In whose interests? Water risk mitigation strategies practiced by the fruit industry in South Africa's Western Cape

Lanari, N., Bek, D., Timms, J., & Simkin, L

Original citation & hyperlink:
Lanari, N, Bek, D, Timms, J & Simkin, L 2021, 'In whose interests? Water risk mitigation strategies practiced by the fruit industry in South Africa's Western Cape' Geoforum, vol. 126, pp. 105-114. https://doi.org/10.1016/j.geoforum.2021.07.025

DOI 10.1016/j.geoforum.2021.07.025
ISSN 0016-7185
ESSN 1872-9398

Publisher: Elsevier

In whose interests? Water risk mitigation strategies practiced by the fruit industry in South Africa's Western Cape

Keywords

Global Production Networks; Water Risks: Horticulture; Western Cape; Sustainability

Abstract

This paper investigates the strategies export-oriented agricultural firms use to mitigate water risks. By doing so, we respond to a gap in Global Production Network (GPN) scholarship, whereby the relationships between economic production and the natural environment have received insufficient attention. We build on GPN 2.0's formulation of environmental risk as a causal driver of firms' strategies, combining it with the concept of water stewardship. Empirical evidence is drawn from the export-oriented fruit industry in South Africa's Western Cape. We find that while current water risk mitigating strategies are successful in securing water for fruit producers, these also have negative impacts on the wider South African water governance regime by depoliticising water allocation. In post-apartheid South Africa, this is deeply problematic. Our findings emphasise the imperative for research to consider the wider socio-political and ecological context when evaluating firm strategies to mitigate water and other environmental risks in South Africa and beyond.

1 Introduction

This paper investigates the strategies export-oriented agricultural firms use to mitigate water risks. The agricultural sector consumes roughly 70% of global water resources (UNWWAP, 2016). Due to increased trade liberalisation and export orientation as a driver for economic development, nearly 30% of the world's direct water withdrawals end up embedded in agricultural commodities traded globally (Chen and Chen, 2013). Climate change, population growth, and increased competition over water have stakeholders within global production networks concerned about their future ability to produce and trade water-intensive commodities (UNWWAP, 2012; WEF, 2019; Zeng et al., 2019). Despite this dependence on water, conceptual and theoretical frameworks studying global value chains and production networks have largely overlooked the environmental dimension of economic globalisation.

South Africa's Western Cape, where the fruit industry depends on a constant supply of clean irrigation water to produce high-value crops for export, is an appropriate location to explore environmental risks through the prism of contemporary economic globalisation frameworks. The recent 2015-2018 drought highlighted how the Province faces challenges in providing water for different users due to its winter rainfall regime and climate change (Wolski, et al., 2017). These challenges are intensified by rapid population growth, urbanisation, severe socio-economic inequalities, and an imperative to ensure economic growth and job creation (Marais, 2011; Movik, 2009; Sinclair-Smith and Winter, 2018). Within this context, the fruit industry faces different water risks that it seeks to mitigate.

The aim of this paper is to identify the water risk mitigating strategies deployed by the fruit industry in South Africa and critically evaluate their impacts. To do so, we use Global Production Network (GPN) theory (Coe and Yeung, 2015; Henderson et al.,

2002), as it provides a robust framework that considers both the horizontal and vertical dynamics of globalised agricultural production. We combine GPN theory with the concept of water stewardship to address the specificities of water-related issues (Newborne and Dalton, 2016) (see Section 2). Section 3 then discusses our methodological approach, and Section 4 presents the empirical data. In Section 5 we draw our insights together and utilise narrative analysis (Roe, 1994, 1989) to discuss the implications of water-risk mitigating strategies for water governance in South Africa and GPN theory more broadly.

Our research demonstrates that fruit producers embedded in global production networks and value chains deploy a range of strategies to successfully mitigate various water risks and secure water for their productive activities. Importantly, however, we also show how these water risk mitigating strategies have broader negative impacts on South Africa's water governance regime by depoliticising water allocation. While our case study focuses on the South African context, this paper makes a broader contribution that emphasises how critical the politics of access to natural resources – here water – are for globalised production and trade. With the rising importance of sustainability, understood as including not only a strong environmental but also a strong social and thus ethical component, it is imperative for GPN theory to consider the environmental dimension more thoroughly, including the politics of access to natural resources.

2 Global Production Networks and Water

Despite 30-years of sustained research on global value chains and production networks, the natural environment has largely been absent from GPN analysis (Coe et al., 2008; Irarrázaval and Bustos-Gallardo, 2019). This is surprising in two ways: first, because lead firms increasingly impose sustainability requirements with clear

environmental components upon their suppliers (Bek et al., 2017a; De Marchi et al., 2013); second, because the very existence of many global production networks relies on the appropriation of natural resources (Baglioni and Campling, 2017). This latter point is salient considering the impact of climate change on the natural resource base and its links to processes of environmental governance (Franz et al., 2018). We build on GPN 2.0's formulation of environmental risks as causal drivers of firm strategies (Yeung and Coe, 2015) to place the environmental dimension centrally into the analysis of global production networks. By utilising concepts from the water governance literature, we develop a refined framework for understanding how the export-oriented fruit industry in South Africa's Western Cape mitigates water risks. Additionally, when discussing our results in Section 5, we draw on narrative analysis (Roe, 1994, 1989) to explain how narratives shape courses of action.

In their theorisation of GPN 2.0, Yeung and Coe (2015) conceive the competitive dynamics and risk environments of global production networks as causal drivers that shape the strategies economic actors adopt to (re)configure their global production networks. Here we focus on risk environments, which are categorised as economic risk, product risk, regulatory risk, labour risk, and environmental risk. While Coe and Yeung (2015) introduce an 'environmental risk' category, we find its conceptualisation as a one-off shock event, such as natural disasters (e.g. earthquakes, tsunamis), unsatisfactory in the context of water. The risks associated with water are considerably more nuanced and common place than those resulting from natural disasters.

