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Sources of human insecurity in the face of hydro-climatic change

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ABSTRACT

Policy agendas increasingly respond to the perceived security threats of climate change, not least via its effects on water. Yet, solid links between climate, water, conflict and security have seldom been substantiated empirically. Drawing from the conceptual framework and empirical results of the EC-funded research project CLICO ('Climate Change, Hydro-Conflict and Human Security') which is presented in this Special Issue, this opening article looks at the conditions that shape conflict and insecurity, with a focus on the role of adaptation policies. We find three main sources of human insecurity: first, democratic deficits, which are more influential than hydro-climatic stresses; second, mal-adaptations, i.e. adaptations that have adverse effects for the security of some groups; and third, structural violence, often related to economic and state development. There is a systemic contradiction insofar as the pursuit of adaptation through state-led economic growth projects ends up producing new insecurities for parts of the population. Adaptation to hydro-climatic change, therefore, is likely to be a contested and painful process. Research on security and climate change must move beyond narrow investigations of conflict and study the links between structural violence and human insecurity, in particular the conditions and processes that reduce the options available to deal with potential insecurities.

1. Introduction

The unprecedented pace of changes in the earth's climate has led major policy actors to assert that climate change is a threat to security (IPCC, 2007, 2013; Ban, 2007). Top political and military officials as well as international environment, development and security forums have all acknowledged the existence of potential links between climate change, scarcities and conflict (McGowan, 2007; UN General Assembly, 1992; Solana, 2003). However, while apocalyptic headlines mostly result from think tank reports, NGOs and statements from public officials, there has been inadequate scientific evidence or peer-reviewed studies to substantiate and elaborate claims beyond speculation or reasonable concern (Gleditsch, 2012).

A prevailing policy preoccupation is that climate change may affect security through changes in the hydrological cycle and the quantity, quality and variability of water resources (e.g. National Intelligence Council, 2008). We refer to such water related stresses associated with climate change, as hydro-climatic change. One alleged outcome of climate change on security is that changes in water resources will generate violent conflict (Klare, 2001). A second possible effect on security includes direct impacts on human settlements, e.g. by floods, causing the loss of life or livelihood, injury and suffering or dislocation and involuntary migration (Renaud et al., 2007). Yet there is very little knowledge of the factors that mediate between hydro-climatic change on the one hand and human security on the other. The links between security, vulnerability and conflict are poorly understood (Barnett and Adger, 2007).

This paper contributes to the literature in two ways. First, drawing from the most recent qualitative and quantitative studies, it revisits and sheds more light on the causal relationships between climate, water, conflict and security, or what has otherwise been termed as the 'long chain' between climate change and social impact, which is fraught with uncertainty (Nordas and Gleditsch, 2007). In particular, this article unpacks the political–economic, as opposed to climatic, causes of insecurity. Second, it highlights a little studied phenomenon: the ways in which policies pursued in the name of adaptation and security, may end up undermining the security of at least some parts of the population. While the adaptation literature up until now has focussed significantly on analyzing the attributes of successful adaptive interventions (e.g. Adger et al., 2005) it is important to understand also how and why current formal (e.g. state-led, planned adaptation) and informal
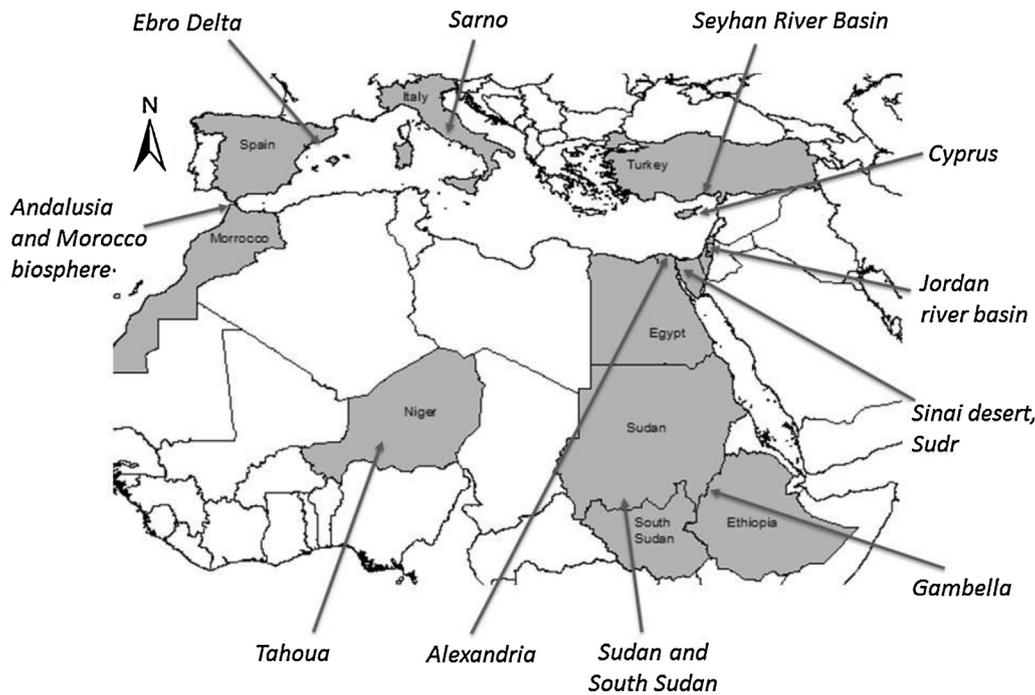
Fig. 1. The location of the eleven CLICO case studies.

(e.g. autonomous adaptation) interventions may undermine human security. We explore this using the concept of structural violence: violence that is "built into the structure [of society] and showing up as unequal power and consequently as unequal life chances" (Galtung, 1969, pp. 170–171). Our analysis reveals a systemic contradiction between political–economic processes that purport to provide human security for all, but instead end up often undermining the security of the most vulnerable parts of the population.

