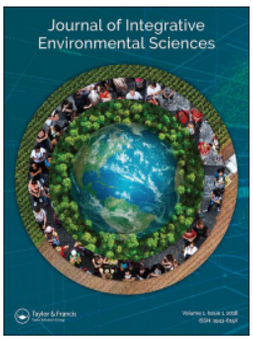

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Rethinking the urban Nexus - Resilience and vulnerability at the urban Nexus of Water, Energy and Food (WEF). An introduction to the special issue

With over half the world's population now living in cities, urban resilience has become a leading global challenge as can be seen in the Sustainable Development Goals and the New Urban Agenda (Artioli et al., 2017; Barnett and Parnell 2016). Cities are complex networked spaces where access to key services is often unevenly distributed among city dwellers, as are the impacts of urban environmental risks (Romero-Lankao et al. 2018). In the light of projected climate change impacts, resource constraints and growing populations, the provision of basic services and commodities such as food, water and energy is increasingly problematic for many cities. The interactions between water, energy, food and environment within cities (i.e. the urban "Nexus" of WEF) are seen as key for the development of sustainable and resilient cities (Terrapon-Pfaff et al. 2018). Yet these flows and interactions are poorly understood due to the sectoral approaches to water, energy, food and waste services often taken in most cities.

Much of the current discussion in academic and policy circles on urban sustainability and resilience, as seen through the frame of the "urban Nexus" of WEF, focuses on building the resilience of urban systems through integrative cross-sectoral initiatives. Such an emphasis on the (mainly physical) system-level resilience by State and private sector actors in response to perceived WEF resource insecurities may result in a neglect of the (social) vulnerabilities at the household or user level, especially in poorer and marginalized communities (Stirling 2014; Williams et al. 2018; Mguni et al. 2020). But not only the vulnerabilities are neglected in this frame. Everyday practices around the WEF Nexus such as cooking, heating and waste-recycling may also constitute resilience-building even when they are disconnected from city-level policies. Hence, understanding the way in which the flows of water, energy, food and wastes intersect within cities through everyday practices, is important for understanding vulnerabilities as well as creating solutions that foster urban sustainability and resilience across all scales (Swatuk and Cash 2018; Foden et al. 2019). Such social, everyday life understandings of the Nexus are beginning to emerge from the social and political sciences as critical studies (Pahl-Wostl et al. 2018; Wiegleb and Bruns 2018) especially as fine-grained case studies from the Global South.

The neglect of socially constructed vulnerabilities by contemporary physical resilience approaches presents an opportunity for seeking ways of linking up resilience policy instruments with user practices and providers of basic services (Mguni et al. 2020). Such junctures could give insights into how the governance of service provision at the urban Nexus can be approached in order to meet overall resilience objectives, whilst addressing the vulnerabilities experienced by marginalized urban communities and households.

Viewing the urban Nexus from the bottom – The Resilience and Vulnerability at the urban Nexus of water, energy, food and the environment (ResNexus) project (2016–2018).

This Special Issue comes as a result of the ResNexus project; a three-country study focussing on expanding a social science understanding of the urban Nexus in the developing and transitional cities of Kampala (Uganda), Guarulhos (Brazil) and Sofia (Bulgaria). Jointly funded by the NWO (Netherlands), FAPESP (Brazil) and ESRI (UK), the project brought together three groups of researchers on a mission to complement existing knowledge about the urban Nexus with a comparative view of the urban Nexus from the local-level, i.e. looking at the urban WEF Nexus (dis)connections in the day-to-day lives of vulnerable and marginalized communities in the three cities.

Using a social practices approach to the Nexus, as well as participatory vision-building, the ResNexus project mapped the emergent vulnerabilities in poor communities within the three cities thus giving a granular bottom-up view to the urban WEF Nexus. Such a view is essential for understanding the governance aspects and implications of the urban Nexus for the world's marginalized populations (Stirling 2014; Allouche et al. 2015; Dodds and Bartram 2016; Swatuk and Cash 2018). Social practices approaches to the Nexus are indeed gaining ground especially in studies that seek to link seemingly mundane WEF resource consumption activities at household-level with urban policy-making and resilience-building processes (Foden et al. 2019; Mguni et al. 2020). Ultimately, a social practices approach to the urban WEF Nexus should contribute to further deepen understanding within the burgeoning sub-field of nexus governance.

In Kampala, the ResNexus project examined how vulnerabilities at the urban WEF Nexus emerge by looking at the cooking practices of families in informal settlements (Mguni et al. 2020). In Guarulhos, emergent nexus (dis)connections were examined from a public health perspective looking at the challenges of food and clean water provisioning in a community fighting trends of diminishing access to affordable and healthy food (Giatti et al. 2019a; Giatti 2019b). Finally, in Sofia, the ResNexus project examined the vulnerabilities to food insecurity and fuel poverty faced by the urban poor who depend on zimnina-making[1] as an essential food source to survive the harsh winter months that are increasingly characterized by energy poverty (Hiteva 2019).[2]

In all three cases, the urban WEF Nexus at the household scale was found to be characterized by contingent and indeterminate logics of provisioning and consumption on a day-to-day basis for poor households. For the urban poor, both vulnerability and resilience at the WEF Nexus are dynamic and emergent properties (Faulkner et al. 2018) which are a result of "[…] intertwined social practices predicated upon particularly volatile, variegated and non-discretionary configurations of consumption, lifestyles and systems of provisioning" (Mguni et al. 2020, p. 8). By concentrating on understanding the continuous struggle that households face to access and consume water, energy and food, the cases contributed to the move beyond the "integrative imaginary" (Cairns and Krzywoszynska 2016:166; Gevelt 2020) that underpins many Nexus academic and policy discourses, towards a more granular understanding of how WEF Nexus management interferes with the practices in households and communities. As such, the cases also contributed to an expanded understanding of the Nexus' place in urban resilience-building and sustainability agendas.

