Security as a threat to development: the geopolitics of water scarcity in the Nile River Basin

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Abstract

The aim of this paper is to take a closer look at the reasons which lay behind the sensitive geopolitical context of the water of the Nile. It will situate the discourse on 'water wars' within the framework of securitization of water resources. This is further illustrated by the case of the Nile basin. Then we will explore the possibilities/necessity for de-securitization of water resources, with some conclusions for policies aimed at turning water into a resource for broader cooperation and integration.

Introduction

In July 2009, ministers from 10 countries from the Nile River basin convened in Alexandria, Egypt, to reach an agreement on the management of their shared water resources. The meeting failed in this intent, despite the urgent need to use the water of the Nile more efficiently. The challenges for the basin states were nevertheless grave: to safeguard the water resources for their future development and well-being, in a context where take place in the living conditions of everyone living in the basin – in society, economy and the environment.

The reason for the failure can be traced back to mutual distrust among the countries in the river basin, which transcends concerns for development and human well-being and frames water as a security threat to states and a geopolitical issue. This is especially the case for Egypt and Sudan, two countries which are very sensitive to water consumption by upstream riparians and which claim the Nile as their exclusive water resource. That claim collides with the interest of upstream riparian countries, which are eager to deploy the water resources for their own development. Tensions might build up and erupt in a violent conflict, a 'water war' that has been often predicted to occur.

In this article, I will take a closer look at the reasons which lay behind the sensitive geopolitical context of the water of the Nile. I will situate the discourse on 'water wars' within the framework of securitization of water resources. This is further illustrated by the case of the Nile basin. Then I explore the possibilities/necessity for de-securitization of water resources, with some conclusions for policies aimed at turning water into a resource for broader cooperation and integration.

Water Wars and Securitization: Turning Water in a Source of Conflict

"War for water" is a fascinating story. It comes up to a basic fear of man: in extreme circumstances, if they risk dying of deprivation, people will fight for the last bits of water they have. Several indicators tell us that living conditions in many parts of the world indeed become serious: population grows, consumption of water rises, resources are threatened by pollution and overconsumption, and alternatives for additional water are very limited. War therefore doesn't seem such a farfetched scenario when states feel that security and welfare of their inhabitants come under pressure and neighbouring countries claim their share in increasingly scarce resources.

Especially when this coincides with existing regional tensions this could turn water into oil on a smouldering fire. That's why the late Egyptian president Anwar Sadat in 1979 referred to water as "*the only matter that could take Egypt to war again*" (Starr1991). Others, like former UN-Secretary-General Boutros Ghali, also an Egyptian, are famously quoted as they predicted that "*the next war in the Middle East will be fought over water, not politics*" (Nicol 2003).

Since the 1990's, when new security concerns turned up in the aftermath of the end of the Cold War, 'environmental security became a new area of interest in media and academia. Linking water scarcity with violent international conflict provided some with catchy news headlines; in academia the idea was picked up and resulted in books titled 'Rivers of fire' or 'Resource wars: the new landscape of global conflict', providing scientific foundation for the prophets of upcoming water waters.[i] It remains to be seen whether this impression is correct. Does water scarcity end in water wars? Do we inevitably head for violent conflict over water resources or will scarcity urge the different user of water to cooperate and better manage the resource - thus preventing violence to occur? *Securitization* is an interesting approach that enables to explain why water scarcity becomes a security threat. In the context of this paper, *securitization* gives me a framework to understand why countries wield an official discourse of water scarcity and emergency, while wasting precious amounts of water through poor water management. Or, to understand why very similar conditions of scarcity become a security threat in one country, and are considered just a normal policy issue in another.

Securitization is a concept that is linked to an approach of international security by the so-called Copenhagen School.

Researchers at the Danish Peace Research Institute (PRI) were looking for alternative explanations for the arising of conflicts, apart from explanations based on power politics which were popular during the Cold War period. Instead, with their critical approach of conflicts they were looking into ways how" neutral" issues suddenly become a security issue. They present securitization as a process in which a securitization actor refers to an issue as an existential threat, and tries to convince an audience that extraordinary measures must be taken in order to contain the problem (Buzan, Waever & de Wilde 1998). Naming something a security issue and mobilizing the population behind the existential threat is an intentional act, a deliberate way to conceal political motivations that cannot be uttered so explicitly. The acceptance of this constructed threat by the audience is key, and remains necessary for securitization to succeed.

