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The Reconfiguration of Hydrosocial Territories in Rural Uzbekistan: Evidence from Samarkand Province

Madina Gazieva

School of Law and Government, Dublin City University, Dublin, Ireland; madina.gazieva2@mail.dcu.ie

ABSTRACT: In recent years, Uzbekistan has embarked on an expansive agricultural modernisation programme, cast under the banner of the 'Green Economy'. Within the agriculture sector, this has entailed an overhaul of the former cotton-centred production model in favour of high-value crops and vertically integrated clusters that are irrigated using the most up-to-date technologies. This paper argues that such a process entails 'hydrosocial re-territorialisation', which is characterised by a shift from horizontal, socially mediated surface-flow interdependencies to vertical and individualised groundwater access. Using the case of the pseudonymised village 'Dostlik' in Samarkand Province, the paper looks at local manifestations of Uzbekistan's current hydro-agrarian overhaul, arguing that hydrosocial re-territorialisation – by facilitating water grabbing – becomes the locus of agrarian change, experienced as 'slow violence' by rural residents. The effects are felt most acutely by scattered, informal homestead farmers who must continually dig deeper wells to irrigate their plots.

KEYWORDS: Political ecology of water, hydrosocial territories, slow violence, Green Economy, homestead farmers, Uzbekistan

INTRODUCTION

In recent years, Uzbekistan has embarked on an expansive agricultural modernisation programme. Cast under the banner of the 'Green Economy', the country has been feverishly transitioning from a state-dominated, cotton and wheat 'inward-oriented' system in favour of export-led growth through crop diversification and private foreign and domestic investment[1] in processing, vertical integration, and intensive production methods (Djanibekov et al., 2024). The country's hydro-agrarian landscape has morphed accordingly. Habitual furrow irrigation of cotton is increasingly ceding place to drip and sprinkler systems to increasingly irrigate horticulture, on farms owned increasingly by different sorts of owners – businesses and conglomerates from Tashkent and beyond, such as the UAE, Singapore, South Korea, Russia, and the United States. On-farm infrastructural upgrades include state-of-the-art pumping stations, sediment and storage basins, private tractors, and processing machinery. The associated signifiers, such as 'sprinkler', 'pumping station', and 'sediment basin', are now part of the received lexicon within Uzbekistan's agriculture sector; its aspirations are captured by the corresponding iconography, namely images with AI-generated 'green' landscapes that feature wind turbines and solar panels overlaid on lush hills that roll into a timeless misty horizon. One can find these images on government-sponsored websites or in PowerPoint presentations of flashy international forums. They are suggestive of an idealised, projected culmination of what is in reality a messy process of rural change, particularly for homestead farmers, who sit uneasily within this new agrarian vision.

The political fuel for these changes is a 'scarcity' discourse that scapegoats 'backward' elements in Uzbekistan's agriculture sector. It is rooted in fears of climate–change–induced unpredictability and

[1] Agricultural land in Uzbekistan remains the property of the state.

regional water diversions, with the latter exemplified by (among others) Tajikistan's upstream hydropower expansion or Afghanistan's planned Qosh-Tepa Canal (Daloz, 2023). Uzbekistan is currently labelled 'water stressed' by media and international organisations (UNECE, 2025). As declared by President Shavkat Mirziyoyev, mitigating these anxieties requires stricter administrative oversight and enforcing water charges. The prevailing logic is captured by his 2023 announcement that, "we need to instil the idea that water is not free" (*Gazeta,* 2023a). Soviet-inherited repertoires of communication are thus activated to instil a sense of urgency and harness popular consent; these include the designation of 2024 as the "Year of Transition to a Water Saving Regimen in Uzbekistan", or 2025 as the "Year of Environmental Protection and a 'Green Economy" (CACIP, 2025, *The Tashkent Times,* 2023). Accordingly, traditional farmers' 'irrational' water use and loss-incurring, outdated infrastructure have been identified as key targets of the agrarian overhaul under the 'Green Economy' (*Gazeta*, 2023b), addressed by foreign-aid-supported technological upgrading to 'rein in' these purported inefficiencies.

Uzbekistan's efforts to transform its agricultural sector have reignited questions about the fate of its rural dwellers, whose lives during the Soviet era and over the nearly 30 subsequent years were defined by a state-administered cotton system. With regard to water, the sweeping reforms overtaking Uzbekistan are bound to redefine distributional dynamics, particularly for the rural poor. Examples from across the world demonstrate that large-scale agricultural change reconfigures relations between humans and their environment (Swyngedouw, 2015), which are obscured amid the thicket of narratives, planning and economic and political imaginaries (Liao and Schmidt, 2023; Mehta et al., 2012). As currently observed in Uzbekistan, such large-scale change assumes the (authoritarian) neoliberalisation of society-nature relationships, which tends to, "steer water flows in the direction of supposedly more productive uses and users" (Zwarteveen and Boelens, 2014: 143).

To render visible the transformation of (dialectical) rural Uzbekistan's society-nature relationships, this article centres the concept of 'hydrosocial territories' from political ecology of water and critical geography studies. Pioneered by Boelens et al. (2016), 'hydrosocial territories' is employed to interrogate how Uzbekistan's ongoing agricultural modernisation is spatially and hydrosocially internalised at the local level, particularly by homestead farmers. As this article shows, for rural inhabitants, agricultural restructuring unfolds incrementally and slowly through water dispossession, accompanied by ambivalent attitudes toward increasing water and livelihood precarity. By tracing the production of a new hydrosocial territoriality as a function of *de*-territorialisation and *re*-territorialisation, it is argued that Uzbekistan's hydro-authoritarian, agro-modernising venture engenders a gradual shift from *horizontal* water access relations to *vertical* ones (Elden, 2005; Swyngedouw, 2004). This is materially reflected by the gradual de-linking of surface-flow interdependencies that were rooted in Uzbekistan's former political economy of cotton production, in favour of increased individualised reliance on receding, precarious groundwater resources. In its scholarly aim, the article takes its cue from existing critical scholarship on Central Asia's hydro-transformations (Eichholz et al., 2013; Kim and Hornidge, 2016; Oberkircher, 2011; Zinzani, 2018). It goes against the grain of mainstream, neo-institutionalist approaches that place undue blame for Uzbekistan's water governance inadequacies on 'informal institutions' and on incomplete adoption of the donor-imported Integrated Water Resources Management (IWRM) framework (Amirova et al., 2019; Djumaboev et al., 2017; Hamidov et al., 2020)

In what follows, the paper presents the conceptual underpinnings of the analysis in order to develop a framework that draws on 'hydrosocial territories', 'hydro-authoritarianism' and 'slow violence' (Boelens et al., 2016; Nixon, 2013; Spoor and Thiemann, 2025). The next section describes the research's ethnographic methodological approach. It then lays out the logic of the argument by elaborating on what is meant by 'horizontal modality of hydrosocial territorialisation'. It goes on to outline the contours of Uzbekistan's new political economy of agricultural production as rooted in export-led, diversified and technologically upgraded growth. The empirical sections focus on Samarkand's Jomboy district. They detail the mechanics that reconfigure hydrosocial territories, based on the experience of a village that is pseudonymised as 'Dostlik'.

