Zikos, D., and M. Roggero 2012. The patronage of thirst: exploring institutional fit on a divided Cyprus.
Ecology and Society **18**(2): 25. http://dx.doi.org/10.5751/ES-05442-180225

Research, part of a Special Feature on Nudging Evolution? Critical Exploration of the Potential and Limitations of the Concept of Institutional Fit for the Study and Adaptive Management of Social-Ecological Systems

The Patronage of Thirst: Exploring Institutional Fit on a Divided Cyprus

Dimitrios Zikos [1] *and Matteo Roggero* [2]

ABSTRACT. We explore the links between Cyprus's colonial past, divided present, and current water scarcity. With reference to the concept of fit, we tackle the question of whether we can observe fit in settings where institutions for collective action work differently than we would expect. We perform a secondary analysis of interview materials on Cyprus's water conflicts, extracting arguments for and against different solutions to water scarcity. Two perspectives on fit emerge: "island fit", which supports island-wide institutions; and "patronage fit", which embodies institutions that link Cypriots to their respective patrons Turkey and Greece. The analysis reveals a preference for island-wide institutional arrangements. However, rather than resting on biophysical considerations, such preference is linked to the feeling of unity of the two communities inhabiting Cyprus. We therefore observe institutions that face a trade-off between fitting to social groupings and fitting to biophysical circumstances.

Key Words: *Cyprus; fit; islands; social-ecological systems; water institutions; water scarcity*

INTRODUCTION

Within the institutional economics discourse, the crafting and recrafting of institutions relies on presently well studied mechanisms shaping the interaction between individual and group actors. Actors crafting institutions to live by are understood along a continuum between resource users in a harvesting situation (Ostrom 1990, Vatn 2005) and authoritative actors in a democratic decision-making context (Bromley 2006). We intend to broaden the scope of this line of inquiry and turn our attention to settings where those very same interaction mechanisms cannot be assumed to be working.

We explore institutions with reference to the concept of fit. Fit supposes certain advantages for those institutional settings that closely resemble the social and biophysical circumstances they intend to address. With the present work, we intend to provide insights concerning whether institutions crafted within "impaired" mechanisms for actor interaction do comply with fit, and, if so, in which terms. We do so with reference to water institutions on the divided island of Cyprus, where a colonial past and a long history of tensions between the ruling entities impede and outlaw the joint management of the shared water resources.

Certainly, understanding Cyprus's water institutions is per se a worthwhile endeavor, considering the severe scarcity of water faced by the island. However, the focus on this particular Mediterranean island has specific advantages for the study of fit: dealing with an island allows for an almost intuitive identification of those biophysical circumstances fit relies on, while dealing with a divided island, where not every fit is permitted, allows us to explore and further qualify the presumption of superiority of those institutional arrangements that do fit against those that do not, or that do so in different ways.

Thus the overarching research question for us to explore is the fit of those arrangements for the use and conservation of Cyprus's water. We look at these through interviews presenting local perspectives on the issue. We find that the inherent problems of these institutions do not come from a missing fit, but rather from a different fit. Two alternative perspectives on fit thus emerge from the empirical materials: island fit and patronage fit. These perspectives shed light on the preference granted to arrangements in place.

We first describe the theoretical underpinning and analytical framework of our endeavor. Then we highlight the biophysical and socioeconomic setting in Cyprus in relation to the water resource, followed by an introduction to the specifics of the Cyprus case with particular reference to the historical records on the island's division. We also describe the empirical materials we used for our analysis, and we report and discuss those perspectives on fit that emerge from the empirics. The final section of the paper presents our conclusions.

FIT AND INSTITUTIONS

Our work is based on contributions from the Albrecht Daniel Thaer Kolloquium 2010 — Towards an Integrated Study of Social-Ecological Systems, Interactions, and Dynamics: The Empirical and Conceptual Foundations of "Fit" (http://www.ecosystemservices.de/files/2010_thaer_kolloquium_themes.pdf), and is closely related to two other publications (Vatn and Vedeld 2012, Bromley 2012) that capture specific theoretical insights. Our work complements such contributions with empirical perspectives. We introduce the key arguments of the above-mentioned contributions, and invite the interested

[1]Humboldt University Berlin, Department of Agricultural Economics, Division of Resource Economics, [2]Humboldt University Berlin, Department of Agricultural Economics, Division of Environmental Governance

reader to refer directly to the papers and the authors at stake for a more detailed exposition.

In their manuscript, Vatn and Vedeld (2012) interpret Young's fit from within a "hand-and-glove" metaphor: functioning institutional arrangements can be expected to "cover" the biophysical extent of the resource they manage. Fit, understood in these terms, has an undeniably intuitive appeal. However, further exploring Young's fit from within this metaphor, and focusing on the institutional dimension of environmental regimes, Vatn and Vedeld (2012) identify several theoretical overlaps and conceptually important areas that the triad of fit–scale–interplay, as it stands, does not cover. From their critique, two points stand out as most relevant for our analysis: (1) when dealing with fit, interplay and scale are not entirely separate matters; and (2) the current conceptualization of fit does not adequately reflect motivational issues and behavioral aspects.

In Vatn's and Vedeld's view, how well "the glove fits the hand" is connected to how well the institutions at play perform in distributive terms, that is, whose interest they are protecting while shaping actor values and behavior. Yet, individuals may apply very different rationalities to the same issue, and these rationalities differ most of all in distributive terms. This means for us, that socially motivated individuals (actors also considering others' interests) will see a different fit for the same bundle of institutions than self-regarding individuals (actors considering only their own interests) would. From here, Bromley's contribution (Bromley 2012) shapes the direction of our inquiry one step further: different individuals, bearing different interests, may see not just different gloves, but also very different hands onto which the glove is supposed to fit.

Bromley's main point of criticism towards fit is that it grants a pre-ordained status to biophysical considerations. Bromley argues that fit presupposes a biophysical reality, encompassing many a "thing in itself", to which social structures may or may not fit. It is therefore useful only in the absence of competing, incompatible "imaginings" (truth-claims). The problem with environmental issues in a socially constructed world is that incompatible truth-claims are not settled upon (Bromley 2006). Instead, conflicting individuals and groups hold different views of what is out there.

This point is important because it locates our endeavor in a very specific science-philosophical area of inquiry. We deal with social-ecological systems in a socially constructed world. The concept of social-ecological systems can certainly be taken for granted in *Ecology and Society*—therefore it shall be stressed that humans are a significant component of the biophysical world, not just "users". The reference to a socially constructed biophysical world, other than what the wording may seem to suggest, does not mean that humans shape the environment to their liking. The social construction of phenomena describes an epistemological perspective on reality in which the biophysical world first of all exists in humans' perception of it (hence constructed); furthermore, it is a product of their social interaction (hence socially constructed).

