Finance and Water

"Where's The Data?"

Workshop with the financial services sector and the Centre for Ecology and Hydrology (CEH) to scope the current and future landscape of water-related investments and data as a means of managing and using water sustainably.

09:00 – 11:00, Monday, 7 June 2010
Z/Yen Group Limited
5-7 St Helen's Place, London

Hosted by:

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A delivery partner for:

Knowledge Transfer Network
Financial Services

Delivered on behalf of:

NATURAL ENVIRONMENT RESEARCH COUNCIL

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1. Background

The global population depends on a fraction of the total volume of water available on this planet. Most water is saline and of the precious 3% that is freshwater on the continents, the volume that is turning brackish or dangerously polluted is increasing annually. The hydrosphere is under increasing stress as there is greater demand for a very finite and easily polluted resource. Poor management of freshwater supplies through, for example, inadequate regulation of industrial effluents and sanitation systems, increasing abstraction and contamination of groundwater, are depleting reservoirs and rendering some supplies unusable for future generations. It is for these reasons that more institutions and scientific bodies are looking to find solutions to what is increasingly being seen as 'the water problem'.

The inability to match demand to supply is a complex issue and climate change will most probably make it even harder, as precipitation patterns alter and affect local and regional supplies. Unlike carbon, a greenhouse gas whose emissions are already being traded, water has yet to be earmarked as a commodity in a market of its own. Water-supply industries in different countries work in diverse ways. There is no standardised sustainability check on the water-supply industries. Desalination is seen as an all-too easy fix in countries with stunted freshwater supplies. However, desalination is energy-intensive and is fraught with ecological consequences. In sum, the current situation is unlikely to be sustainable.

Links between the environmental science and the reality of water management are often tenuous. The aim of this project is to bring these two spheres together, to better enable sustainable water management.

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2. Workshop

Z/Yen and the Natural Environment Research Council (NERC) hosted a morning workshop on finance and water bringing together investment managers, insurers, lawyers, investment researchers, water consultants from the financial services sector with water experts, hydrologists and hydrogeologists from two NERC research centres - the Centre for Ecology and Hydrology (CEH) and the British Geological Survey (BGS).

The aim of the discussion was to decipher what water-related data the financial services sector ("the City") requires to better inform their sustainable investment decisions, and how to best attune the data available through CEH with the City's needs.

The workshop agenda was as follows:

1. **Introductions**

2. **Objectives**
   - ♦ Establish how data is or could be used
   - ♦ Establish what data gaps exist
   - ♦ Establish how data could be disseminated

3. **Presentation**
   - ♦ Background on Centre for Ecology and Hydrology (CEH)

4. **Critical Success Factors**
   - ♦ Critical assumptions
   - ♦ Critical decisions
   - ♦ Critical information

5. **Valuing Water as an Asset**
   - ➢ Worksheet

6. **Roles for NERC?**

7. **Next steps**

A summary of the discussion points is set out below. This summary records the key points of the discussion, but in no way implies that any of the participants agreed with all, or any, of the specific comments. The purpose of the record is knowledge exchange - to help inform others who may wish to understand the current positions of the financial services sector with regards to sustainable water supplies, and the potential water data sets behind those

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positions. It is also hoped that some of these observations may be developed, perhaps with collaborations between industry and the science base, to improve data sets, intelligence and investment decision-making supporting sustainable water use.

3. Introductions and Objectives

Water has until very recently been overlooked for investment by wholesale markets. National and private water industries are largely left to their own devices to set prices and manage supplies. The links between environmental science and financial services are tenuous beyond the UK insurance market (which is apparently not seeking diverse data sets). The aim of the workshop is to push beyond this sector into broader financial services, and most importantly, seeking to establish the interest of water data for capital markets. The global water industry is complex, and we need to see where and how finance fits in. Numerous models exist and are being deployed by environmental science to gauge the state of global water supplies and demand, but these are largely outside the realm of capital markets. Dissemination of this data is vital to bring these two sectors together.

4. CEH Presentation

"Global water resources – an uncertain future" by Alan Jenkins, Science Director, Water Programme.