THEORETICAL PERSPECTIVES ON HYDROSOCIAL RE-TERRITORIALISATION IN UZBEKISTAN

This section outlines the conceptual pillars underpinning the article's central argument that the hydrosocial transformation in Uzbekistan is represented by a localised, territorial shift from horizontal and visible surface water interdependencies, to vertical, subterranean configurations mediated by technology. This verticalisation of hydrosocial relations is examined through three interlinked conceptual lenses: hydrosocial territory, hydro-authoritarian water grabbing, and slow violence.

By conjuring the now-established concept of the hydrosocial cycle, scholars of political ecology of water imbue its more technical predecessor, the hydrological cycle, with social and political dimensions (Mollinga, 2014). Hydrosocial analysis begins with the premise that water and social power are dialectically related; thus, any effort to (re)direct the flow of water will act on social formation and "actively shape new geographies" (Linton and Budds, 2014: 174). Accordingly, in its spatio-geographic application the hydrosocial cycle is extended by the conceptual framework of hydrosocial territories, defined as, "socially, naturally and politically constituted spaces that are (re)created through the interactions amongst human practices, water flows, hydraulic technologies, biophysical elements, socio-economic structures and cultural-political institutions" (Boelens et al., 2016: 1).

In this rendition, the understanding of the word 'territory' in hydrosocial territories is an import from debates in critical geography studies (Hommes et al., 2018). This literature challenges conventional treatments of territory as fixed and contained, unfettered by globalisation's incursions. Territory, instead, emerges as a multi-scalar, networked, bounded-yet-porous space that is socially constructed and dynamic, and is shaped by information, capital flows, migration and technologies (Agnew, 1994; Elden, 2022; Painter, 2010). At the same time, it is politically structured and administered by the hegemony of the state and its actors, who mediate or temper the bearing of the constitutive elements of scales and networks on a territory. Inspired by Timothy Mitchell's suggestion that the state is an effect of social practices, Painter (2010: 1090) transposes this abstraction onto territory in order to render its definition concrete, demonstrating "territory-effect as the outcome of socio-technical practices". Following this premise, he cites Lussault in elaborating that, "it is the political valorisation of the spatial continuity and coherence of a delimited area that defines the specificity of territory vis-à-vis other types of space". To emphasise this spatial continuity as the internal characteristic of a territory, Lussault invokes the metaphor of the "territorial fabric" whose "tearing" could lead to "social fracture" (Painter, 2010: 1102). Territory, therefore, while networked, scalar and porous, contains within it a coherence that is vulnerable to fragmentation as a result of "socially unsettling" spatialised capitalism where the "exigencies of competition undercut the settled identities of job, skill, and place" (Wolin, in Agnew, 1994: 75).

It is precisely this fragmentation of territorialised, hydrosocial 'place' in rural Uzbekistan that this article is concerned with. Globalisation entails the reconfiguration of administered space in a dialectic tension between *de*-territorialisation and *re*-territorialisation (Elden, 2005; Swyngedouw, 2004). When subjected to hydrosocial analysis, the making of new territory "entails reconfiguring physical, social, and symbolic features to realize a certain socio-territorial imaginary", thus qualifying hydraulic projects as governmentality projects (Hommes et al., 2018: 152). Within an administered area, surface water flows can be said to serve as material linkages that lend coherence to a hydrosocial territory, akin to threads of the 'territorial fabric'. This hydrosocial fabric risks being torn by the process of political-economic transformation, as accumulation by dispossession takes the form of successive rounds of 'water grabbing' (Harvey, 2004; Mehta et al., 2012).

Commitments to increase water-intensive commodities shift control over water use away from national and local actors to international players who increasingly set the terms of water use at the expense of previous configurations (Vos and Hinojosa, 2016). In political contexts that qualify as hydro-authoritarian, which includes Uzbekistan, this neoliberal transformation can acquire a particularly forceful quality (Spoor and Thiemann, 2025). Hydro-authoritarian projects are centrally financed, hierarchical and coercive; they are unencumbered by the distractions and limitations posed by

"institutional and temporal limits on power" (Spoor and Thiemann, 2025: 279). The discursive legitimation of such projects is facilitated by states' "information monopolies 'that announce scarcities' for engineers to solve", through techno-fixes that realise new "nation-building and accumulation strategies conceived far away" (Spoor and Thiemann, 2025: 279). In Uzbekistan's case, the production of new hydrosocial territories-as-effect of the state's (neoliberal) agricultural modernisation strategy is articulated through modalities of hydro-authoritarian power. This is demonstrated in the subsequent sections.

