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WATER RESOURCES IMPACT

WATER MARKETS IN EUROPE

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During the summer of 2008, ships carried emergency supplies of water to Cyprus and Barcelona, Spain. These expensive deliveries were the result of political decisions to transfer water to "important" destinations, not arms-length transactions in a market. European water markets for bottled water, equipment, and services are highly developed, but the same cannot be said for markets in water quality or quantity that are well-known in parts of the United States (U.S.) and Australia, respectively. Water markets in Europe are underdeveloped because they are difficult to implement within existing institutional constraints or inefficient from a transaction cost perspective. This article describes Europe's nascent water markets, explores the factors affecting their development (or lack thereof), and speculates on where and how markets may emerge in the future.

EXISTING WATER MARKETS IN EUROPE

Table 1 gives a partial overview of the state of water markets in Europe. I use "partial" because it is neither an exhaustive census of all European countries nor authoritative in characterizing the state of markets in a country. I may have missed some markets.

Markets in Quantity

Water markets in Spain, according to Garrido (2011), are similar to water markets in California. Market trades are allowed but subject to restrictions on movement and use. The impact of trades on environmental flows are not always known, but environmental constraints can block trades. In some cases, water "rights" can be unilaterally redefined or revoked by the issuing authority. Trades can be challenged by third parties, restricted to certain buyers, or redirected to the State.

Despite these barriers, water purchases and trades took place at the height of the last drought (2006-2008). Most local purchases were directed at limiting groundwater withdrawals in an area (i.e., the government running a reverse auction to buy back farmers' pumping rights). Annual transbasin sales from farmers to other farmers and urban interests in drier areas ranged from 68-102 million m^3 (55-83 af) at prices that ranged from 0.15 euro to 0.28 euro per m^3 ($270 to $500 per af). Government taxes, subsidies, and adjustments changed these top-line numbers by ±50 percent.

The market for water basically collapsed after the drought ended in 2008 and water users returned to business as usual. Carlos M. Gomez (Universidad de Alcalá) emailed me this excellent summary:

> *Rather than representing a radical institutional change in the way water rights are defined and allocated, allowing some water trading was mostly part of a "disaster management strategy." The official drought finished in 2008 when abundant rains came back and washed water markets out from the policy arena, sending them back to the researchers' desks where they still are waiting to be properly dissected. Some leftovers of these markets are still exposed to the public curiosity. In fact, some agreements to trade water have survived and not more than one digit number of transactions took place in 2010 and all of them consisted in the renewal of some previously signed contract.*

Garrido (2011) confirms Gomez's view. He notes that water markets will not flourish without a political push to reform Spain's existing water rights and laws. In the meantime, water management efficiency will improve as regulations on water quality and supplies continue to tighten. Winpenny *et al.* (2010), for example, describe complicated exchanges of freshwater, desalinated water, and wastewater among agricultural, urban, and environmental interests in Spain. These exchanges do not take place in an open market.

According to Cave (2009), water markets in England and Wales have not developed as hoped. The market for "inset services" (where customers using more than 50,000 m^3 per year can replace the local monopolist with another seller) is quite small (18 appointments). The market for "common carriage," where a wholesaler uses another monopolist's network to deliver water to a

Table 1. Markets for Water Quality and Quantity in Selected European Countries.

Country	Quantity	Quality	Comment (*see text)
Baltic Nations		Discussed	N, P emissions trading
Belgium		Potential	N, P emissions trading
Bulgaria/Romania		Pilots	*PES (WWF/Danube)
France		Some	*Payments for quality
Germany		Some	*Payments for quality
Italy			No legal framework
Netherlands		Discussed	*Payments for quality
Spain	Some agricultural	Some	*Inactive
United Kingdom	Some M&I	Discussed	*Services to large customers

customer, is practically nonexistent (one transaction). Cave (2009) recommends liberalization towards tradable permits for abstraction and discharge and a framework allowing "upstream sources" to add raw or treated water into incumbent networks.