We stress this for a reason. Young (2002:68-69) acknowledges that:

> *We are used to drawing a clear distinction between biogeophysical systems and social systems . . . . Increasingly, however, we are coming to the realization that humans are major (sometimes dominant) players in ecosystems dynamics [. . . and that we therefore . . .] have to endogenize the role of human actors to develop models of coupled human–natural systems to be used in efforts to create appropriate regimes.*

In light of this, pointing to the social-ecological coproduction of institutional arrangements is perhaps not the most original or fairest critique of fit. However, stressing the plurality of fits that a socially constructed biophysical world can allow for provides the issue with new and fresh analytical depth: South Cyprus's water can be one with Greece's water or one with Northern Cyprus' water, with neither of the two truth-claims being less true than the other, despite leading to different fits.

In their contribution, Vatn and Vedeld (2012) explore the implications of a socially constructed reality on the analytical boundary between fit and interplay. A duplication of their effort is not necessary. Instead, we are left with the task of determining how different individuals and groups with conflicting interests and objectives actually interact and reshape each other's socially constructed biophysical world, and determining which one of the many alternative biophysical realities will constitute the terms of reference for the fit of the institutions at stake. Bromley's contribution addresses exactly this question, thus providing a conceptualization of how individuals holding different "imaginings" of the physical reality establish a common understanding of it in order to craft shared institutions.

So far, we would expect individuals and groups to see slightly different hands while searching for appropriate gloves—the different "imaginings" of the physical reality, in Bromley's terminology. The strength of such conceptualization comes from the fact that Bromley has provided it with a dynamic element. To begin with, imaginings about the physical reality are considered as mere preferences. Secondly, individuals can express preferences only through a certain degree of collective reasoning about them. Bromley thus invites us to explore those "conversations" that produce arguments in favor of and against the different institutional options (the gloves) available to a

community, each bearing a specific set of imaginings (the hands). Let us try to characterize such conversations.

Bromley's theoretical construct, including his understanding of institutional change, is strongly tied to the intellectual area of public policy, foreseeing courts, parliaments, states, and at least some set of pre-ordained institutions that regulate the way these entities work, interact and "deliberate". Within this frame of mind, political institutions fulfill the task of capturing and integrating their constituencies' preferences and translating them into socially sanctioned choices. On this matter, Bromley focuses on the workings of courts and parliaments. In western market democracies, courts and parliaments speak "*for* and *to* the political community in their legislations, in their administrative rulings, and in their judicial decrees" (Bromley 2004:79, emphasis in the original). The exchange of arguments taking place in those courts and parliaments constitutes, in Bromley's view, the sort of "conversation" leading to reasonable options for new institutions.

Turning to Cyprus, it is not our aim to deny democracy as far as water management is concerned. However, the comparatively young democratic history of the island, together with its multifaceted relationship with British colonialism as well as with Greece and Turkey, may affect the definition of which specific constituencies ruling courts and parliaments are presently "speaking for and to". If we need to characterize the conversation that defines reasonable solutions to water scarcity, we thus may need to focus our attention on the drivers that have steered that very same conversation in the recent past. To this end, we have crafted the analytical framework shown in Fig. 1.

Fig. 1. Analytical framework. The boxes with the oblique pattern represent the objects of our research question. Links that are not explored herewith are instead grayed out.

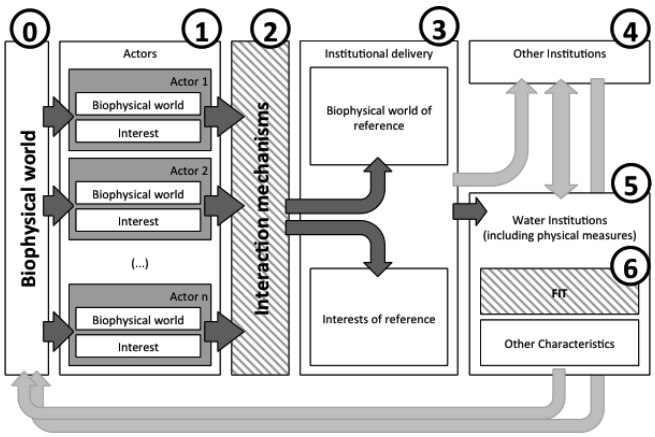


Fig. 1 links all analytical elements we derive from the contributions above. We deal with a plurality of actors (marked with the number 1), each one bearing specific interests and advocating for a specific view of the biophysical world that the institutions at stake shall fit to. All these views and interests come together through particular "interaction mechanisms" (2) which lead to institutional delivery (3) embodying one specific view on both the biophysical world and those interests worth protecting. Of all those institutions being delivered through such interactions (4), we focus here on those dealing with water (5), and more precisely with their fit (6). If fit is to affect their performance, it will affect the biophysical world (0), and with it those interests held by the different actors and their views on the physical world they live in.

Through Fig. 1, we can clarify our research question in relation to the insights provided by the scholars above. Assuming a shared understanding of the physical reality across all actors, Young (2002) fundamentally assumes a linear and unproblematic link from 0 to 6. Vatn and Vedeld (2012) put actors in the middle (1), and stress how the plurality of interests involved may lead to diverse fits in box 6 (the different "gloves"). Bromley's (2012) contribution also hinges on the diversity implied by box 1, showing that we can expect different "hands" in box 6, not just different "gloves". He furthermore stresses the role actor interaction plays in defining both hands and gloves, thus shifting the attention to box 2 in the definition of which pair of hand-plus-glove we should ultimately expect to find in 6.

Against this background, we focus on those interaction mechanisms portrayed in box 2. Here is where we believe the colonial past of the island may presently affect the way interests and ideas about the biophysical world (3) are transferred and embedded into water (5) and other (4) institutions, and thus define their fit (6). Let us rid ourselves from the assumption that courts and parliaments that define water institutions on the islands speak for and to the island's inhabitants, and thus represent a different type of interaction mechanism (2) to what Bromley would assume. Can we trace the effect of this change in the fit that we observe in 6? If so, what does it tell us about the concept of fit as we know it? The sections below provide us with clues so as to answer these questions.