This is an overview paper synthesising the results of an international project, CLICO ('Climate Change, Hydro-Conflict and Human Security', www.clico.org), which the authors of this article coordinated. CLICO focussed on the Mediterranean, the Middle East and the Sahel, three of the regions most exposed and vulnerable to floods and droughts (Kallis, 2008) drawing on eleven case studies (Fig. 1). The research, carried out over three years (2010–2012), combined quantitative and qualitative social science research and involved fourteen partner organisations from Europe, the Middle East and Sahel. The evidence for this article is drawn from the empirical results of these studies with more emphasis on three case studies (Milman and Arsano, 2014; Selby and Hoffmann, 2014; Snorek et al., 2013) and a large-N statistical study of domestic water conflicts (Böhmelt et al., 2014), which also form part of this special issue.

This paper proceeds as follows. Section 2 presents a conceptual framework that was developed for CLICO and which links hydro-climatic change, conflicts and human security. The section pays special attention to the concept of human security, which is key for this paper, whilst also introducing other terms and concepts used in the paper and this Special Issue more generally. In particular we move beyond security as a national or state centred issue as well as notions of security as "being protected from or not being exposed to danger" (Barnett, 2003, p. 7) and adopt as a starting point an approach to security that focuses on individuals' and communities' human security, i.e. safety from chronic threats and sudden disruptions (United Nations Development Programme, 1994). Section 3 outlines and explains three core findings: first, that political and economic factors are more important causes of insecurity than climatic ones; second, that adaptation policies often backfire and increase the insecurity of vulnerable groups; and third, that violence is also structural, rather than direct. Section 4 combines these findings into a theoretical proposition about the contradictory aspects of human security policies and then discusses policy and research implications. Section 5 concludes the paper.

2. Conceptual framework and key terms

The conceptual framework that shaped CLICO research and in turn was shaped by the empirical results of the research is shown in Fig. 2. The concept of human security is central to this conceptual framework. By using the term human security we are concerned with the security of individuals and communities within the context of the social–ecological systems and political economies that they occupy. Human security emerged as a term in the seminal 1994 UNDP Human Development Report, which identified two key dimensions of the term: "first, safety from such chronic threats as hunger, disease and repression. And second, [. . .] protection from sudden and hurtful disruptions in the patterns of daily life – whether in homes, in jobs or in communities" (United Nations Development Programme, 1994, p. 23). A human security perspective implies consideration of the well-being, physical survival, quality of life, and safety of all, including the most vulnerable and marginalised (Adger, 2010). Various formulations of human security bring into play freedom from fear (Black and Swatuk, 2009), freedom from need (Shinoda, 2009), and freedom to live in dignity (UN General Assembly, 2005) as constituent elements of security. Moreover, a "freedom from hazard impacts" component of human security has been proposed to acknowledge the importance of hazards (e.g. droughts and floods) on welfare and security (Brauch et al., 2005). These formulations reflect both material and non-material (psychological/emotional) aspects of security, where insecurities may result from threats to livelihoods and well-being, e.g. those associated with land or water scarcity. Threats to physical safety and psychological well-being may result from violence or environmental extreme events, or fear of harm associated with violence or lack of access to resources (Adger, 2010).
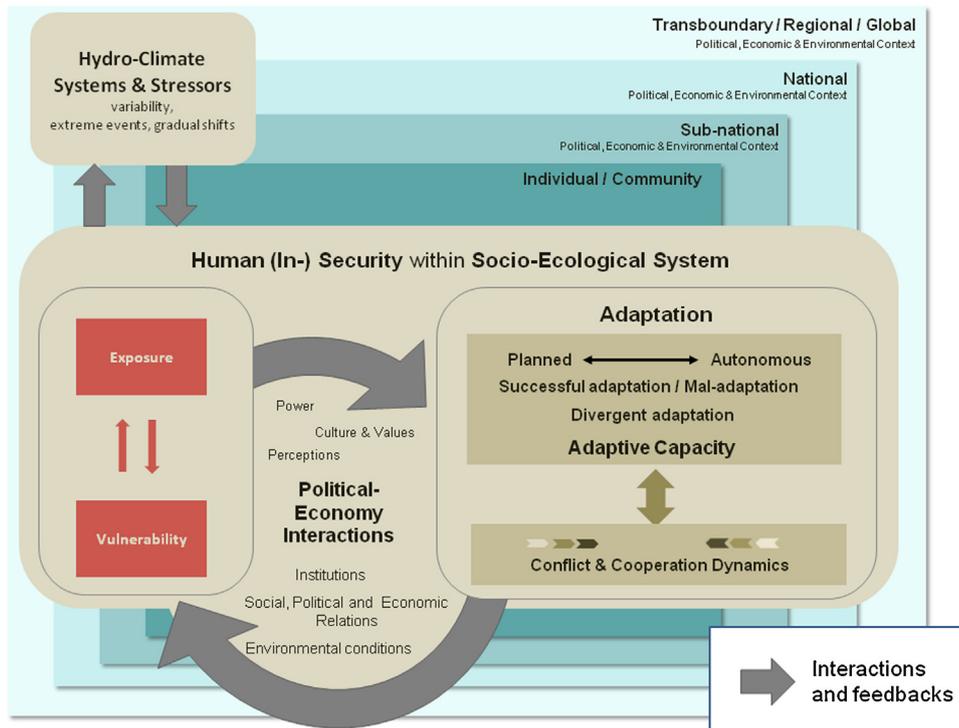
Fig. 2. Conceptual framework of hydro-climatic change, conflict and human security
Adapted from version produced by Niklas Gebert, Julia Kloos, Fabrice Renaud, and Julie Snorek of UNU-EHS in Goulden and Grainger (2012).

Human security sheds light on problematic aspects of mainstream traditional-realist approaches to security, which emphasise the state as the referent object of security thus privileging military solutions as a policy means to ensure security in the context of a changing climate (Grove, 2010). Human security attempts a paradigmatic shift by emphasising the individual and communities as referent objects of security (Barnett, 2003), as well as developmental and justice interventions instead of force as a means to reduce insecurities (Adger, 2010). Importantly, human security answers differently than realist approaches the key question "security from what/whom?" Side by side with 'state' and 'nature', globalisation and humankind's economic and consumptive (e.g. unsustainable lifestyle) behaviours are considered key security dangers impossible to be contained with military force or logic, but instead requiring proactive strategies that aim at sustainable development (Brauch, 2009).