The Centre for Ecology and Hydrology (CEH) and British Geological Survey (BGS) are joined through their research and interests, under the umbrella of NERC as research centres. The biggest drivers of water resource change are:

- population (especially agricultural related consumption of groundwater);
- production of biofuels (specifically the requirement for irrigation);
- climate change (where there is massive uncertainty);

Time-lines are being re-thought. Water policy and infrastructure now need to be more flexible and adaptable to changes in shorter time frames. Political boundaries create challenges for setting parameters for measuring water resources. River catchment areas and how they interact with groundwater provide useful criteria. The demand-side of the water equation is more problematic to measure. Hydrologists estimate the volumes of water used by agriculture, industries and households. They have the data and models to apply at three different geographical resolutions:

- locally;
- regionally and;
- globally.

The resolution available will depend on the questions and needs from the financial services sector. There is a great deal of uncertainty in global circulation models (GCMs), and climate change will exacerbate the uncertainty. No two hydrological models will predict the same outcome, thus it is necessary to use at least two models, and to understand the uncertainties within them. Scientists are going beyond places which are typically thought of where demand exceeds supply such as India and China, and looking at over-exploitation in places such the UK and USA. In short, CEH can deliver the science for the sustainable management of catchments and water resources.

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5. Current Situation in Financial Services

Mainstream investment analysis is mostly focused on carbon – this is what gets investors' attention currently. There is more investment appetite for water's impact on other investments. Investors need evidence on potential impacts on investments prior to making them. How far ahead do companies look to secure the sustainability of investment projects? A five year timeline typically applies, regardless of whether the capital project takes more than five years to completion. In the case of a banking research team looking at India, it can be seen that the investors are not aware of water-related risks. When financial analysts are verifying the longevity of investments and their sustainability, they will take some best-guesses for lack of data. For some countries such as China, data is very fragmented and it must be used with caution. The consequences and risks of large-scale engineering schemes such as the Three Gorges Dam or hydropower projects in Brazil are very hard to predict. Projects in the UK are approved on the back of data sets accumulated over the last 50 – 100 years, and water data in Europe is more extensive and consistent. On the other hand, hydroelectric projects in India are based on 5 – 10 year data sets. The absence of long-past data is often a problem in emerging economies. There is no consensus on the number of data years should be used to approve projects.

Bankers look at water mostly through a risk prism and not as an opportunity for investment. In order to fully value the supply chain of any water-based good or service, such as hydropower, the financial services sector needs:

- data
- analysis
- information on core technologies

A first attempt has been made to measure and assess the extent to which firms are engaging with water from a sustainability aspect through Water Disclosure (WD), launched in 2009 by the Carbon Disclosure Project (CDP). CDP is a UK-government initiative established in 2000 which has run annual questionnaires to 500 global companies requesting information on their operations and supply-chain carbon emissions. Although CDP data quality is high, WD is currently limited as it is focussing solely on the publication and transparency of data, but expects to compare the performance of participating companies in the future. This initiative's geography of interest is at a local level, corporation by corporation. WD did not involve CEH as the latter would not have been on the financial services professionals' radar, a factor that is changing as a result of NERC's Knowledge Exchange Programme. CDP would be improved if companies had to declare how much of their revenue is water-dependent. For instance, it appears that Nestlé could. Usage and emissions data are required to help the investment community to address the following issues:

- secondary impacts of, for instance, potential chemical reactions when the products from two different industries combine in water;
- improved research on enforceability related to the problem of trans-boundary water pollution, to help develop a framework in which to carry out enforcement.
- resource abstraction, improving disclosure which could be broken down by sector;
- not many listed companies are exposed to agriculture (producers and manufacturers are the mediators between the end product), as the supply chains are so diverse that risk is, therefore, already off-set. However, the report published by Ceres (2010) entitled "Murky Waters – Corporate Reporting on Water Risk", demonstrates that supply-chain evaluation and transparency is crucial.

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The financial services community currently obtains water data from a variety of expert sources, mostly engineering, but they are also receptive to NGO approval. Most water-related advice is currently sought on an ad-hoc basis from a variety of experts, and the financial services sector would be receptive to the government scientific community providing authoritative data on a regular basis. There is little data on water investments, for example, on how countries manage supply. In developing countries, water supplies are controlled by government subsidiaries – which can be a barrier to private investment. Environmental lawyers are mostly involved in the legal side of corporate due diligence but that requires localised facts - and hydrology seldom features in due diligence even in the UK. Water data is mostly focused on flood risk, with very little on supply. Developing hydro-fracturing to extract natural gas from shale is done mostly with a belief that there will be no harmful consequences. Hydro-fracturing is a classic risk scenario. Power generation is another key risk issue, especially given hydropower and water needed for cooling. The International Hydropower Association operates on a sustainability grading scale of 1 to 5. Different parameters for sustainability thresholds may develop over time, for which there will be requests for data. NERC can push out the data into these areas as demand for resources increases. However, geography is significant. Atmospheric carbon can be measured, but water measurements at molecular level are more challenging.