For this reason, we turn to water governance literature, particularly the concept of water stewardship. Water stewardship was originally developed by non-governmental organisations (NGOs) in partnership with businesses (AWS, 2010; Morgan, 2018; WWF, 2013) and is now starting to feature in academic inquiry (Rudebeck, 2017; Sojamo, 2015; Vos, 2016). Water stewardship refers to the contributions firms make

towards water management and governance within their own operations as well as beyond their company 'fence line' (Hepworth and Orr, 2013). It is spurred on by water risks: companies face water risks when inadequate water security due to wider processes jeopardise their operations; simultaneously, companies generate water risk when their operations jeopardise the water security of the wider society (Hepworth, 2012). Therefore, water stewardship addresses the spectrum from water risk to water security.

We understand water security to be the 'availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies' (Grey and Sadoff, 2007, p. 548). The caveat 'acceptable' in the definition emphasises that water security may be understood differently by various actors and that, therefore, water security is a societal goal that needs to be negotiated among stakeholders (Pahl-Wostl, et al., 2016). Water risks, in contrast, describe the various ways water security for different actors may be impaired (see also Section 4). The water stewardship literature categorises water risks as physical, reputational, and regulatory/political (Baleta, 2015; Orr and Cartwright, 2010). This categorisation fits with the relational character of GPN and expresses how environmental risks can be underlying and act as a constant causal driver.

The World Wide Fund for Nature (WWF), as one of the key advocates of water stewardship, offers a five-step ladder to categorise such strategies (WWF, 2013). As Figure 1 illustrates, the first three steps of this ladder refer to processes taking place on the farm. In contrast, step four – collective action – refers to engagement with other (local) water stakeholders, while step five – influence governance – refers to a company's or sector's ability to influence formal governance processes and engage in policy dialogue. The bridge between the first three and the last two steps of this ladder,

according to WWF (2013), marks the transition from water management to water stewardship. The aim of water stewardship is to further the sustainable management and governance of water resources in the public interest through such collective action among private actors and between private and public stakeholders (WWF, 2013). Previous works have argued that this transition between water management and water stewardship has been plagued by a 'collective action chasm' (Morgan, 2018, p. 24), whereby companies struggle to engage meaningfully with other actors on water issues. We find an adapted version of this water stewardship ladder valuable to analyse the strategies the Western Cape fruit industry deploys to mitigate its water risks. Furthermore, we argue that our insights (see Section 5) strengthen the conceptual underpinnings of water stewardship.

[Figure 1 about here]

Finally, we draw on narrative analysis to frame the discussion of our findings. Narrative analysis, as developed by Roe (1994, 1989), is useful for cases characterised by polarisation, complexity, and uncertainty. The politics of access to water in South Africa, which emerged as a key concern from our findings, is certainly characterised by polarisation, complexity, and uncertainty (Movik, 2014). Narrative analysis allows us to identify the stories used by fruit producers and other stakeholders to navigate these politics of access and demonstrates how narratives are a force in themselves that shape policy outcomes. This innovative approach, combined with our primary data (see Section 3), makes an important contribution to GPN theory and its proponents' efforts to integrate a strong sustainability agenda.

3 Methodology

We follow an in-depth qualitative approach (Clarke and Braun, 2013) based on a multi-year engagement with the Western Cape's horticulture industry and associated global

value chains. This consists of a case-based approach (Yin, 2016) to provide detailed analysis of a specific context through 'thick description' (Geertz, 1973). We use data from a range of sources within the boundaries of our case, including semi-structured interviews, document analysis, and casual forms of observation. Using multiple sources of evidence allowed us to triangulate our findings, leading to more accurate conclusions (Maxwell, 2013).

We conducted 76 interviews semi-structured interviews (Clarke and Braun, 2013) in the Western Cape with fruit producers; industry associations; national and international market actors; NGOs; academics; and representatives from local, provincial, and national government in South Africa. The bulk of these were conducted over the course of 2017, a drought year in the Western Cape Province, through a purposive snowballing sampling strategy (Flick, 2002). Interviews were conducted in English, audio recorded, and transcribed *verbatim*. After each conversation, interview notes were reflected upon and annotated. All interviewees were anonymised and their confidentiality guaranteed in line with the ethical policies of our University.

This interview data was complemented by an analysis of South African water and agricultural policy as well as industry and NGO reports. Documents are invaluable to corroborate and verify information obtained from other sources, such as interviews. Documents are also important to identify relevant actors and institutions that can be approached for interviews or to collect more documents (Bowen, 2009; Yin, 2014).

Furthermore, we participated in relevant industry and NGO workshops, which allowed for casual forms of direct observation. Observational evidence is a way of providing additional information about the research topic and can range from highly formalised to relatively casual (Yin, 2014). Casual forms of direct observation are particularly useful during the collection of other evidence, e.g. during interviews or as here, during our participation in relevant workshops. During each workshop we took notes on the

proceedings and discussions between stakeholders, which we reflected upon afterwards. This complemented our field notes. All the collected data was stored on two password-protected external hard drives as well as a cloud-based server provided by our University (also password protected).