European water markets for quality and quantity are not well developed ... the main reason is a European emphasis on bureaucratic water allocation and regulations on water quality

Markets in Quality

Water emissions trading is not well developed in Europe, probably due to the "crowding out" influence of the Water Framework Directive (WFD) and transaction cost/complexity tradeoffs discussed later. According to Heinz (2002), farmers in Germany, France, and the Netherlands have participated in Payments for Environmental Services (PES), changing their practices in exchange for payment (or "subsidy," depending on your perspective). PES can be more efficient than regulation in reducing negative externalities when the transaction costs of dealing with point sources are low. The World Wildlife Fund is piloting a program in the Danube basin in Bulgaria and Romania with financial support from the European Union (EU) and the United Nations (see http://tinyurl.com/awra-z1). Besides working directly with point sources, the World Water Forum (WWF) project avoids potential problems with regulators who are incapable or unwilling to regulate water quality.

BARRIERS TO MARKETS

The European elephant in the room is a WFD that requires EU countries to monitor and bring water quality within watersheds up to "good" levels by 2015. The WFD (see http://tinyurl.com/awra-z2) uses cost-benefit analysis to determine which pollutants represent the biggest risks and which technologies are best at reducing those risks, but it says that "all existing technology-driven source-based controls must be implemented." Although the WFD emphasizes the importance of polluter pays and full-cost pricing, the practical application of mandated "technology-driven source controls" leaves little room for implementing a cap and trade system that meets standards within the watershed by allowing bigger polluters to use less-than-best practices in exchange for paying other polluters to implement better practices (see http://tinyurl.com/awra-z4).

This emphasis on across-the-board best practices probably reflects a transition from historic directives controlling point source emissions of nitrates, wastewater, industrial emissions, etc. It may also represent a policy solution supported by polluters with expensive equipment who did not want their investments rendered uncompetitive by a cap and trade market that would allow their competitors to meet pollution standards using purchased cheap credits instead of expensive equipment.

From a more pragmatic perspective, it is also easier to monitor equipment installations and operations than discharge levels when the quality and quantity of regulators varies, from Greece to Denmark and from Spain to Lithuania. So it is easier to require that facilities have the same equipment (inputs) and monitor overall river health (outputs) without worrying about intermediate emission details.

Nevertheless, the WFD's emphasis on point source standards and best practices that require heavily capital expenditures is starting to wear thin where people do not see the value of investing in marginal water quality improvements. One of the United Kingdom's largest water companies proposes trading in emissions and bulk water (Severn Trent Water, 2010), arguing that additional capital spending on raw water sourcing and wastewater treatment imposes costs on consumers, does nothing to reduce nonpoint pollution, and increases carbon emissions. Such expenditures can also be wasteful, as when the "best available" technology cannot be properly implemented or when regulation targets the wrong version of "clean."

Regulatory Efficiency?

Markets tend to be more efficient when transactions are standardized and separable. Bureaucratic processes tend to be more efficient when transactions create spillovers or are difficult to quantify. These tradeoffs also depend on the skills and ethics of the bureaucrats implementing regulations. The lack of markets in Europe may therefore reflect a longer history of "subtle" regulation and a greater faith in competent bureaucrats.

Europe has a longer history of human activities and a higher population density than market-friendly places like the U.S., Australia, and Chile. Population density in the Netherlands (No. 30 in the world, according to Wikipedia) and most of Europe is higher than in the U.S, (No. 179) or Australia (No. 234). It is easier to use markets to allocate quantity or quality from one place to another when population density is lower and there are fewer spillovers affecting other uses.

Now consider the institutions that markets would replace. Some Dutch water boards (*waterschappen*) have been managing water quality, quantity, and infrastructure since the 13th Century. Some Spanish irrigators have depended on *tribunals de las aguas* (water courts) to manage local water supplies since the Moorish era (which ended in 1492) or even earlier. Other countries have similar institutions that have delivered results for centuries and reflect a balance among water uses that may be impossible to qualify, quantify, or simplify. They may represent the most efficient mechanism for managing water, but – even if they aren't – it would be difficult to convince the people who rely on these institutions to switch to markets that promise efficiency. That said, Spain's tribunals have been superceded by changing events. It is easier to add markets in places where single-purpose institutions (such as irrigation districts) maintain canals and distribute water. That's what's occasionally happened in the U.S. and more widely in Australia and Chile. It could also happen in Europe. Finally, we must consider a European "preference" for solutions managed by bu-

reaucrats with higher status and better qualifications and status than their equals in the U.S. These stylized facts mean that there may be two equilibria for allocating water quality and quantity decisions: markets in places like the U.S. and Australia and regulators in Europe.