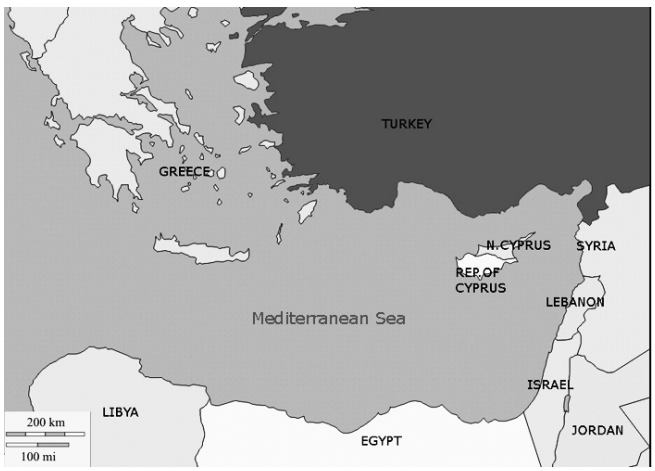
WATER SCARCITY AND THE BIOPHYSICAL CONTEXT

As pointed out above, the analytical value added of fit requires a pre-ordained understanding of what self-evident biophysical circumstances are thought to be out there. This advantage fades as soon as these understandings become contested due to their interplay with vested interests. However, by looking at "scientific"—in theory "interest-free"—accounts of the reality perceived, we may get an idea of what fit we could expect to find. Accounts of this sort, both for Cyprus and for

similar large Mediterranean islands, are plentiful (e.g., CLICO: Climate Change, Hydro-Conflicts and Human Security (http://www.clico.org/); MEDIS: Towards Sustainable Water Use on Mediterranean Islands (http://www.uni-muenster.de/Umweltforschung/medis/); AQUADAPT (http://www.ua.es/es/internacional/internacionalizacion/aquadapt/); WaterStrategyMan Project (http://environ.chemeng.ntua.gr/wsm/); ShareWater Cyprus (http://www.sharewatercyprus.net/); etc.). This section provides a synthesis of the insights they offer.

The current body of literature on Cyprus's water issues stresses the island's insular nature and its geographical location in the eastern Mediterranean basin. Located a few hundred kilometers off the Turkish, Syrian, Lebanese, and Israeli coasts, Cyprus is characterized by a hot climate with little precipitation (Fig. 2). All major Mediterranean islands (the Balearic Islands, Corsica, Sardinia, Sicily, Crete, Cyprus) present two characteristic traits: water availability is highly dependent on scarce precipitation, and (2) the socioeconomic structure relies on agriculture and tourism—two water-intensive sectors that often compete with one another for water (see Margat and Vallee 1999, Lange et al. 2005, Donta et al. 2006). The south of Cyprus represents the most water-stressed area in the European Union (EU), making water conservation a top priority of any governmental or collective action. Freshwater needs are presently met by relying on precipitation, groundwater abstraction, desalination or, more recently, by water imports (Donta et al. 2006).

Fig. 2. Map of the east Mediterranean countries.



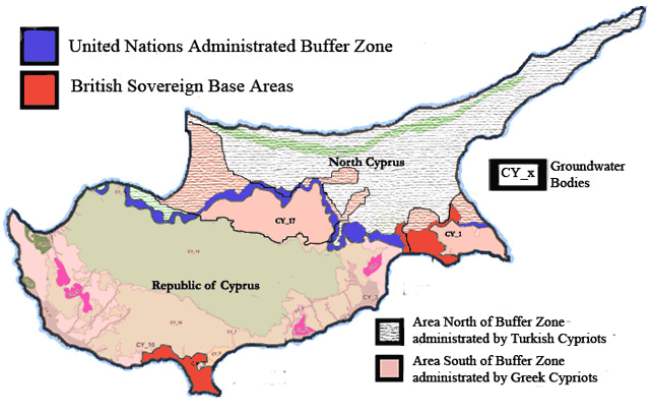
Historically, insular social-ecological systems in the Mediterranean Sea have developed a high degree of sophistication in supporting economic development despite the limited natural resources available (Ponting 1992, Patton 1996, Blondel 2006). Vogiatzakis et al. (2007) point out that human activity on the island has led to a physical environment which is highly intertwined with the social, cultural, and economic practices of the inhabitants. The long presence of humans on Cyprus (ca. 11,000 years) has resulted in the replacement of native forests by maquis, garigue, and grass communities, which in turn has shaped the pattern of agricultural development. Human interventions, such as terracing in mountainous areas, have provided arable land, soil erosion control, nutrient depletion control, and water conservation. Furthermore, the engineering of the landscape typically constituted a collective, labor-intensive "obligation" with byproducts such as stronger ties between community members and cultural interaction (Kardulias and Shutes 2007).

The major human displacement that has followed the island's division allows us to see the interconnectedness of the social-ecological system at work. Post-1974 migration has led to an increased demand for housing and employment in coastal areas, resulting in the loss of coastal ecosystems and conflicts between tourism and agriculture for water use (Vogiatzakis et al. 2007). For this reason agriculture is being gradually abandoned for tourism and hence the terraces that provided arable land are not maintained any longer (Perez Beverinotti et al. 2010). As they collapse, we can expect erosion stemming from drought-induced vegetation loss to further intensify. This is likely to decrease the enhancement of groundwater reserves during precipitation events. Besides, the geomorphological features of Cyprus's water resources deserve attention on two further accounts.

First, two of the 20 groundwater bodies on the island cross the border between the two Cypriot communities: the Center and Western Mesaoria (CY_17) and the Kokkinochoria (CY_1) groundwater basin (Fig. 3). The Center and Western Mesaoria, the island's second largest and most productive groundwater reservoir, is already characterized as extremely stressed and in constant deterioration since 1974 ("poor quantity" according to the Water Development Department of the Republic of Cyprus). The Kokkinochoria reservoir is smaller and considered to be in a "poor" state, both in terms of quantity and quality, due to degradation by urban and agricultural waste and saltwater intrusion. This reservoir is under constant pressure from increased abstraction for agriculture by both Cypriot communities.

Second, while only two reservoirs are "officially" shared, the particular geomorphology of the island and the in-island water transport infrastructure link the various river basins and water reservoirs with one another (Water Development Department 2012), which makes groundwater a single joint-impact good. This results in the exchange of significant volumes of water (Water Development Department 2012) and the fact that each encroachment on the water resource on one side of the island has an impact on the other, as several cases at a smaller scale have shown (Sorman and Zikos *in press*).

Fig. 3. The four self-administrative entities and the groundwater bodies of Cyprus. The boundaries of the shared CY_1 and CY_17 are bolded.