We subjected all of this data to a thematic analysis (Braun and Clarke, 2006). Thematic analysis is ‘a method for identifying, analysing and reporting patterns (themes) within data’ (Braun and Clarke, 2006, p. 79) and as such organises and describes the collected data in rich detail. We used the software tool NVivo 12 to organise and analyse both primary and secondary data. After producing the interview transcripts, we familiarised ourselves with the data through reading and re-reading, while noting initial ideas. Using a blend of inductive and deductive approaches – as recommended for case study protocol and practice (Yin, 2014) – we then coded interesting features of our data in a systematic manner across the entire data set (Braun and Clarke, 2006). Once the entire data set was coded, these codes were reviewed, some were merged, and others split. This was a key step to work towards identifying potential themes. Potential themes were then reviewed in relation to our coded extracts and the whole data set. From this we refined each theme to analyse and elaborate on the strategies Western Cape fruit producers deploy to mitigate water risks and ensure their water security. We verified the validity and reliability (Maxwell, 2013; Yin, 2016) of the results through triangulation between primary data, observations, field notes, secondary data, and discussions among our research team.

4 Water Risk Mitigating Strategies

The Western Cape fruit industry confronts a range of physical, reputational, and regulatory/political water risks, as shown in Table 1. Physical water risks refer to a shortage of water, too much water, or pollution of water emanating from poor

infrastructure or unserviced communities. Polluted water can turn into a downstream reputational water risk when stringent water quality standards from European lead firms are breached. Upstream reputational water risks refer to concerns about how surrounding communities perceive the fruit industry's water use and whether such a negative image leads to added regulation. Fruit producers already confront such regulatory/political water risks because the post-apartheid government elected in 1994 deprioritised the industry's access to water within legislation, resulting in a perceived loss of privilege on the part of a farming community dominated by white South Africans. Ultimately, the combination of these water risks may lead to the one dreaded outcome: insufficient availability of irrigation water of acceptable quality. Such a situation would fatally undermine the commercial viability of fruit producers. Producing export quality fruit, however, is good business, not just for the commercial farmers but also their workforce and the wider economy.

[Table 1 about here]

In the next section, we illustrate how the Western Cape fruit industry proactively mitigates physical, reputational, and regulatory/political water risks. We use an adapted version of the water stewardship ladder introduced in Section 2 to categorise the fruit industry's strategies into (1) on-farm strategies, (2) collaborative efforts, and (3) influencing government. We demonstrate how the different strategies are not necessarily sequential ladder steps but overlap and may be driven by different actors at different scales with the ultimate purpose of ensuring the industry's water security.

4.1 On-farm Strategies

On-farm strategies describe actions producers take within the farm-gate to mitigate water risks. They fall within the first three steps outlined within the water stewardship ladder (WWF, 2013). They manifest in two ways in the study area. Firstly, many fruit

producers aim to increase their irrigation efficiency by improving on-farm water usage. In GPN terms, we can understand this as a process of environmental upgrading (Achabou et al., 2017; Jeppesen and Hansen, 2004). Secondly, most producers try to diversify their irrigation water sources.

4.1.1 Do More with Less: Increasing Efficiency

By increasing efficiency, fruit producers reduce water loss that occurs during the transport of water from the reservoir to the plant, e.g. through leaks in pipes, or during water application to the plant, such as runoff or evaporation. When these water losses are reduced, less water needs to be transported and then applied to a plant. At the scale of the individual orchard, this can lead to considerable water savings, which producers can use to irrigate additional hectares. In this way, producers are effectively 'doing more with less', i.e. producing more fruit with less water per hectare. A producer explained this approach:

> The ideal is […] to maintain our tonnage of fruit per hectare or increase [it] with the same amount of water. Not to use more water, to get more [fruit] but to use the same or less by using specialised programmes or improving our […] irrigation systems. (Producer Interview)

Fruit producers increase on-farm irrigation efficiency to mitigate direct physical water risks, such as lack of rainfall, as experienced during the 2015-2018 drought. The area under production can be expanded with no additional water licence thereby mitigating regulatory/political water risks.

Producers achieve these improvements in irrigation efficiency via specialised technology. In the study area, they either use automated short-range micro-jets or drip irrigation, in conjunction with computerised soil moisture measurements (Producer Interview). While such high-tech irrigation systems are capital intensive, they lend themselves to tight control, monitoring, and constant (re)evaluation of water application

(Perry and Steduto, 2017). These technological features also enable fruit producers to mitigate reputational water risks.

Reputational water risks damage the image of a business or industry. During the recent 2015-2018 drought, when Cape Town almost ran out of water, agricultural water use came under intense scrutiny. Being able to show that water wastage is minimised by irrigating as efficiently as is technologically possible is important for mitigating these upstream reputational water risks (Dauvergne and Lister, 2012). The use of high-tech irrigation systems is also important to manage expectations and requirements in relation to export markets. For example, irrigation is critical for achieving the desired yield as well as appropriate fruit size and quality (Producer Interview). Furthermore, retailers and associated private governance mechanisms, such as Global G.A.P. increasingly require greater information about water usage on farms (Producer Interview). High-tech irrigation systems offer a simple mechanism for maintaining appropriate records which can be provided for sustainability certification audits (Thorlakson et al., 2018).

4.1.2 Diversifying Water Sources

Because of the inverse relation between winter rainfall patterns and summer production demands, Western Cape fruit producers rely on water sources other than direct rainfall to produce fruit commercially. Typically, they will depend on a combination of the following water sources: river water; groundwater; scheme water from local or regional reservoirs; or on-farm water storage (dams) to collect run-off or store allocated scheme water. If one water source fails, whether due to pollution, a lack of rainfall, or increased regulation, other options are available.

For example, in the study area, the main river used for irrigation runs through the village, past the Wastewater Treatment Plant (WWTP), and through informal

settlements. Therefore, it is easily polluted. In contrast, the local reservoir where irrigation scheme water is stored is located above all settlements and human activity. From the dam, closed pipes distribute water to individual farmers. Consequently, there is little risk of contamination at source and during transport (Producer Interview). In case of a WWTP spillage into the river, producers who have access to both scheme water and river water for irrigation can manage such pollution of the river by drawing on the scheme water until the pollution in the river is diluted.