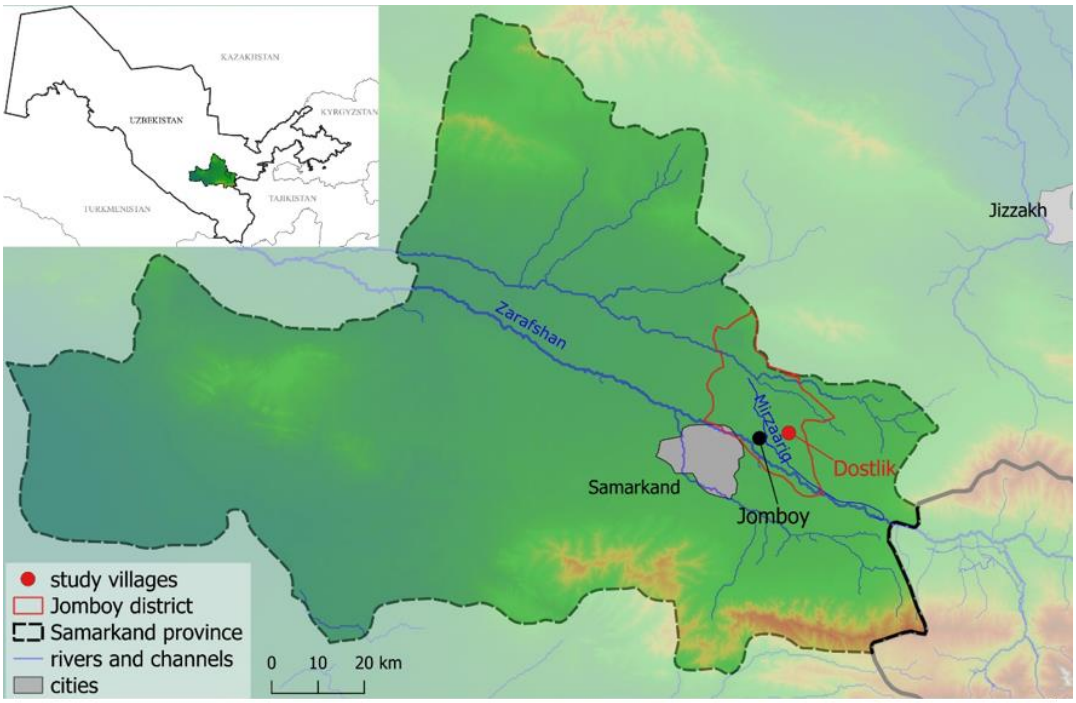
Nixon's 'slow violence' captures the incremental, time-bound and spatialised ways in which Uzbekistan's modernisation redefines hydrosocial territories and entrenches environmental injustice. He defines slow violence as, "violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all" (Nixon, 2013: 2). In contrast to the spectacular nature of calamities plaguing the news cycle, slow violence materialises through vertical power within institutionally driven processes that are mediated by the state (Ioris, 2012; Panez and Olea, 2023; Panitch, 1994). More poignantly, its effects are disproportionately felt by the most vulnerable or those without the means to escape it (Nixon, 2013). Because slow violence unfolds over time and is constituted by interactions among the political, social and material, an examination of the local hydrosocial cycle and territorialisation needs to be embedded in an historical account of the transformations that produce it.

METHODOLOGY

This study adopts a qualitative, ethnographically informed case study approach that is based on a small village herein pseudonymised as Dostlik, located in the Jomboy district of Samarkand Province. Since 2005, Samarkand has been subjected to conversions of land use from cotton to horticulture. The transition has accelerated in the last several years, following the launch of agricultural modernisation. The province has thus garnered significant attention in the scholarship on Uzbekistan's recent agrarian change, as it allows researchers to observe the effects of crop diversification and institutional change in real time (Amirova et al., 2019; Charyyeva and Herzfeld, 2024; Lombardozzi, 2020).

The core data for this paper was collected from May to September 2023, with a brief return visit in the summer of 2024. It consists of multiple day-long ethnographic visits to Dostlik, participant observation of irrigation practices, and semi-structured interviews with three private commercial farmers, six members of homestead farms, and two regional, state-employed water delivery staff from Jomboy's State Water Supply Service. During my visits, two young local employees from my host institution walked me through the village's canal network and explained how the canals are distributed between the houses and commercial farms. They also introduced me to their neighbours and family members, with whom I was able to engage in half- to one-hour discussions about land plot history, changes in water access and availability, household plot cropping practices, and impressions of agrobusiness farming around Dostlik. I asked questions that aimed to tease out how water distribution between various producer types – commercial farmers (*fermers*), homestead farmers, and agribusiness – was being reconfigured under agricultural modernisation.

Figure 1. Map of Samarkand Province



Source: Map produced by Atabek Umirbekov (2025)

Acquiring definite and cohesive information was difficult, especially in Dostlik. As a Tashkent-raised, Russian-speaking, yet Westernised Tajik with intimate knowledge of the national context, my identity does not sit comfortably in Uzbekistan's ethno-cultural categories. Very often I was suspected of being state-affiliated, tasked with collecting and reporting on locals' clandestine practices to the central government, which is notorious for its long-standing surveillance over its people. This prompted me to display my French passport and offer additional reassurances of my Western institutional affiliation. At the same time, my semi-local identity and thus my knowledge of customarily appropriate behaviour were conduits for tighter bonds with colleagues from my host institution, with whom I interacted extensively and learned from immensely.

The nature of my inquiry was also perceived as unusual. Locals struggled to take my questions about their potatoes, beans and chickens seriously, perceiving my informal, non-positivist approach as casual. Some anthropological nuance was unfortunately lost because I often relied on translation help from employees of my host institution. I was, for example, unable to probe the details of the relationships between various producers, as I sensed that it aroused discomfort among the interlocutors. Dostlik, with its population of only 2000 inhabitants constitutes a tightly knit community. My external position to it – which I was unable to overcome by securing an extended stay due to institutional and logistical constraints – prevented me from tracing the intricacies of 'social power'. Doing so would have been intrusive. As an alternative approach to clarifying the lines and hierarchies of social power, I use two strategies. First, I draw conceptually on the reconstitution of 'territory' as a proxy for social power; and second, I nest local observations within qualitative data from a range of sources and stakeholders. Because this fieldwork was conducted as part of my broader PhD research, the present article benefits from over 30 interviews and informal conversations with national and international water experts, international development staff, local officials, and representatives of agribusinesses and homestead

farmers operating in various parts of the country from Bukhara, to Qashqadaryo, to Ferghana. All of these have been used to piece together a coherent narrative.

THE COTTON PRIORITY AND HORIZONTAL WATER ACCESS

If the concept of hydrosocial territory encompasses the "interface of administrative, cultural, hydrological, and organisational layers" (Kumar and Saizen, 2023: 2) mediated by the state (Damonte and Boelens, 2019), then Uzbekistan's prioritisation of cotton prior to the 2016 (partial) marketisation can be conceived of as a modality of hydrosocial territorialisation underpinned by a rural accumulation strategy based on cotton monoculture. The subsequent sections sketch the contours of this modality by drawing on key studies of Uzbekistan's agrarian transformation.

Under the former President Islam Karimov, Uzbekistan's economic growth was predicated on a particular form of import subsititution industrialisation, also branded as the 'Uzbek model'. Through a monopsony system whereby the government purchased the bulk of farmers' output, it leased land to individual commercial farmers (*fermers*) for up to 50 years and required them to meet quotas on cotton for export and on wheat to ensure food security. Cotton was bought at artificially low prices and sold internationally at market rates. The economic squeeze meant that *fermers* struggled to make a profit and pay a fair wage to labourers, which created significant pressures on them to achieve high yields (Galdini, 2021; Veldwisch and Spoor, 2008). *Hokims* (district governors), in turn, were directly responsible for the timely fulfilment of targets at the risk of losing their positions; they thus subjected *fermers* to a harsh system of punishment involving land confiscation and beatings. Most notoriously, cotton was harvested using the forced labour of pupils, teachers and civil servants, a practice that was abolished in 2020 (Muradov and Ilkhamov 2014; ILO, 2022).

