

Images of water security: a more integrated perspective

Jeroen Warner, Flood Hazard Research Centre, Middlesex University
Queensway, Enfield EN3 4SF, Middlesex, UK
warnassist@wxs.nl; J.Warner@mdx.ac.uk

Abstract

Post-1989, 'security' has acquired a wider meaning than protection from military threat. Unpacking 'security' into different domains of security can show the variety of security images and needs. A holistic view of security, echoing 'sustainable development', must accommodate this diversity to arrive at a better fit with local perceptions and reality. The present article provides a preliminary conceptual framework to facilitate this unpacking.

1. Introduction

(We need to) reformulate the foundations of security and link it back to the forms of political community from which it has been severed by a variety of modern practices. A number of internal critics have rightly pointed to the question of political overload asking, in effect, if in so doing, modern citizens are asking too much of their political institutions and not relying on forms of social mobilisation and networking that both undergird and overlap those of the formal state' (Klein, 1997: 365).

The nineties have seen a spate of books proclaiming the next century to be the century of water wars and eco-conflict. Clearly, the focus of 'security' has gone through a significant change.

After all, security studies have tended to be limited to military issues. In the past few decades however have seen the broadening of the security scope. In the 1980s, the rise of Japan as an economic powerhouse shifted attention to 'economic security'. The Environmental Security school has widened the focus to population and environment issues. Still, it has often overlooked non-material (social-cultural) factors.

This on-line article is a first attempt at exploring a more integrated perspective that gives pride of place to these new areas of security. In response to the current concern with the 'water crisis' (Section 2), it is concerned with water resource management as seen from five different security angles: physical, economic, ecological, socio-cultural and political. If we are to increase the solution space in water management, you'll have to recognise that there is no single actor, no one best way, no single knowledge base that can do the trick. So the best we can do is to recognise these aspects (*differentiation*), then try to make sense of them and *integrate* them into a unified vision (see also Fig. 2). The article is guided by the multi-security model identified by Barry Buzan (1991).

Next, three conflicting 'images' or doctrines of water security will be briefly sketched (Section 3), on the basis of the classification devised by cultural anthropologist Eric Wolf and applied to water management by Johnston and Donahue (1998). These three, state-centered, market-centered and community-centered views of water, with their attending knowledge systems, will be shown to correspond quite well with Realism, liberalism (pluralism) and some critical approaches in the theory of International Relations.

It is not maintained in any way that this categorisation is exhaustive and final. The point made here however is that it is useful to consider the different dynamics and rationalities underlying each of those systems, to gain a more complete and systematic picture of reality.

The next section will identify five security domains, their prime concerns and

rationalities.

1.1 Multiple securities: Five security domains

After the Cold War, security studies have evolved into a more diverse (and exciting) field of endeavour. It was recognised that military security, concerned with protecting territory and independence, is only one domain in which conflicts are meted out. In the early 1990s, different typologies have been advanced, if not always with the same rigour. Lonergan's list, for example (economic, food, health, personal, community and political security; Lonergan, 1996) seems to mix up levels and types: health is primarily an individual characteristic; community is at the group level and seem to refer to identity.

Buzan's five domains of security are military, economic, environmental, socio-cultural political. De Wilde (1995), finally, building on that model advanced by Buzan (1991, 1995), has suggested conflating the political and military areas, which seems to mix up material hardware and political software. I shall therefore stick with Buzan's model for want of a more convincing classification, but for one amendment. As the military sector is primarily concerned with the defence of territory, I have amended the military sector to a more generic 'physical' to make room for water and raw materials.

LEVEL/ TYPE	PHYSICAL	POLITICAL	ECONOMIC	SOCIO-CULTURAL	ENVIRONMENTAL
intl. system					
macro-region					
unit (state)					
sub-system					
prime concern:	integrity	stability, legitimacy	wealth	identity	health

Table. 1 Buzan's security model (slightly adapted)

Note that the *domains* (or sector) are structurally (water security impacts on health security) and/or politically interconnected (linked) The dominant *perceptions* in different domains cannot but be influenced by external developments in domains that have *material/structural linkages* to the domain at issue.

For example, Israel responds to personal insecurity (fear of terrorism) with measures that keep Palestinians economically insecure – which again is related to Palestinian political insecurity (Warner 1996). This is not the place to go into linkage politics, it is only pointed out to indicate the complexities (as well as bargaining opportunities) of security trade-offs.

1.2. Multiple Rationalities

The value of identifying different domains reaches beyond providing analytical clarity. Skimming through the literature, it becomes clear that each of these sectors seems to have its own *logic*. What a scientist may define as 'rational', an environmentalist may deem 'madness'.

Colin Green has defined economics as 'the application of reason to choice'. But what is 'reason'? What we have come to define as 'rational' is a scientific or economic rationality of Western origin. As soon as we accept the human factor, different types of rationality come into play. Similarly, causality and linearity are alien to some cultures. Goal rationality is not the only way people are 'programmed'.

If the system is simple and easily controlled, like a thermostat, linear (goal)

rationality will work. But as soon as complexity reaches a threshold, (human) *context* creeps in. Engineers, i.e. the engineering community, are grounded in Newtonian physics. Their job is to systematically model and handle problems and hand them back to society. Geldof (1994) recounts a session in a newly, rashly built area where shoddy building has led to wholly predictable groundwater problems. The engineer models the problem in his computer programme, and suggests building drains.

But this is not how the neighbourhood perceives the problem. To them, the problem is one of survival as a group, to prevent their estate being demolished. This would necessitate them to move to higher-rent houses, maybe causing their closely-knit community to fall to pieces. This makes damp cellars only a minor element in a tangle of poverty, rents, etc. Their voice is 'noise' to the engineer, but to stakeholders this complexity constitutes their life-world. Similarly it is often observed that major cities have 50-60% unaccounted-for water, which is attributed to distribution losses due to leakage. However, it will often turn out that a significant part of this unaccounted-for water (UFW) has been siphoned off by illegal residents making illegal connection and perhaps bribing underpaid civil servants to tolerate these connections. In a way, this is a socially efficient outcome for many although it of course disadvantages paying customers. An engineering solution will not solve this problem - the problem context of urbanisation and urban poverty must be addressed as well.

We should not blame engineers and scientists for their reductionism. Uncertainty reduction is a normal, basic human impulse. To cope with complexity, people seek to simplify and seek patterns to gain control of their environment. A powerful and currently dominant model is the Newtonian, linear model favoured by technologists; public servants make rules and cultural systems develop customs to provide the same kind of predictability.

The German Enlightenment philosopher Immanuel Kant (1724-1804) was well ahead of his time in identifying goal rationality (*Zweckrationalität*) versus value rationality (*Wertrationalität*). Goal rationality is rooted in material values, in efficiency and linearity. Value rationality is concerned with process. Process rationality: give people enough space to have their say. The dichotomy of technical rationality vs. cultural rationality. (Fischer 1995) is based on a similar recognition that context matters. Integrated management requires integrated rationalities! These different rationalities will emerge when discussing rationality in our five domains. The physical and environmental sector do not have a rationality of their own, even though they have their own logics. For now I'll just concentrate on the three 'social' sectors: the economic, sociocultural and political domains.

Political rationality

If we apply the 'scientific' criterion to the *modus operandi* of politicians, some extremely 'irrational' decisions tend to be taken by governments: in the name of development. Huge waterworks are constructed that would never be economic. But they make sense from a political point of view: they are a way of increasing control over the population. For a certain type of politician, rational is what brings power, even it means betraying your best friend - political rationality, Macchiavellian style. Moreover, there is more to be earned from water projects in terms of kickbacks for corrupted high-level bureaucrats in large projects than in small projects. 'Bureaucratic rationality requires that people's land and lives should be reorganized the better for government to administer them. (Williams 1982, quoted in Ferguson 1996).