Our conceptual framework postulates that human insecurity arises, at least in part, due to the vulnerability of individuals, communities and the social–ecological system to hydro-climatic stressors: extreme events such as flooding or drought; gradual shifts such as changing average precipitation; increased exposure to flooding due to sea-level rise; increased water scarcity due to temperature rise. However, although the links between climate, water and human security are the main focus of the CLICO research discussed in this paper, the framework recognises the possibility of many other influences on human security arising from the economic, political and environmental context of social–ecological systems. Such influences, explained in detail below, include adaptation processes and outcomes, and conflict and cooperation dynamics, which interact with vulnerability and human security through the political economy. Social, economic and political relations, institutions, perceptions, values and culture, as well as environmental conditions shape those interactions. The term political economy embraces the ways in which political forces, shaped by power relations, affect policy choices and the generation of distributive conflicts through political institutions (Alesina, 2007), as well as the influence of economic forces on political decisions.

Political economy interactions occur at multiple scales and across scales, and can influence local vulnerabilities and human security, for example through the action of globally connected markets, movements of people and goods and the influence of global environmental changes (Adger et al., 2009b). Similarly, the socio-ecological system, where linkages between human activities, the state and hydrological, climate and ecological dynamics develop, can be examined at multiple scales from the local to the global (Gunderson and Holling, 2002). CLICO research considered scale by conducting studies at different scales ranging from the local (e.g. Sarno, Italy, D'Alisa and Kallis, 2012) to national (e.g. Sudan and South Sudan, Selby and Hoffmann, 2014) and transboundary (Fischhendler and Katz, 2012). Case studies also investigated the significance of political economy interactions that cross scales, such as international food and land markets that influence national agricultural policy choices and have local impacts on displaced populations, for example in Gambella (Milman and Arsano, 2014) and Sudan (Selby and Hoffmann, 2014).

Adaptation has a key influence on human security. It involves responses to perceived or experienced climate stresses aiming to reduce their impact and the vulnerability of systems or people to adverse effects (adjusted from Pielke, 1998). Adaptive capacity is understood as "the potential or ability of a system, region, or community to adapt to the effects or impacts of climate change" (Smit and Pilifosova, 2001, p. 881). Political economy interactions influence adaptation choices as well as conflict and adaptive capacity outcomes (upper curved arrow in Fig. 2). They also influence ways in which adaptation affects human security and vulnerability to hydro-climatic and other stresses (lower curved arrow in Fig. 2). We draw on the evidence from the CLICO case studies, which examined particular actions, policies

and interventions that responded to climate related risks within the specific context of each case study, for example the Villagization programme in Gambella (Milman and Arsano, 2014) or the engineering solution to mudslide hazards in Sarno, Italy (D'Alisa and Kallis, 2012). Political economy interactions were explored by studying the key actors involved, the arguments used to support policies and interventions and the outcomes of the policies or interventions on the human security of the population most affected. Policies and interventions often had multiple goals, only one of which might be adaptation to hydro-climatic stressors. An understanding of power relations, decision making processes and values placed on aspects of livelihoods and approaches to risk is necessary to unpack these interactions, as we explain in Sections 3.2 and 3.3.

Adaptations to perceived or experienced hydro-climatic stresses can have differential impacts on the adaptive capacity and human security of different actors or social groups. This is referred to as 'divergent adaptation' by Snorek et al. (2013). Maladaptation in turn, involves adaptive action that "does not succeed in reducing vulnerability but increases it instead" (McCarthy et al., 2001, p. 990). Conflict between different actors and within and between social groups can arise from adaptation policies and actions. Conversely successful adaptation may require collective action involving cooperation between different social actors (Adger, 2003). Conflict and cooperation are terms frequently used when looking at transboundary water interactions, although they can exist at all scales from individuals and groups up to nations. Conflict and cooperation are dynamic in nature since they co-exist and change over time (Zeitoun and Mirumachi, 2008), and can have both positive and negative influences on vulnerability and human security. Violent conflict causes human insecurity, partly through reduced adaptive capacity. Less severe forms of conflict can be positive if they open up debate and action that expands adaptation options, or allows marginalised groups to push for political change (Turner, 2004). Similarly, extreme events (e.g. floods) may spur cooperation and provide political space for democratic shifts in the relation between citizens and the state. In such cases, citizens may go past traditional, patronage-based relationships to demand the state to comply with its duties and provide basic services, producing positive responses that go beyond regular 'absent state' reactions (Siddiqi, 2013).

Table 1
Summary findings from CLICO case studies.

