solutions and innovations in the short term and to differing degrees. In the context of current population projections and their associated consumption levels, a resilient community (be that a family unit, a village, a mega city or a country) in an industrialised context can only exist based on external supplies of food, energy, water, trade and so on. As those external supplies become increasingly fragile, only behavioural change will allow “communities” to continue in the long term.
58. In the short term, technology and innovation may be needed whilst behavioural change embeds. The risk is that short term technology and innovation is so seductive that it constrains behavioural change. A non-industrialised country may be less reliant on external connections *per se* (if it has access to plenty of productive land, water and natural resources) but then the desire to “have” what industrialised nations have kicks in (health provision always available, education easily accessible, some form of welfare support in the event of difficulty and so on) resulting in increasing dependency on external supplies.
59. The concept of resilience allows different starting points and the more resilience that can be established in a non-industrialised country, the less exposed it is likely to be to reliance on external supplies and the greater potential it has for a sustainable future state.
60. Resilience cannot reasonably expect to do anything about population, consumption or climate change within the short term, barring nuclear war, pandemic or similar catastrophic event. Over time there will be greater societal pressure for change to which the political elite may or may not respond. Meanwhile resilience helps to chart a way forward to respond to shifting circumstances and shocks while continuing to function, prosper and shift towards sustainable development. This recognises that radical change will be required, to the way humanity function and its interactions with the planet, in order to achieve sustainable development.
61. So, CIWEM could advocate, through a range of communication tools, policies and statements, the importance of behavioural change and resilience, and help to embed resilience in organisations, institutions and governments by engaging with decision makers at all levels and by providing leadership thinking on community and planetary resilience, and sustainability.
62. Incidentally, ten scientists have also recently proposed a new architecture for sustainable development and published this in *Nature*; *Policy: Sustainable development goals for people and planet*.<sup>25</sup>
63. The director of the Stockholm Resilience Centre, Johan Rockström, recently explained in a video<sup>26</sup> why we must redefine sustainable development.

<sup>25</sup> <http://www.nature.com/nature/journal/v495/n7441/full/495305a.html>

<sup>26</sup> <http://www.stockholmresilience.org/21/research/research-videos/4-5-2013-redefining-sustainable-development.html>



### Something for us all

64. Water scarcity will be a paramount issue in 2013. It could be anticipated that water availability in many parts of the world will fall because of droughts, inefficient use of water, chemical runoff, and/or salt water intrusion. There will be new requirements for water purification in many areas of the world, though this may also cause water usage rates to increase. We could see more advocacy groups emerge, urging people to conserve water and use it more efficiently. As a result of these factors, finding ways to use water more efficiently in homes, offices, and especially in agriculture and industry should gain traction. There is a great deal that remains to be done to manage better water resources within an expanding population, with a changing climate, with diminishing natural resources and within a decision-making context of politico-corporate elites that simply do not see through that same lens.
65. Should we be concerned? Of course, we should but what to do? Winston Churchill famously said: "*Scientists should be on tap, but not on top.*" That may still be appropriate though this should not be mistaken for complacency. There is something very British about putting up with adversity, and making the best of a bad situation. Although often quite laudable, one of the downsides, of course, is that those with something to gain simply take advantage. **So, as water professionals where should we draw the line in our advocacy?** Probably in a different place to where we do now.
66. In February this year, the Secretary of State (Energy and Climate Change) gave a speech on climate change and made some interesting observations, whilst accurately noting that "*It is fair to say that trust in politicians is not something the public has in abundance*", he then made some quite alarming remarks:
- ... when it comes to climate change, it is so important that all the rigours of the scientific method are applied;
  - ... it is the science that drives policy;
  - ... we hear loud and clear from the experts;
  - ... when the scientists tell us that the evidence proves that smoking is addictive and can cause a whole host of deadly medical conditions from emphysema to heart disease, we believe them.
  - ... when scientists tell us to that prolonged exposure to the sun's ultra-violet rays can lead to cancer, we believe them, because their views are based on strong evidence.
  - ... so if we have this trust in scientific evidence, why would we make an exception when it comes to the science of climate change; and
  - ... when it comes to assessing the health of our planet's eco-system – we should listen to the scientists – and we should believe them.
67. **We should not dismiss that invitation.** Although influence is a bit like drizzle, all around and hard to pinpoint, we do see the effects of short term decision-making everywhere and we do need to make clear that some actions are unacceptable at each opportunity. We could, either do that individually or within our branches by:
- Promoting behavioural change to embed considerations of resilience into modern governance and its power relationships (with the political, corporate and media axis) in order to improve decision-making that benefits all people;
  - Securing policy and legislative changes necessary for a more just and equitable economic and societal model with planetary limits at its core, and furthering resilience of communities and society;
  - Drawing on our collective insight, knowledge and experience to inform, influence and support key decision makers and governments;
  - Providing a forum for debate, for the formulation of ideas and innovations, and for policy making;
  - Hosting events to engage the broadest possible range of decision-makers, opinion-formers and stakeholders; and
  - Providing thought leadership on community and planetary resilience, and sustainability.

### Conclusion

68. In conclusion, it is proposed that a more urgent, and certainly more radical, basis for addressing UK water issues is needed within the context of the UK and global landscape. Things simply need to be done differently by calling on government, on the sector and on CIWEM to each play its part. And, it is a part that they must play. Recall a reflection of Robert Swan<sup>27</sup>
- "... The greatest threat to our planet is the belief that someone else will save it..."*

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<sup>27</sup> the first person to walk to both Poles