Contributions

This Special Issue of the Journal of Integrative Environmental Sciences brings together three papers that focus on giving a view into the (dis)connections and interventions between WEF resource flows, infrastructures, institutions and people in cities as well as contributing to the continued improvement of the conceptualizations of aspects of the urban WEF Nexus debate. All

three contributions were first presented as part of the "Rethinking Resilience and Vulnerability at the Urban Nexus of Water-Energy-Food Conference" which took place in Wageningen in October 2018. The Conference brought together academics, policymakers, urban planners and water, food, energy and environment practitioners in civil society.

Covarrubias and Boas (2019) take a food-centred perspective to the urban WEF nexus as they examine the nascent making of the sustainable food city in Barcelona, highlighting that food is an often-neglected aspect of the urban Nexus as well as urban sustainability and resilience-building programs. They take their departure point from Barcelona's subscription to the "proximity food" idea (Spaargaren et al., 2012) as a pathway for achieving aspirations towards sustainable food provisioning and the reduction of accompanying trade-offs with water and energy, i.e. virtual water and food miles, respectively. To investigate the work and challenges confronting actors in Barcelona's food system, the authors use a "networks and flows" conceptualization (Castells, 2009) to analyse the emergent horizontal character of the governance of food in Barcelona. They find that the way Barcelona's sustainable food system is currently "coded" excludes the water and energy dimensions involved in proximity food and as such, contrariwise, the vision for a sustainable food city in turn is missing a nexus perspective to its framing. They conclude that in seeking to make cities more sustainable via concepts such as proximity food, city managers need to move beyond the idea of water and energy as mere inputs for resource (food) production towards seeking physical and social connections to water and energy flows all along the food system.

The contribution by Urbinatti et al. (2020) further extends along this direction towards the issue of "nexus governance". The "governance" aspect in the Nexus debate remains underdeveloped, and as a result leaves the WEF Nexus debate without concrete implementation recommendations (Al-Saidi and Elagib 2017; Pahl-Wostl et al. 2018). Urbinatti et al. (2020) grapple with the nebulous character of "nexus governance" by executing a review of social scientific literature on the WEF Nexus and on governance. Using Social Network Analysis and Discourse Analysis, the authors investigate the conceptual basis of the nexus governance debate and search for normative principles within the literature that could help further conceptualize "nexus governance". They identify the main groups of nexus governance conceptualizations that are most prevalent in literature and call for a more robust conceptualization of nexus governance by further identifying three gaps within existing conceptualizations of nexus governance. These are namely (1) the lack of sufficiently deep theoretical grounding to clarify what nexus governance entails as existing conceptualizations remain diffuse; (2) the lack of participatory approaches which could further inform nexus governance; and (3) the need for critical approaches to the WEF nexus which problematize the Nexus debate and the techno-managerial elite circles within which it is still largely confined.

The analysis by Granero de Melo et al. (2020), rounds off the special section by delving into a critical and territorial analysis of the impacts of Brazil's Agrarian Reform policies from a WEF Nexus perspective. Taking a social justice departure point, the authors use a literature review, observations and interviews to trace the struggles of a community resettled in the Agricultural Reform Area of Sepé Tiaraju. Taking a territorial perspective to the WEF Nexus allowed Granero de Melo et al. (2020) a unique opportunity to position the Nexus as spatiotemporally entwined in socially constructed spaces where a vulnerable (and stigmatized) community works through various strategies for recognition, collaboration and provision of WEF on the peri-urban fringes of the two municipalities of Serra Azul

and Serrana. The authors find that the community of Sepé Tiaraju has gradually used food provision (through sales of ecological/organic food produced by the community) to counterbalance the power asymmetries with the two municipalities to some extent, and to gain a claim to social acceptance. Besides providing a territorial frame to the WEF Nexus, the paper also points to the centrality of land in understanding the politics of producing, accessing and consuming WEF Nexus resources by the "bottom billion" (Dodds and Bartram 2016) so to speak.

The three papers in this Special Issue capture a broad range of dimensions of the WEF Nexus ranging from a plurality of methodological approaches, scalar considerations as well as conceptual perspectives to contribute to the evolving debate on the WEF Nexus. The papers provide evidence of the challenges faced by communities, cities and academics when considering the WEF Nexus. Furthermore, the papers present case studies to show how a WEF Nexus perspective could help cities and communities to build resilience and pursue sustainability. Urbinatti et al. (2020) point to a need for addressing the governance aspects of the Nexus and its further conceptual enrichment as well as for understanding the "lived" aspects of the WEF Nexus especially as experienced by the vulnerable communities on our planet. The Sepé Tiaraju case highlights the likely slow and modest properties that may characterize urban resilience-building for vulnerable communities, while the Barcelona case showed how "proximity food" as a sustainability solution would gain more momentum from a Nexus-based understanding of ways in which food flows relate to physical and social connections to water and energy.

Notes

1. The preparation pickled summer foods for consumption over the winter months in Bulgaria. See https://www.urbantransformations.ox.ac.uk/blog/2018/zimnina-making-the-urban-nexus-of-food-water-and-energy-in-the-city-of-sofia/
2. See https://www.urbanet.info/zimnina-making-urban-nexus-sofia/

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