We conducted fieldwork during 2017, a year of drought, and many respondents highlighted the value of multiple water sources. They termed boreholes as 'Plan B' or 'insurance policy' (Producer Interviews). Several producers sunk extra boreholes during this drought to make up for the failure of other water sources. While this ‘extra’ water enabled growers to continue their productive activities with less disruption from the drought (Exporter Interview), it was also largely illegal. One producer explained, for example, that ‘I drilled two [boreholes] last year that nobody knows of’. Even when boreholes have permits, this does not grant unlimited pumping, as water licences prescribe volumetric amounts per water source (DWS, 2016); thus equating pumping beyond the licenced volume to water theft (Government Interview).

Times of crisis, however, are not the only occasions when producers circumvent the law to ensure their water security. Producers view dams as an ideal solution to mitigate water risks. It allows them to collect run-off during winter and store it on their farm, which many view as a way to remove themselves from the hydro-political line of fire (Lanari et al., 2018). However, building a new dam is complicated by regulatory/political risks and involves transformation requirements[1] that some fruit producers are not willing to concede. As a result, and to manage these regulatory/political water risks,

[1] Transformation in South Africa refers to the post-apartheid policies and practices that aim at redressing historical inequalities by including those who were marginalised and excluded from benefits and rights in the past based on their race or gender.

some producers side-step the administrative and legal processes required to build on-farm dams. One government representative described how some producers 'built dams, which no one knows about'. And a producer explained how the transformation requirement has thus far stopped them from building an additional dam, but that there is potential to bypass this by expanding their existing dams little by little:

> It would be nice, at some stage, to expand the dams. Another thing they say is that […] every time you rehabilitate your dams they get slightly bigger, but no one notices, no one's really looking.

As this quote also shows, the public-sector capacity gap to enforce water legislation plays into producers' favour. There are simply not enough personnel to verify compliance of individual farmers. As a result, 'people have expanded beyond the sustainable yield of our area, illegally, but nobody is stopping them' (Producer Interview).

Fruit farming in the study area is lucrative and producers want to expand production. However, limited access to water is a constraint upon fruit producers' ability to further their participation in global markets. Many Western Cape fruit producers are white South Africans who are not given priority when considering new water allocations or permits for dams and boreholes. Regulatory/political risks thus compound the direct physical water risks producers' experience. At the same time, the public-sector capacity gap plays a conflicting dual role – one the one hand posing a regulatory/political water risk – but on the other enabling producers to circumvent the physical water risks without recourse.

4.2 Collaborative Efforts

Collaborative efforts describe the water risk mitigating strategies fruit producers undertake with other stakeholders beyond their farm gate. They fall into the 'collective action' category of the water stewardship ladder (fourth step). While we provide evidence to counter claims that a 'collective action chasm' is pervasive (Morgan, 2018,

p. 24), we also show that these collaborations might not necessarily produce the 'public-good outcome' advocated by water stewardship, i.e. the sustainable management of water resources in the public interest (WWF, 2013). Instead, their main purpose is to ensure the water security of the fruit industry.

4.2.1 Clearing Alien Invasive Plants (AIPs)[2]

AIPs are water-intensive, invasive species, whose seeds spread across properties, infesting land and waterways, resulting in dramatically reduced water budgets. The only way to reduce their spread is by repeatedly clearing infested areas (McConnachie et al., 2012). Many producers tackle AIPs on their own farms, but the scale of the problem and its arbitrary spread has also resulted in collaborative efforts. These include engagement with local and provincial government, NGOs, among farmers through private conservancies, and through water organisations, such as Water User Associations (WUAs) and the Breede Gouritz Catchment Management Agency (BGCMA).

In their most basic form, collaborative efforts happen locally and rather informally among farmers, e.g. by providing labour for clearing activities. Other collaborative efforts are more formalised and aim to access external funding to lighten the financial burden of clearing for producers. Because AIPs need to be cleared regularly, clearing activities are costly for individual producers. In the study area, farmers have organised themselves by creating formal conservation areas on unused farmland in partnership with external organisations such as WWF South Africa (WWF SA); the Table Mountain Fund (TMF); CapeNature; and LandCare, an arm of the provincial Department of Agriculture.

[2] In the 17th Century, non-indigenous plants were brought into South Africa by colonial settlers. Over the years, more than 8,750 species have been introduced, of which 161 are highly invasive, e.g., Hakea, Eucalyptus and Acacia. Once established, these species spread rapidly, causing disruption to local ecosystems as they outcompete indigenous vegetation (Bek et al., 2017b).

WWF is also an important facilitator of collaborative efforts around AIPs clearing, which has been supported with funding from UK retailer Marks & Spencer (M&S) (Dzikiti and Schachtschneider, 2015; Schachtschneider, 2016). M&S identified stone fruit production in the Western Cape as a water risk hotspot within its fruit supply chain and started a water stewardship exercise, facilitated by WWF. A key component of this exercise was to drive collective action around AIPs clearing, which received additional support from LandCare and CapeNature. In this instance, supply chain water risks prompted a lead firm to investigate the water situation at the production scale via an NGO, which sparked a water stewardship project that included investments in AIPs clearing.