Throughout the late 1990s and early 2000s, homestead farms were distributed to hedge against the economic collapse following the fall of the Soviet Union and to absorb the surplus labour supply after decollectivisation (Galdini, 2023). Rural households were entitled to lifetime inheritable possession of a small plot of land near their home called a *tomorqa*, and in some cases they could acquire an additional plot of land that was usually located further from the house. Plot sizes ranged to a maximum of 0.35 hectares (ha) for irrigated land, and to 0.5 ha for non-irrigated land, with significant variation across the country (Kandiyoti, 2003; Veldwisch and Bock, 2011). Under the aforementioned laws, a member of the household could also rent additional land from the government for up to 10 years; this was called a *dehkan* farm and was around 1 ha. This policy remains till today (Republic of Uzbekistan 2021). Homestead farming became crucial for rural social reproduction as well as national food production (livestock and horticulture), with the majority of households engaging in market exchange by selling produce in local markets or informally exporting it to neighbouring countries (World Bank, 2012; Zorya et al., 2020).

Studies on the agricultural structure of Uzbekistan conducted prior to agricultural modernisation define the political economy of rural production as one of *bimodality* or symbiosis. *Fermers* relied on the labour of rural families with homestead plots, and the latter, in turn, negotiated with the *fermers* for land and surface water (Djanibekov and Assche, 2013; Veldwisch and Bock, 2011). These relationships have been categorised as "gatekeeping" or "paternalism" (Djanibekov and Assche, 2013; Kandiyoti, 2003; Veldwisch, 2008). As put by Veldwisch and Bock (2011: 595), "the *fermers* who appear as patrons in their relations to [homestead farmers] are themselves involved in relationships of dominance and dependency, as their access to resources has also been secured through personal relationships".

Formally, water access relations were guided by donor-endorsed principles of Integrated Water Resources Management, in which Water User Associations (or WUAs, legally known in Uzbekistan as Water Consumer Associations, or WCAs) were established along a mix of hydrographic and administrative borders (Zinzani, 2015). WCAs were to serve as the grassroots democratic platform for local water distribution (Kim and Hornidge, 2016). In reality, however, IWRM's utopian ambitions proved naïve as

Uzbekistan's farmers did not voluntarily organise into WCAs; instead, WCAs were mandated by the state. They were set up to fill the institutional gap left by the dissolution of collective farming, thereby facilitating irrigation for the repressive state order (Zinzani, 2015). Homestead farmers, seen as external to this system, remained unregistered. They occupied the 'informal' terrain, with their water needs seen as peripheral to core production for the state order; in this, however, there was significant variation across the country, depending on local norms and water availability. District water administrations were legally obliged to ensure a minimum flow in village canals; however, quantities were highly variable (Kim and Hornidge, 2016; Moss and Hamidov, 2016; Veldwisch, 2008).

WCAs were the basic territorial entry point that defined the boundaries of the relational entanglements between homestead farmers, *fermers,* the WCA leadership and the district government (Eichholz et al., 2013; Oberkircher, 2011). Interconnected by the 'threads' of canal flows that conferred internal coherence, WCA jurisdictions constituted distinct hydrosocial territories. Water was assigned to them on the basis of a centrally established 'limit' and was distributed among *fermers* upon the collection of irrigation service fees. Fee collection, however, was low, hampered by financial pressures placed upon *fermers* and by *hokims'* responsibility for achieving cotton quota fulfilment (Zinzani 2015: 177). Staff of district irrigation departments in Bukhara and Samarkand explained to me that a consistent flow of water of 0.450 litres/second for household plots was an explicitly stated requirement. In practice, however, homestead farmers' water access was dependent on the irrigation cycles of large farms; this was because water coursed through a canal network that stitched together the patchwork of cotton-wheat farms and households and followed the fluctuations of seasonal and annual availability. In the following passage from a July 2023 interview, a former rural inhabitant from the Qashqadaryo Region describes the conflictual reality of this modality of hydrosocial territorialisation:

> This incident happened in 2006-07, my grandfather was a farmer who mainly grew cotton and wheat. I used to work on this farm after school. I mainly followed the big ditches to bring water to the fields. Irrigation works lasted for a week or 10 days.
>
> In the middle of July, if the cotton was not watered for the 3rd time, it would not give a good harvest. During irrigation, we slept very little, to be honest, we didn't sleep at all. My job was to follow the water from the canal 3 km away to the cotton field on my bicycle. Many people of the neighbourhood diverted the water coming for cotton to their kitchen gardens in the evening. If I saw such situations, I would close the water supply, if I could beat that person I did, if I could not, I would use a stick. If it was a woman, she would beg and ask me to give her water. They were not given water either, because if I agreed to give water, I got a stick from my uncles. I hate myself now when I remember those times. We used to fight with a lot of people during watering, people hated the farmers and looked at them with a bad eye. At that time, my grandfather was sitting near the cotton field. In the middle of the night, a man with a private garden near us opened the water and diverted it to his garden. My grandfather resisted, and those people beat my grandfather. After that, my grandfather went to the hospital and got sick. Not only the incidents that happened with us, but also other farmers were fighting with the residents. It was the third watering of cotton that was very worrying and difficult.

This vivid and unsettling account negates all temptation to romanticise the former hydrosocial order, exposing the lived 'fabric' of hydrosocial territories during Uzbekistan's state-run extractive cotton production. It reflects the social and paradoxical repercussions of enforced interdependence, where surface water's materiality both engendered conflict and sustained territorial cohesion. In spatial terms, such a configuration represents a *horizontalised* modality of hydrosocial territorialisation, that is, an enmeshment of households, *fermers* and state water institutions, woven by surface-flow irrigation as the dominant resource. As shown in subsequent sections, ongoing agricultural modernisation disrupts this configuration, increasingly replacing lateral relations with fragmented, subterranean, *verticalised*, and technologically mediated modalities of water access.