In recent years water has become a scarce commodity in Cyprus and it is regularly rationed, even in Nicosia, which is the largest human settlement on the island. Making the best of the little precipitation available requires the maintenance and careful use of the available infrastructure for water transport and storage, while, according to the experts interviewed, large infrastructure projects for water desalination, treatment, and/or import require most of all economies of scale if they are to be viable. Here is where we see the institutional challenge faced by the divided Cypriot community: the separation of the island constitutes an upper limit and constraint to all the available and envisioned options. At present, these mainly concern desalination plants and water transfers via tankers from Greece (to the exclusive advantage of the South) and a soon-to-be-built underground water pipe transferring freshwater from Turkey (to the exclusive advantage of the North).

The reader will find more information on these very same measures in the interview excerpts in this paper. However, the amount of detail provided so far is sufficient for only a general characterization of the water-scarcity issue in Cyprus. We deal with a drought-prone insular environment where historically grown water-conservation measures are now struggling to cope with present demographic and socioeconomic changes. Given the interconnectedness of the water resources across much of the island, any new institutional solution has to affect water users in both communities. From the theoretical perspective laid down in the previous section, we would expect both parties to interact and engage in a "conversation" in Bromley's sense of the word. That is precisely what the island's recent history makes impossible—as we will see in the next section.

COLONIAL AND DIVIDED CYPRUS

Cyprus has a long history of foreign rule and interventions. Under Ottoman rule since the 16th century, it was leased to (1878) and later annexed by the British Empire (1914) and subsequently declared a Crown colony (1925). The British found a Cypriot population of illiterate and impoverished peasants, living according to a "code of honor" conserved by tradition. They subsequently initiated a "modernization" of the country. Although this happened in an authoritarian manner (Trimikliniotis 2001), many features of present day Cypriot society emerged in this colonial period. The old institutions were transformed and adapted to the new order (Katsiaounis 1996), and the administrative structure introduced by the British still survives today.

Under the British, the Muslim landowner elite lost its privileges and influence, while a new elite of mainly orthodox Christian merchants emerged. The latter formed an embryonic bourgeoisie, which became intertwined with the British establishment. Meanwhile, intellectuals developed affinities to Athens and to Hellenic nationalism (Trimikliniotis 2001). Over the years, the British regime grew increasingly intolerant towards the Orthodox Christians, fuelling the development of Greek nationalist sentiments. The growth of Greek nationalism eventually provoked strong reactions from the Muslim population that sought support from Turkey.

In 1931 an armed insurrection against the British was violently subdued. As a consequence, the British denied any democratic participation of Cypriots in the administration until 1959 (Faustmann and Peristianis 2006). Between 1955 and 1959, Cyprus witnessed an increasing influence of Greek and Turkish diplomacy on the island's affairs (Faustmann and Peristianis 2006). Independence finally came in 1960, although Britain, Greece, and Turkey shared the responsibility for the preservation of constitutional order and the territorial integrity of the island. When a coup d'état, allegedly supported by Greece, established a military junta on the island in1974, Turkey invaded the newly installed Republic of Cyprus and occupied what is now known as "the Northern Territories" or North Cyprus.

Cyprus is now divided between the Orthodox population under the protection of Greece, and the Muslim part under direct administration by Turkey. Two further autonomous administrative entities must be accounted for: the British military bases (under UK jurisdiction), and a UN-administered buffer zone, i.e., the "Green Line" that separates the North from the South. Together, they encompass around 6% of the island. Finally, although the two "main" regions of the island are technically autonomous, their respective patron powers of Greece and Turkey retain a certain degree of indirect, latent power over the island's affairs through the various forms of "aid" that they provide to the respective communities. This

clearly puts water transfer projects under a different perspective—as the interviews later in the text will confirm.

During the political separation of the island, internal (forced) migration took place, leading to today's Greek-speaking South and Turkish-speaking North. While the South is officially recognized as the EU member Republic of Cyprus, the status of the North, under Turkish patronage, remains unclear. Turkey does not recognize the Republic of Cyprus. The rest of the world does not recognize the North despite the unilateral declaration of independence in 1983 under the name "Turkish Republic of Northern Cyprus". The North and the South co-existed for nearly 30 years, completely isolated from one another. Since the opening of the borders in 2003 the situation has changed greatly, however without involving any formal interaction between the two communities. Let us now listen to their voices and try to understand how they look at the water-scarcity problem, the currently envisioned solutions to it, and beyond.

METHODS

Our materials were derived from original research carried out between 2008 and 2010 within several projects. The EU project "GoverNat – Multi-level Governance of Natural Resources: Tools and Processes for Water and Biodiversity Governance in Europe" (2006–2010, http://www.governat.eu/) first explored the behavioral and cooperative dimensions of water governance on the island. Later on, the 2009 project "The Cypriot Natural Resources as a Common Space", supported by the Peace Research Institute (PRIO)—Cyprus Centre (http://www.prio.no/Programmes/Programme/?x=14), explored the implications of the previous findings for the ongoing reunification and reconciliation process. Both projects were grounded in Ostrom's work on common pool resources (Ostrom 1990, 2007), on the role of trust between users for the success of natural resource management (Ostrom 2005), and on needs-based approaches to resource use (Max-Neef 1991, Wolf 2007). Findings are available through several publications (see Zikos et al. 2009, Papasozomenou and Zikos 2009, Zikos et al. 2010, Zikos and Sorman *personal observation*; Sorman and Zikos *in press*).

As a byproduct, both projects have provided us with rich empirical materials on the link between Cyprus's political situation and water: semistructured, open-ended interviews with representatives of the administration, academics and researchers, technicians and practitioners in the water sector, water users, NGOs, and international actors were carried out during several field trips (March 2008, October 2008, March 2009, October 2009). Thirty-three interviews were carried out both in the North (11) and in the South (22, including 6 interviewees from international organizations). Here we carry out a secondary analysis of these materials.

The interview guidelines focused on: (1) the actual and prospective condition of the water resource, (2) relevant experiences with it, (3) drivers and impacts of the present water scarcity, (4) possible solutions, (5) possibilities of cooperation between North and South, and (6) conflicts within and between different user groups (e.g., tourism vs. agriculture). The interviews vary in length from 20 minutes to 3 hours (averaging roughly 1 hour).

The interview guidelines did not focus on fit. This allowed interviewees to frame the issues at the scope of their linking (e.g.: Greek–Turkish relations, Cyprus as a whole, North/South Cyprus, within the boundaries of the municipality, within those of the irrigation infrastructure, etc.). By focusing on the water-scarcity problem and the conflicts it generates, the interviewees brought fit-relevant arguments forward, which we have extracted—the whole list can be found in Appendix 1. These arguments allow us to characterize the fit between the water-scarcity problem and the solutions currently under discussions from the perspective of the Cypriots. This allows us to approach the socially constructed dimension of institutional fit.