Case study and reference	Focus of study	Main findings with respect to sources of human insecurity, adverse impacts of adaptation and structural violence indicators
Andalusia (Spain) and Morocco biosphere, Pascual et al. (2012)	Water vulnerability	*Political–economic sources of human insecurity* Successful adaptation is conditional to effectively tackling increased human pressure upon water resources resulting from economic and demographic development
Ebro delta, Albizua and Zografos (2012) and Zografos (2012)	Values and micro-politics of vulnerability and adaptation to climate change	*Adverse impacts of adaptation* Maintenance of sources of vulnerability; diminishing trust in decision-making; citizenship grievances
Sarno, Italy, D'Alisa and Kallis (2012)	Implications of large engineered infrastructure response to mudslides	*Political–economic sources of human insecurity* Capitalist and illegal interests in the "cement cycle" privileging large infrastructure responses after natural disasters *Adverse impacts of adaptation* Adaptation through a large protection canal in Sarno, used up funds that could have been used more efficiently for softer interventions in the rest of the region, which remains as vulnerable to mudslides as before
Seyhan river basin (Turkey), Turhan (2012)	Migrant seasonal agricultural labour, adaptation in labour-intensive agriculture and state intervention	*Adverse impacts of adaptation* Adaptive shift in crop patterns towards capital-intensive crops is threatening household incomes of migrant workers since available work in labour-intensive crops is decreasing
Cyprus, Charalambous et al. (2012)	Water resources and tourism	*Adverse impacts of adaptation* Little economic incentive for increased efficiency of water use and low awareness of climate change impacts limits adaptation
Sinai desert, Sudr region, (Egypt), Tawfic Ahmed (2012)	Climate change vulnerability	*Political–economic sources of human insecurity* Isolation and illiteracy of the population increases the vulnerability to climate extremes
Jordan River Basin, Israel-Palestine, Tamimi and Abu Jamous (2012) and Fischhendler and Katz, 2012	Integrated water resources management under uncertainty in the West Bank Uncertainties and transboundary water cooperation and conflict between Israel and Palestine	*Political-economic sources of human insecurity* Severe and prolonged violent conflict undermines human security also indirectly by reducing the access of people to resources and infrastructure, and by increasing their vulnerability to climate change Social and political uncertainties play a much stronger role in water negotiations than do technical or physical uncertainties
Greater Alexandria, (Egypt), Gebert et al. (2012)	Forced and planned relocation of populations at risk from flooding	*Adverse impacts of adaptation* Planned relocation may reduce insecurities from flood damage associated with sea level rise but decrease livelihood security and damage social networks that provide resilience
Gambella, (Ethiopia), Milman and Arsano (2014)	Contradictions in outcomes for adaptation and human security from development programmes in highly vulnerable regions	*Indicators of structural violence* Development initiatives and adaptation outcomes that focus on modernisation of the economy and political stabilisation are prioritised rather than protection of the population and their livelihood resilience
Sudan and South Sudan, Selby and Hoffmann (2014)	Water, conflict and climate change in the two Sudans	*Political–economic sources of human insecurity and Indicators of structural violence* Land appropriation by local elites for strategies of development and state-building in the context of the global political economy of land
Tahoua (Niger), Snorek et al. (2013)	Divergent adaptations of agricultural and pastoral groups	*Political–economic sources of human insecurity and indicators of structural violence* Marginalisation of certain ethnic groups and livelihoods (pastoralism) in favour of others (agriculture/agro-pastoralism) *Adverse impacts of adaptation* Expansion of agro-pastoralists into areas reserved for pastoralists leads to conflict and reduced viability of pastoralist livelihoods

3. Findings

In this section we discuss the findings from the CLICO case studies that illustrate political and economic sources of human insecurity, adverse consequences of adaptation and structural violence as a cause of insecurity. Table 1 presents a summary of the key findings from the eleven CLICO case studies, which are discussed in more detail below.

3.1. Democratic deficits are crucial sources of human insecurity

Conflict, especially violent conflict, can reduce human security by depriving individuals of access to food and other assets, by creating uncertainty, fear and psychological harm, and by reducing adaptive capacity (Barnett, 2006). The examples of conflict documented in the CLICO case studies take many different forms from low level, 'silent' or latent conflict, for example in the Ebro Delta in Catalonia, where stakeholders dispute causes and solutions to loss of agricultural land associated with water abstraction, subsidence, salinisation and sea level rise (Albizua and Zografos, 2012), to overt or violent conflict, for example in Tahoua, Niger and Gambella, Ethiopia, where competition between ethnic groups for access to land and water, sometimes spills over into violence (Milman and Arsano, 2014; Snorek et al., 2013). Violent conflict is also a feature of the Jordan West Bank case study in the Palestinian Occupied Territories, where water scarcity and poor water management are exacerbated by the ongoing violence and political uncertainty associated with the Israel-Palestine conflict (Tamimi and Abu Jamous, 2012); and in the two Sudans, where a long history of violent conflict is associated with appropriation of land by the state for agricultural and dam building projects (Selby and Hoffmann, 2014).

Böhmelt et al. (2014) report on a quantitative analysis of 10,352 domestic water related events in 35 countries of the Mediterranean, Middle East and Sahel, derived from media articles published between 1997 and 2009 (Bernauer et al., 2012). Overall, there are slightly more cooperative domestic water events than conflictive ones (with nearly half the events recorded being neither cooperative nor conflictive) (Bernauer et al., 2012). Variations in water demand as a result of levels of economic development, and variations in the levels of democracy and political stability, influence the degree of domestic water conflict and cooperation more than supply variations related to climate variability do. The degree of political freedom in a country influences the nature of conflict: more democratic countries experience a higher number of conflictual events but a lower intensity of conflict (i.e. lower number of violent conflicts) than non-democratic countries. A likely explanation of this, offered by Böhmelt et al., is that political freedom allows conflicting views to be expressed both in society and through the media, but has a restraining influence that limits escalation of conflict to violence.

Qualitative studies shed light on some of the more intricate connections between political–economic dynamics, institutions, conflict and security. A number of case studies highlight the role of decision making processes and deficits in democracy in creating conflict and/or increasing human insecurity. In particular decision making processes that fail to recognise diverging values, whilst prioritising the agendas of politically powerful groups can lead to latent (Albizua and Zografos, 2012) or manifest (Milman and Arsano, 2014) conflict. Snorek et al. (2013) find that conflict between pastoralists and agro-pastoralists is a response to the marginalisation of pastoralist livelihood needs by institutions that favour the interests of agro-pastoralists, rather than a direct response to hydro-climatic stress. Nevertheless, competition for access to land and water is exacerbated by the responses of both

groups to environmental change associated with rainfall variation and land degradation.

Selby and Hoffmann (2014) study the Sudans and claim that political economic factors, "the strategies adopted by local elites, and the global dynamics in which these are embedded" are more likely to lead to conflict than either water scarcity or climate change. The authors deconstruct the argument that competition over scarce water resources and underdevelopment leads to conflict in the Sudans. It is rather where there is an abundance of water resources combined with developmental efforts to exploit those resources, such as in the Nile river valley or the Sudd swamps, that there is conflict, they argue. Land and water resources development have a long history as part of a state-building project in Sudan and has often been realised by the forcible eviction of people.

