Water trading may deliver more sustainable water supplies for urban areas and reduce the impact on local aquatic environments. Regulation must not stand in the way.

Water is an increasingly scarce commodity; population growth and climate change will only make this worse. According to the United Nations almost half the world’s population will be living in areas of high water stress by 2030.

Often the literature focuses on agriculture and its impact on freshwater eco-systems and biodiversity. Yet the crisis that we face also affects urban environments and the quality of life of ever increasing urban populations. Water is a vital input to the urban environment, both for industrial processes and to support high population concentrations.

Unsurprisingly, in areas of the world where water is most scarce there is strong competition for this resource and yet the mechanism for its allocation is typically anything but competitive.

This article considers how market mechanisms, particularly inter-regional water trading, may be harnessed to manage scarcity more efficiently from an environmental as well as economic perspective. It argues that water trading might help deliver more resilient water supplies for urban areas, but also reduce the impact that urban water demand places on local aquatic environments.

Urban development and water demand

The first phase of urban development in the UK was mainly driven by industry, creating additional demands for water and risking pollution of supplies. In England water supplies from the Pennines were exploited to supply the burgeoning industrial towns of the North and water was brought from Wales to supply Birmingham and Liverpool.

Subsequently as economies mature the emphasis moves to the service sector, and if industry moves elsewhere water demand can stagnate or even reduce.

The current focus of urban development is London and the South East. Whilst industrial water use had declined, demand for water has increased due to rising population and smaller households; the Office for National Statistics forecasts continuation of these trends for the foreseeable future.

The option of redirecting urban development to areas with more plentiful resources has been discussed and even implemented to some extent.

About us

Ofwat is the independent, economic regulator of public water supply and sewerage in England and Wales. Its statutory aims include protecting consumers’ interests, wherever appropriate by promoting effective competition. The authors are members of Ofwat’s Market Reform Team, which is responsible for identifying and implementing market mechanisms to ensure the sustainable provision of public water and sewerage services in terms of the environment, investment and the consumer interest.

Figure 1 | Water licensing status in England and Wales

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extent, with the development of 'new towns'. However, there are strong economic factors driving further population growth in the south east of England, and water costs are often only a minor factor.

London, the South East and East Anglia are already the driest parts of England, with similar levels of rainfall to Jerusalem or Damascus, and climate change is likely to aggravate this situation. Combined with high demand, this leads to scarcity. Figure 1, from the UK’s Environment Agency, shows pockets of scarcity across the country but with a bias to the South and East.

Water resources in the Thames basin are already used very efficiently with much more reuse of water than in other catchments in England and Wales. Therefore, as well as optimising resources within these areas, the urban development pressure in the South East is likely to drive it increasingly towards importing water. It is in this context that we examine the merits of water trading.

**Organisation of the industry**
Currently in England and Wales, 22 vertically-integrated water companies have statutory monopolies in their appointed areas, as shown in Figure 2. The industry is organised along regional lines, with water and sewerage company areas roughly corresponding to river basins, such as the Thames, Severn and Trent. However, particularly in South East England, there are also smaller ‘water-only’ companies and hence responsibility for water supplies in London and the South East is fragmented.

**Evolution of water networks**
Utilities tend to have supply networks within which the commodity can move more-or-less freely. There are also connections between these networks that help with supplies but are not sufficiently dense to constitute full integration. Over time, new connections are made and sometimes networks merge. The drivers include diversification of supplies, pressures from customers for network integration to equalise prices, and resilience against network failures.

Compared to other utility products water is relatively heavy and relatively cheap. For example, average household use of water per year amounts to over 120 tonnes. Moreover, the average household water bill is below £200 per year (excluding sewerage costs) compared to over £600 per year for gas. Consequently water networks are smaller than in energy, or indeed telecommunications. Within England and Wales there are about 100 water networks, ranging from very small to practically regional, whereas bulk electricity and gas networks cover the whole of Great Britain and there are interconnections with continental Europe and Ireland.

There are exceptions to this story depending on topography and river systems, for example as mentioned above the Victorians developed long-distance bulk water supplies to Birmingham and Liverpool.

In recent years there has been a trend towards interconnection and integration within water companies. Wessex Water is making new connections between its four networks (Wessex Water Services Ltd., 2008) and United Utilities has recently built an East-West link (United Utilities, 2011) that integrates Liverpool and its supply from North Wales with Manchester and its supply from the Lake District. Similarly there is a single network covering most of Yorkshire and Thames Water has built a ring main to form an integrated network in London.

The challenge we face is barriers to interconnection between company areas, as we believe there is significant value to consumers and the environment that is not being realised. The independent review of the water industry by Professor Cave (Cave, 2009)) was surprised that, despite some companies having water supply surpluses and others having deficits, bulk supplies between water companies had remained broadly constant at around five per cent of national distribution input since privatisation in 1989.