INSTITUTIONALISING NEW WATER GRABS, PRODUCING NEW HYDROSOCIAL TERRITORIES

This section outlines the mechanisms that displace the web of resource interdependencies described in the previous section. It looks at how Uzbekistan's diversified, export-led growth configures water governance around a new agricultural subject, the cluster or agribusiness, which now commands privileged access to surface water. The water diversions necessary to service this subject disrupt the dominant modality of hydrosocial territorialisation by deprioritising individual *fermers* – themselves hydrosocially bound to homestead farmers – in favour of capitalised and technologically endowed producers. As demonstrated in subsequent paragraphs, the new form of water grabbing is an institutionalised operation. It is incentivised by the continuities in Uzbekistan's hydro-authoritarian system of governance, which interact with the new dictate of wide irrigation technology adoption under value-added, export-led growth.

Under Uzbekistan's agricultural modernisation framework, the former state-cotton monopoly is being replaced by a 'cluster system',[2] that is, a vaguely applied policy approach to transforming independent cotton, cereal, and horticulture farms into horizontally and vertically integrated productive networks[3] (Babadjanov and Petrick, 2023). It is implemented via controversial land management transfers of, on average, much larger proportions, from local *fermers* to private foreign and local investors (Asfaw, 2021; Lombardozzi, 2023; Tsetereli, 2018). Clusters and intensive gardens now benefit from preferential state-managed channels for inputs and outputs, allowing them to "divert their surpluses into horizontal or vertical commercial activities, marking the advent of rural accumulation" separate from the state. This new mode stands in contrast to the unchanged status of the vulnerable, yet productive homestead sector (Lombardozzi, 2020). A testament to the prominence of the diversification mandate is the Uzbek government's plan to increase horticultural exports from US$1.2 billion to US$5 billion in the 2020-to-2030 period. Achieving this will require colossal increases in sector productivity, driven by large agricultural producers (Press Service of the Republic of Uzbekistan, 2021). As already remarked by Lombardozzi, it risks accelerating "expropriations, proletarianisations, and urbanizations", particularly as it implies the eventual replacement of small, dispersed and informal homestead farmers as a primary food producer group (Lombardozz, 2023: 13).

Amid these transformations, Uzbekistan's incentive structure for provincial and district hokims has not changed not in form, but in content. Instead of being required to fulfil quotas for cotton, hokims are now evaluated on the basis of their ability to promote "export, export and once again export" (Mirziyoyev in Dadabaev, 2019: 897). Failure to attract foreign investment and to develop agriculture constitutes a legitimate reason for a hokim's dismissal. They are now subject to a new accountability system under which, "enhancing the *efficiency* of every dollar of investment must become the primary objective for regional and sectoral leaders" (*Ferghana News,* 2025 emphasis added). The "efficiency of every dollar" was proclaimed by President Mirziyoyev himself following the demonstrative dismissal of a provincial hokim, reflecting the (ongoing) activation of a new form of governmentalisation of Uzbekistan's territories (Hommes et al., 2018). It is highly reminiscent of the rhetoric that accompanied the hydraulic mission of Spain's Restoration government, captured by the notorious slogan that, "not a single drop of water should reach the ocean without paying its obligatory tribute to the earth" (Swyngedouw, 2015: 51).

In Uzbekistan's agrarian vision, agricultural clusters (agroclusters), intensive gardens, and large producers are now the bastions of modernisation. To streamline water distribution to these new producers, water governance structures have been reformed accordingly. In 2019, after announcing that "Water Consumer Associations are ineffective", the Uzbek government dissolved 1500 formerly

[2] See Babadjanov and Petrick (2023) for a critique of the variability and inconsistency of cluster implementation in Uzbekistan, whose full interrogation is beyond the scope of this article.

[3] Efforts to diversify started as early as 2005, but have only picked up in pace in the last decade (Lombardozzi, 2023).

'independent' WCAs, and replaced them with 158 District Water Supply State Institutions (District Water Supply Service). The District Water Supply Service offices are located in former district irrigation departments under the country's 152 district *hokimyats*, each chaired by the district hokim himself (Irkakhodjaev, 2019; Republic of Uzbekistan, 2024; Republic of Uzbekistan, 2025; Sokolov, 2021). The new structures bear little resemblance to the former 'participatory' *fermer* associations; instead, they, "include the heads of district organisations of ministries and agencies authorized in the field of use and protection of water resources" (Republic of Uzbekistan, 2025, Article 16). Uzbekistan's new Water Code (2025) permits the self-association of *fermers*, dehkans, and homestead farmers into new, now-*actually* grassroots, WCAs whose representatives are entitled to membership in the District Water Supply Service. Whether this concession has borne fruit, however, remains to be seen (Republic of Uzbekistan, 2025). More importantly, these changes represent the consolidation of surface water governance centralisation, which was formerly diluted by attempts – however nominal – at 'participation' and 'democratisation' in the form of WCAs.

The water privilege of agribusinesses is additionally incentivised by their ability and requirement to invest in expensive water-efficient technologies to meet 'Green Economic' objectives. This is made explicit in the Water Code, which stipulates that, "water supply to areas where water-saving irrigation technologies have been implemented [are] a priority" (Republic of Uzbekistan, 2025, Article 52). As mentioned in the introductory paragraphs of this article, the crisis discourse around the urgency of water-saving and efficiency in Uzbekistan has reached an existential pitch, and the means of attaining wide technology adoption are no less feverish. In Uzbekistan's hydro-authoritarian, and now techno-fetishist logic of water provision, the promise of establishing an agribusiness with state-of-the art machines justifies dramatic diversions from canals supplying water to scarce areas. In May 2023, I spoke to an agrobusiness agronomist who ran an intensive 70-ha cherry garden sprawling across the expansive, and at-first-glance, vacant foothills of the Urgut mountains in Samarkand Province. As this interviewee put it,

> Before, this was a militarised zone, there was nothing here, until this land was given for exploitation by private businesses. The *intensivniy sad* [intensive orchard] was set up in 2018. There is a cluster nearby, which was set up in 2015. With the help of the district irrigation department, water was brought from the Old Anhor canal, piped 3.5 km and lifted by 40 meters.

This intensive garden grows dwarf and semi-dwarf varieties of cherries and is irrigated using smart technology with water drawn from the second of two filtration water basins. Their source, the Old Anhor canal, joins the Qashqadaryo River in the south to irrigate the lands of the eponymous region, among the most water-scarce in Uzbekistan. While the production of export goods irrigated with advanced technologies is commendable, indiscriminate diversions from tributaries of rivers in water-scarce regions risk neutralising water-saving efforts at downstream levels (Conrad, 2022). The Uzbek government's fixation on spearheading production for export may offset resource-saving efforts, actually "contributing to the exacerbation of the problem that they were ostensibly deployed to mitigate" (Galdini, 2021: 212).