But there is another aspect of political rationality that concerns us here: legitimacy. Water projects are potent vote-earners, enhance the national pride thus broadening the legitimacy base. One definition of a politician is the 'broker of values'. However, it is not the values themselves that concern the politician or indeed the bureaucrat. They are instrumental to

policy acceptance, building a support base, implies attention to 'due process' which is now seen as essential to 'good governance'.

Cultural rationality

Information is filtered by values (normativity). Emotions are not irrational; they are non-linear and may often seem confused, but they have a function of their own. Emotions, instincts, are a function of our instinct for survival (Geldof 1994).

Each sector in the extended Buzan model may turn out to have its own rationality, so below.: For now, however, I will keep to the three types mentioned above. The three rationalities gives rise to different research agendas. (Again I recognise that within the disciplines, different schools may define the central research question of their discipline differently.)

Political science is nicely summed up by the question: 'who gets what, where when and how'.

Economics is concerned with optimising efficiency and utility (Pareto optimality) It has a goal rationality where utility is the goal. Cost-benefit calculations are its preferred modus operandi.

Cultural anthropologists, finally, do not look at what people think they are doing, their 'projects', but the 'complex set of social and cultural structures through which they operate'. In other words, they are concerned with circumstances and processes under which outcomes are produced rather than outcomes themselves.

<i>rationality</i>	physical rationality	economic rationality	ecological rationality	socio-cultural rationality	political rationality
	goal rationality	cost-benefit ratio	adaptivity	social values, habits; instinct	legitimacy; power base

Table 2: Five types of rationality

2. Crisis, what crisis?

The starting point for much writing about water is an impending crisis: the infamous 'water war' literature. Recognising that a crisis is what you make it - no water war has been fought yet - this section explores what makes a water crisis.

2.1. Goal Setting

Now that we have broken down 'security' into different sectors, a new set core values of security emerges. The 'prime concern' of each security sector shown in Fig. 1 (above) can quite literally be seen as the 'bottom line' that should not be surpassed. If this concern is compromised, defence mechanisms are triggered. Security is, ultimately about threats to *survival* and *integrity* of a system. Maintaining territorial integrity and political sovereignty has been the traditional task of the military. However in each sector of security, similar survival and integrity goals can be traced. Below, such goals are hypothesised for each of Buzan's five sectors (informed by Buzan et al 1995):

domain	minimum (1st order goal)	maximum (2nd order goal)

	<i>protection</i>	<i>accumulation</i>
physical (or territorial)	integrity	Lebensraum
economic	sufficiency	wealth; development
environmental	integrity	sustainability ?
social-cultural	identity	self-realisation
political	legitimacy	power

Table 3: Goal setting in five security domains

In each of the domains, an untouchable baseline state can be hypothesised, as well as a maximising value (risk ceiling). If the baseline value is violated, a security logic may be invoked by an actor who feels deeply about that value. Note that the first-order goal is conservative or restorative, the second, ambitious goal is ‘progressive’ i.e. may require a lot more risk-taking. A combining value may come into play - sustainable development is a measure of long-term economic growth as well as social and ecological values; similarly the perceived threat of social exclusion combines cultural cohesion as an asset with economic sufficiency.

Interestingly, Buzan *et al* (1995) do not seek to establish an ‘objective’ security threshold, but accept its intersubjectivity. What’s more, they posit its instrumentality: the maximising security or risk value may be set with the political goal of ‘legitimising’ exceptional measures (although it may turn into one when zero-sum mechanisms come into play): this is what Buzan et al have termed ‘securitisation’.

The problem of water stress

As nearly every media text on water issues points out, only 2.5% of all water is freshwater, and that only 1% of threat water is recoverable. Part of this percentage is degraded by organic and chemical pollution. Clearly, the global water freshwater supply is finite. However, it is also clear that this ‘limited’ amount will still be sufficient to support an expanding global population - with some important caveats.

Unequal endowments - climatically driven, but reinforced by economic and political choices - create *local* scarcities. In today's world it is possible to have access to radio, television and computers, but not to a safe source of water. One billion people lack access to safe drinking-water and the health of three billion is affected by water pollution and/or poor sanitation. There can be no clearer indication that the challenge of water management has not been met by capacity - the result being 'stress'. As we shall see below, opinions differ on the question whether this stress will be expressed in violent conflict, but no matter your stance on 'water wars', our appalling record on water provision and wastewater disposal remains a cause for great concern.

Political analyses, and negotiations, tend to pretend we are talking about a unitary resource, wanted by all stakeholders at the same time, quality and energy. A first thing to note is that there *demand is differentiated* in locality, timing and quality. The table below lists the various aspects of water, which present different priorities to different actors and in so doing, opportunities for win-win solutions.

PARA-METER	Type of change	accidental/ developmental intervention	politico-strategic intervention
Quantity	availability	creation of storage lake	supply cutoff
Quality	pollution	hydropower (heat)	well poisoning

Timing	seasonality	cloud seeding	'manual flood'
Energy	increased speed of run-off	canalisation	'manual flood'
Amenity / landscape value	water project as eyesore	canalisation	water capture
Accessibility	ease of access	diversion	water capture

Table 4: Parameters of transformation in water systems

2.2. Different types of scarcity

With the above theory in mind, we can rephrase some water issues. Most prominently, the trend of increasing water scarcity tends to be posited as a home truth. In view of the limited availability of water in several regions, it would stand to reason to conceive of water security as the degree to which people are insulated from or can adapt to shortage relative to their needs.

Water stress can be expressed in fewer m³ per capita (scarcity) or more people per m³ (population pressure). Scarcity however is a highly relative concept. Human choice has a strong bearing on the physical local availability of water, not to mention the perception whether this amount is sufficient.

Local and regional scarcities due to maldistribution are undisputed, and tends to happen where many people are concentrated and evapotranspiration is high. Moreover, pollution impairs the usability of available freshwater resources.

Finally, human needs strongly depend on one's circumstances and socio-cultural background. While Bedouin crossing deserts may get by on one bottle a week, modern domestic use may run up to 2000 m³ p.a. for a household with a large garden.

What are we to make of the situation?

Jan Selby has nicely identified three discourses of scarcity (Selby 1998).

(1) The first discourse 'ecological' is predicated on scarcity leading to water wars. Fortunately, the population boom is now predicted to level off and stabilise in the late 21st century. Unfortunately, though, the demographics are skewed: while Europe will experience net depopulation and aging, nearly all population growth will be concentrated in densely populated, developing countries, where urbanised areas will treble in size. The Rev. T.R. Malthus argued that food production could never catch up with population increase. Malthusians have posited a linear increase of people and resource use giving rise to doom scenarios such as the famous 'Limits to Growth' reports (Meadows & Meadows 1974).

(2) The second discourse is 'technical' (technocratic) and promises us a bright future. The idea of an inevitable water and food crisis is a Malthusian fallacy: it underestimates technological progress. Scarcity, in this discourse, can be solved by opening up new water sources, improving access to them, the efficiency of their exploitation and distribution, or by importing water from water-rich countries. It has been argued by many that rising population and the wealth effect ('water civilisation') shouldn't have to be a problem. But that is the engineering approach. Water is a perishable good that currently cannot be transported over large distances without loss of quality. However, seawater can be desalinated, icebergs are tugged from the Antarctica to the Persian Gulf and supplied from Malaysia and the former Yugoslavian countries by supertanker.