Water Scarcity, a Fuzzy Notion

As I mentioned before, demand for water is rising, driven by population growth and economic development. This is a worldwide phenomenon, especially in developing countries.
Essentially, population growth leads to more water needed for basic human needs (drinking, hygiene, health). With the world population expected to reach a level of 9 billion by 2050, the amount of thirsty mouths will expand by 50% compared to 2000. As economic development leads to higher individual water consumption, each additional mouth will demand more water to meet its basic needs. Population growth will also push for more agricultural production, and more water will be needed to grow more food. Part of this will be realised by expanding the area of irrigated agriculture, which might lead to overexploiting of rivers and groundwater resources. Because more and more marginal arable land will be cultivated, water inputs per unit of production will increase. Additionally, as societies increasingly move from a rural based economy to urbanization and industrialization, the water demand of these sectors will rise and competition with agriculture will occur where the availability of water resources is relatively limited. In sum, we see that demand of water is growing relatively steeper than the actual increase of population; since 1950 world population doubled but water consumption tripled. The situation in Africa is no different than in other areas of the world (Björklund, Connor et. al. 2009; Donkor 2006).

As demand is rising, water supply remains relatively constant.
Conservative estimations put the renewable amount of sweet water on earth on 9.000 km³- although climate change might alter the overall picture (Shiklomanov 1993). With a world population nearing 7 billion, there will be an average of 1286 m³for every inhabitant of this planet. But in real life, 'averages' don't exist; table 1 below shows us how diverse water availability and water use is:

	Total withdrawal (km³/year)	Population (million)	Withdrawal per capita (m³/p/y)
Belgium	6.2	11	580
Egypt	68.3	84.5	809
Ethiopia	5.6	85.0	69
Sudan & South Sudan	27.6	43.2	607
Uganda	0.3	33.8	9

Table 1: water withdrawal by some countries in the Nile River basin, compared to Belgium; source: FAO-AQUASTAT 2009; Gleick 2014; World Bank-World Development Indicators 2009).

Note the very diverse consumption patterns, with very low per capita consumption in Ethiopia and Uganda (upstream riparians) and much higher figures for Sudan and Egypt.
The average amount of water consumed per person per year (m³/p/y) as an indicator for the degree of scarcity. Many international organizations like the World Bank and UN agencies use the average 1000 m³/p/y as a marginal value for water scarcity.[ii] If water withdrawal falls below this level, the effect is generally that economic development suffers, health risks arise and society sputters. Based on this indicator, the situation in a country like Sudan should be more than comfortable, whereas Belgians must worry about the impact of lack of water on their daily life. However, the reality is different: Belgium can perfectly support its high level of development with less water than Sudan, where the availability of more water not necessarily leads to better living conditions for its inhabitants. Thus, conclusions on the gravity of water scarcity that are based on this indicator alone create a fuzzy notion of the concept and a false view on the impact of water scarcity in real life. Therefore, additional aspects have to be taken

into account to get a better understanding of the potential consequences of water scarcity. The concept of 'social resources' may contribute to that (Ohlsson 1999).
Social resources is a generic term for all kinds of ingenuity and skills that societies can apply to cope with challenges to their well-being, as in the case of water scarcity. They include issues like issuing of rules that are sufficiently supported by the population (importance of public participation in governance), institutions that function properly and effectively (importance of transparency of government), a system of social services (importance of social abilities), values that realize these social services (solidarity, justice, equitability), etc. Social resources enable societies to function properly despite their scarce water resources. Certain traditions maintain arrangements on access to water and management (rules, commandments, interdictions); lifestyle and methods of production are tuned to the water resources available. A social resource like solidarity manages to reduce strains within society during difficult periods, like droughts. The absence of these social resources reveals itself in corruption, authoritarian regimes, mismanagement, or wastage. Lack of social resources turns individuals and societies more vulnerable for the impact of water scarcity. Modern phenomena like the explosive population growth add to the erosion of these social resources, especially under existing conditions of poverty. Hunger and starvation, as we observe them nowadays in Sub-Saharan Africa, is therefore less the result of natural phenomena or 'disasters' like drought than the outcome of poverty in social resources. The lack of adaptive capacity leads to a vicious circle, where competition not only rises over natural resources but also over access to social resources themselves. This might lead to violence, so-called secondary conflicts which are not directly brought on by natural resource scarcity but by poverty and the absence of ways to cope with it (Brauch 2003; World Bank 2007; WMO & UN-ISDR 2006).