6. Potential Solutions and Limitations

1 Behavioural change is needed to adjust water consumption patterns to raise sustainability levels. This is not happening yet for water, but is in motion for carbon (albeit at early stages). How can water data be used to change behaviour? Companies need data to help them make decisions on heightening their water-awareness, for example Tesco are beginning to scope three areas:

- ecosystem services
- supply-chain and in-house consumption.
- water foot-printing as a useful mechanism (even if currently used for marketing purposes).

Polaris Institute research case study: "Murky Waters: The Urgent Need for Health and Environmental Regulations of the Bottled Water Industry" (2009) is flagged up as an example of how risks can be overlooked by an industry.

2 It is early days for water risk ratings conducted at a sector by sector level. The construction sector is building energy consumption into the equation but not water data. Yet the supply chain for this industry can be hugely water intensive (e.g. cement), but the industry is only beginning to explore how the value of the building is affected by embedded water and in-use water. There is access to some high level data, but not much. In order to perform a more high level analysis two sets of data are needed:

- information on how much water a company uses (which is very difficult to acquire);
- regional and local data on supply and flow.

Vested interests mean it is difficult to obtain impartial data. Two main obstacles are faced: firstly, there is no recognised best practice on water usage, and secondly, project finance does not look closely at water risks. Project finance needs consistent data sets for water-related investments and independent sources of information.

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Though there are 20,000 environmental consultancies in the UK, they give generic advice. Furthermore, there are inconsistencies in how supplies are valued. For example, ground water and surface water are valued differently in the UK:

- investment in surface water is more visible because it is less easy to capture and, therefore, perhaps more attractive to investors.
- ground water is not as easily placed on a balance sheet. It doesn't require much investment in capital to extract so it seldom goes on the balance sheet.

3 **Debt market** and **bonds.** A link to water availability would need to be established. Funding could be more closely tied to available markets when it comes to sovereign debt markets and bond markets. Suggestions are:

- a water-based bond in the way that there are green bonds and carbon bonds
- sovereign debt tied to water capacity and water risk management in different countries
- an energy efficiency bond, as there is a potential benefit for technology companies developing water efficiency.

4 A **benchmark** for different sectors (taking into account the legal requirements for putting water back into the system). However, a benchmark would be complicated from the science point of view because the impact of an effluent on water quality depends on discharge rates and is affected by the different flow rates in different rivers. The BBOP roundtable for the global mining community is an example of a similar initiative in an industry sector:

- focus on biodiversity;
- defining standards (e.g. Chesapeake bay barometer of agricultural run-off).

5 **Standards.** United Nations (UN) and World Health Organisation (WHO) do have guidelines or standards but disclosure on a country by country basis depends on the different jurisdictions. An example is the varying standards for potable water and water for agricultural use. However, the standards we are aiming for are fairly well established in some places.
There is little research on the enforceability of standards, and law suits can go on for over a decade. UN agencies have good water quality standards, but the focus is on water in the environment:

- there are no industry level standards;
- standards are related to flow which will not be the same globally;
- is a universal quality benchmark possible?
- a local level index is possible perhaps, but how useful is this?

7. Water Data as an Asset

What is of most interest to financial services?

- hydropower, energy and renewable energy (SE Asia, Latin America, Africa) – it is important to make distinction between dams and the run of the river.
- industry inputs/outputs, such as mining, abstraction of water for this purpose and the effluent released in the process.

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- demand-side efficiency presents a technology opportunity, for example rain-water harvesting technology can be upgraded for more efficient technologies than those currently in operation.
- disclosure, valuation and breaking distribution down by industry.
- upstream resource abstraction, by volume and quality
- tidal power may be of limited interest as the market is apparently too small at present.
- the links to real estate where rights to water are implied, and where they can be clarified so that companies can break it down and identify it as an asset:
  - US water rights are separated from land rights - in the western states water rights are tradable;
  - EU accounting standards differ from country to country;
  - UK licenses were assigned by the Environment Agency (EA) in years of plenty, however, EA has spent the last decade re-working water licenses.
  - water often goes to whoever can pump the fastest.
  - Latin America water rights are valued at a very low level.