This means that potential benefits to customers, companies and the environment are not being realised. Water trading provides new options, alongside local resources and alternatives such as demand management, leakage control, winter storage and desalination, and sometimes better solutions can be found. Ofwat, in a desktop study, identified a potential...
£960 million of savings over the life of assets if water companies increased interconnections rather than developing in-areas sources. The Water Resources in the South East group in more detailed modelling work found potentially savings of £500 million over 30 years in the south east of England. The environment could also benefit from moving from areas with surplus water to areas of over-abstraction where the environment is being damaged.

The water companies have since pointed out that many water companies have out-of-area assets and shared resources which transport water between company areas accounting for around a further ten per cent of distribution input, but these may not have the same supply diversity and resilience benefits as interconnected systems.

Why introduce markets?
Market mechanisms excel at promoting flexible and adaptable responses to changing circumstances. Markets respond more quickly to problems and opportunities, are able to address complex issues, actively encouraging or even requiring innovation from their participants. Markets are also a very efficient way of allocating scarce resources to the use where they are most valued; a useful property for water, given its increasing scarcity.

However, markets can fail where there are externalities i.e. where the decision of buyer and seller optimises their private interests but does not reflect wider societal values. We recognise that the environmental impacts are of crucial importance if water markets are to deliver benefits to society as a whole.

Why facilitate water trading?
In a capitalist economy markets often spontaneously develop to meet consumers’ needs. However, water markets in England and Wales are highly regulated and that regulatory framework has unintentionally stifled water trading and the benefits of trade are not being achieved.

The alternative of central planning also has drawbacks. Every five years each company is required by law to prepare and consult on a long-term plan for water resources in its area. This has tended to be somewhat insular, as companies are not required to consider possible imports and exports. Some progress has been made through the Water Resources in the South East group. While there has been some co-operation in the past, experience suggests it is difficult to realise the savings the group identified. There may also be potential entrants with new sources of water that could be made available, but it is hard to assess the extent because the existing institutional arrangements do nothing to encourage entry.

If we can reform the institutional system and remove barriers to trade:

- The environment will benefit from moving from areas with surplus water to areas of over-abstraction where the environment is being damaged.
- Consumers, both household and non-household, will benefit from cheaper and more sustainable supplies. Water trading provides new options, alongside local resources and alternatives such as demand management, leakage control, winter storage and desalination, and sometimes better solutions can be found. The gains from trade can be shared between importing and exporting areas. In addition, water customers will benefit from increased security of supply from more interconnection of networks and being able to receive water from a wider variety of sources.
- We need to give water companies sufficient incentive to consider water trading, and they will benefit if we allow them to retain a greater proportion of the gains.

Removing the barriers
A study (Arkell and Piper 2010) for Defra identified 29 barriers to water trading, many resulting from the regulatory system. With improved regulatory measures designed to bring down the barriers and improved incentives, water companies can be encouraged to trade more water between them, where the overall benefits outweigh costs.

To help deal with the barriers to co-ordination and water trading Ofwat, working with the Environment Agency and Government is considering several measures. The main ones are:

- Moving towards a regulatory approach based on outcomes to allow water companies more choice in how they deliver the outcomes that matter to customers;
- Looking at ways of removing the perceived capital expenditure bias which can encourage firms to develop their own sources rather than buy water from elsewhere;
- Increasing the financial return to exporters and importers of bulk supplies;
- Increasing the pressure on water companies to contract with efficient entrants;
- Introducing an incentive mechanism to discourage abstractions in over-abstracted catchments;
- Improving the information available to potential entrants about the costs of water companies’ own water resource options;
- Providing improved access price information so that entrants know how much it will cost to transport their water using the incumbent company’s network;
- Developing a model bulk supply contract to reduce negotiation time and costs;
- Providing clearer guidance on how we will treat requests to Ofwat to determine bulk supply contracts; and
• Working to make the Water Resource Management Plan (WRMP) process more open to bulk supplies, for example adopting Severn Trent Water’s proposals (Ernst & Young and Severn Trent Water, 2011).

Conclusion
Growing water scarcity in England and Wales, in particular in south east England, calls for all options to be considered. One tool which has been neglected since privatisation is water trading. We are aiming to remove barriers and rebalance incentives so that water companies in England and Wales can consider water trades on a level playing field with other options for balancing supply and demand. If we are to sustain the supply of water to England and Wales’ ever-increasing urban populations we cannot afford water trading to be discouraged accidentally by the regulatory regime. *

References
Ernst & Young, and Severn Trent Water (2011), Changing course through water trading, (Coventry: Severn Trent Water Limited).