Water Politics in the Nile Basin

The Nile River basin is the 4rth largest on earth, with a catchment area of 3.2 million km², with 11 riparian countries: Sudan, Ethiopia, Egypt, Uganda, Tanzania, Kenya, DR Congo, Rwanda, Burundi, Eritrea and the Central African Republic (in that order of magnitude; the contribution of the Central African Republic to the flow of the Nile is very minimal as hardly any precipitation from its territory reaches the stream).

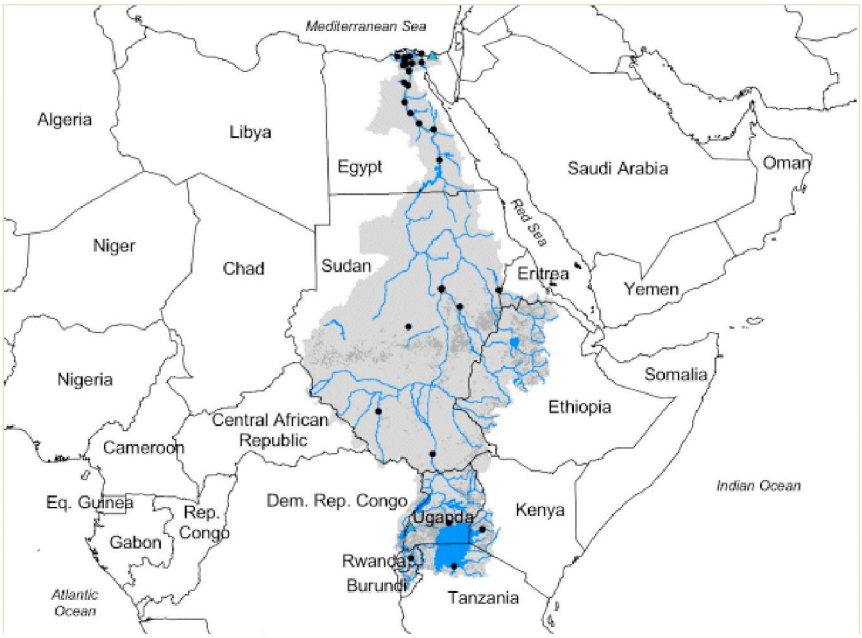

Figure 1: Map of the Nile River basin and the riparian states (from InternationalRivers.org).
Ethiopia contributes for about 84.55 km³/yr or 77% of the river's renewable water resources to the downstream riparians (FAO-AQUASTAT 2005).

Until present, water consumption by upstream riparians remained rather moderate, with very little impact on the quantity available to the downstream riparians. But the situation may turn different when population growth and economic development will push water consumption into a higher level. This is bad news for Sudan and Egypt, as even modest alterations in the flow will result in less water for these countries. They rely respectively on 77% and 97% of water coming from abroad, through the Nile. It makes them vulnerable for changes in the flow of the river, especially since their consumption pattern of water in agriculture and other sectors is geared to the amount of water currently available(respectively 64.5 million m³and 58.3 million m³) (FAO AQUASTAT 2005).

Both countries appeal to historic user rights to claim nearly all the water from the river, denying the right of upstream riparians to expand their own water consumption. This claim is based on a series of agreements, in which the downstream riparians were assigned the lion's share of the Nile water.

However, these agreements hardly take into account the interests of upper riparian states, as they were concluded under the British colonial rule (like the treaty between Britain and Egypt of 1929 regarding the use of water of the Nile for irrigation purposes or the treaty of 1949 between Egypt and Britain regarding the construction of Owen Falls Dam in Uganda) or simply kept upstream riparians away from the negotiating table (the agreement of 1959 between Sudan and Egypt on dividing the entire flow of the river) (UNEP 2002)[iii].