Both Selby and Hoffmann (2014) and Albizua and Zografos (2012) raise the role of water demand, in particular for irrigated agriculture, in the social production of water scarcities and insecurities. Such scarcities and insecurities are often the result of global political economic processes such as the recent trend for foreign direct investment in land, cases of which include Ethiopia (Milman and Arsano, 2014) and Sudan (Selby and Hoffmann, 2014). In Gambella, Ethiopia, land is being made available to national and foreign investors for large scale agricultural investment as part of the national focus on economic modernisation, agricultural development, and perceived benefits of foreign exchange earnings for food security through connection to global food markets (Milman and Arsano, 2014). These agendas of agriculture-led development and modernisation are influenced by global agendas that see foreign investment and an open economy as key for Ethiopia's development and stability in the region (Milman and Arsano, 2014).

The role played by politics, amongst the multiple influences on human security, is illustrated by the risks to urban settlements from rainfall-induced mudslides in the Campania region of Italy that result from a combination of high slopes, loose volcanic soils, excess rainfall and inadequate state response to the risks (D'Alisa and Kallis, 2012). Part of the problem is a political system that treats events such as the Sarno landslides as a 'state of emergency', relies overly on technical expertise and avoids a genuine public debate of alternative approaches to vulnerability reduction. This suggests that even in democracies there might be democratic deficits that undermine human security. Unpacking the political economy of Italy in relation to disasters, the authors reveal a complex process of consensus making between political and civil society. In the case of Sarno, the authorities allowed people to stay in the exposed area, the one destroyed by the Sarno mudslide, responding to common sense fears about resettlement and ghettoization. This was not so much a case of politicians being responsive to peoples' demands. The real reason was that allowing settlement in the exposed zone justified the construction of an expensive protective infrastructure of dams and canals, which like other infrastructure projects in the region fed the circulation of capital and cement that benefits powerful – legal and illegal – interests.

Whereas much attention has been given to the direct effects of violence on human security, violent conflict, especially when severe and prolonged, may also undermine human security by reducing the access of people to resources and increasing their vulnerability to climate change. The Jordan West Bank occupied territories are an exemplar of such a situation. Palestinian access to water and capacity to manage water effectively is highly constrained by the continued conflict with Israel, and its consequences for Palestinians in terms of poor water infrastructure, access to only meagre quantities of water and hence high vulnerability to natural hazards and future climatic change (Bar-On and Gerstetter, 2012; Tamimi and Abu Jamous, 2012).

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3.2. Mal-adaptation has adverse consequences for human security

One might expect adaptation actions in response to hydro-climatic and other threats to increase human security. However CLICO research shows that policy responses that are claimed to support adaptation to hydro-climatic stress as well as autonomous responses of individuals and groups may instead be an additional source of human insecurity (D'Alisa and Kallis, 2012; Gebert et al., 2012; Milman and Arsano, 2014; Snorek et al., 2013).

Adaptation, or at least actions in its name, can increase inequalities between groups. For example, in Tahoua, Niger, unreliable rainfall, population expansion and loss of soil quality has prompted the expansion of arable farming into areas reserved for pasture as an adaptive strategy by agro-pastoralist farmers; this in turn, has put greater stress on the livelihoods of pastoralists who rely on their ability to migrate in search of pasture (Snorek et al., 2013). In this example, one group's adaptive success reduces the adaptive capacity of another group, a socio-environmental phenomenon which Snorek et al. (2013) refer to as divergent adaptation. It is a subject for further research to see how generalised such patterns of divergent adaptation may be elsewhere.

How adaptation policies may have both negative and positive effects on human security is illustrated by research examining planned relocation as a response to sea level rise in the city of Alexandria, Egypt. Poorly planned relocation of communities that does not adequately consider people's housing needs and access to livelihood activities risks creating significant new insecurities for those relocated (Gebert et al., 2012). Planned adaptation in the form of relocation may reduce risks from some hydro-climatic stressors (sea-level rise and flood risk) but undermine human security in other ways, for example by reducing livelihood security and social networks (Gebert et al., 2012). To overcome this, Gebert et al. (2012) suggest that adaptation policy needs to do a much better job in understanding the security concerns and preferences of the affected population.

Adaptation policy and interventions are subject to power relations. Milman and Arsano (2014) illustrate this for the region of Gambella, Ethiopia, where state institutions are pursuing two policies with the stated purpose of both economic development and adaptation to climate variability: the Villagization Programme and the Agricultural Development Led Industrialisation programme. These are founded on the premise that agricultural modernisation will transform societies, provide increased food security and reduce poverty and vulnerability to climate hazards. By moving farmers who practice flood recession agriculture out of the flood plain and into permanent settlements, the villagisation programme purported to reduce the population's vulnerability to floods but it actually increased their vulnerability to water scarcity and food shortage, given the erratic rainfall in Gambella that is likely to increase with climate change. By prioritising some aspects of security (security from flood hazards in the mid to long term) over others (food security in the short term) these programmes have led to declines in human security for the affected population, at least in the short term. A focus on reduction in flood risk and a neglect of vulnerability to drought fits with a discourse in Ethiopia that Gambella is a water rich region, ripe for investor-led agricultural development. Resettlement of dispersed populations also provides benefits to the state in terms of provision of services, control of the population, avoidance of violent conflict resulting from ethnic tensions in Gambella, and facilitates the process of demarcating permanent land entitlements thereby clarifying availability of land for agricultural expansion through large scale investments. This, argue Milman and Arsano (2014), shows how the costs and benefits of development and adaptation, and their distribution among different groups, are determined to a large extent by relationships between politics, economics and power.