The drive behind AIPs clearing is multi-faceted due to the range of different risks they pose. AIPs constitute a considerable fire risk, burning far hotter and quicker than native vegetation (Le Maitre, van Wilgen, Gelderblom, Bailey, Chapman, & Nel, 2002). They also pose a threat to the Western Cape's rich biodiversity, including the native *fynbos*, which is one reason collaborations with conservation bodies are successful. In the end, however, there is a clear water dimension to the clearing of AIPs. This is because AIPs are so water-intensive, clearing whole catchments 'means a lot more water ends up in your dam' (WUA Interview). This creates interesting dynamics for water governance, as fruit producers clear AIPs to free up water for other uses, e.g. to satisfy increasing urban demands. WWF SA (2016, p. 12) estimated the amount of water lost to AIPs nationally at 1.4 billion m^3/year, which could sustain 3.38 million households of four per year or an additional 120,000 hectares of cropland. Respondents in the study area, who feel acute pressure from urban water demands in the form of Cape Town, were aware of this as outlined by a representative of the local WUA:

> We don't know if Cape Town is coming to us and say we want some of your water. So, if we've got the money to clear rivers and stuff like that, there is more water that can go to Cape Town.

This shows how the clearing of AIPs mitigates not only direct physical water risk but also serves to manage competition over water arising from the growing urban centre of Cape Town – and the associated threat of increased regulation for agricultural water use. The prevailing narrative is that if producers clear AIPs, more water becomes available for other uses while existing allocations to farmers remain untouched and protected.

4.2.2 Dominating Local Water Governance Structures

In areas where export-oriented farming clusters, commercial agriculture dominates local water governance structures, including, in the study area, local WUAs and Irrigation Boards (IBs). At the level of WUAs and IBs, this means that farmers collaborate on water issues. While these local water organisations cannot, formally, make decisions about water allocation, they remain a key forum for decision-making processes around irrigation water and shared irrigation infrastructure. We can trace the formation of many of these local water organisations back to the country's apartheid legacy. White farmers not only received preferential access to land and water resources but also subsidies and soft loans to build local reservoirs and irrigation infrastructure (Steyn et al., 2019). It is around these projects that IBs were formed and they exclusively served white farmers' interests. After apartheid, the government introduced WUAs as a distinct innovation for local water management and governance, intending to include all concerned water stakeholders. Only some IBs have transformed to WUAs, and even then, little has changed in terms of existing patterns of access and control over water resources (Peters and Woodhouse, 2019).

The reason behind the refusal of some IBs in the study area to transform into a WUA lies in the different definition of the two forms of organisation. IBs serve a narrow scope of managing irrigation water, while WUAs have a much broader and inclusive conception. Due to the structural make-up of the Western Cape fruit industry,

producers are unlikely to fulfil these requirements, as deciphered by a representative of the South African Water Research Commission:

> So, the different users had to be represented [in WUAs] and the different races. And that's very often where Irrigation Boards had problems. If, let's say, 80% of the water is used for farming, then they say 'well, why should I have a board which has other interests, which then can make my life difficult?'

By remaining organised in an IBs, such producers can retain access and control over those water resources without having to cooperate with other water users.

These dynamics are linked to local irrigation infrastructure. Most communal water storage reservoirs in the Western Cape were built during apartheid when producers pooled finances. Shares of the water from the dam were conferred to producers based on their investment (Government Interview). Today, despite an extensive rewriting of water legislation, many of these allocations remain unchanged. This is because the new National Water Act of 1998 (NWA) made provisions to protect existing water allocations gained during apartheid with the 'Existing Lawful Uses' (ELU) mechanism (National Water Act, 1998).

4.2.3 Economic Justification Narratives

Different stakeholders within the study area have deployed, what we term, an Economic Justification Narrative to legitimize agricultural water use. We consider it a collaborative effort as this narrative is established in dialogue with other actors and often deployed by a series of stakeholders, including producers, government representatives, market actors, and NGOs. The Economic Justification Narrative identified here is used to legitimize agricultural water use in response to competition over water linked to reputational risks and regulatory/political water risks.

The Economic Justification Narrative intertwines the allocation of water to commercial agriculture with the sector's ability to provide employment. Unemployment is a key political concern in South Africa. The (official) national unemployment rate lies at 26.7%

(19.7% in the Western Cape) (BFAP, 2018). Irrigated agriculture, specifically horticulture, has been identified by the National Development Plan (NPC, 2012) as a key industry with employment creation potential because it is comparatively labour-intensive and creates further jobs through its considerable backwards and forwards linkages. The fruit industry has seized on this link between labour- and water-intensity to create the Economic Justification Narrative. The narrative is straightforward: 'If you cut the use of water, we will have lower production, we will have less food, less employment' (WUA Interview). It ties the question of fruit producers' livelihoods who 'without water […] can't produce' to the livelihoods of the workforce dependent on this employment, because otherwise 'what are these people going to do?' (Consultancy Interview). Especially in rural regions, the horticulture industry may be the only employer for low- or unskilled workers with few other alternatives for waged labour (Government Interview). The Economic Justification Narrative then becomes useful to veer the focus away from water use to job creation.

This shift in focus allows the fruit industry to mitigate two different water risks – reputational risk and regulatory/political risk. Being the largest water user in the Province, irrigated agriculture is often the first sector to be scrutinised when water becomes scarce, resulting in upstream reputational water risks. Being able to project an overall positive image of the industry by focussing on its employment creation potential helps to mitigate this reputational water risk.

It is also useful to mitigate regulatory/political water risks expressed in the threat of water reform further restricting water allocations to agriculture or worse, removing existing ones. It finds its expression in statements like 'Cape Town is shooting itself in the foot' if they were to divert water from agriculture to urban needs, 'because of all the jobs' (WUA Interview). Deploying the Economic Justification Narrative is a strategic way of influencing policy discussions around water reform and allocation. For example,

during the recent 2015-2018 drought, the Economic Justification Narrative proved instrumental. Farmers, like other users, experienced heavy water restrictions and had to use drastic measures to reduce their water requirements and keep their fruit trees alive, including cutting down trees and reducing production. A farm that is producing less, will need less labour. One producer highlighted how it would be a disaster 'socio-economically […] if there is no crop because all the seasonal workers won't have a job and income' (Producer Interview). During a drought, reduced water allocation to commercial agriculture has 'knock-on effects on the community' (Government Interview), especially those in precarious employment, while also affecting the general performance of the sector (BFAP, 2018; WCG, 2017a, 2017b).