(3) The third, 'political', discourse is premised on unequal power and unequal access

to and control of water. This 'vulnerability' perspectives sees people as victims of the political economy; coming to grips with the problems would involve reducing these inequalities. Depending on this, the future could be bright or grim.

The question of structural inequality and the resulting politically-induced scarcity (Warner 1993) seems to be a legitimate one. A state deciding to allocate irrigation water to, for example, cash cropping on huge state-owned farms, necessarily leaves less to other water users, who may experience the squeeze of 'increasing scarcity'. This has led Richard Sexton (1992) to expand the concept of 'scarcity' to include the economic use of water, to highlight the socially adverse effect of choices in favour of agricultural export. This points at the key political-science question of allocation and distribution: who gets what, when, where, how and why? This is only a small step from another question, '*cui bono?*' (in whose interest)? If this interest concerns the few, it leads to the unequal social distribution of the resource, which Thomas Homer-Dixon lists alongside environmental change and population growth as sources of resource scarcity (Homer-Dixon 1994: 8-9).

As a result of resource capture and manipulation (the strategic use of the resource), m^3 per capita dwindles sharply. Especially in areas governed by clientelism, water allocation is contingent on political clout and favours, which is why latifundists are allocated so much more water than subsistence farmers (a 'two nation project') and why national capitals get better water provision than remote towns. In this case, water capture (skewed distribution) underpins regimes, while elsewhere power contenders for state power (warlords, religious fundamentalists) may use their capacity for monopolisation and reallocation to a client base to delegitimise the central authority (a point raised by Turton & Ohlsson 1999).

2.3. Vulnerability as third approach?

However, the vulnerability discourse is prone to victimise the 'weak' and the 'destitute' is to apply disingenuous and oversimplifying labels. The approach reduces individuals 'solely to subordinated elements of macro structures (...). A complete removal of proactive, autonomous aspects from individuals' cognitive and decision-making abilities restricts our understanding of the human and natural-event interface. (Emdad Haque 1997).

Work by development researchers (e.g. Sarch 1999 on Lake Chad) and anthropologists (e.g.. van Dijk e.a. 1995 on the Fulbe people) has shown that the groups at issue are neither weak nor destitute - they have found resourceful ways of dealing with their challenging natural environment. Applying well-meaning but patronising Western yardsticks of 'development' to them may easily lead to one-size-fits-all (World Bank) prescriptions that may erode their rich repertoire of 'flexible responses' to what aid institutions may perceive as permanent crisis.

As the above world systems-type approach (cf. Wallerstein) is a critique rather than a practice, and a flawed critique at that, I will refrain from the theoretical trichotomy traditionally identified for educational purposes in International Relations: Realism (etatism), pluralism (competition) and world system (dependency) (Viotti/Kauppi 1993) and side with Johnston and Donahue in highlighting the 'cultural' approach. This issue will be taken up in greater detail later on.

Two levels of scarcity?

The logical consequence of my five-sector security grid is a slight modification of the theorisation developed by Ohlsson and Turton (1999). I use a slightly different theorisation from their two orders of capabilities. There is an interesting analogy to Friedrich Kratochwil's two orders of rule in a *voluntary* regime (comparable to the state-society *contrat social* in International Relations. A first-order rule simply assigns roles, rights and responsibilities.

However in many cultures, including the Japanese business culture, rules (and contracts containing rules) as strictly 'as is' - unlike the litigious US culture, they contain an implicit understanding of reasonably accounting for changes that occurred since the stipulation went into force.

Unlike Ohlsson & Turton I do not superimpose physical scarcity and social inflexibility in one column but box them horizontally as two out of the same five areas, to enable a broader applicability of their theory. Physical capital (water) and social capital are different forms (not levels) of capital (*capabilities*) - see below - and likewise incidental or structural poverty (i.e. lack) can be experienced in each domain. Trade-offs between the different types of capital can improve the overall security situation.

For example Tony Allan has identified a largely self-regulating, medium to long-term structural mechanism linking between water scarcity and adaptive scarcity: the virtual water thesis. One way of adapting to scarcity is to switch one's exports from water-intensive crops (citrus exports) to water-extensive exports, and increase the intensity or amount of water encapsulated in imported good. This 'virtual water' strategy has been practised throughout the Middle East. However, this economic adaptivity has not been matched by political adaptivity. The discourse of 'greening the desert', 'food self-sufficiency' and so on is still perceived by politicians as a tremendous vote-puller and support-enhancer. Openness (information) about the adaptive strategy would be political suicide, so it is hushed up. When they admit that water is tight, as in Israel, they may proceed to a 'don't waste a drop' campaign, which is only a partial remedy - it leaves out the environmental baseflow (now recognised in South African water law). Rivers such as the Colorado and Indus have seen the total exhaustion of the resource during prolonged periods of the years, which has unfortunate effects on both downstream users (Mexico, Bangladesh) and the resilience of environmental services. An example is that drought promotes erosion which in turn intensifies runoff during the next flood.

One of the great virtues of Turton & Ohlsson's work however is that it introduces dynamics of social change. When limited water availability forces a country to change its economy, this will cause considerable stress and opposition. The security impact of change processes is not a 'project' in the usual, technocratic sense of the word but a 'project' as a social-political programme. Whenever a major change is initiated, some parties will gain and others will lose. Institutions, procedures, rights, rules, roles and will likely be altered. Disagreement over these rights may lead to a second-order conflict.

2.4. Capital

I realise full well that the concept of 'capital' and 'endowment' can strike the reader as overly economic, but for the purposes of this paper I will adapt customary usage while expanding the scope to all the security domains listed above. This is to expand on and modify Serageldin and Steer's elements. Serageldin and Steer (1994) specify as a minimum condition for *sustainable development* that the total amount of capital should be non-declining at any time. To this end however they only identify natural capital, human-made capital, human capital and social capital. Human-made capital (artefacts; visibles) while human capital (invisibles) seem to be subsets of 'economic capital' (assets) - at least they are on the contemporary company balance sheet.

In my interpretation, I propose that *capital* in each of the security domains is a measure of the resilience assets that help actors cope with stress. The availability and distribution of different types of capital will have a bearing on the mitigation of the stress factor. I will quickly go through the five sectors. By *physical capital* ('*geocapital*') includes *natural* capital (stock of environmental assets) water, land. The value of *environmental capital* has traditionally been

ignored, but as Pearce notes, 'natural resources must no longer be treated as free goods to be exploited, but as finite capital' (Johnston 1996: 2). Valuation of that stock differs - Pearce's recommendation to marketise the natural stock seems an attempt to view it as an extension of the economic sphere (market image). For now, I prefer an ecology-driven view in which environmental resources such as water clean air, biodiversity in energising the ecological system first, the social function second (health, subsistence). This 'critical natural capital' (cf. Lorenz et al) cannot be substituted - biochemical cycling, space and water. 'Sustainability' then refers to the environmental coping system, the obverse of vulnerability. *Economic capital* refers to visibles and invisibles as outlined above.

Which leaves the category generally labelled 'institutions' - the socio-cultural and political systems. In the context of the 'water wars' debate, it emerges from Homer Dixon's theorisation (1994) that in between scarcity and violent conflict there is a social-political system that may or may not be resilient enough to absorb shocks. The same recognition is found in famine theory: the difference between lack of food and famine is the breakdown of social resilience (institutions).