Before turning to the results of our observations and analysis, let us qualify our approach in relation to the materials available to us. The most important point for the reader to bear in mind is that this analysis has an exploratory character, due to the small number of interviewees, the semistructured, open-ended interview design and the fact that fit was not specifically targeted as an interview subject. Here, it is our personal judgment that it is plausible, based on what we know about the case, to talk about "the Cypriots" and their common and diverse positions concerning the fit of their water institutions. Although our data do not allow for generalizations, in terms of statistical presumptions, we find them to be sufficiently consistent to support the beginnings of a discussion, which is our exploratory aim here.

The data upon which we draw can be understood as an indicative sample of the positions of various actors involved in what we may call (following Bromley) the "conversation" concerning the island's water institutions. Setting our unit of analysis at the level of the arguments used by our interviewees, we proceed to consider their positions more or less at face value, with a minimal amount of implicit knowledge concerning why they have taken this position. The following quote may serve as an example:

> *We have exactly the same problems: the water from the well becomes more and more salty. It makes sense as the water from our wells comes from the same reservoir, I assume. If this fence was not between us things could be improved and we could work together on the problem somehow.*

(An Elderly farmer, South. Translated from Cypriot-Greek, see Appendix 2.)

This interviewee brings up a chain of arguments according to which (1) the wells at both sides of the green line tap into the same groundwater basin; (2) the saltwater intrusion problem is therefore common to both sides; and (3) the cooperation is not possible, even though (4) there is a willingness, among farmers on both sides, to cooperate. For this characterization, a common-sense interpretation of its content is sufficient to our requirements.

We have extracted such arguments as the building blocks of the reasoning proposed by our interviewees. With reference to the list in Appendix 1, the arguments appearing in the quote above are: shared, island-wide hydrology/groundwater (Env12); (2) salt intrusion in groundwater reservoirs (Env11); (3) formal North-South cooperation illegal/impossible (Law01); and 04) citizens of North and South cooperate on environmental issues at individual level (CnP08). Following this procedure, we can produce an inductive coding of the interview materials and search for emerging, fit-relevant patterns, which we do in the following section.

RESULTS

The interviewees presented us with two distinct perspectives on the fit of water institutions on the island. We labeled them through the headers of "island fit" and "patronage fit" that were anticipated in the introduction. The first is the one both Northern and Southern interviewees describe as their own, foreseeing island-wide institutions for the management of water resources and acknowledging the insular nature of their biophysical world. The latter is instead the product of the separation process and of the role that Greece and Turkey play in today's Cyprus: a perspective where the Republic of Cyprus has Greece as a patron, while Turkey is the direct role model for Northern Cyprus. Under the separation perspective, those institutions dealing with water, including those solutions to the current water-scarcity problem, should fit the two separated Cypriot communities as extensions of their respective patron's territories.

At this point, it is important to stress the following—despite the absence of a focus on fit, almost all interviewees believe that: (1) current water management institutions take a certain scalar point of reference (i.e., the divided parts of the island), and (2) choice of scale causes institutions to perform poorly in addressing water scarcity. In Young's (2002) terminology, that would qualify as a "misfit". Interviewees, instead, see the whole island as the correct scale for water institutions, thus endorsing island fit. Nonetheless, they are aware of the "different fit" that present institutions effectively comply to: they fit the two halves of Cyprus as extensions of Greece and Turkey respectively, and craft solutions to water scarcity accordingly—water institutions therefore comply with patronage fit.

Disregarding the very existence of the other half is an important aspect of the patronage fit logic. The following quote makes this point clear:

> *Importing water from Greece and Turkey just reinforces the established situation and reproduces the litany: our protectors and saviors are the Greeks, their protectors and saviors are the Turks. Greeks and Turks are here to protect us from each other. And within this protectorate status they provide us with water. If this chain is to somehow break then different alternatives will come up. It is "us" together and "them" becomes all other non-Cypriots. In such a frame of true sovereignty other options may appear. For example why not even explore the possibility of importing water from Lebanon, Syria, or Israel? If it is more profitable for the island why not? However under the current situation, this is a scenario not even worthy to be explored.*
> (An Administration representative, South. Translated from original Greek, see Appendix 2.)

The interviewee stresses that the range of official options is limited to patron-dependent solutions (Tech05), and that water transfers increase patronage/dependency (CnP06). Other passages in the interview materials stress, moreover, that dependency upon a patron is not acceptable to the respective other community (CnP05), so that water imports from patrons make reunification processes more difficult. Interestingly, two interviewees point at the following argument, that the Turkey–North Cyprus water pipeline under consideration is only viable if shared with the rest of the island (Tech04), but:

> *[the South will rather] die from thirst than get water from Turkey that does not even recognize us as a country.*
> (A Researcher, South. Translated from original Cypriot-Greek, see Appendix 2.)

Given that, the pipeline and the water it carries are subsidized by Turkey, water dependency becomes financial dependency, and patronage is strengthened by financial dependency (CnP13).

The "pipeline argument" sheds further light on the dynamics behind the patronage fit perspective. An interviewee reports that:

> *Pharaonic works like the undersea pipeline from Turkey are constantly on the table although plans have not proven to be feasible.*
> (An Engineer, North Cyprus. Original English.)

Indeed, various reports and announcements foresee these pieces of infrastructure to become operational within the next few years (Elkiran and Ergil 2006). Similar arguments are brought up for the corresponding measures in the South.

Interviewees stress that water transfers via tankers from Greece are not sufficient (Tech18), but rather suggest desalination plants as a solution (Tech06). However, desalination does not solve the problem (Tech07). Besides the problems integral to desalination (Tech08, Tech12, Tech14, see Appendix 1), energy-intensive desalination plants make water dependent on energy (Tech 13) which is another scarce resource on Cyprus, thus increasing the role of patronage (Tech09) via energy imports. Together with water imports via tankers or water pipes, desalination can be understood to support a strong patronage fit.

Patronage however, is generally not well seen by the interviewees (CnP07). They maintain, instead, that North and South Cypriots get along well on a personal basis (CnP01) and cooperate willingly on environmental issues at an individual level (CnP08). The reasons they bring this up are, for example, that the island's environment is an integrated whole (Env04), that ecosystems are interlinked (Env07), and that, in particular, water affects all other resources (Env15). Water infrastructure requires cooperation between the North and the South (Tech02), but formal cooperation between the two communities is formally illegal (Law01). Informal cooperation does take place, but it lacks legal backing (Law05). Of course, the absence of a legal framework makes cooperation efforts difficult (Law06) despite its argued potential.