The Economic Justification Narrative is a powerful tool in the study area. We acknowledge that the impact of reduced water allocations for commercial agriculture and its workforce, either due to regulatory/political motivations or because of drought, would lead to the serious problems projected by our respondents. However, we caution against the projection of such a uniform discourse within a context of highly unequal access to natural resources (see Section 5).

4.3 Influencing Government

Within the Water Stewardship paradigm, the last step of the ladder refers to influencing water governance to describe engagement in the public water policy arena to mitigate water risks. We understand water governance as 'the ways societies organise themselves to make decisions and take action regarding water' (de Loë and Patterson 2017a: 76–77). This involves multiple actors, happens at a range of scales, and takes place through a variety of mechanisms, including regulation, market tools, incentives, and formal and informal networks (Castro 2007, Ingram 2011, Rogers and Hall 2003, Wiek and Larson 2012). As such, this understanding of water governance ackmolwegdes actors and networks beyond government and thus all the strategies

discussed so far influence water governance in some way. For this reason and to avoid conflating water governance and government, we refer to this last strategy as 'influencing government' to describe its impacts upon formal or public water governance processes. Ideally, this engagement should be aligned with public interests and accompanied by transparent and accountable processes in line with principles of good governance. As WWF (2013, p. 18) writes, '[s]tewardship is about guiding and supporting government policy, not supplanting it, and certainly not thwarting or undermining its implementation'.

As one of its key constituents, white commercial farmers enjoyed wide-ranging support from the apartheid government, who designed water legislation and regulation in such a way as to ensure producers' water security (Mackay, 2003). When South Africa transitioned to democracy in 1994, the new government became an unreliable partner in terms of water security (Steyn et al., 2019). While democracy meant losing considerable privileges around water, most notably the abolition of private and riparian water rights, it did not render commercial agriculture powerless or leave them without influence. This is due to one of the key features of commercial agriculture, namely the collective power that stems from its organised nature. There are several bodies that are part of the 'organised'-component of commercial agriculture in South Africa. As put by an industry representative, 'the industry has a long history of […] strong organisation and structures' and these organisational structures are being leveraged to influence water governance and mitigate regulatory/political water risks for commercial farmers in South Africa. The role of Agri SA and its provincial arm, Agri Wes-Kaap (WK) is particularly illustrative in this regard.

In 1999, the South African Agricultural Union (SAAU) rebranded itself as the colour-blind Agri SA (Bernstein, 2013). Today, Agri SA is a federation of agricultural industry organisations that conducts policy assistance and lobbying for commercial agriculture

(Agri SA, 2018a). While Agri SA and Agri WK constantly engage in agricultural concerns, including how they relate to water, here we exemplify specific strategies that have been deployed to mitigate regulatory/political water risks by selecting three distinct instances in the time since 1994.

The first instance refers to the elaboration of the NWA. Drafting of this piece of legislation was preceded by a two-year consultation process, including those with vested interests. As such, Agri SA (then SAAU) was a key actor at the table. They vehemently opposed the abolition of private and riparian water rights and the implementation of limited-duration water licences. There were concerns that these 'insecure' water licences could lead to a devaluation of farming properties, reduced investment in irrigation infrastructure, and lead to a covert expropriation of water rights without compensation (Backeberg, 1997). These fears proved to be exaggerated. The ELU-provision recognises water uses lawful under previous legislation as lawful under the NWA until such a time that they shall be converted into a water licence (National Water Act, 1998). Commercial farmers realised that their water rights might have been diluted from apartheid, but the new law still serves their interests (Muller, 2018). Agri SA, as the organised voice of commercial agriculture, is now one actor calling for the full implementation of the NWA.

Second, and as an example of Agri SA putting its weight behind the NWA, is a court-case from the late 2000s. The court-case pitched a commercial farming business, Groede Wellington Broede (Pty) Ltd, against the Department of Water and Environmental Affairs in 2012. The farm on the banks of the Berg River in the Western Cape had applied for the transfer of a water licence, which had been rejected by the Department based on the need for equity and redress in terms of the NWA, a decision upheld by the Water Tribunal. Agri SA got involved and brought the case to the South African Supreme Court of Appeal, disputing that the Department could refuse the

application for water transfers based on the need for equity, as equity could not be taken as the highest priority criteria based on Article 27 of the NWA (Möller and Opperman, 2011; Van Koppen and Schreiner, 2014). Agri SA won the case, in the process showing how the organisation has the resources to contest decisions, influence policies, and the ability to 'play the institutional game of water' (Förster et al., 2017, p. 530).

Third, the recent 2015-2018 drought in the Western Cape coupled with the perceived instability in water policy has spurred Agri SA to launch a specialised Water Desk (Agri SA, 2018b). The focus of the Water Desk is to make 'South Africa's Water Law Work' and it supports catchment area management through WUAs and CMAs. This is important because previous publications on water policy by DWS have proposed the abolition of WUAs as a level of water governance (DWS, 2014). Similarly, a recent Business Case publication by DWS proposes to establish a single Catchment Management Agency, instead of the legislated nine (DWS, 2017). In areas where commercial agriculture clusters, such as the fruit-producing areas in the Western Cape, producers exercise considerable power over water questions within these devolved institutions (see 4.2). The abolishment of WUAs and/or CMAs in the Western Cape could cause a considerable power loss. In addition, the Water Desk focuses on key questions of water allocation (validation and verification, compulsory licencing, and definition of ELU), which are political and historically charged questions. These questions are negotiated at the national level and are a key concern during the ongoing revisions of the NWA – and Agri SA is making sure they have a seat at the table.