Putnam (1993) defines *social capital* as the trust, norms and networks that facilitate social co-ordination and co-operation for mutual benefit. Van Deth *et al* (1999) call it the 'cement of civil society'. Pelling conceives of it as a relative measure of the number (individually or collectively) and quality (inclusiveness, transparency, accountability) of social linkages associated with a defined social group facing a specific developmental pressure' (Pelling 1998: 470). Social capital may be divided up in coping mechanisms which tell a society how to deal with unchanging scarcity levels, but not with disruptive change, and the faculty of adaptivity, which is long-term coping.

Political capital is about influence, about a support base for one's platform. In democracies, short-term *political capital* (vote pulling), which tends to have passed its sell-by date after four, five years, is generally valued higher than long-term capital (legitimacy). Authoritarian governments have longer time horizons, which pleases investors. Business and banking have tended to favour operating in authoritarian environments: in apartheid-era S. Africa, for example, business associated white rule with stability and predictability, (personal communication with Turton 1999). But they but rely on slimmer support bases, making long-term stability more tenuous. Countries with long-term political capital hold out better prospects for conversion to demand management. But even in 'adaptive societies' 'securitisation' of a water-related value can be invoked to create a type of (possibly short-term) political capital to thwart (or enable) adaptation or downplay the necessity for change. A 'strong' and 'advanced' society in the conventional sense is not necessarily one that uses its 'water IQ'!

Having groped our way to an understanding of capital, we can now make statements on what a the meaning of a crisis. According to Habermas (1976), a pervasive crisis is the simultaneous presence of:

- a crisis of efficiency and rationality at the system level,
- a crisis of legitimacy at the societal level
- a crisis of motivation at the individual level

This may lead to the breakdown of the system.. The link between scarcity and anarchy then is more complex. Anarchy requires the disintegration of both state and society (a 'black hole', see Hettne 1998) The emergence of anti-state or anti-society sub-group formation in itself is no sign of the imminent breakdown of civil order, although a *security crisis* are likely to ensue (Hettne 1998: 7)

Water (management), then, is in crisis not because of scarcity but because of a lack of social, cultural, political and economic adaptivity.

In other words, perceived local water scarcities are, then, a function of *scarcities in other domains*: lack of technical, economic, political, social, cultural capital. Accumulation of such resources increases the flexibility and resilience: the potential for widening the range of options (diversification). However it takes 'water IQ' to actually utilise those resources in a sensible manner that fits the water problem at hand. Stories of hi-tech turn-key machinery that does not work are legion - either the material on supply is incompatible with local situations, or the local system is unable to adapt to what is available to it i.e. the (supply). Expanding government introduces control and dependency on public services. Such political clientelism crosscuts mutual aid systems, which are the stock of social capital. It breaks up social networks on which people depends and in so doing force people to build up political capital rather than social capital. In the developing world social security at local level will remain far more important than government support in foreseeable future.

Social and/or political disintegration easily spills over into technical disintegration. Before criticising actions such as people vandalising water meters, self-serving use of equipment and illegal waste dumping we have to ask ourselves why these things happen. Likewise, clientelism and corruption, illegal connections, illegal well-drilling may be 'coping mechanisms' dealing with economic exclusion undermining system coherence.

Ohlsson and Turton's theorisation on social adaptivity recognises that a change to water demand management cannot be engineered. Karshenas, an economist and Ohlsson, a political scientist, have independently noted that in the face of dwindling water supply (m^3 per capita) some countries are extremely adaptive while others are not. Of course, adaptivity to resource limitations is already happening. In calamities, people have proved surprisingly resilient. Coping, which is short-term adaptivity, can take the form of more efficient resource use but also of mining as well as illegal activities. People in shantytowns who have no access to the formal system, or do not trust it (legitimacy) will see themselves forced to make illegal diversions, or drill their own wells. These diversions are illegal as in the hydrosocial contract, the individual generally surrenders his right to mobilise water to a 'central authority of sorts' (Turton & Ohlsson 1999), it being a common-pool resource.

Similarly, countries that are denied freshwater (Palestine, Jordan) may resort to resource depletion. Such 'mining' may be sensible from an individual point, but from a systems point of view it is disruptive. Just like widespread illegal activities undermines the cultural (value) reservoir of a society, the long-term capital of the society is undermined by resource mining. To help reintegrate the system - either a society or a regional security complex - actors in the system need to re-establish social trust and political legitimacy. To achieve policy legitimacy, the actors will have to understand and recognise each other's interests and rationalities. The next section will discuss at some length three conflicting 'images' of security informed by different views of the world.

3. Three images of security

A quick scan of the literature yields different theories of what constitutes security, how it is threatened and what should be done about it. The present section will inventory these theories: independence, interdependence, and adaptivity/resilience.

Water management can be seen as a branch of ecopolitics. The environment itself arrived late on the political scene and therefore bears the brunt of a history of traditional antagonisms, often phrased as state vs. market antagonism. Water policy provides a new arena of these traditional conflicts - as well as some solutions to them (opportunities). However, if we

stop there, we have missed something crucial: what goes on in people's hearts and minds (Turton 1999).

Indeed, a serious omission in much work by political scientists (including, I'm afraid, my own work) is the cultural factor - beliefs, values, custom. The present conceptualisation hopes to make up for this deficit by drawing on work by the anthropologist Eric Wolf, who has identified three forms of social organisation, each leading to a fundamentally different image of water. This analytical schema is built on by Johnston & Donahue (1998). The three images will be treated separately, although it should be remembered that they are continually in conflict. As Johnson and Donahue note, when one mode enters into conflict with another, it also challenges its fundamental principles. While maintaining their triad, I have turned the order of presentation around to fit the development of (modern) political theory more closely. The three images or models, which overlay each other (Fig. 1), may be labelled 'State', 'Market' and 'Community'. Wolf's triad provides, as it were, the basis for three mutually conflicting '*model contracts*'. The idea of a contract will be elaborated in an upcoming publication (Warner & Turton, forthcoming). Another helpful triad is Hettne's (1995) pattern of resource distribution: Redistribution, market exchange (market) and reciprocity.

Table 5: Composite of three value systems, three schools of theories and organising principles

Type	Value (Johnston & Donahue)	Organising principle (Hettne)	Paradigm
State	water = power	Redistribution	dependence
Market	water = commodity	Market exchange	interdependence
Community	water = gift	Reciprocity	adaptive

We end up with a trichotomy of three different world views, each with a different temporal, spatial and ideological outlook, which will be further explored below (Table 6).

state	market	community
modern nation-state hydromission	late capitalist global privatisation	premodern local living with water

(Table 6)

3.1. The STATE model - Theories of independence

The State view of security is geopolitical in that it perceives water as a power resource like any other (manpower, money, technology). Central to this model is the Westphalian state - externally, the formal equal of all other states in the international system, internally, the absolute sovereign over water. Buzan (1991) visualises the different levels as an hourglass: the state is the bottleneck, the conduit between the top (international scene) and bottom (domestic scene). The State then has a *domestic policy* and *foreign policy* face (see image at end of article).

Foreign:

In political science, the uncertainty-reducing mechanism has until recently been expressed in an exclusive focus on the interstate level. In this still dominant security studies perspective, known as Realism, the defining actor in the international system is seen (and probably likes to see itself) to be a sovereign, unitary state, operating in a Hobbesian international anarchy. Likewise, security studies have placed states at the centre and described the capacity of the state to pursue national interests relative to states who are seen as real or potential enemies and whose status or relationship is deemed important.