- water supply industries have bigger turnovers, whilst the sanitation industry is growing at a faster rate.
- agriculture and fisheries are key as industrial footprints are not always regulated for these two water-based industries. This can be done effectively by valuing the entire supply-chain, for example where underlying commodities being sourced for Procter & Gamble, Unilever; Nestle and sustainable palm oil are water intensive. Trade commodities of agricultural investment, e.g. Saudi Arabia's supplies of rice and wheat.

8. Roles for CEH and NERC

A plethora of data is available, but NERC needs to know exactly what data, the geography of that data and at what resolution it is needed. This leads to further questions:

- are there consistent reporting mechanisms?
- what is best practice?
- consultants are generalists – hydrology is not taken into account but can be.

CEH note that they are not in a position to assess industry use but can:

- define water supplies in space and time;
- define the risk.
- define quality – although the data is less reliable for this and has to allow for various factors like accepted regional and national pollution standards.

Maps are currently available to detail:

- availability;
- scarcity;
- risk;
- flow;
- EU abstraction licenses;
- however, quality data has only been developed in the last 10 years so outputs are variable.

In short, NERC, via CEH, can provide data on where the water resources are, they can define the water that is there in any given space and time and can model risk for any given reservoir. Data on quality is less reliable especially given that regionally there are different

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levels of pollution that are allowed. Over the last decade robust data on aquifers has been built up.

NERC is aiming to get the data available into the hands of the market in order to perform benchmarking industries and transparency, along the lines of the Extractive Industries Transparency Initiative (EITI).

More specifically, there was an interest in the following data for use by the financial services sector:

- reservoir data, expanding from Europe to an international perspective.
- seasonal effluent data sets (based on the question of whether consumers should be charged more for water during the summer/dry season? This would affect industry too).
- storm water management systems, flooding, and water infrastructure e.g sewerage.

Hydrological Summaries could be done basin-by-basin for all catchments. The data is available globally, for example, American satellites are monitoring water in Africa. Maps show where science is going:

- Water Model Intercomparison Project (MIP) – part of the WATCH European project;
- trying to reduce uncertainties but can't rely on one model alone;
- issue is multi-sectoral – need to interpret data for different sectors;
- need agricultural discussions e.g. orange groves in Brazil, corn and wheat irrigation in Spain.

NERC understands that the financial services sector is looking for an aid to investment decision-making : for example a tool to help the decision to site a hydropower plant in India that can be applied universally. There is a huge variety of potential demand, so need to develop a generic tool with multiple applications to connect the science with the user needs. Global-level reporting is possible using satellite data which can work at the:

- global;
- regional;
- local scales.

9. Closing Remarks by the Chair

It seems water is emerging as a key investment theme, but a clear, consistent, adequate water evaluation model has yet to be established across the sector. There is a general opinion from the financial services sector's attendees that there is currently insufficient access to water data. The data resolutions needed are both global and local at the same time, and not at a company by company basis like WD or on a purely national basis; but at a river basin and individual reservoir level. This fledgling sector presents a plethora of risks and opportunities to investors. Methods to control and assess water usage such as foot-printing and disclosure are not entirely redundant but we must accept their limitations. Overall, in comparison to the carbon market, the correlation between the environmental data and the use of that data is still relatively immature. However, it is very exciting as the stage of this initiative harks back to the beginnings of carbon valuation in the early 2000s.

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Attendees

Dave Allen	British Geological Survey
Hassen Bali	Markit
Andrew Bowen	Centre for Ecology and Hydrology
Alexander Clode	Bloomberg LP
Malcolm Cooper	Z/Yen Group
Leonor Fishman	Z/Yen Group
Jemma Green	JP Morgan Chase & Co.
Eszter Gulacsy	Davis Langdon
Alan Jenkins	Centre for Ecology and Hydrology
Michael Mainelli (co-Chair)	Z/Yen Group
Richard Max-Lino (co-Chair)	Natural Environment Research Council
Andrew McKenzie	British Geological Survey
Will Oulton	Mercer
Rachel Potter	Standard Chartered
Stephanie Rochford	Z/Yen Group
Neil Runnalls	Centre for Ecology and Hydrology
Rick Stathers	Schroder's
Stephen Sykes	WSP Environmental
Ashley Thomas	Daiwa Capital Markets
Joe Waring	HSBC
Rob Ward	British Geological Survey

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