Upstream riparians in the Nile basin reject the validity of these agreements, stating that they cannot be legally binding for parties that were absent when the agreements were concluded.

Therefore, they consider the present water sharing regime invalid and call for a new distribution formula which takes into consideration their future water needs as well. For Egypt, these prospects justify the threatening attitude towards the upper riparian states, a 'war over water'. Given the fact that water will become increasingly scarce in Egypt, the Egyptian government seems to be rightly concerned about the future well being of the nation and water scarcity can be seen as a security threat. But the question arises if this is an appropriate

approach to address the issue of water scarcity. A closer look at the Egyptian water policies learns us that this is highly doubtful.
Due to population growth and economic development, internal demand for water is growing in Egypt; the average availability of water per person will drop from 838m³ now to 670m³ in 2017 (World Bank 2009). As I discussed it previously, this isn't sufficient as an indicator for measuring the impact of water scarcity on development of the country, or to predict the effects of water stress on agricultural and industrial production or the functioning of households. This impact depends for a larger degree on the way how Egypt can handle the issue, or: how vulnerable the country is for alterations in its access to water resources.
To answer this, we have to look into the particular way of management of water and the unequal distribution of scarcity in Egypt. Agriculture gets most of the Egyptian water, 86% of the total consumption. Table 2 shows us how water consumption is divided along sectors:

	Agriculture (%)	Domestic (%)	Industry (%)
Belgium	1	12	88
Egypt	86	8	6
Ethiopia	94	6	< 0.1
Sudan & South Sudan	95	4	1
Uganda	38	48	14

Table 2: division of water consumption in the Nile Basin, with Belgium for comparison (Gleick 2014).

At first sight this high rate for agriculture seems logical, given the climatologically conditions which require intensive irrigation for all the crops. But economic indicators tell us that Egypt is initially an industrialized country, with agriculture contributing only 15.5% to the country's GDP. Moreover, a part of the preciously irrigated agricultural products (like onions, fruit, green 'haricots verts' beans, or potatoes), is exported and finally ends up in a shop or supermarket in Western Europe, thus creating a virtual flow of water towards more water-rich countries (FAO-AQUASTAT 2005). In 2004, 1m³ of water invested in agriculture created an additional value of $0.18, against $15.9 in industry (see table 3 for a comparison with other countries). The growing urban population of Egypt is least well off, officially entitled to an average of 70m³ for domestic use (still 192 liter/day) but due to leakages in the water grid receiving less than half of this amount (World Bank 2009).

	Agriculture ($/m³)	Industry ($/m³)
Egypt	0.18	15.9
Ethiopia	< 0.01	-
Sudan	0.06	16.1

Table 3: the added value of water withdrawal from renewable resources in agriculture and industry ($/m³), for the main competitors in the Nile Basin (calculations based on World Bank-World Development Indicators 2009; Gleick 2014).

In Egypt and Sudan, the added value of water in industry is more than 88and 276 times greater than that of agriculture. In Ethiopia, just like in other upstream riparian countries, the added value of water in agriculture and industry is minimal, due to the fact that most agriculture is still rain fed and industrial capacity is underdeveloped.

Figure 3: the evolution of the added value of agriculture as % of GDP (1960 to 2008), for the main competitors in the Nile Basin, and Belgium (based on World Bank-World Development Indicators 2009). Added value steadily declines in Egypt, to less than 20% in 2008. The share of