The present organisation of international society was created with the Peace of Westphalia of 1648. Formally independent, endowed with absolute sovereignty – the supreme, independent and final authority - clearly separated by borders and the obligation of non-intervention in domestic affairs of other states, states are commonly portrayed as unitary, impenetrable billiard balls. States are assumed to be acting to maximise the national interest and always on the look-out for power and stability. The state's key interest, however, is national security. A state will always attempt to organise the means to safeguard its security in direct ratio to perceived *threats* to state survival.

Realism encourages a maximising, not an optimising strategy: States act to maximise the national interest. The importance of state security may even justify certain acts by the prince (the State) that would be forbidden to others. The ends – state security - justify any means (note the separation of politics from ethics). 'Necessarily, there is a particular political rationality underlying this system, a Westphalian rationality that takes a particular state as the given and only guarantee for security as well as for welfare. The identical nature of the security of the citizen and the security of the state is taken for granted' (Hettne 1998:3).

In *economics*, Mercantilism has reared its head ever since the French minister Colbert devised his policy of mercantilism, a system to protect (strategic) domestic industries import substitution; (or fledgling ones: the infant industry argument.) Based on accumulation strategy (regulation school): more is better. Likewise, in this political ideology maximising and controlling the supply and development of water equals prosperity.

The 'dependencia' school has criticised the dependency the modern economic system generates: It 'restricted its attention almost exclusively to the economic and, to a certain extent, the political mechanisms of domination and control (...) [b]ut dependency theory failed to address the cultural dimension of domination (...) Despite the challenge it posed to the hegemony of the modernization discourse, dependency theory shared some of its basic premises' (Tucker 1999: 12) Their preferred solution, such as import substitution, is a deliberate separation from the world economy in fact internalising the Realist/Mercantilist paradigm (Hettne 1995). Likewise, what Realists in fact propose by advocating autarky (self-sufficiency) is to choose to be dependent on the scarce resources on their territory, resulting in vulnerability to mining. It may also include robbery (resource capture), increasing political conflict.

Domestic:

Governments are - often constitutionally - supposed to provide 'stability and security'. In most countries, central government has claimed ownership to and stewardship of all water and offered protection and welfare to its citizens in exchange for legitimacy. (Note, however, that this 'welfare model' has been a fairly recent episode.) When formerly colonial states gained independence, they were quick to adopt two elements of Western government: internal and external sovereignty and the welfare state model. Often in response to popular pressure, they made at times outrageous claims: tap water for everyone within n years. This legitimised megaprojects which in turn attracted plentiful international resources, underscored by the relative successes of the Green Revolution.

In many cases, the economic, social and environmental effects of water projects, intended to improve security (regulation to provide relief from drought and flooding) have, at best, proved a mixed blessing, and are, at worst catastrophic. An astonishing number of accidents and cases of human suffering has been recorded (see e.g. Knoppert & van Hulst 1995, Pearce 1992). While it can be argued that Lake Nasser tided Egypt over the eight consecutive years of drought (1980-1988), the Nubian Bedouin that drowned because someone forgot to inform them about its impoundment (Waterbury 1979) are a symptomatic 'side-effect'.

In the Etatist paradigm, the state is unitary - it speaks with one voice. This single-minded set-up is commensurate with the Modernist engineering perspective. It is based on control, predictability, one-size-fits-all, one-best-way. To a great degree, it factors out human beings, as they are much more difficult to engineer. The human factor appears as 'noise', to be 'normalised' by statistical method. If a problem can be 'solved' at the technical level without involving people, this will therefore be the preferred option. (Geldof 1994).

However, in practice the state is not monolithic. The rise of the state has seen feudal systems of personal rule, in which tribute and taxation were exchanged for protection by a king or bishop, evolve into a bureaucratised centralised actor. The dynamics have not really changed, however. This time it is not different rulers vying for legitimacy but different branches of the government bureaucracy. They can be seen as a tributary system, collecting resources (wealth: taxes, interest payments flowing into sponsoring organisation) to finance public works. Different agencies have separate policy objectives regarding water (and therefore different cultural definition). Bureaucratic institutions frequently maintain their power through the funding (of water) projects (and may therefore develop 'project culture'). Since these projects sustain their funding institutions as well as manage water resources, the first may take precedence over the second.

The concern with (state) vulnerability caused by dependence on a single resource makes *prima facie* political sense. The perceived lack of alternatives (diversification) makes countries vulnerable to external obstruction. Egypt's vulnerability explains an almost obsessive refusal to consent with Ethiopian development of Nile waters. No wonder water-poor countries are not exactly enthusiastic about single-shot water solutions. The Turkish Peace Pipeline to Israel and Saudi Arabia probably never took off because of its vulnerability in a region of intense and explosive antagonisms. No state would willingly run the risk of obstruction either by Turkey or third party terrorists and see its water imports blackmailed. In agriculture, too, the impact of crop failure in monocultures is much worse than when mixed cropping is applied.

Early environmental *conservationism*, a critique of the unintended side-effects of modernisation, but remains within the same paradigm. It sought to 'save the whale', without looking at the whale's ecology. Conservationists have often stressed the intrinsic value of animal species such as whales and seals. Ecologies are connected and change all the time. Trying to freeze an animal population or a wetland disacknowledges the dynamic nature of the system and in so doing kills the system.

Modernisation has absolved people from participating in the resource management. It shifts the burden of responsibility wholesale to the state and its technocratic elite. The attendant technocratisation of water has taken the problem out of society, to centralise it so people do not have to worry about it.

Worryingly, the emergence of environmental consciousness in industrialised countries has not really changed this outlook. Source control in urban runoff management, and demand management in water supply management are still technocratic innovations based on goal rationality.

3.2 *The MARKET Model - Theories of interdependence*

'In an increasingly interconnected system, there is neither invulnerability, nor developmental irreversibility.' (Nef 1997)

The late 1970s saw the rise of free-trade liberalism, which advocates openness (free exchange) of trade and information. This makes it an ideology of opportunity and risktaking; in its view the expanding states and attendant regulation stifle the creative and adaptive

energies of economic actors. Conceptually, the view of water as a tradable, non-monopoly good, introduces some interesting differences in the security model: in its ideal form, it legitimises competition, differentiation, transparency. On the security to risk continuum it endorses the 'risk' side.

The market image of water, then, views water as exploitable, tradable and marketable commodity, as private property. This view of water made immediate sense to the post-colonial élite, many of whom attended the Chicago School of Economics. Many countries simply lacked the capacity to make their ambition happen. Utilities soon turned out to be loss-leading underperformers; states were seen to fall short of their end of the 'hydrosocial contract' (Turton & Ohlsson 1999).

Governors watched with interest the developments in England and France where new governance models were introduced, deeply involving the private sector. In France, governments retained the infrastructure but outcontracted water management in 10-years management contracts. In England, everything was privatised, with only a regulator to safeguard the public interests. Despite the occasional loss, water management turned out to be profitable, especially in large cities where pipeline can be short and where sufficient wealth is accumulated to cross-subsidise connections to the less affluent. With the active sponsorship of the World Bank, the idea of water as an economic good was enshrined in the Declaration of Dublin (1993).

Soon developing countries started auctioning off their water systems, with notable hiccups (Indonesia is a notorious example) when politicians balked at signing too much state sovereignty over their resource base away. Now that privatisation of water has become commonplace, however, disconnections policy has become stricter and Safari hotels in Africa buy up water sources that used to supply entire areas (Peter Gleick quoted in *Volkskrant* 12-8-95). States that have retained the sole ownership of water recognised the opportunity of water as a commercial commodity. Turkey now offers water to Israel, Saudi Arabia and Central Asia - even if it has trouble supplying its own urban population!