WHERE MARKETS MAY DEVELOP

The relative lack of European water markets does not mean that they will never appear. Worsening freshwater scarcity, decreasing returns to WFD regulations, and growing knowledge of markets elsewhere increase the probability of more markets in Europe. Let's consider the demand and supply for markets.

Demand for markets in quantity will increase where water is scarce (Figure 1). The supply side will be driven by changes in land use, additional conveyance or storage infrastructure, and changes in fees or regulations that reprioritize uses. Turkey and Russia are relatively water rich countries on the edge of Europe that have proposed water exports. Turkey ended talks to sell water to Israel in June 2010 after Israeli commandoes killed several Turks on ships carrying "humanitarian aid" (the cargo is disputed) toward Gaza. Turkey plans to build a pipeline to ("Turkish") Northern Cyprus by 2013, but that export deal is certainly not an arm's length market transaction. Russia's Putin has suggested selling water to other countries, but he (and his government) are unreliable partners in any long-term transactions.

Demand for markets in quality will come where water is polluted (Figure 2). Supply will come from changes in water use, treatment technologies, and new or enforced regulations that create opportunities to sell quality improvements.

CONCLUSION

European water markets for quality or quantity are not well developed. The main reason is a European emphasis on bureaucratic water allocation and regulations on water quality. These institutions may be relatively efficient for European conditions, but growing water scarcity and increasing cost for meeting watershed quality goals are creating opportunities for markets that can deliver greater amounts of cleaner water at lower costs.

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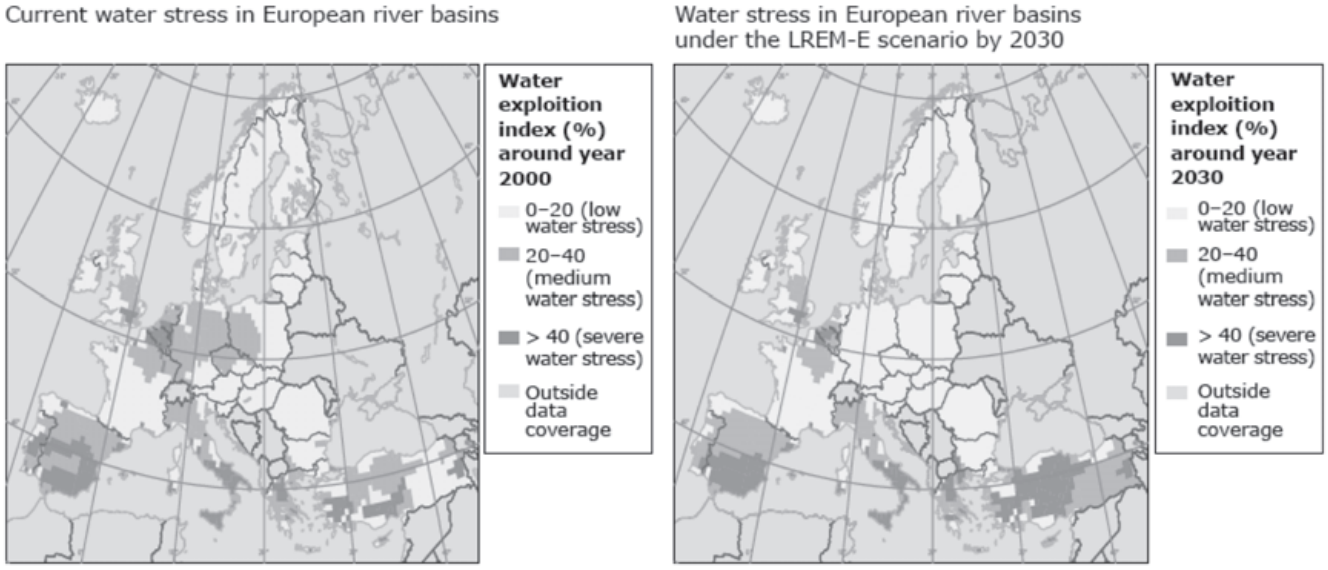

Figure 1. Water Exploitation Index in 2000 and 2030.
Source: European Environment Agency (http://tinyurl.com/awra-z5).