All these arguments indicate a strong understanding and support among our interviewees of the island fit perspective, which would be served by creating water institutions that take the island as the reference point and not the two communities separately. This raises the question as to why patronage fit persists and seems to dominate the water issue. Interviewees stress that politicians in both the North and the South are not willing to cooperate on water issues (CnP09). This is because the political leadership on the island is bound to the patrons Turkey and Greece (CnP02), and Turkish and Greek relations are stuck to where they were in 1974 (CnP03). Because water and environmental issues do not belong to the 1974 scenario (CnP04), they have no connection with the raison d'être of the heads of the two communities. This can be understood to have locked Cyprus into patronage fit for water and environmental institutions.

This interviewee brings this line of argument to the point:

> *One of the most important changes is the availability of natural resources necessary for the socioeconomic development and the well-being of all Cypriots. This is a new variable in the problem . . . . It is like the time stopped in 1974 and it just started ticking again a few years ago. The risk now is that a solution may be found dealing with the problems of the 60s and 70s while those problems have meanwhile been replaced by others. So it is like the politicians are looking for the correct answers to problems that are no longer applicable.*
> (A Researcher, South. Translated from the original Greek, see Appendix 2.)

A parallel line of argument explaining the persistence of the particular kind of fit in the island's water institutions focuses on the conflict between agriculture and tourism. It is argued that agriculture consumes the most water by far (AvsT05), while tourism is considered to be the driver of the economy (AvsT20). Respondents observe that official institutions allegedly favor tourism at the costs of agriculture (AvsT14) because having economic sectors divided strengthens the role of the patrons as providers of scarce and competed-for goods. Similar to this "divide et impera" type of logic, it is claimed that farmers save water by cooperating (AvsT07) but the separation holds back this type of cooperation (AvsT08). With the present institutional misfit, illegal groundwater abstraction is out of control (AvsT09), leading to increased groundwater salinity, which harms agriculture (AvsT10) and possibly contributes to the retreat from agriculture in favor of tourism-oriented landscape development.

Interestingly, we do not observe a polarization of positions concerning the political lock-in of the patronage fit perspective. Interviewees agree that this persists as a function of the detachment of the island's political elites from the sentiments of the citizens concerning the separation. Controlling for differences in socioeconomic group (research, administration and politics, agriculture, tourism, other) or for community (North, South) does not significantly alter the thrust of arguments brought forward on this point, thus returning to narratives that are basically no different from what we have reported here so far. This can be seen in Appendix 1.

DISCUSSION

It is sufficiently clear that interviewees—with reference to our analytical framework—identify the Greek–Turkish influence over the island as a strong driver within those interaction mechanisms determining whose interests shall be protected by water institutions. In the light of this, what do we know about the fit of water institutions on Cyprus under the influence of the Greek and Turkish patrons? Asking ourselves whether fit has anything to explain on the issue, we observe that the interviews have the concept of fit at their very core, and explicitly so. This shows that our interviewees fundamentally endorse what Young (2002) has suggested: that institutions need to fit to specific biophysical circumstances in order to successfully function. In their view, current institutions fail because they do not take the whole island as a term of reference.

By looking at how interviewees characterize solutions for water scarcity, we find that actors from North and South do not deny being interdependent with respect to water. This is their way of linking water management institutions to the

island scale, defining those specific features that water management should have in order to comply to the island fit they endorse. However, they also never fail to stress that they belong together, because they largely see themselves as one community, even if they speak two different languages and belong to two different religions. Being one community, they argue that they ought to share their most important institutions —such as those protecting water.

Our interviewees believe that institutions ought to fit to biophysical circumstances as much as they ought to fit to social groupings. Here we have started with a concept of fit where institutions as social structures adapt to physical circumstances and have encountered an alternative perspective on fit where institutions face choices so as to adapt to mutually exclusive social structures, each implying its own (socially constructed) biophysical circumstances.

The interviews also confirm that current water institutions can hardly be seen as the direct expression of what Cypriots see fit. Institutional economics would assume institutions to: (1) be consistent with those preferences that a constituency holds regarding which and whose interests to protect in given situations, and (2) adapt so as to stretch and cover those biophysical circumstances affecting such interests. Constituencies on both parts of the island seem to endorse water institutions that take the island as a scale of reference (island fit). Instead, we find institutions that are the product of the influence of Turkey and Greece over Cypriot affairs, thus complying with patronage fit. This state of things shows a high degree of continuity with the colonial history of the island and is thus highly plausible. Therefore, the first insight we derive from our exploration is that institutions do fit, but do so from within those pre-ordained power structures in which the Cypriots are caught and for which they can hardly be held accountable.

At this point, we would restrain from a judgment about whether dependence on Greece and Turkey is actually good for Cypriots or not—given that it is conducive to patronage fit, with all that means for water institutions in a situation of severe water scarcity. Our interviewees have so far brought forward a sufficient number of qualified and insightful arguments on the matter. We will follow a different path instead and sharpen our previous question on fit under specific interaction mechanisms. We ask: is there anything we can learn from fit in colonial and/or post-colonial settings, or more generally in settings where democratic institutions for collective action work differently than we would expect them to?

Herewith we try to carefully generalize our Cyprus findings to similar “colonially affected” settings. If this case was by any means representative, we could generalize from it that the colonial twist to an otherwise linear rollout of “democratic” public-choice mechanisms changes the terms of reference for fit but—and here is the insight—it does not invalidate its logic altogether. Indeed, (1) the intuitive appeal of the concept is so strong that it permeates the entirety of the interview materials, despite the interview guidelines making no reference to it at all; and (2) current water institutions do fit very effectively, albeit within a patronage fit perspective.

On the other hand, our analytical set up is so strongly reliant on social construction, cognition, and discourse that it may have overshadowed and oversimplified the consequences of colonialism for the setting under scrutiny. In other words, we are working with analytical tools that are very sensitive to the interviewees' framing of the issue in colonialist terms, but who have, for example, no sensitivity for the diplomatic dimension of the whole phenomenon, for legal issues, or for the overall set of obligations between the nations at stake. Our analysis is limited in scope in that it is narrowly focused on fit within stakeholder perceptions, leaving out other avenues of inquiry that may link water institutions and fit in “nondemocratic” settings.