agriculture in the GDP of Ethiopia and Sudan is more fanciful during the years, probably more influenced by periods of drought.
Seen from the point of view of an economic rationale, this excessive consumption of water by the agricultural sector is hard to explain when the official discourse tells us that water is that scarce that the country even might wage a war over it.
From a political perspective, this water for agriculture does make sense.
In the aftermath of the revolution of 1952, the coup d'état against the monarchy, the new leadership of the Free Officers Movement introduced a land reform. With this land reform, the new regime tried to secure its popular support base by (officially) abolishing large landownership and entitling small tenant farmers with a plot of arable land (Kamrava 2005). More water for irrigation was needed in this fragmented farmland.
Simultaneously, production of cash crops like cotton, the most water consuming culture there is, was further stimulated as their export generated foreign currency.[iv] The natural cycle of flooding of the Nile, the gift of the gods that sustained this small strip of arable land in the Sahara desert for millennia, wasn't suitable any more to support these new agricultural policies. A more reliable flow of water was necessary, and a dam could provide a continuous resource of water for irrigation. The construction of the Aswan High Dam was an answer to this, and together with the generation of hydropower, this dam would contribute to the industrial and agricultural development of Egypt and add to the prestige of its leader, Gamal Abdel Nasser. The dam, and thus indirectly also water for agriculture, became a tool in regional and world politics. The West and the Soviet Bloc tried to haul in Egypt into their camp as part of their attempt to establish spheres of influence in the Middle East; both the US/UK and the Soviet Union entered a round of bidding on financing the construction of the Aswan dam. Eventually, the Soviet Bloc succeeded in1956, on the eve of the nationalization of the Suez Canal and the following Suez War, with a package of cheap loans and an arms deal. All this boosted Egypt's position within the Middle East as the champion of Arab nationalism (Ehrlich 2002; Kamrava 2005).
During the first decades after the completion of the dam, the country really benefited from its steady flow and hydroelectricity.
But gradually it became clear that this medal also had its reverse. The river loses as much as 25% of its water in Lake Nasser, the huge reservoir in the desert, due to evaporation; artificial fertilizer replaced fluvial silt (traditionally the natural fertilizer of the soil after flooding) and polluted the ground water; in the northern delta, the river hardly reached its destination in the estuary and fertile soil became brackish as seawater found its inland way. This adds to the growing demand for water that I described before.
Given its precarious downstream position, Nasser and his successors always kept a close eye on events in Ethiopia. Both countries shared a history of geopolitical competition, dating back to the 16th century (Christian) Ethiopian-Portuguese power struggle with the (Muslim) Ottomans, or the conflict over supremacy in the Coptic Church (Ehrlich 2002; Shillington 2005). Nasser's suspicion towards Ethiopia water wasn't totally mistaken. Haile Selassie, fearing the growing influence of Egypt (and of Muslims in general) in Africa, made overtures to Israel; when Shimon Peres visited him in 1963 in his capacity as undersecretary for defense (entering into secret negotiations with the French on the Israeli nuclear weapons programme), he realized that Ethiopia's position on the Nile was the key of the future of Egypt and he promised his host Israeli support for future projects on the river (Ehrlich 2002; Hultin 1995).
In the 1970's, the geopolitical context changed. Nasser's pan-Arabism which had to position Egypt as primus among the Arab states, had failed. His successor Anwar Sadat terminated cooperation with the Soviet Union and switched alliance.
Ethiopia was explicitly perceived as threat to 'Egyptian' water.

When Haile Selassie was overthrown during a military coup in1974, the new regime received generous support by Moscow.
The Soviet Union and its allies provided the Derg regime of Mengistu Haile Mariam with weaponry and initiated several projects to modernize the country, including some schemes to tap off water from the Nile. The Nile became the symbol of Ethiopian resistance against colonial imperialism and an example of African resistance against the influence of Arabs and Muslims, especially after Arab states decided to support the Eritrean rebellion against his regime (Ehrlich 2002; Hultin2005; Woodward 1997).
Meanwhile, Sadat had to deal with growing internal discontent in Egypt. Modernization didn't redeem the high hopes of prosperity for the masses and the regime had suffered quite some damage in the aftermath of the defeat against Israel in the war of 1967. His move to seek conciliation with the enemy, and the Camp David peace agreement of 1978 brought on him the wrath of almost the entire Arab world and his own Islamist opposition. When he made his remark in 1979, on water as the only matter that could take Egypt to war again, was therefore not entirely coincidental. It can be seen as an attempt to set himself up as a true Muslim and Arab, protecting the 'Arab' and 'Islamic' water of the Nile against the intrigues of unbelievers who try to arrogate the flow. Water became instrumental for the regime to burnish up its authority. Until present, water is the pivot of an ideological rivalry, with at stake influence in the Horn of Africa. A case in point is Mahmoud Abu Zeid, a former Egyptian minister of water affairs and an authority in the Arab world, who stated in the Egyptian parliament that forces hostile to the Arabs (he was referring to Israel and the United States) are trying to spread their influence in the Nile basin (ECSSR 2009). He tried to make it appear as if the Nile was a battleground, comparable to Iraq or Palestine, where Arabs and Muslims had to defend themselves against foreign aggression and that Egypt doesn't stand aloof. Interestingly enough, when the Israeli minister of foreign affairs later visited Kenya and Ethiopia in September on a tour through Africa, official communications focused attention on the agreement to increase cooperation between Israel and Kenya in the management of water resources and in the introduction of modern irrigation methods to the agricultural sector, and on agricultural projects in Ethiopia (MFA 2009). Someone with a suspicious nature may read this as an attempt to interfere in Nile water. Allegedly, according to the Israeli newspaper *Haaretz*, along with these irrigation projects came arms dealers, as the Israeli foreign ministry estimated Africa's business potential at some $1 billion (Melman 2009). If that is true, such involvements of rival forces may add to the securitization of the Nile river basin.