The above demonstrates that, in both policy and practice, Uzbekistan's surface waters are reserved for and diverted to the producers most likely to contribute to export metrics and irrigation technology standards. As subsequent sections demonstrate, this leaves other producer types – namely individual *fermers,* and homestead farmers – to scramble for whatever residual or alternative water sources remain. Indeed, *fermers* as a producer group persist; however, they continue to carry out their activities under the constant threat of land confiscation and redistribution to a more efficient or productive agricultural entrepreneur. As later sections show, this reconfiguration of hydrosocial territories relegates *fermers* to a hydro-peripheral position, incentivising them to increasingly rely on unregulated groundwater abstraction.

THE AGRO-ENVIRONMENTAL CONTEXT OF JOMBOY DISTRICT

This section describes how Uzbekistan's agricultural modernisation translates into changes in Samarkand Province's Jomboy district, where the case study village of Dostlik is located. Jomboy district is located 5 km east of Samarkand city, near Bulungur, Toylaq, Akdarya, and Payarik districts, and borders Jizzakh Region to the North. A quarter of its 167,000 population is employed in agriculture. Agricultural land covers an area of 25,548 ha and produces mainly grains, livestock, and fruits and vegetables (Samarkand Regional Government, 2019). Samarkand Province initiated agricultural diversification in Jomboy district in 2005 (Lombardozzi, 2020), and, as reported by farmers, by 2015, cotton had lost its predominance as the area's main crop.

The majority of the water supplied to Jomboy comes from the Zeravshan River in the south of the district and from its distributaries, namely Mirzaariq and Bulung'ur. The northern part of Jomboy gets additional water from the Polvonariq canal, which flows from Jizzakh Province in the northeast (Ismatova, 2022). Zeravshan, translated from Persian as 'spreader of gold', is a transboundary river that originates in Tajikistan; it was formerly a tributary to the Amu Darya River when it emptied into the Aral Sea. As a result of historic irrigation expansion that began as early as the second millennium BCE and was drastically expanded during the Soviet era, the 877-kilometre-long Zeravshan now dissolves short of reaching Amu Darya, scattering across canals and ditches and into the Kyzyl-Kum Desert. Most of Zeravshan's resources service Uzbekistan's Jizzakh, Kashkadarya and Samarkand Regions, with the latter accounting for 2.8 cubic kilometres per year (km^3/a) of the river's 4.3 km^3/a inflow into the country (Hydrosolutions, 2023; Olsson et al., 2012; Rahmonov et al., 2017).

On Uzbekistan's side, the Zeravshan River is overburdened, overstretched and fragile. During the Soviet era, the basin was managed along hydrological boundaries, as the administrative boundaries of the constituent Soviet republics were coordinated by Moscow as one country. Independence created distributional challenges, particularly due to divergences in water needs; Tajikistan, for example, relied on water for electricity generation, while Uzbekistan required it for cotton irrigation (Olsson et al., 2012). With the change in Uzbekistan's leadership and the concomitant agricultural modernisation described above, the two countries saw a thawing of relations and embarked on joint hydropower projects on the Tajik side, which are currently under construction (CAREC, 2025). The effects of upstream electricity generation on water levels have not yet materialised, and Zeravshan's current water scarcity thus stems primarily from high demand and outdated infrastructure. Due to water shortages, 60% of the farmland in the Zeravshan Basin is irrigated by pumping from the Amu Darya River in the south. The Zeravshan River's flow regime is also altered by climate-induced glacier retreat, leading to higher winter and spring discharge and to substantially reduced summer flow when demand is highest (Hydrosolutions, 2023; Olsson et al., 2012).

Jomboy's development is thus entwined in a complex web of national and transnational hydraulic activities, where upgraded technologies are naturalised as indispensable to climate change adaptations and for meeting requirements for resource-sharing. Between 2016 and 2018, as part of the state development programme of Samarkand Province, Jomboy was subject to a 128% increase in government investments and loans targeted at technological upgrading of industrial enterprises. In the agriculture sector, the government is now committed to promoting intensive orchards and distributing more dehkan lands[4] for rent (Samarkand Regional Government, 2019). These exemplary intensive orchards grow dwarf and semi-dwarf varieties of walnut, apple, and cherry, among others, irrigated using state-subsidised drip and sprinkler systems fed by on-site artificial reservoirs (Kuvandikov, 2020; Republic of Uzbekistan, 2023).Water for the farms located within the borders of Jomboy's territories is supplied by the Jomboy District Water Supply Service, which is housed in the former District Irrigation Department. It manages withdrawals from the Zeravshan River and from parts of the Polvonariq and Mirzaariq canals. The District

[4] Resolution of the President of the Republic of Uzbekistan 10.09.2022 n. PP-373.

Supply Service employs *mirobs* (water masters) who are responsible for opening and closing sluices at every off-take on the canal network. They do so according to centralised water limits, hydromodule zones, and delivery contracts with *fermers* who cultivate land within the administrative territory. Correspondence with the District Water Supply employees revealed that Jomboy is now entitled to reduced water limits, as horticultural and other grain crops are less water-intensive than cotton production. While locals agree that horticulture uses less water, water demand still outstrips supply and must be met with pumping. As one water delivery expert in Samarkand Province lamented in a May 2023 interview,

> After removing cotton, which you can imagine drank a lot of water, Jomboy gets only slightly more than half of its required demand from canals and rivers (…) because the long-term water level of the Zeravshan river has fallen. For example, our local [Zeravshan] beach in Jomboy district [on a small groundwater lake near the river] used to be full of water, but since 6-7 years it has dried up without a single drop of water.

Fermers and homestead farmers alike admit that Jomboy's water availability is higher than in some nearby districts; there is a consensus, however, that scarcity is a threat. It stems from a combination of climate change and political-economic considerations (namely the water diversions described in previous sections), which are difficult to discern at the local level. The immediate causal chain that produces water scarcity in Jomboy is obscured by the grid of decisions and agreements made at upstream national and transboundary levels, at various scales, and in combinations of formal and informal power struggles (Wegerich, 2015).

HYDROSOCIAL TERRITORIES IN FLUX: THE CASE OF DOSTLIK

Earlier sections of this article demonstrate how agricultural modernisation engenders new rounds of water grabbing by privileging agribusinesses through path-dependent modes of governance. The following case study, based on Jomboy's pseudonymised village Dostlik, outlines how this elicits new hydrosocial territories where interdependencies between *fermers* and homestead farmers are materially and socially delinked. As this section argues, this is a function of: 1) water's commodification and relative scarcity, which 2) encourages groundwater (over-)abstraction, eventually eliminating horizontal, socially negotiated water access, to produce verticalisation. Because this process is gradual and transposes social contention onto the environment itself – namely (invisible) depleting groundwater – this section frames verticalisation in terms of 'slow violence' that is characterised by ecological precarity and the ambivalent sentiment it conjures among *fermers* and homestead farmers.