CONCLUSIONS

We have explored the link between Cyprus's political division and its water institutions. We have done so with reference to the concept of fit, building upon the insights offered by Young (2002, 2008), but as framed by Vatn and Vedeld (2012) and Bromley (2012). They sketch fit as the matching of institutions and biophysical circumstances, as a glove fits a hand. From that perspective, they move on to explore the possibility of different “gloves” for the same “hand”, as well as to question the uniqueness and pre-ordained character of that “hand”.

Relying on their contributions, we have investigated which arguments underpin the fit of those institutions dealing with water and offering solutions to the problem of water scarcity on the island. We have done so via a secondary analysis of interview materials from several research projects dealing with water conflicts on the island of Cyprus. From a bundle of 33 semistructured, open-ended interviews, we have extracted arguments that interviewees brought forward while explaining the current water-scarcity problem.

Despite the absence of a focus on fit in the original interview guidelines, interviewees share the belief that current institutions take a certain scale as a point of reference, and that the choice of scale turns out to be problematic. More specifically, two perspectives on fit emerge from the interview materials: island fit and patronage fit. The former takes the island as a reference, while the latter sees the two halves of the island as extensions of the respective Greek and Turkish territories. Although interviewees have a preference for the first, they provide explanations for the persistence of the latter too.

The arrangement deemed superior, island fit, matches with the most intuitive biophysical circumstance for the case: water should be managed by island-wide institutions. It is however not implemented in practice because current institutions

provide solutions to water scarcity that perpetrate and strengthen the patronage of Greece and Turkey over Cyprus. In the eyes of the interviewees, these institutions represent a very effective patronage fit, rather than a missing fit. Both notions ultimately co-exist: if the dividing fence was not there, the entire population could work together in harmony, sharing water institutions that fit the island as a whole. However, the fence is there and it is there for reasons that lie beyond the citizens' choices and power, forcing the existence of institutions that fit a very different view of the problem.

The analysis of the arguments presented by our interviewees reveals a deeper meaning to the superiority of island fit over patronage fit. The choice of the island scale is deeply intertwined with the feeling of unity of two communities that have traditionally inhabited Cyprus together, the Turkish-speaking Islamic population and the Greek-speaking Christian Orthodox population. This clearly illustrates the claim put forward by Vatn and Vedeld (2012) and by Bromley (2012) in their respective contributions: that we cannot presume a pre-ordained status for the biophysical circumstances to which institutions are supposed to fit, forcing a subsequent adaptation of social structures. Instead, the two dimensions (social and biophysical) go not only hand in glove but also hand in hand.

Responses to this article can be read online at:
http://www.ecologyandsociety.org/issues/responses.php/5442

Acknowledgments:

Part of this research was supported financially by the European Union (European Commission, Marie Curie RTN GoverNat, contract No. 0035536, www.governat.eu) and from the project "Sharing Water and Environmental Values: Peace Construction efforts in Cyprus", funded by the International Catalan Institute for Peace (ICIP) and the Agency for Management of University and Research Grants of Catalonia (AGAUR). The authors are indebted to Katherine N. Farrell, Andreas Thiel, and the two anonymous reviewers for their precious comments on earlier drafts of this work. We would also like to express our gratitude to Ourania Papasozomenou and Alevgül Sorman for their active help in gathering the empiric materials, and to the Peace Research Institute of Oslo —Cyprus Centre for supporting the projects that have made the interviews possible. Finally, we would like to thank all the interviewees for sharing their knowledge and insights in sometimes very difficult and risky situations.

LITERATURE CITED

Blondel, J. 2006. The 'design' of Mediterranean landscapes: a millennial story of humans and ecological systems during the historic period. *Human Ecology* 34(5):713-729.

Bromley, D. W. 2004. Reconsidering environmental policy: prescriptive consequentialism and volitional pragmatism. *Environmental and Resource Economics* 28:73-99. http://dx.doi.org/10.1023/B:EARE.0000023821.33379.b7

Bromley, D. W. 2006. *Sufficient reason: volitional pragmatism and the meaning of economic institutions*. Princeton University Press, Princeton, New Jersey, USA.

Bromley, D. W. 2012. Environmental governance as stochastic belief updating: crafting rules to live by. Ecology and Society 17(3): 14. http://dx.doi.org/10.5751/ES-04774-170314

Donta, A. A., M. A. Lange, and A. Herrmann. 2006. Water on Mediterranean islands: current conditions and prospects for sustainable management. *ZUFO-Reports*, Vol. 5. Center for Environmental Research, University of Münster, Germany.

Elkiran, G., and M. Ergil. 2006. The assessment of a water budget of North Cyprus. *Building and Environment* 41:1671-1677. http://dx.doi.org/10.1016/j.buildenv.2005.06.014

Faustmann, H., and N. Peristianis, editors. 2006. *Britain in Cyprus: colonialism and post-colonialism 1878–2006.* Bibliopolis, Mannheim, Germany.

Kardulias, N. P., and M. T. Shutes. 2007. *Aegean strategies: studies of culture and environment on the European fringe (Greek studies).* Rowman & Littlefield Publishers, USA.

Katsiaounis, R. 1996. *Labour, society and politics in Cyprus during the second half of the nineteenth century*. Cyprus Research Centre, Nicosia, Cyprus.

Lange, M. A., D. Poszig, and A. Herrmann. 2005. Water on Mediterranean islands: advanced study SUSTAINIS. *ZUFO-Report* Vol. 4. Center for Environmental Research, University of Münster, Germany.

Margat, J., and D. Vallee. 1999. *Water resources and uses in the Mediterranean countries: figures and facts*. Blue Plan – Regional Activity Centre, Sophia Antipolis, France.

Max-Neef, M. 1991. *Human scale development: conception, application and further reflections.* Apex Press, London, New York, USA.

Ostrom, E. 1990. *Governing the commons*, Cambridge University Press, Cambridge, UK.

Ostrom, E. 2005. *Understanding institutional diversity.* Princeton University Press, Princeton, New Jersey, USA.

Ostrom, E. 2007. Institutional rational choice: an assessment of the institutional analysis and development framework. Pages 21–64 *in* P. Sabatier, editor. *Theories of the policy Process*. Westview Press, Boulder, Colorado, USA.

Papasozomenou, R., and D. Zikos. 2009. Linking perceptions and water management: reflections from Cyprus. *Transactions on Environment and Development* 12(5):749-758.

Patton, M. 1996. *Islands in time: island sociogeography and Mediterranean prehistory*. Rouledge, New York, USA. http://dx.doi.org/10.4324/9780203433331

Perez Beverinotti, D., E. Buhman, and E. Pietsch. 2010. Potential landscape architecture contributions toward a more sustainable water management on the island of Gozo, Malta. *A|Z ITU Journal of the Faculty of Architecture* 7(2):21-34.