Fourth, and related to the Water Desk, is how the support provided by AgriSA was leveraged during the recent 2015-2018 drought in the Western Cape. In 2015, early signs of drought were apparent. 2013 and 2014 had been wet years with copious amounts of rain but 2015 brought below-average rainfall. While they implemented

some restrictions, the Province and the National Government had previously delayed projects to augment the provincial water supply (Muller, 2017). With less rain, the reliance on stored water increased, both from the agricultural side and urban side. These early restrictions proved to be insufficient. In response, and because agriculture receives the least assurance of supply, the government aimed to restrict agricultural water use fully. And this is where Agri WK, Agri SA's provincial arm, intervened. A representative of the organisation retold it as follows:

> And then when [the drought] really started serious, they just wanted to cut our water off. And we said 'No, you can't cut our water off […] we've warned you, this is what you've got. We are prepared to look at a 10, 20, 30, or even 40% reduction. But you're not going to cut us off because you've done nothing to prepare'. Cape Town woke up too late to put in water restrictions. If we've done this in 2015 already, we would have been able to manage it much better than we were able now.

The main reason Agri WK intervened so strongly was that the proposed total restrictions came in the middle of the fruit season. Such a complete restriction would have damaged or even destroyed many fruit trees and hampered successful participation in the global fruit production network. Within this context, the Economic Justification Narrative, discussed in Section 4.2, was instrumental in preventing a complete water cut.

5 Discussion and Conclusion

This paper has identified and critically evaluated the water risk mitigation strategies deployed by export-oriented horticultural firms in South Africa's Western Cape. Our analytical approach combines the concepts of environmental risk, as proposed within GPN theory, and water stewardship. This approach places the environmental dimension centrally into GPN analysis and demonstrates that environmental risks in global value chains are not solely experienced as one-off shock events. Instead, we have shown that water risks exist as ongoing, underlying issues that act as causal

drivers for distinctive firm strategies which play out at different scales. Our contribution is furthered by locating our research within the agricultural sector, thereby responding to Vicol et al.'s (2019) call to apply and develop GPN 2.0 ideas within sectors beyond the manufacturing and service industries of East and Southeast Asia which provided the context for Coe and Yeung's (2015) initial formulation of GPN 2.0.

Our analysis also further enhances the notion of water stewardship. First, we demonstrate how the different strategies of stewardship should be viewed as overlapping strands rather than as progressive ladder steps. Furthermore, we argue that different strategies are often deployed simultaneously at different scales, by a range of firm and non-firm actors to ensure water security for the export-oriented fruit industry. Second, we challenge the idea that a 'collective action chasm' (Morgan, 2018, p. 24) exists in firms' water risk mitigating strategies. As shown in Section 4.2 and 4.3, collective action does exist in the Western Cape fruit industry. However, this does not necessarily result in 'public-good outcomes', i.e. the sustainable management of water resources in the public interest, as promoted within the water stewardship paradigm. Some forms of collective action like alien clearing might have secondary benefits for other actors, but that is not their primary goal. The strategies analysed here primarily serve fruit producers' interests. Our research highlights how fruit producers have the means to ensure their sectoral and individual water security due to power asymmetries which play out through politics (Förster et al., 2017).

Turning to the empirical outcomes, we have outlined the strategies used by the Western Cape fruit industry to mitigate water risks which manifest relationally for fruit producers. To analyse these, we find the tools of narrative analysis useful, which is suitable for cases characterised by polarisation, complexity, and uncertainty (Roe, 1989). Water risks for fruit producers result from the political economy of water in the post-apartheid Western Cape, and fruit producers' embeddedness in the commercial

there has been ample criticism and research into the effectiveness and equity of post-apartheid water governance and policy (e.g. Goldin, 2010; van Koppen and Schreiner, 2014), there is an ongoing struggle to articulate this into a narrative that translates into progressive policy and practice.

Our research adds to existing criticism of post-apartheid water governance, showing how the water risk mitigation strategies identified and analysed here impact negatively on other water stakeholders beyond the fruit industry. However, our innovative approach of combining GPN theory with concepts from water stewardship literature can create a more fully developed counternarrative to the current dominant story. This is because we explicitly consider how the commercial dynamics of export-agriculture interact with the South African water governance regime.

Our research also has relevance beyond South Africa. There is an ever-growing global imperative to ensure sustainable production, distribution, and consumption. Water, in particular, has become a high priority issue for globalised agricultural production (UN Global Compact, 2018; WEF, 2020). Our findings have shown how strategies focused on value chain actors alone can have wider negative impacts. Therefore, if national and corporate policies are to adjust to confront increasing water-related challenges as the climate crisis unfolds (Distefano and Kelly, 2017), it will be crucial to devise risk-mitigating strategies that are in greater harmony with the wider socio-political context.

Planning Commission (NPC), Pretoria. https://doi.org/ISBN: 978-0-621-41180-5

Orr, S., Cartwright, A., 2010. Water scarcity risks: Experience of the private sector, in: Martínez-Cortina, L., Garrido, A., López-Gunn, E. (Eds.), Re-Thinking Water and Food Security. CRC Press, Boca Raton, Florida, pp. 181–192.