Unequal power relations between decision makers and different stakeholders are also evident in adaptation responses that fail to consider the value dimensions of climate change and hence result in the silencing of voices (Albizua and Zografos, 2012; Turhan, 2012). This in turn can lead to increased insecurity, a sense of injustice, and potential or latent conflict. Analytically speaking, the relevance of power also highlights the importance of paying attention to the micro-politics of human security, i.e. the heterogeneous practices, thoughts, and routines in which various persons and groups engage (Halsey, 2004) when it comes to adaptation, security, and climate change. Such practices, routines and discourses can be instrumental in activating sources of insecurity and hence produce and reproduce value marginalisation. For example, CLICO's study of heterogeneous practices, thoughts and routines as regards coastal erosion and sea-level rise in which policy-makers and local stakeholders in the Ebro Delta engage, revealed that conflicts over adaptation options have a citizenship dimension, i.e. bring to the fore questions regarding the power relationship between individuals and the state (Zografos, 2012), which reflects broader patterns of conflict in Spanish politics. We find that this focus on micro-politics is valuable in conceptual and methodological terms, as it can fruitfully complement current structuralist conceptual (Adger, 2010) and empirically based (Selby and Hoffmann, 2014) attempts to incorporate power and politics when researching connections between human security and climate change. This is crucial, because beyond shifting the emphasis of discussions of the security dimensions of climatic change from the militarised intervention implications of national security and state-focused analyses, human security scholarship has not yet substantially engaged with the deeply political nature and power dimensions of the links between human security and climate change. With their focus on everyday practices, micro-political analyses would add methodological nuance and conceptual fodder to structural investigations of links between climate change and security, and thus help engage more comprehensively with the power dimensions of this relationship.

The United Nations Framework Convention on Climate Change sets the nation state as a key referent for adaptation planning and regulation (Gerstetter et al., 2012). However, Milman and Arsano (2014) question the appropriateness of a strong role for the state in adaptation in contexts under which the views of state actors fail to represent those of the population. In Ethiopia, the state adopts a view that modernisation should occur at the expense of traditional livelihoods. But, according to Milman and Arsano, when the state intervenes questions arise as to "who and what is prioritised and how such determinations are made?" Despite these reservations about state-led adaptation, some argue that improvements in the capacity of state institutions are a necessary condition for improving the adaptive capacity of the population (Gebert et al., 2012; Snorek et al., 2013). D'Alisa and Kallis (2012) argue that there is no alternative to the state, and that the point is not to go beyond the state and decentralise responsibilities to communities, but instead to reinvent the state and socialise (democratise) its control. Using evidence from the political response to the Sarno mudslide disaster, they find that Italian authorities did not act against the wishes of the local civil society, as often assumed in other studies of mal-adaptation which attribute it to lack of consultation or participation, but instead negotiated and directed through consensus the desires of people to relocate back to the place of the disaster, in ways that were compatible with capital circulation. This took the form of a gigantic, and partly unnecessary and maladaptive engineered system of protective concrete canals and tanks. This response had a huge opportunity cost, leaving other areas as vulnerable to mudslides as before, and without early warning systems. Contemporary neo-liberal states mal-adapt, D'Alisa and Kallis argue, because they care more about maintaining capital circulation, than social welfare; if they can do this with the consent of civil society, so much the better.

Other studies indicate that adaptation interventions or policies promoted by the state may fail to consider the social, political and environmental contexts in which marginalised populations find themselves and therefore fail to meet their adaptation needs (Gebert et al., 2012; Milman and Arsano, 2014; Turhan, 2012). Turhan (2012) shows how inadequate state policies in Turkey have shifted the responsibility of adaptation on to individuals, in this case migrant agricultural labourers, who are unable to change the socio-institutional structure and conditions responsible for their marginalisation. In Niger, a lack of enforcement of the Rural Code, a legislation-backed policy that delimits zones for cultivation and pasture, left pastoralists inadequately supported in their adaptation efforts (Snorek et al., 2013).

In some cases state actors adopt a climate change discourse and use the adaptation agenda for their own aims, giving the label of 'adaptation' to policies and projects that serve other purposes (Milman and Arsano, 2014; Turhan, 2012). Turhan (2012) analyses state interventions in the name of adaptation as 'biopolitics' (Reid, 2010). He argues that so-called adaptation policies for the agricultural sector in Turkey are not designed to reduce the vulnerability of the most vulnerable groups, such as seasonal workers, but to create adaptable individuals and maintain in this way the circulation of a cheap labour force for agriculture (Turhan, 2012).

A different issue that emerged from some CLICO case studies concerned the appropriateness of incremental versus transformational adaptation measures, the latter referring to adaptations "that are adopted at a much larger scale, that are truly new to a particular region or resource system, and that transform places and shift locations" (Kates et al., 2012, p. 7156). Milman and Arsano (2014) and Gebert et al. (2012) raise concerns about the human security implications of large-scale interventions that aim to transform livelihoods, social practices or locations. As already described, the Villagization programme and Agricultural-led development programmes in Gambella aimed to transform livelihoods in the region radically but have resulted in significant reductions in the human security of the relocated population affected, at least in the short term (Milman and Arsano, 2014). Planned resettlement in response to the threat of sea level rise in Alexandria, which could also be considered a transformational adaptation, risks cutting farmers off from their income sources and livelihoods, weakening social networks and creating areas of informal housing which could be more vulnerable to climate change (Gebert et al., 2012). Gebert et al. (2012) recommend that planned resettlement programmes should address livelihoods sustainability and provide targeted incentives for people to relocate such as adequate housing and livelihood opportunities.

These findings from Alexandria (Gebert et al., 2012) and Gambella (Milman and Arsano, 2014) support an argument in favour of a balance between incrementalism and transformation in adaptation to climate change. The question, however, is also about how appropriate the nature and goals of transformations are. D'Alisa and Kallis (2012) for example criticise the adaptation intervention of the Italian state for failing to transform the situation. This was not an incremental intervention; it was a large-scale engineering infrastructure. But instead of a transformation of the infrastructure, they argue, what was needed was a transformation of the goals and function of the state, with a shift in emphasis from safety and capital circulation to one of social welfare. Bringing back a strong social (welfare) state is a transformational change, one that they find necessary in the face of the intensifying risks associated with climate change.