The risk-orientedness of private involvement in water management has no doubt introduced some much-needed dynamics and efficiency to the sector. The drawback, of course, is that it overestimates the self-help capacity of individuals and its effect on social and ecological stability. In practice, the free market has often given to those who own and takes from those who have not, leading to exclusion and self-help. It is naively a-political, ignoring the potential for resource capture. Instead, it relies on the existence or emergence of binding norms inciting people to co-operate. In this respect, it mirrors the endless debate between political scientists who claim politics precedes law, and international lawyers who claim the primacy of norms. The market image is based on an ethics-free philosophy. Water companies cherry-pick and cater to the rich and industrial actors, and seek shareholder value. Anglian Water, for one, complains it cannot enforce disconnections to non-payers. It will therefore always have to be accompanied by stiff non-private regulation.

Parallel to the (re)discovery of water as a marketable commodity, the discipline of International Relations has seen the rise of liberal institutionalism or regime theory. In response to the rise of supra- and intergovernmental organisations, a liberal theory of co-operation gained currency: Pluralism (other names are also in use) Its central concept, 'complex interdependence' allows for national as well as sub-, inter-, supra- and transnational actors on the international scene. It recognises that the explosive movement of information, capital, commodities and people makes the billiard-ball metaphor more and more irrelevant. Instead of a unitary state, Pluralism pictures the state as a fragmented multiplicity of actors, with multiple state-society and transnational relations.

The resulting 'cobweb' offers a different perspective on vulnerability. Viewing interdependence is tantamount to vulnerability. Realist leaders have tried to reduce interdependence, since in their view interdependence creates dependence. Pluralists, on the contrary, encourage interdependence, since the existence of multiple channels decreases the utility of military solutions. This is quite analogous to the ecosystem view in which resilience is a function of the complexity of internal interactions between organisms: the more interconnectedness and complexity, the more resilient a system is to perturbations. The power of complex interdependence, it is predicted, will slowly but surely erode the centrality of the state. The underlying harmony of interests in trade will abolish war. After all, you can't catch the fly (that is, economic prosperity) without a well-built cobweb. Interdependence promotes integration, reduces nationalism and promotes stable peace. As a consequence, government will become smaller, incidentally a prediction that, despite widespread liberalisation, hasn't yet been borne out in practice.

This acceptance of dynamics could in principle open the door to a more ecological view of the natural environment. The free-market competition model is essentially modelled on a Darwinian, and therefore ecological view of the world in its crudest sense, which is necessarily global rather than local. Indeed, the discovery of the greenhouse effect impressed on liberal policymakers that sovereignty stopped at the environment. However, the belief in the invisible hand of competition and the resilience of nature shapes the need for maintaining biodiversity. Liberals are reluctant to intervene on behalf of the environment. Recognising the need for continued biodiversity they will argue that nature is quite capable of taking care of itself. Others are less concerned about the natural environment and show themselves extremely optimistic about the human ingenuity to deliver us from hardship. 'Cornucopians' such as Julian Simon are the most bullish (and technocratic) believers in progress. While he won his famous bet with doomsayer Paul Ehrlich about the cost of raw materials (they fell in the course of ten years), water was notably absent from that basket. However, some economists have interpreted this self-stabilising potential as a blank cheque to exploitation.

Globalizing complex interdependence has also given the economic system an ever-increasing dynamics. What David Harvey (1987) has termed 'flexible accumulation' (Just In Time delivery is a prime example) has resulted in rapid and intense flows of ideas, goods, symbols, people, image and money on a global scale, which are disjunctive and fragmenting, anarchical and disordered. (...) Power today also often flows more placelessly beneath, behind, between, and beyond boundaries set in space as new senses of artificial location become fluid or more mobile.' (Luke 1998) This makes for an increasingly ungovernable, economy-dominated global system.

3.3 *The COMMUNITY Model - Theories of Reciprocity*

The failure of the 'state' and 'market' approaches has brought on a rediscovery of the community. If we accept for a moment an ideal-type of this model as a contrast to state and market, we note that (traditional) communities are organised along kinship lines. Here, the image of water is that of a commons, lifeblood of cultural identity and social life. Political theory, like theories of 'development', has tended to assume that everything prior to the emergence of the Westphalian state was '*tabula rasa*' as if people had been anarchic individuals living in a 'state of nature'.

Of course institutions were created from a very early stage. 'Societies classed as 'traditional', no less than some that are 'modern', prove to have developed rather robust and humane ways of coping with drought or flood' (Hewitt, 1995). Water Tribunals in Valencia, Spain, are an example of an age-old self-organised communal management structure. There, communal control developed an elaborate, sophisticated and reasonably fair system of self-governance, and established flexible social and intercommunal rights.

Culture is the domain of anthropologists whose inquiry focuses on what kind of 'glue' binds groups together and how 'meaning' is created in the process. This internal view of groups may be complemented by an 'population ecology' view which seeks to explain how groups adapt to their environment - or to adapt their environment to their wants and needs. Especially nomadic and semi-sedentary groups have developed highly adaptive ways of coping with natural resource related extreme events. For them, crisis may be a way of life. This is why conservation measures such as establishing national parks were resented by Africans as a Western invention - Westerners failed to understand 'the true nature of the African environment and of shifting agriculture as a viable adaptation to that environment' (Kibreab 1997, World Institute for Development Economics Research conference). The importance and specificity of local conditions is likely to result in an enormous degree of *diversity* which sits ill with homogenising tendencies of the other two sectors. In addition, the perspective of the value of water is radically different.

In the 'community' image, water has cultural meanings that are *not* valuable in economic terms. A defining characteristic of the community image is that water tends to be seen as a God-given boon and therefore, a free (un-ownable) good. Baptising and ritual cleansing are only two religious expressions of the symbolic value of water; in community life, water may be strongly related to the local history and as such, a history for passing on values across the generations (cultural survival).

Most importantly, as it is a vital good, it is seen as morally unjustifiable to exclude people from safe water: water enables subsistence in the face of ecological hardship (Economic survival) as well as vital to health and life (physical survival). Western-style ownership rights may do just that, taking the flexibility out of the system. Many communities have established use rights but not ownership rights to water. The Group of Lisbon seems to have picked up this model advocating for water to be declared the common heritage of mankind and therefore cannot be owned (Petrella, 1999)

To make this possible, Petrella (1999) has argued, the international water companies should be restricted to an ancillary role, welcome to bring in funds and technology and be rewarded for this, but not at the price of gaining ownership of water.

As for distribution, in the 'community' image, the institutionalisation of economic life is effected along the lines of reciprocity (Hettne 1995). In the political sphere, patron-client relationships occasion a reciprocity of obligation; in the social sphere the 'moral economy' is at work and in the economic sphere, often non-monetised exchanges take place. The reciprocity elements creates obligations as well as rights. The pressure of solidarity may, for example, stop individuals from sensibly moving away from hazardous floodplains. Water use or usufruct rights (and obligations) are often informal, based on custom. They are part and parcel of coping and distribution systems.

An important strategic aspect of traditional communities, is that optimising rather than maximising strategies seems to come more naturally as a result of their life 'on the edge'. To hedge against bad luck, they diversify crops, so that if one fails, others can still bloom. Much like water, transhuman groups in LDCs have always simply ignored state boundaries and property rights. Their system is superimposed on the Vienna State system. Diversification as a resilience-enhancing strategy is extended into social relations: it increases social capital. The result is a diversity of water management systems that fits ill with the homogenising thrust of the other two systems.