Until 2016, Dostlik was dominated by state-administered cotton production. The village is located upstream of one of Mirzaariq's wide distributary canals. It is immediately surrounded by 16 *fermer* lands of between 15 and 50 ha, where a variety of crops are grown including corn, wheat, onions, tomatoes and carrots. Based on accounts of the *fermers* and homestead farmers, Dostlik is no stranger to the spoils of Jomboy's sweeping modernisation. According to a May 2023 interview with a homestead farmer, its prime upstream location has attracted two new agroclusters and one intensive orchard, all of which range between 30-300 ha, and are owned by Uzbek entrepreneurs "from the city". The intensive orchard and one of the agroclusters benefit from surface water abundance owing to their location at the head of the canal flowing to Dostlik. The manager of the third agrocluster installed a new 150-metre artesian well to replace the too-shallow Soviet-era 100-metre one. As two *fermers* told me in May 2023 interviews, the land acquired by agrobusinesses was either sliced off from land owned by Dostlik's existing *fermers* or confiscated from what were now former *fermers* on the dubious grounds that the latter were "unproductive". Inhabitants explained that the agribusinesses are equipped with state-of-the-art irrigation technology, although one cluster struggles to keep it running.

Figure 2. Division of canals in Dostlik

Source: Author (2023).

In terms of Dostlik's surface water, *fermers* and homestead farmers continue to be bound by a tangled and complicated network of canals, narrow streams, and ditches running through and around the village. Broadly sketched, the secondary canal and its offshoots run parallel to, and around, the village, avoiding intersection with households in the middle. They supply water to the upstream intensive orchard, the agrocluster, and the majority of *fermer* lands. A minority of *fermer* lands are stationed behind the village and receive their water from two narrower, tertiary canals flowing along Dostlik's outer boundaries. These two canals, intended primarily for *fermer* lands, are also used by a row of homestead plots on the outskirts of Dostlik, in accordance with ad hoc informal agreements with *fermers*. This distribution is complicated by the existence of a depleting *rodnik* (natural spring), whose water joins the network of ditches flowing *through* the settlement. The rodnik is reserved exclusively for household needs and for irrigation of homestead plots on the basis of a separate long-standing verbal agreement among all Dostlik's nearly 2000 inhabitants. Nostalgically recalled by my key informant as once large and a site for recreational swimming for local children, it has now been reduced to a modest but scenic marsh at the entrance to the village. The mechanics of the natural spring's depletion and its re-territorialising outcomes are described in subsequent sections.

Water shortages, pricing enforcement, and expansion of unregulated pumping among fermers

Based on interviews with *fermers* from Dostlik, the proliferation of water pumping in the village coincides with both the decrease in state water allocations to Jomboy described above and the stricter enforcement of water delivery fee payments introduced by the reforms. During cotton cultivation, scarcity resulted from the sheer water needs of the crop; as reported by interviewees, its delivery was free under the WCAs due to the prioritisation of cotton in the state order. As in the illustrative (and unsettling) account from Qashqadaryo village (above), this water was shared with homestead farmers during irrigation cycles. Now, however, many farmers produce for private commercial entities, with only portions of their crops, such as wheat and corn, submitted to the state order. In effect, two of the three *fermers* interviewed expressed satisfaction with liberalisation from cotton; as one said in a May 2023

interview, "we can grow whatever we want now". Following diversification, however, guaranteed water inputs (in exchange for meeting state targets) were removed, water became commodified, and water entitlements were reduced. In Swyngedouw's (2004) and Elden's (2005) words, this change de-territorialises and re-territorialises hydrosocial relations at the scale of Dostlik by incentivising unregulated artesian water pumping. The gradual reorientation towards groundwater, mediated by the pursuit of fuel and pumping technology, materially de-links *fermers* from the surface-flow networks that once bound them to homestead farmers.

Groundwater withdrawal in Uzbekistan is formally regulated through licensing to *fermers* and agrobusinesses. Since 2017, boreholes (artesian wells) deeper than 25 metres that intend to withdraw more than 5 cubic metres per day (m^3/day), are required to be registered with the State Committee for Geology and Mineral Resources and receive a special water permit, which exempts most homestead farmers as their uses fall below the limit. Following an assessment by a drilling company affiliated with the above State Committee and an additional environmental evaluation by the State Committee for Ecology, a water permit is then issued to *fermers* and agrobusinesses indicating a maximum extraction limit. Knorr, Theesfeld, and Soliev's (2022) investigation into groundwater extraction in regions of Uzbekistan, including Samarkand, found that electricity emerges as a common proxy for groundwater regulation. This is because most *fermers* fail to see through the costly, bureaucratic maze of obtaining a drilling permit, instead opting to register with *hokimyats* (local government offices) and the state electricity supplier to secure energy for their motorised wells. Operation of the well is then subject to an electricity quota that is subsidised to varying degrees, which acts as an unintended regulatory mechanism for groundwater extraction (Knorr et al., 2022).

All three of the *fermers* interviewed in Dostlik confirmed using unregistered artesian wells. They operated the wells with gas engines, indicating that they were not connected to the electricity grid and were thus entirely unregulated. Odil's situation is a prime example. A *fermer* with a 35-ha farm where he grew wheat, barley, onions, potatoes, carrots and tomatoes, his land was at the head of a group of farms that received water from a canal that did not intersect the village. As Odil put it in a May 2023 interview, "The *mirob* [water delivery master] instructs on how many cubic meters of water I am entitled to, but this amount is insufficient. So I use six artesian wells to make up for the loss. But I plan to install water-saving technologies in the next year".

Odil's assurance that he intended to install irrigation technologies was unconvincing. It came as an afterthought, as if he was worried I would report him for violating the rules on groundwater extraction. Our fleeting interaction left a lingering awareness of the compliance that farmers operating on the margins of the Green Economy are expected to perform. Unfortunately, such performative conformity in Uzbekistan's water sector is far from novel. Hornidge et al. (2013) demonstrate that *fermers* deployed discursive practices to compensate for deviations from formal water management institutions, masking non-compliance behind verbal deference to the 'reified' IWRM framework, naturalised as an external standard regardless of local conditions. What has changed in present-day Uzbekistan is the *content* of that deference: where Hornidge et al.'s *fermers* invoked institutions, Odil invokes (Green Economy) technology, the new reified standard against which compliance must be performed.