3.3. Violence is also structural

Political power is instrumental in shaping such adverse consequences of adaptation policies. Expressions of unequal power

relations in our case studies appear in different guises: as the capacity to impose views on the nature, development and use of places and their resources, e.g. through agricultural modernisation in 'water rich' Gambella; as the ability to exclude or prioritise certain aspects of security, population needs and strategies to deal with insecurity, e.g. when state institutions marginalise nomadic population security strategies in Niger; as the ability to hegemonise civil society and obtain its consent while maintaining key economic and institutional structures necessary for capital circulation, e.g. with large-scale engineering adaptations in Sarno; and through creating subjects capable to respond to multiple future socio-environmental changes in order to maintain conditions of capital accumulation, e.g. through state attempts to shift the responsibility of adaptation upon individuals in Seyhan. As a consequence, CLICO findings evidence the existence of both coercive (e.g. capacity to impose decisions) and consent-related (e.g. creation of adaptable subjects) strategies of power, the two major categories for understanding the operation of power in environmental governance (Peet et al., 2011). But side-by-side with these, power manifests itself also in the phenomenon of structural violence: unequal power relations sustain situations of structural violence, which not only account for causes of insecurity in relation to climate change, but also constrain the range of options available to deal with such insecurity.

The CLICO studies reveal that violence in the context of changing hydro-climatic conditions is in many instances the result of direct, personal attacks, such as physical attacks and deaths in Gambella (Milman and Arsano, 2014) and Tahoua (Snorek et al., 2013). But we also observe that policy priorities (e.g. modernisation) and specific measures (e.g. Ethiopian villagisation programme) that aim at reducing vulnerability end up increasing insecurity by devaluing and annulling the capacity of traditional means of resilience (e.g. shifting cultivation) used to respond to hydro-climatic changes. This suggests the existence of structural violence, i.e. a type of violence that "shows up as [. . .] unequal life chances" (Galtung, 1969, p. 170).

Often this is the result of policies and measures that pursue growth-related economic (e.g. Milman and Arsano, 2014 – for Ethiopia) and state-building (Selby and Hoffmann, 2014 – for Sudan) political agendas and logics, which are "built into the structure" (Galtung, 1969, p. 171) of socio-ecological systems in the form of national targets (e.g. Ethiopia's Growth and Transformation Plan) and strategic schemes (e.g. transforming Sudan into "Africa's breadbasket"). Reduced human security and specifically reduced options, freedom, and capacity to react to climate change threats is brought about by numerous institutionally sanctioned actions, practices and processes inter alia resulting from a drive to reach the imperatives of economic growth and state development that are built into the structure of the predominant political economy in each case. In short, human insecurity reveals the occurrence of structural violence.

The case of seasonal workers in the coast of Turkey is illustrative of structural violence (Turhan, 2012). Kurdish workers from Eastern Turkey, displaced by large dams that provide water and electric power for a growth -hungry Turkish economy, migrate to the South in the growing season, where they work under unhealthy conditions, underpaid, without insurance, and live in temporary settlements exposed to heat, floods and diseases. When droughts or market conditions affect production, they are the first ones to suffer and remain without work. The violence they experience is not armed or physical, but structural, i.e. a violence depriving them of options to live a dignified life, exerted by a system that pursues growth and for which it needs a cheap and docile labour force.

4. Discussion

Our findings point to the existence of three key sources of human insecurity. First are political and economic factors, and

particularly lack of genuine democracy that maintains the vulnerabilities and insecurities of the politically and economically less powerful groups. This occurs both within authoritarian regimes that are more likely to experience violent conflict as a result of stresses, or within democratic regimes suffering from democratic deficits. Here, we consider genuine democracy mainly in terms of political equality, "the core principle of democracy" (Heywood, 2002, p. 69): a situation of equal distribution of political power and influence where all voices are equally loud. The way CLICO research has empirically considered political equality has differed among studies, ranging from looking at the existence of free elections with the project's N-study, to more nuanced, case study examinations of the extent to which plural values are considered in decision-making (e.g. Böhmelt et al., 2014; Albizua and Zografos, 2012). Still, all approaches consider the relevance of (either narrow or extended) participation and inclusiveness in decision-making, which is germane to political equality and democracy.

Second, state-led or state-supported adaptation interventions can be sources of human insecurity, be they large scale such as those in Gambella, Sudan, and Sarno or smaller scale such as the ones seen in Tahoua or the Ebro Delta. Third, structural violence built into institutionally sanctioned practices and decision-making processes provides a source of insecurity by sustaining conditions that lead to vulnerability or reducing the capacity for alternative means of resilience.

These sources of insecurity point to a contradiction that lies at the heart of the hydro-climatic change and human security relation: the contradiction between a system that creates insecurity and the very idea of that same system achieving human security for all. When studying the long chain between climate change and its social impacts (Nordas and Gleditsch, 2007), we note the operation of elements of socio-ecological systems that simultaneously attempt to establish security from the impacts of hydro-climatic changes and reach for other ends which themselves contribute significantly in undermining security. This contradiction is perhaps best revealed by studying state attempts to reduce insecurity and the overall role of the state within such systems. Here, we note that states use their resources to reduce insecurity, e.g. in the form of actions such as adaptation policy and modernisation of agriculture. But at the same time, states pursue other objectives such as high economic growth and nation-state development, which involve engaging in actions that increase insecurity. As we empirically observe e.g. in Ethiopia and Sudan, efforts to achieve those goals clash with the idea of achieving human security in the guise of "safety from such chronic threats as . . . repression" (United Nations Development Programme, 1994, p. 23) but also in the guise of "protection from sudden and hurtful disruptions" (United Nations Development Programme, 1994, p. 23) as evidenced by the study of conflicts in Niger (Snorek et al., 2013).

So, state actions both increase and decrease security. This contradiction can be traced to inherent tensions in processes of development based on economic growth. Economic growth improves on the one hand the living conditions and security of some parts of the population, e.g. by modernising agriculture and producing higher food yields, financing a welfare state and a system of civic protection. But it often comes at the expense of the security of other groups, such as those being relocated or deprived of their livelihoods in the name of agricultural modernisation or water supply (dams). Growth and development shift costs spatially and temporally, when, for example, growth is achieved by extracting materials and polluting territories elsewhere (spatial shift), or when past economic growth is bought at the expense of future climatic instability (temporal shift). In this way security is pursued in some places or at some scales at the expense of

insecurity in other places and scales (Dalby, 2009). This unevenness of development processes is even more pronounced in the case of capitalist development, which is particularly prone to produce and benefit from spaces of prosperity and destitution in different places and times (Smith, 2008). The contradiction therefore that we noted concerning the role of the State (a necessary but also at times detrimental institution for human security) reflects a broader contradiction whereby under contemporary capitalism, processes of development produce security somewhere at the expense of insecurity elsewhere. Normatively this means that there is an irreducible distributional and value aspect of operationalising the goal of human security, which is concealed by policies claiming to provide generalised security for all, and which is at odds with conceptualisations of human security that see it as indivisible (Glasius, 2008; United Nations Development Programme, 1994). It also implies that economic system transformation is an issue that should explicitly enter into the security and climate change policy agendas if policy-makers are to seriously attempt maintaining security in the face of changing hydro-climatic conditions.