We should not fall into the trap of blindly sanctifying 'community' and 'traditional values', however. First of all, these values may be a million miles removed of a Western conception of

'fairness'. Moreover, as Ball (1997) warns, to describe people as a community is to define away ethnic, cultural and other differences as well as power differentials within a local community, so that they may not function as a unit at all.

While the 'community' has been the oldest social institution but only recently regained some prominence after the World Bank recognised the failure of both state-only and market-only (Kooiman & Warner 1998). Participation and institution-building are the new catchwords, as if institutions (water parliaments, land tenure arrangements; the power of traditional value systems which often have much greater flexibility in ownership and tenure relations) have not always been around and sometimes destroyed by 'development' and Etatism.

In this image, ethnicity and group identity become important. Traditionally regarded as an obstacle to modernity, identity has proved hardy. The integrity of the community is not just a cultural priority in the South - van der Werff records the outrage of Dutch villagers on the river Ijssel in hamlets in the East Netherlands, such as Twello and Helhoek, at a river diversion plan that will 'destroy the cohesion of the community'. The people of the American town of Bonneville who had to make way for a water works likewise refused to be split up.

In the environmental area, Gaia-type holistic theories have gained prominence, which re-infuse Nature with some 'mystical' elements. In a way, this *is* the environmental paradigm, as the human ecology of traditional local groups tends to mirror (and, for better or for worse, be symbiotic with) the ecology of the natural world.

4. Integrating the three images

The security game

It is interesting to consider Buzan's table of security area as an apartment building, firmly grounded on the bottom row, individual security (an onion might even be the more powerful metaphor). The bottom line, it has been noted, is survival. What is it that makes the individual surrender (part of) their sovereignty to a larger entity - a group, the state, or even the international system?

While realists are concerned with coercion, pluralists would say that it is a form of *trust*, not just in the actor but in the actor as a representative of the system. The private sector and NGOs can help out (Table 7) in relieving some of the burden of governance; safeguards against infringement of basic rights can be properly laid down in meta-governance rules (cf. Kooiman & Warner 1998). In return for legitimacy, and a tax base to be reallocated and redistributed according to system needs, the national governor undertakes to see to the basic needs of the individual citizens. This should result in a more equitable distribution of resources and relieve local scarcities and pressures on the resource base. Where basic trust in the government is absent people will revert to a form of self-help (drilling their own wells, pipes) to outright protest (smashing water meters), as happened in apartheid-era South Africa (see Turton 1999a).

However, the local-national interface is not the only dynamic. The concept of overlay, well known in security studies (Buzan 1991), rears its head as well. In the Cold War, the overlay of superpower rivalry dividing the world up in two competing blocks exerted strong overlaying pressures on local security complexes: the presence of American and Russian military units on other territories limited the room for manoeuvre to conduct a locally adequate security policy, whereas it created opportunities for developing countries to play off the superpowers against each other. Currently, the (economic, political and cultural) overlay of globalising capitalism combined with retracting or disintegrating governments in parts of the world increasingly overlays local economies (Hettne 1995). As Mark Duffield (1999) has

noted, the traditional monopolisation of the means of security (means of coercion as well as the means of protection) are increasingly divorced from the public sector, ending up as private arrangements or NGOs competing with governments for power and legitimacy. In the light of the above framework, we can see that the fragmentation of governance in the political sector affects all other domains of security. Barry Buzan’s Westphalian ‘hourglass model’ (Image 2, below) in which the state acts as a conduit/filter between the subnational and supranational level, may be growing out of style. In its place, a multidimensional geography (if perhaps not along the alarmist lines of Kaplan’s ‘Coming Anarchy’) appears that provides multiple overlays on the local security situation (Image 1, below).

In the area of water, for example, a private multinational company may supply a metropolis (market image), a community may operate its own wells (community image) as a parastatal provides peri-urban areas with freshwater (state image). This juxtaposition of very different institutional settings and underlying paradigms occasions a hybrid configuration of competences and limitation that is more like a network than a hierarchy.

This is not to deny that there seems to be great potential for releasing social potential, social energies, but this will only materialise if the ‘language’ of society is spoken, their meanings and understandings of water addressed, and specifically social and cultural types of capital are tapped. Water has non-political and nonmarket *values* that need to be taken into account.

Some examples:

(1) Turton and Lichtenhäler (1999) show how communities in Yemen, a society boasting the highest *per capita* possession of Kalashnikov guns in the world, have managed to channel their disputes into a cultural contest (the power of poetry!)

(2) Research in the Netherlands shows that water has a powerful symbolic value - playing upon this symbolism has helped re-integrate people in water management (see Geldof 1994 on source control in cities).

(3) Microcredit schemes such as the Grameen Bank in South Asia, working outside the formal and often extortionate banking system, have proved powerful instruments for releasing economic activity. Social control helps guarantee that borrowers default on loans extremely rarely. This has helped realise community water schemes ahead of schedule.

But how will these instances cope with the thrust of state- or market-led ‘development’ efforts? Clearly, the three images of security interact in complex ways. Vulnerability perspectives correctly point out the negative effects of both state formation and marketisation on marginalized groups, but the increasingly fuzzy scene (Luke’s fluidity) may also create niches for them. To end on an optimistic note, new and different linkages and synergies could arise from the mutual confrontation of the three images creating an opportunity to expand the solution space, which has until recently tended to be limited to state and market solutions (Image 1 below). Hopefully the present conceptual framework can be helpful in identifying and assisting such opportunities

Table 7 Diversifying alternatives and actors

	physical measures	‘institutional’ measures
reduce challenges		
enhance coping		

	private actors	public actors	civil society actors
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intl. system	Biwater	Rhine Commission	Greenpeace
state level	-	central government	<i>Agences Bassins</i>
substate level	local/regional utility	municipality	water users associations, NGOs

Fig.1. Overlaying security cosmologies: two images

Image 1: Security Overlay Model

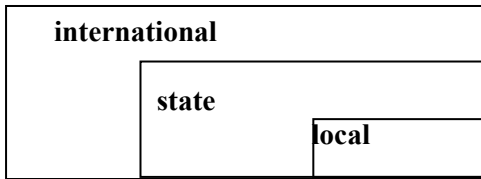


Image 2: Hourglass model (Buzan)

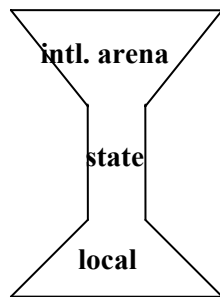


Fig. 2 Integrating types of security, social sectors and rationalities.