Ponting, C. 1992. *A green history of the world: the environment and the collapse of great civilizations*. St. Martin's Press, New York, USA.

Sorman, A., and D. Zikos. *In pres*s. Cyprus: does water recognise borders? *In* P. Antunes et al., editors. *Methods and tools for environmental appraisal and policy formulation*. New University of Lisbon, Portugal.

Trimikliniotis, N. 2001. Europeanisation and modernisation: locating Cyprus in the southern European context. *The Cyprus Review* 13(2):47-74.

Wolf, A. 2007. Shared waters: conflict and cooperation. *Annual Review of Environmental Resources 2007* 32:241–69. http://dx.doi.org/10.1146/annurev.energy.32.041006.101434

Vatn, A. 2005. *Institutions and the environment*. Edward Elgar, Cheltenham, UK.

Vatn, A., and P. Vedeld. 2012. Fit, interplay, and scale: a diagnosis. Ecology and Society 17(4): 12. http://dx.doi.org/10.5751/ES-05022-170412.

Vogiatzakis, I. N., G. Pungetti, and A. M. Mannion. 2007. *Mediterranean island landscapes: natural and cultural approaches*. Springer, Dordrecht, Netherlands.

Water Development Department. 2012. *Ground water bodies of Cyprus*. Ministry of Agriculture, Republic of Cyprus. [online] URL: http://www.moa.gov.cy/moa/wdd/Wdd.nsf/resources_en/resources_en.

Young, O. R. 2002. *The institutional dimension of environmental change: fit, interplay, and scale.* The MIT Press, Cambridge, Massachusetts, USA.

Young, O. R. 2008. Institutions and environmental change: the scientific legacy of a decade of IDGEC research. Pages 3-45 *in* O. R. Young, L. A. King, and H. Schroeder, editors. *Institutions and environmental change: principal findings, applications and research frontiers*. The MIT Press, Cambridge, Massachusetts, USA.

Zikos, D., T. Kluvánková-Oravská, and L. Sláviková. 2010. Policy experiments on common pool resources: innovative tools providing multi-dimensional insights. Experiences from three new EU member states. Pages 107-127 *in* T. Kluvánková-Oravská et al., editors. *From government to governance? Multilevel governance for water and biodiversity. The perspective of central and eastern Europe*. Alfa Printing s.r.o, Bratislava, Slovakia.

Zikos, D., F. Rauschmayer, and A. Sorman. 2009. Participation, conflict and cooperation over water resources: experimenting in Cyprus. *European Society of Ecological Economics Conference*, 29 June – 2 July 2009, Ljubljana, Slovenia.

Appendix 1. Appendix Table: Arguments extracted from the interviews. Numbers in parentheses indicate the number of interviews presenting the argument at stake. They correspond to the different groups Research/Administration/ Agriculture/ Tourism/Other, respectively (independently of which community, North or South). The numbers preceded by "N:" and "S:" correspond to the number of interviews presenting the argument at stake by the North and South interviewees, respectively (independently of which group).

Please click here to download file 'appendix1.xls'.

APPENDIX 2: Original quotations from the interviews when not in English

In the following we present the quoted parts of the conducted interviews in the original language.

An Elderly Farmer, South, Cypriot-Greek

Έντζιαι, εν τα ίδιαν ακριβώς προβλήματα που έχουμεν: το νερό που το Πηγάδι αρμυρίζει ούλλο τζιαι περίτου. Χαρκούμαι εν λογικό, αφόσουν το νερό το πηαδίσκιο εν που τον ίδιο τον τόπο που έρκεται. Αν δεν ήτουν τούντα ττέλλια, τα συρματομπλέγματα, μεταξύ μας ήταν να'τουν καλύττερα τα πράματα τζιαι ήτουν να εβρίσκαμεν μαζί μια λύση για τούντο πρόβλημα.

An Administration Representative, South, Greek

Η εισαγωγή νερού από Ελλάδα και Τουρκία απλά ενισχύει την υπάρχουσα κατάσταση και αναπαράγει το παραμύθι: οι προστάτες μας, οι σωτήρες μας, είναι οι Έλληνες. Οι δικοί τους προστάτες και σωτήρες είναι οι Τούρκοι. Έλληνες και Τούρκοι είναι εδώ για να μας προστατέψουν από τους εαυτούς μας. Και μέσα στα πλαίσια ενός καθεστώτος προτεκτοράτου, θα μας δώσουν και νερό. Αν κάπως αυτή η αλυσίδα σπάσει, τότε θα παρουσιαστούν και εναλλακτικές. Τότε το «εμείς» θα γίνει όλοι οι Κυπριοι και το «αυτοί» θα είναι οι μη Κύπριοι, 'Ελληνες ή Τούρκοι δεν έχει σημασία. Σε ένα τέτοιο πλαίσιο Πραγματικής εθνικής κυριαρχίας, θα δούμε κι άλλες εναλλακτικές. Για παράδειγμα γιατί να μην ερευνήσουμε έστω την πιθανότητα εισαγωγής νερού από το Ισραήλ ή τον Λίβανο; Αν αυτό είναι για το καλό του όλου νησιού, γιατί όχι; Δυστυχώς στην παρούσα τέτοια σενάρια θεωρούνται ανάξια λόγου»

A Researcher, South, Cypriot-Greek

(στον νότο) ο κόσμος προτιμά να πεθάνει που την δίψα παρά να πκιάσει νερό που την Τουρκία που εν μας αναγνωρίζει πιλέ μου σαν χώρα.

A Researcher, South, Greek

Μια απ'ο τις σημαντικότερες αλλαγές αφορά στην διαθεσιμότητα των φυσικών πόρων, απαραίτητων για την κοινωνικοοικονομική ανάπυξη και ευημερία όλων των Κυπρίων. Αυτή αποτελεί μια νέα μεταβλητή στο όλο Κυπριακό. Ώρες ώρες μοιάζει σαν να σταμάτησε ο χρόνος το 1974 και το ρολόι να ξανάρχισε να χτυπά ξανά τα τελευταία χρόνια. Ο κίνδυνος είναι να βρούμε μια λύση που όντως θα λύσει τα προβλήματα του 60 και του 70, μόνο που τα προβλήματα αυτά έχουν στο μεταξύ αντικατασταθεί από άλλα. Είναι κατά κάποιο τρόπο σαν να προσπαθούν οι πολιτικοί να δώσουν τις σωστές απαντήσεις αλλά σε προβλήματα που δεν υπάρχουν πια.