Pahl-Wostl, C., Gupta, J., Bhaduri, A., 2016. Water security: a popular but contested concept, in: Pahl-Wostl, C., Bhaduri, A., Gupta, J. (Eds.), Handbook on Water Security. Edward Elgar Publishing, Cheltenham, Glos, pp. 1–16. https://doi.org/10.4337/9781782548010.00006

Perry, C., Steduto, P., 2017. Does improved irrigation technology save water? A review of the evidence. Food and Agriculture Organisation, Cairo. https://doi.org/10.13140/RG.2.2.35540.81280

Peters, R., Woodhouse, P., 2019. Reform and Regression: Discourses of Water Reallocation in Mpumalanga, South Africa. Water Altern. 12, 1–16.

Roe, E.M., 1994. Narrative Policy Analysis: Theory and Practice. Duke University Press, Durham and London.

Roe, E.M., 1989. Narrative Analysis for the Policy Analyst: A Case Study of the 1980-1982 Medfly Controversy in California. J. Policy Anal. Manag. 8, 251. https://doi.org/10.2307/3323382

Rogers, P., Hall, A.W., 2003. Effective Water Governance, Vol. 7. ed. Global Water Partnership, Stockholm. https://doi.org/10.1017/CBO9781107415324.004

Rudebeck, T., 2017. Corporations as Custodians of the Public Good? Exploring the Intersection of Corporate Water Stewardship and Global Water Governance. University of Cambridge, Unpublished PhD thesis. Cambridge.

Schachtschneider, K., 2016. Summary report: Breede Catchment Water Stewardship

Programme. WWF-SA, Cape Town.

Sinclair-Smith, K., Winter, K., 2018. Water demand management in Cape Town : Managing water security in a changing climate, in: Scott, D., New, M., Davies, H. (Eds.), Urban Development and Climate Change: Lessons from Cape Town. UCT Press, Cape Town.

Sojamo, S., 2015. Unlocking the “prisoner’s dilemma” of corporate water stewardship in South Africa-exploring corporate power and legitimacy of engagement in water management and governance. Sustain. 7, 6893–6918. https://doi.org/10.3390/su7066893

Steyn, M., Meissner, R., Nortje, K., Funke, N., Petersen, C., 2019. Water Security and South Africa, in: Meissner, R., Funke, N., Nortje, K., Steyn, M. (Eds.), Understanding Water Security at Local Government Level in South Africa. Palgrave Pivot, Cham, Switzerland, pp. 1–44.

Thorlakson, T., Hainmueller, J., Lambin, E.F., 2018. Improving environmental practices in agricultural supply chains: The role of company-led standards. Glob. Environ. Chang. 48, 32–42. https://doi.org/10.1016/j.gloenvcha.2017.10.006

UN Global Compact, 2018. The CEO Water Mandate [WWW Document]. URL https://bit.ly/MUiQFZ (accessed 11.10.18).

UNWWAP, 2016. The United Nations World Water Development Report 2016: Water and Jobs. UNESCO, Paris. https://doi.org/ISBN 978-92-3-100146-8

UNWWAP, 2012. The United Nations World Water Development Report 4: Managing Water under Uncertainty and Risk. UNESCO, Paris.

van Koppen, B., Schreiner, B., 2014. Priority General Authorisations in rights-based water use authorisation in South Africa. Water Policy 16, 59–77.

https://doi.org/10.2166/wp.2014.110

Van Koppen, B., Schreiner, B., 2014. Priority General Authorisations in rights-based water use authorisation in South Africa. Water Policy 16, 59–77. https://doi.org/10.2166/wp.2014.110

Vicol, M., Fold, N., Pritchard, B., Neilson, J., 2019. Global production networks, regional development trajectories and smallholder livelihoods in the Global South. J. Econ. Geogr. 19, 973–993. https://doi.org/10.1093/jeg/lby065

Vos, J., 2016. The Contradictions of Corporate Water Stewardship Certification, in: Global Governance/Politics, Climate Justice & Agrarian/Social Justice: Linkages and Challenges. The Hague, pp. 1–11.

WCG, 2017a. Economic Impact Assessment: Drought in the Western Cape, in: Agricultural Economic Services. Western Cape Government: Agriculture, Cape Town.

WCG, 2017b. Informing the Western Cape agricultural sector on the 2015-2017 drought. Western Cape Government: Agriculture, Cape Town.

WEF, 2020. The Global Risks Report 2020 15th Edition. World Economic Forum, Geneva.

WEF, 2019. The Global Risks Report 2019: 14th Edition. World Economic Forum, Geneva.

Wiek, A., Larson, K.L., 2012. Water, People, and Sustainability-A Systems Framework for Analyzing and Assessing Water Governance Regimes. Water Resour. Manag. 26, 3153–3171. https://doi.org/10.1007/s11269-012-0065-6

Wolski, P., Hewitson, B., Jack, C., 2017. Why Cape Town's drought was so hard to forecast [WWW Document]. Conversat. URL http://bit.ly/2BfOv3b (accessed

12.19.17).

WWF-SA, 2016. Water: Facts and Futures. WWF-SA, Cape Town.

WWF, 2013. Water stewardship: Perspectives on business risks and responses to water challenges. WWF, Gland.

Yeung, H.W.C., Coe, N.M., 2015. Toward a Dynamic Theory of Global Production Networks. Econ. Geogr. 91, 29–58. https://doi.org/10.1111/ecge.12063

Yin, R.K., 2016. Qualitative Research From Start to Finish, 2nd ed. The Guilford Press, New York.

Yin, R.K., 2014. Case Study Research: Design and Methods, 5th ed. Sage Publications, Inc., Thousand Oaks, California.

Zeng, H., Zhang, T., Zhou, Z., Zhao, Y., Chen, X., 2019. Water disclosure and firm risk: Empirical evidence from highly water-sensitive industries in China. Bus. Strateg. Environ. 2030, 17–38. https://doi.org/10.1002/bse.2347

Figure & Table Captions