Towards De-securitization of Water in the NileRiver Basin?

Despite this regional 'cold war', issues related to water are not destined to remain stuck into a state of rivalry and threats.
Regional cooperation over the Nile isn't very mature but at least it exists. The Nile Basin Initiative (NBI) started in 1999 as a platform for exchange of information. It gradually evolved into an intergovernmental conference where ministers responsible for water affairs of ten riparian states meet and look for a joint vision on water use and cooperation. Current projects include the exchange of electricity to set off temporary shortages, or the improvement of irrigation to make it more efficient (Kameri-Mbote 2007; NBI 2009).
Nevertheless, old discrepancies between upstream and downstream riparians keep on disturbing the climate of cooperation. During the ministerial meeting in Alexandria in July 2009, the representatives of the countries failed to reach agreement on a new distribution of the water. Egypt and Sudan continued to demand for a veto in any decision on future water projects and the upstream countries rejected to take into consideration historical claims. Despite the pressure to come up with a result to mark the tenth anniversary of the NBI, the

ministers were unsuccessful in further institutionalizing mutual understanding over necessity of cooperation (Leila 2009; Menya2009).
Securitization still stands in the way of real cooperation, which is necessary to address the challenges of the future like climate change. The precise impact on the countries of the basin is still uncertain as some areas might receive less precipitation than other areas, but some effects are already visible. Although some models predict more rainfall in the upstream parts of the river basin (see figure 3 below), the level of Lake Victoria on the White Nile is falling and causes local agitation as Kenya and Uganda dispute the tiny island of Mingingo. This piece of rock, which only a few years ago hardly surfaced, is now the cause of a territorial dispute with the fishing grounds of Nile bass at stake (Gettleman 2009). Tensions like this can easily stir up disorder and may provoke further escalation into violence.
Issues like this demonstrate how the countries in the Nile river basin are condemned to each other for their future welfare and wellbeing of their populations. Desecuritizing water is urgently needed.
Figure 3: Changes in available water (UNEP-Arendal 2008). Left map: precipitation at the end of the 20th century. Note the high levels in the Nile catchment area in Ethiopia on the left map. Precipitation rates might rise in the upper riparian Nile basin countries, according to the models represented in the right map. North Africa is in greater trouble, as is the whole of Southern Africa and parts of the Sahel in West Africa.

Conclusions

In this article, I used the example of the Nile basin to illustrate how securitization of the issue of scarce water resources does not result in sustainable solutions but maintains the established water regime and its intrinsic tensions. The Nile is not a single case, nor is the behaviour of its riparian states unusual; in other basins in the world where water is used in a geopolitical context, similar mechanisms of securitization lead to bad governance and resources to deteriorate.
The challenges of countries in the Nile basin are impressive: securing sufficient water to sustain their populations. This is not impossible, since especially this river basin is blessed with rich resources and provided that users treat these resources with care. A couple of technical applications can enhance the efficiency of irrigation and provide the same yield with less than half the amount of water, or: more crops per drop. This leaves the countries in the basin with a huge amount of water to support development and preserve the sustainability of the ecosystem. This is the way to address the vulnerability of people and to enhance the resilience of societies, and to make water an issuer that is beneficial for true regional stability and security.
But before we have reached that point, the problem of securitization of water must be solved. Securitization does not add to a better life for the inhabitants of the basin, but on the contrary structurally keeps in place the conditions that lead to the waste of water. The following remarks may contribute to move away from the securitization discourse:

- Oversimplifying the relation between 'water scarcity' and conflict favours those who have an interest in ignoring the reasons behind the negative impact of resources scarcity on development and well-being.
  The fancy story of water as a security issue must continuously be refuted. The act of securitization keeps people hostage in ignorance about the true reasons for their condition. Or to quote the 2006 Human Development Report: "*The scarcity at the heart of the globalwater crisis is rooted in power, poverty and inequality*" (UNDP2006). A correct representation of their problems and necessary solutions can free them from deception.

In a wider context, the issue of climate change and the 'security impacts' (like immigration, stability of fragile states and access to natural resources) must be addressed in a similar, non-securitized way. This is a challenge also for Europe (Solana 2008).

- Initiatives to promote peaceful cooperation over shared water resources must be encouraged, with special preference to initiatives that encourages authorities tomove into the direction of more efficient use of water. This includes not only technical aspects but also the strengthening of resilience of society (social resources), to cope with the effects of scarcity and expose damaging work of securitization.
- Attention should be paid to consumption patterns in one location that affect the water availability in other locations. This impact can be very direct, like the recent initiatives by countries in the Persian Gulf and Asia to acquire fertile arable land in Africa for extra-territorial food production. Such developments already take place in Madagascar and Kenya, and are the counterexample of reducing the vulnerability of local populations and will increase food insecurity in these countries. The impact of consumption patterns can be also very indirect, as it is illustrated by the concept of 'virtual water' or the waterfootprint5.
- International legal instruments can force states to observe certain principles when they have to deal with shared water resources. The UN Water Convention on the Nonnavigational Use of International Water Courses of 1997includes such principles, as well as mechanisms for peaceful conflict resolution. However, the convention can come only into force when 35 member states ratify the text. This number has not been reached yet, despite the fact that the convention was adopted by a majority in the UN General Assembly. Many European Union member states, including Belgium, still have to ratify the convention. If they finally do so, they will contribute to a new international water regime, and promote basic principles that benefit the needs of all the riparians in a basin.

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[i] See e.g. Soffer A., M. Rosovsky & N. Copaken (1999). *Rivers of fire: the conflict over waterin the Middle East*. Lanham: Rowman and Littlefield; Bulloch J., A. Darwish & A. Darwish(1993). *Water wars: coming conflicts in the Middle East*. London: Victor Gollancz; Klare M. (2001). *Resource wars: the new landscape of global conflict*. New York, Holt.

[ii] This figure of 1000 m³, wrongly referred to as the WHO-standard, was defined by Malin Falkenmark in 1989 to indicate a threshold for water scarcity. The threshold was soon adopted by the World Bank and other institutions in their comparisons of countries. See Gleick, Chalecki & Wong (2002) for a presentation and discussion of indicators to measure scarcity.

[iii] Under the 1929 Nile waters agreement between Sudan and Egypt, Sudan was only allocated 4 km³ annually while Egypt had the right to use 48 km³. In 1959 both countries agreed on a new allocation, with 55,5 km³/y for Egypt and 18,5 km³/y for Sudan (FAO AQUASTAT 2005).

[iv] See FAO-Stat for figures on the expansion of cotton cultivation in Egypt since 1961:http://faostat.fao.org5 Virtual water represents the quantity of water used in the production of a good, a substance or a service. It can be used to measure the impact of production on the resources but also to analyse the global flow of water through the import of export of goods and services. See for instance Chapagain, A. and A. Hoekstra 2008.

The water footprint is an indicator of direct (real) and indirect (virtual) water use, linked to consumption of goods and services within a country. The total water footprint of a country includes the internal footprint (water for the internal production of goods and services) and the external footprint (consumption of goods and services which are produced abroad, using the water resources of foreign countries). The water footprint of Belgium and Luxemburg is 1802 m³/person/year, with 80% of the footprint falling outside the country. See: Water Footprint (2009).