		STATE	MARKET	CIVIL SOCIETY	
LEVEL/ TYPE	PHYSICAL	POLITICAL	ECONOMIC	SOCIO-CULTURAL	ENVIRONMENTAL
intl. system					
macro-region					
unit (state)					
sub-system					
prime concern:	integrity	stability, legitimacy	wealth	identity	health
<i>rationality</i>	goal rationality	cost-benefit ratio	legitimacy; power base	social values, habits; instinct	adaptivity

Literature:

- Allan, J A 1997, 'Virtual Water': A Long Term Solution for Water Short Middle Eastern Economies?;
<http://www.soas.ac.uk/geography/waterissues/OccasionalPapers/AcrobatFiles/OCC03.PDF>.
- Ball, D.M., 'Allowing Local People to Cope with Change and Take Responsibility for Sustaining their Groundwater Sources. An Awareness of a New Agenda for Hydrologists', in Howsam, P & R C Carter, *Water Policy: Allocation and Management in Practice*, E & FN Spon, 1997, pp. 362-370.
- Barry Buzan, People, States and Fear, *an Agenda for International Security studies in the Post-Cold War Era*, Harvester Wheatsheaf, Hemel Hempstead, 2nd ed., 1991.
- Buzan, Barry, Ole Waever and Jaap de Wilde, *Environmental, Economic and Social Security*, Working paper No. 10, Centre for Peace and Conflict Research, Copenhagen, 1995.
- Michael Black, 'The unnatural policies of natural resource agencies: fishery policy on the Sacramento river' in Fischer, Frank & Michael Black (eds.), *Greening Environmental Policy. The Politics of a Sustainable Future*, Paul Chapman Publishing, London, 1995, pp. 53-66.
- Han van Dijk *et al*, Arid Ways, *Cultural Understandings of Insecurity in Fulbe Society*, Central Mali, CERES series No. 1, Amsterdam, 1995.
- C. Emdad Haque, *Hazards in a Fickle Environment: Bangladesh*. Advances in Mnatira; and Technological Hazards Research, Kluwer Academic Publishers, 1997.
- James Ferguson, 'The Anti-Politics Machine'. "Development", Depoliticization, and Bureaucratic Power in Lesotho', University of Minnesota Press, Minneapolis 1996.
- Frank Fischer, 'Hazardous waste policy, community movements and the politics of Nimby: participatory risk assessment in the USA and Canada', in Fischer & Black, 1995.
- Govert D Geldof, *Adaptief waterbeheer (Adaptive Water Management)*, Tauw Civiel en Bouw, Deventer 1994.
- Björn Hettne, *Development theory and the three worlds*, 2nd ed., Harlow: Longman Scientific & Technical, 1995.
- Björn Hettne, 'The Fate of Territoriality beyond Westphalia', paper for the conference 'The 350th Anniversary of the Peace of Westphalia', Enschede, 16-19 July 1998.
- Thomas Homer-Dixon, 'Environmental Scarcities and Violent Conflict', *International Security*, 19 (1), 1994.
- R.J. Johnston, *Nature, State and Economy. A Political Economy of the Environment*, 2nd edition, John Wiley & Sons, Chichester etc. 1996.
- Barbara Rose Johnston and John M. Donahue, Introduction in Donahue & Johnson, *Water, Culture & Power. Local Struggles in a Global Context*, Island Press, Washington, 1998.
- Bradley S. Klein, Conclusion: Every month is "Security Awareness Month", in: Keith Krause & Michael C. Williams, *Critical Security Studies. Concepts and Cases*, UCL Press 1997, pp. 359-368.
- Rijkert Knoppert & Walter van Hulst, *De Keerzijde van de Dam (The Downside of Dams)*, Novib/Jan van Arkel, 1995.
- Jan Kooiman & Jeroen Warner, 'Inter-Active Governance: A Social-Political Perspective', Paper prepared for joint ECA/DESA Conference on Governance in Africa, Addis Ababa, 4 - 6 March 1998.
- Steve D. Lonergan, 'Water Resources and Security: Examples from the Middle East', in: M J de Kok (ed.), Dutch National Research programme on Global Air Pollution and Climate Change, International Workshop on Environmental Security and Sustainable Development, 18-19 April 1996, Proceedings, Bilthoven, 1996.
- CM Lorenz, AJ Gilbert & P Vellinga, 'Sustainable Management of Transboundary River Basins: A Line Of Reasoning, forthcoming (under review).
- Timothy W. Luke, 'The Discipline of Security Studies and the Codes of Containment: Learning from Kuwait', *Alternatives: Social Transformation and Humane Governance*, 1991.
- Dennis & Donella Meadows, *The limits to growth - a report for the Club of Rome's project*

- on the predicament of mankind*, 2nd ed., New York : New American Library, 1974
- Thomas Naff, 'Conflict and Water Use in the Middle East', in Rogers, P and Lydon, P. , *Water in the Arab World. Perspectives and Prognoses*, Harvard UP, 1994, pp.253-285
 - Jorge Nef, 'Human Security and Mutual Vulnerability. An Exploration into the Global Political Economy of Development and Underdevelopment', 1996, www.idrc.ca/books/focus/795/chap1.html 05/17/99 16:59:41).
 - Fred Pearce, *The Dammed. Rivers, dams and the coming world water crisis*. The Bodily Head, London 1992.
 - Mark Pelling, 'Urban Flooding in Guyana', *Journal of International Development*, 10, 469-486, 1998.
 - Robert D Putnam, *Making Democracies Work. Civic Tradition in Modern Italy*, Princeton UP, 1993.
 - Riccardo Petrella, *Le manifeste de l'eau. Pour un contrat mondial*, Labor, 1999.
 - Ismail Serageldin and S.A. Steer, 'Epilogue: expanding the capital stock' in Serageldin & Steer, 1994 (eds), *Making Development Sustainable: from concepts to actions. Environmentally Sustainable Development*, Occasional Paper Series No. 2, The World Bank, Washington, DC, pp 30-32.
 - Marie Therese (Terri) Sarch, *Fishing and Farming at Lake Chad: A Livelihood Analysis*, PhD dissertation, University of East Anglia, July 1999.
 - Jan Selby, 'Between War and Peace: Water in the Middle East', Paper presented to the Centre for Middle Eastern and Islamic Studies (CMEIS) and the Friends of Palestine Society, Durham University, 11 February 1998.
 - Richard Sexton, "The Middle East Water Crisis: Is it the Making of a New Middle East Regional Order?", *Capitalism, Nature, Socialism*, 3(4), December 1992, pp. 65-77.
 - Theodore Steinberg, *The folly of owning nature*, University of California Press, 1995.
 - van Deth *et al*, *Social Capital and European Democracy*, Routledge 1999.
 - Turton, A.R. and Ohlsson, L. 1999, 'Water scarcity and social stability: towards a deeper understanding of key concepts needed to manage water scarcity in developing countries' [http://www.soas.ac.uk/geography/waterissues/OccasionalPapers /](http://www.soas.ac.uk/geography/waterissues/OccasionalPapers/)
 - Lichtenthaler, G. & Turton, A.R. 1999. *Water demand Management, Natural resource Reconstruction and Traditional Value Systems: A Case Study from Yemen*. Proceedings of the Stockholm Water Symposium 1999. Stockholm: Swedish International Water Institute (SIWI). [http://www.soas.ac.uk/geography/waterissues/OccasionalPapers /](http://www.soas.ac.uk/geography/waterissues/OccasionalPapers/)
 - John Vidal, 'Tekorten aan drinkwater bedreigen wereldbevolking', *de Volkskrant* 12 aug 1995, p. 6.
 - Paul R. Viotti & Mark V Kauppi, *International Relations Theory. Realism, Pluralism, Globalism*, MacMillan, New York 1993, 2nd edition).
 - Peter van der Werff, SIRCH paper, 1999 (unpublished)
 - Jeroen Warner, *Tightropes across the river. Managing conflict in Middle East river basins*, MERA Occasional Paper No. 17, Middle East Research Associates, 1993.
 - Jeroen Warner, *Kicking the water habit. Israel, Palestine and the New Water Order*, AMEP paper, University of Amsterdam, 1996
 - Jaap de Wilde, Jaap de, *Zestien veiligheidsvelden. Sectoren en niveaus in het internationale systeem [Sixteen security areas. Sectors and levels in the international system]*, *Internationale Spectator*, Vol 49 (2), February 1995, pp. 91-96.