Still, empirical evidence from CLICO suggests that significant transformations to social structures in the name of adaptation may not always result in security improvements for all. Undoubtedly, context is crucial for determining whether, and what type of transformational (or incremental) adaptation will be more pertinent (Kates et al., 2012). More importantly, the social support necessary for transforming political–economic structures goes hand in hand with transforming mindsets and discourses. In this context, it is important to transform the ways of approaching and understanding what happens in the long chain between climate change and security (Nordas and Gleditsch, 2007), which requires reconsidering and challenging deep-seated practices, mindsets and oft-repeated policy discourses. A first step in a positive direction would be if policy-makers and stakeholders refrained from reiterating simplistic connections between climate change and conflict. Empowering affected groups to influence adaptation decisions, and establishing policies that address the root causes of vulnerability such as poverty and lack of political voice are also pertinent as policy improvements. These are transformational changes. However, there is scope also for incremental action in the sense of trying to build upon the strengths of existing policies. Importantly, the criteria for assessing policy strengths should incorporate social justice and equity, which are fundamental for pursuing legitimate and successful climate policy and security (Adger, 2010). Realising such incremental changes involves pursuing actions which CLICO research has identified elsewhere as beneficial for security, specifically: integrating policies before re-inventing new ones; making sure that existing policies are implemented; and, strengthening social security systems (and social protection mechanisms) where they exist or promoting them where they do not exist or are only now emerging (Kallis and Zografos, 2013).

Genuine democratisation should be part of adaptation-relevant decision-making. Not only can local knowledge benefit adaptation by providing information crucial for improving state-led policy efforts (Ahmed et al., 2012) but also the incorporation of different values in adaptation decision-making can help improve the effectiveness and legitimacy of policies (O'Brien and Wolf, 2010) and avoid mal-adaptations. The negotiation of diverse values and interests as a basis of policy-making through effective governance mechanisms represents one of the core problems of adaptation decision-making at all institutional and political scales (Adger et al., 2009a). States, therefore, need to establish robust mechanisms of genuine public participation which ensure that different preferences and values are integrated in the design of adaptation policies. In some cases this can be a considerable challenge, as

contested adaptation requires long-term deliberative decision making but many states do not have a good track record of this. Nonetheless, establishing such mechanisms could go some way in helping strengthen institutional accountability and hence improve governance. Moreover, it could help in elaborating normative adaptation frameworks that balance unequal impacts of climate change and related adaptation actions and policies. Admittedly, involving marginalised social actors in decisions may be easier said than done, as often their exclusion is nothing but accidental and goes hand in hand with their political and economic marginalisation (Gerstetter et al., 2012). However, without empowering such groups, states cannot seriously claim to engage in the project of improving human security.

Finally, the systemic contradiction exposed in this paper points to the relevance of broader understandings of human security for empirical research in the area. Specifically, it indicates that the investigation of human security is not only about studying safety from chronic threats and protection from sudden and hurtful disruptions as in the commonly adopted UNDP (1994) definition of human security, but perhaps most crucially about studying states of insecurity, specifically the socio-economic and political conditions and processes that produce an absence of *options* to deal with potential insecurities (Adger, 2010). This is crucial from a social environmental science perspective because it explicitly incorporates and reflects the idea that there are societal limits to our response to climate change (Adger et al., 2009a), i.e. that the limits of intervention are socially constructed and politically decided. CLICO empirical research shows that economic development and state building can comprise sources of insecurity not necessarily because they directly decrease safety from chronic threats such as drought, flood, and sea-level rise and do not protect populations from related sudden and hurtful disruptions, but because they deprive populations from options necessary to respond to threats posed by hydro-climatic changes (e.g. state policies to modernise agriculture in Gambella, Ethiopia).

5. Conclusions

As the opening article to this Special Issue that explores links between hydro-climatic change, conflict and human security, we draw on quantitative and qualitative findings of the CLICO research project to argue that, first, political and economic, rather than climatic factors can be a key source of human insecurity. Democracy in particular, is a crucial variable in determining whether conflict can be voiced and managed, or suppressed with the risk to evolve into violence. Even within democratic regimes, genuine democracy, meaning inclusion and participation, is necessary in order to address the distributional aspects of adaptation and (in)security. This suggests that the quality of decision-making procedures is particularly relevant for explaining why and how insecurities are generated under any political regime, no matter how democratic it claims to be. It also calls attention to specific institutional features concomitant to democracy and development, such as strong social and civil security systems, comprehensive health care provision, and resilient infrastructure for all when attempting to improve security, as well as explicit policy consideration of future human security implications of weakening or dismantling such systems (Kallis and Zografos, 2013). Second, we find that adaptation interventions pursued or supported by states often end up reducing the security of groups vulnerable to climate change; these groups are also regularly the most marginalised, and politically and economically less powerful in society. Third, we identify a structural dimension in the production of vulnerability and insecurity (structural violence), linked to the inherent uneven-

ness of processes of development many of which are prevalent under capitalism. We synthesise these findings into a broader proposition that there exists a systemic contradiction in policies pursuing human security through economic development-related adaptation interventions, in that security for some is bought at the expense of insecurity for others. This emphasis upon the distributional dimensions of human security reinforces the significance of genuine democracy in decision-making processes and the need for reform of political economic structures that systematically produce uneven vulnerabilities and insecurities. Given the systemic contradiction we identify and the existence of structural conditions that restrict climate change response options for some groups, adaptation to hydro-climatic change under those conditions will often be a contested and painful process that may achieve human security gains for some but also put at risk the security of others.

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