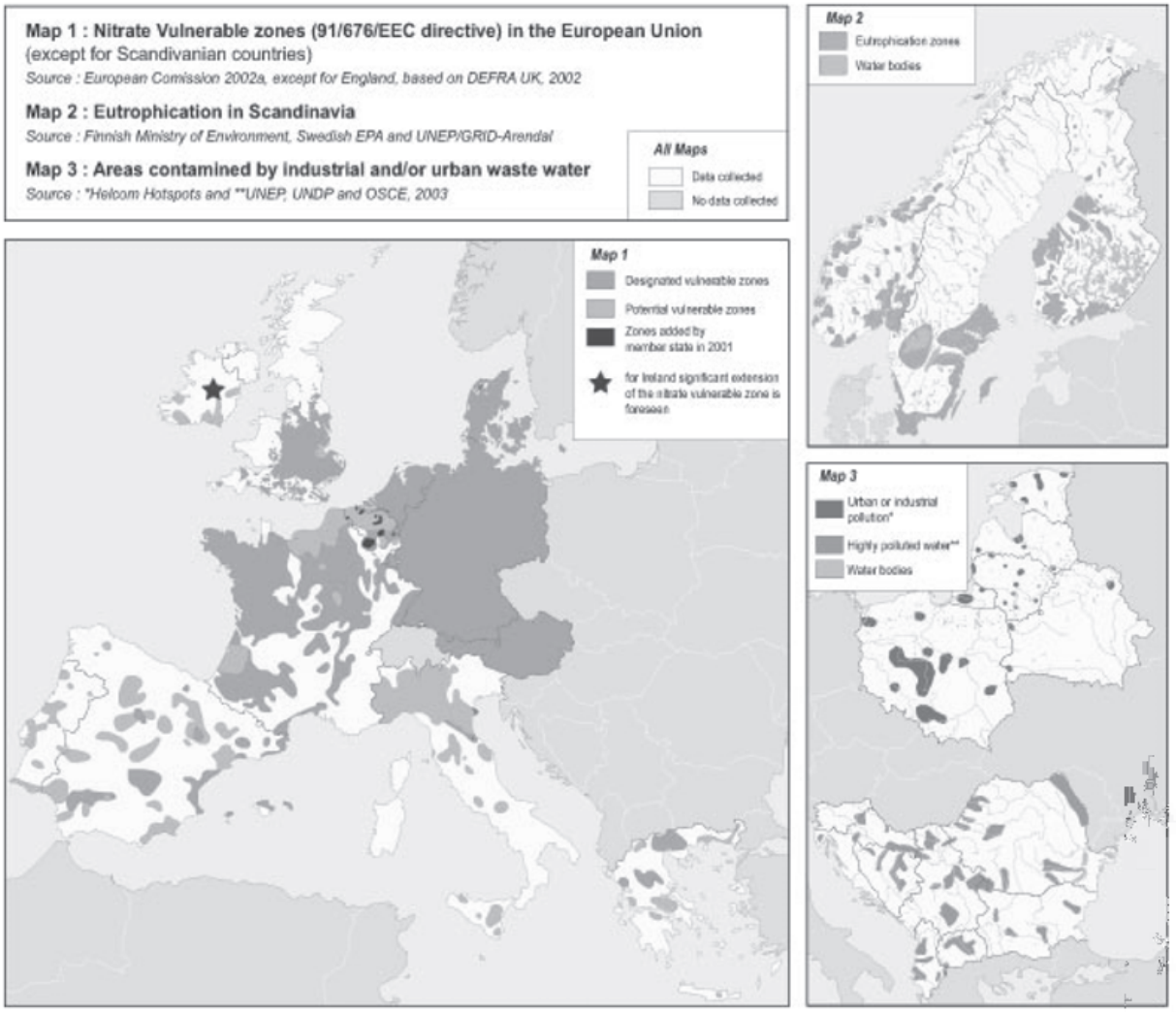

Figure 2. Looming Water Quality Concerns Across Europe.
Source: UNEP (http://tinyurl.com/awra-z6).

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