



Research article

Deliberations about a perfect storm – The meaning of justice for food energy water-nexus (FEW-Nexus)



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ABSTRACT

The current global developments have the potential to cause a ‘perfect storm’ at the core of the Anthropocene: the Food-Energy-Water-Nexus. To discuss the ethical consequences of these developments, i.e., insufficient access to the life sustaining nexus resources, the analysis is focused on Rawls’ theory of justice and its implementation in Germany with a special focus on the FEW nexus. Rawls stresses in his theory of justice the prominent meaning of institutions for a fair society to meet societal challenges and to meet the challenge of our time: a stable and just society.

Hence, the realization of his ideas in Germany is scrutinized and income tax and value added tax are interpreted in the sense of Douglas North and John Rawls as institutions and formal rules of society. This paper focuses on taxes as the most important institutional incentive to organize and structure the political, social and economic cooperation and analyses how these incentives affect selected German households (all households, singles, single man and woman, and couples) with respect to income and FEW expenditures.

The relevant income and usage data sample (Einkommens- und Verbrauchsstichprobe (EVS)) for Germany is used for the analysis of the distribution of income types, FEW expenditures and the revenues of income tax and value added tax, i.e., the main instruments to manage the challenges of the FEW nexus. Therefore two distribution measures have been used: the dispersion of income, taxes and FEW expenditures and their skewness. Five household groups were selected for this analysis: All households, all single households, the single women households, the single men households, as well as the households of couples. The EVS data sample allows the analysis of consequences of the current societal conditions on the various households and thus serves to provide a deeper understanding of the differences between singles and couples but also between single women and men.

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1. Introduction

1.1. Defining the perfect storm

Current global developments of the Anthropocene put increasing ecological, economic and social pressures especially on food, energy and water (i.e., the FEW nexus) resources (Karan et al., 2018). Today almost one billion people are undernourished, 0.9

billion do not have access to safe drinking water and 1.5 billion have no source of electricity (European Commission, 2012; Hoff, 2011; IEA, 2012). According to current calculations, by 2030 the human demand for water will exceed the foreseen availability of water resources by approximately 40% (European Commission, 2012; Federal Government of Germany, 2012). Demand for water is expected to grow by 30%–40% (World Economic Forum, 2011), for energy to grow by 40%–50% (US National Intelligence Council, and for food to grow by 35%–50% until 2030 (Food and Agriculture Organization (FAO), 2014). In combination, the impending threats can be summarized as a ‘perfect storm’ for the global economy (Beddington, 2009).

For the UK Government Office for Science John Beddington summarized the key questions for policy makers and scientists to

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avoid a FEW Nexus induced perfect storm for the global economy (Beddington, 2009):

- “Can 9 billion people be fed equitably, healthily and sustainably?”
- Can we cope with the future demands on water?
- Can we provide enough energy to supply the growing population coming out of poverty?
- Can we do all this whilst mitigating and adapting to climate change (Beddington, 2009)?”

These figures and challenges well exemplify the increasing pressures on the discussed nexus sectors (Schlör et al., 2018b) anchored in different, but interdependent, dynamics of global and regional change (Hoff, 2011). The dynamics encompass a broad spectrum of trends including “demographic changes, urbanisation, industrial development, agricultural modernisation, international and regional trade, markets and prices, technological advancements, diversification and changes of diets, and climate change as well as more context-specific drivers, like governance structures and processes, cultural and societal beliefs and behaviours (FAO, 2014).” If current trends continue, the pressures on natural resources (Krausmann et al., 2009) and ecosystem services will have far reaching consequences (Fang and Chen) and may “drive socio-ecological systems across critical thresholds, e.g., via land degradation, water scarcity or food-crises” (Hoff, 2011), and thus result in the generation of a perfect storm. These trends of a rising storm are already clearly visible as the following quotations indicate. What we see today is:

- The emergency relief coordinator for the United Nations warns of the worst famine since the world organization was founded in 1945. It puts an estimated 20 million lives immediately at risk, and while war exacerbates the disaster in places like South Sudan, Stephen O'Brien says the primary culprit is climate change. Drought and acidification of the oceans is at a crisis point. Drinking water is sparse, animals are dying, and populations are on the move, desperate to find food (Falk, 2017).
- Rising global temperature and increasing pressures on FEW resources (Alhanaee et al., 2017).
- The food situation for children in Africa is disastrous (Campbell, 2008). In countries like the Southern Sudan, Nigeria, Ethiopia, Somalia and Malawi millions of people are threatened by deadly hunger. This development is caused by climate change, war and armed conflicts as well as illnesses like HIV/AIDS and malaria.¹
- In spite of international aid efforts, in 2016, 108 million people starved worldwide – a dramatic increase compared to the number of 80 million people in 2015, according to a new report on food crises published recently by the World Food Programme. This increase makes clear: Conflicts, exploding food prices in local markets and extreme weather conditions such as drought and fluctuating precipitation as a result of El Niño make it extremely difficult for the people in affected countries to produce and buy sufficient food (UN World Food Programme).²
- “Economic inequality is widespread and to some extent inevitable. It is our belief, however, that if rising inequality is not properly monitored and addressed, it can lead to various sorts of political, economic, and social catastrophes (Alvaredo et al., 2017b).”

¹ <https://www.unicef.de/informieren/projekte/einsatzbereiche-110796/hunger-111210/hunger-in-afrika/135392>.

² <http://de.wfp.org/neuigkeiten/pressemitteilungen/108-millionen-menschen-hungern-extrem-%E2%80%93-situation-verschlechtert-sich-weiter>.

- “In every region, ..., biodiversity and nature's capacity to contribute to people are being degraded, reduced and lost due to a number of common pressures – habitat stress; over-exploitation and unsustainable use of natural resources; air, land and water pollution; increasing numbers and impact of invasive alien species and climate change, among others.³” This has been confirmed also, e.g., for the insect population in Germany (Vogel, 2017).

These examples show the failure of local and national institutions and of the international community to combat both global and local challenges (Wutich et al., 2012) and to manage the FEW nexus (Scanlon et al., 2017). Unfortunately, the ecological consequences (Kibler et al., 2018) disproportionately often affect poorer countries and areas with relatively high levels of malnutrition, food insecurity (Ringer et al., 2013) and failed institutions (Acemoglu and Robinson, 2012). Hence, systems solutions for the FEW systems are needed beyond the traditional engineering (Wolfe et al., 2016).

Because institutions – the formal and informal rules of society – play a crucial role in avoiding the perfect storm, in the following we will discuss ethical requirements, which could serve as a just fundament for institutions to propose an equitable provision of food, energy and water resources (Schlör et al., 2018a).

1.2. Background

Gro Harlem Brundtland characterized the ethical dimension of the current global developments: “What is new to our generation is that we [...] have the knowledge and technical capacity – for the first time – to choose to leave, for prosperity, an inhabitable planet (Brundtland, 2002).” This perspective raises severe ethical questions: „We act as we do because we can get away with it: future generations do not vote; they have no political or financial power: they cannot challenge our decisions. But the results of the present profligacy are rapidly closing the options for future generations (World Commission on Environment and Development (WCED), 1987).” Fifteen years later, these developments had reached an extent that led Paul Crutzen to define the ‘Anthropocene’, i.e., a human-dominated, geological epoch with escalated effects of humans on the global environment (Crutzen, 2002).“ To mitigate negative effects, at the time he claimed that a “daunting task lies ahead for scientists and engineers to guide society towards environmentally sustainable management during the era of the Anthropocene (Crutzen, 2002).”

Anne Chin et al. revert to the idea of Crutzen summarizing that the “challenges of the Anthropocene require “intensified research along many fronts and in many sensitive and vulnerable environments (Chin et al., 2017).” Preiser et al. further emphasize the “need to develop ethics and ethical precepts of treating nature as a partner on the planet and treating fellow humans with dignity (Preiser et al., 2017).” This idea is taken up by Jeremy Schmidt who stressed both the necessity of social learning as important ethical practices (Schmidt, 2017b) and the meaning of institutions for coping with the challenges of the Anthropocene.

Based on the Anthropocene research Biermann et al. demand that “the notion of the Anthropocene needs to be scaled down in order to have societal and policy relevance (Biermann et al., 2016),” because in their view the idea of the Anthropocene is a useful concept, if “it is viewed from a cross-scalar perspective that takes into account developments at local, regional and global levels,

³ <https://www.ipbes.net/news/biodiversity-nature%E2%80%99s-contributions-continue-%C2%A0dangerous-decline-scientists-warn>.

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