Moreover, the neoliberal character of Uzbekistan's agricultural transformation, is increasingly at odds with established community norms around water sharing. For example, Otabek runs a 52-ha family farm behind the village, growing corn, wheat and vegetables. His canal follows the outer border of the village, passing along a row of homestead plots whose farmers he remains obliged to share water with: a holdover from the cotton years, even as the new payment system requires him to pay for it himself. Every summer, the strain of the irrigation season's water scarcity brought this obligation to a head. Five years before our conversation, Otabek's family installed an artesian well, restoring, at last, the much-valued, neighbourly peace. "Sharing water with villagers [homestead farmers] is very important", Otabek explained in a May 2023 interview as we sheltered from the sun under a walnut tree on the corner of his

farm. Now, roughly 70% of his water comes from a tertiary canal branching off Mirzaariq, and the rest from the well. As Otabek added:

> The wheat drinks three times a year. Once I pay, the *mirob* opens the water, and the villagers drink from it as well. I pay around 1 million soum into the bank to irrigate the wheat. There is water normally in the *ariq* [canal], but not enough for the whole field. Sometimes, there is no water in the canal at all, even if I pay. Then I have to use the artesian well. The District Supply Service has information about farms, and sometimes they call and tell the farmers how much to pay for the water. Sometimes, the District Supply Service does not have any water, then I use the artesian well.

The *fermers'* ability to successfully operate artesian wells also depends on their access to capital. Some of the homestead farmers disclosed to me that Otabek and Odil, who have been farming for over a decade, are wealthy; this is in contrast to the new *fermer,* Bekzod, a former schoolteacher, who "has to work very hard". Bekzod supports a family of seven that includes his wife, four daughters and his elderly father. To provide for his family and "make some money from farming", he rented 20 ha of land from local authorities downstream from the main canal and with unstable access to surface water. The summer we spoke, the cost of fuelling the artesian well's engine had exceeded his budget and he struggled to irrigate the land, resulting in an unprofitable tomato harvest. He also owns a 0.15-ha tomorqa on which he cultivates cucumbers; this provides a stable income, but also faces water issues, as shown below.

Dostlik *fermers'* coping strategy of operating unregulated wells is a collective attempt to balance water scarcity mitigation with the imperative of profitability within a precarious, hydro-authoritarian regulatory context. Aware that adopting water-efficient technologies is increasingly a condition for retaining their lands, *fermers* are locked into a catch-22: they must illegally pump water to generate the surplus needed to finance such technologies, yet these same violations expose them to the confiscation of their land. Otabek's observation that installing the artesian well "stopped the arguments" with homestead farmers also marks the onset of water-use individualisation in Dostlik. It illustrates the mechanics of the production of what Painter (2010) describes as 'territory-as-effect' of networked (hierarchical) political-economic transformations. The 'effect' is moreover depoliticising because the conflictual negotiation with homestead farmers is unevenly resolved through the technological and financial capacity to entirely bypass the problem of surface water sharing.

The re-territorialising effects of the race to the bottom

Aquifers supply stored water to natural springs in the form of groundwater discharge. Extraction of water from these springs captures this discharge and thereby depletes the aquifer. According to Gleeson (2016), "All groundwater and surface water systems are subject to a 'water budget', whereby an increase in extraction at one point leads to a corresponding decrease in water stored or water available somewhere else". Groundwater extraction first manifests as a drop in water levels in the spring near the extraction point; over the long term, however, extraction leads to a depletion of the discharge itself (ibid). Dostlik's rodnik has been subjected to this very fate. Homestead farmers date their awareness of its depletion to 2020/2021, when neighbours began having conversations around the decline of water levels in village ditches. This observation, and their increasing inability to irrigate their crops, prompted them to replace hand pumps used for drinking water with deeper motorised wells. Shahnoza is a retired woman whose homestead plot formerly relied on irrigation from the natural spring. As she disclosed in a May 2023 interview, "Two years ago we realised that there was no water in the *rodnik* because the farmers and villages around started building artesian wells. We also realised our hand pump had no water, so we had to dig deeper and install a motor".

Water access among homestead plots in Dostlik depends on their proximity to the natural spring or to canals that flow around the village to downstream farms. Scarcity, thus, manifests in two stages. The first stage has materialised over the last three years, when households whose plots are located next to a

surface water source began participating in water turns[5] of three to four households per day. The majority of these households draw water from the canals supplying to *fermer* lands and have historically benefited from abundance when *fermers* received their deliveries from the mirob for their cotton fields. Today, these flows are insufficient. I interviewed two male heads of households who were engaged in water turns. Both had two tube wells, one that was operated by a hand pump for domestic purposes and the other that was motorised. In a June 2023, conversation with one of them managing a tomorqa of 0.02 ha that was adjacent to a large farm, he described the practice,

> For the water turns, I arrange with the neighbours, or go directly to the *ariq* [ditch)]. It's not a regular system. Those who need water, go to the ariq or decide amongst themselves by calling each other; otherwise they go directly to the ariq. For 30 years we did not need to take water turns, but due to water shortages, this became necessary.

In the second stage, total dependence on surface water has long given way to a mixed reliance on surface flows and groundwater extraction. Among them is the family of Azizbek who, when asked about his occupation, proudly replied, "I am a *dehkan*".[6] His labour supports a household of five, including his wife and three sons. He explained that, while two of his sons work in a shop nearby, his tomorqa constitutes the largest single share of the household income. On his 0.12 ha plot, Azizbek grows a rotation of vegetables, such as beans and potatoes, which he sells at the local market. Until 2018/2019, the ditch from the natural spring met all his irrigation needs, but it now accounts for only a third; the rest comes from an 8-metre well with an electricity-powered motor that he shares with his neighbour. In the summer of 2023, the well stopped delivering water, prompting yet another adjustment: installing a 14 m pump. In a June 2023 interview, Azizbek lamented the inconvenience posed by the scarcity of surface water, saying that colder subterranean water hardens the soil and that electricity shortages mean that the pump's pressure is too weak to irrigate the plot comfortably.

For Bekzod, the struggling novice *fermer* mentioned above, water turns for his family's downstream tomorqa ceased in 2020. That was the last summer the village's canals were full. When the water saved from taking turns became insufficient, the family turned to their 8-metre hand-pumped household well to irrigate their plot. In a June 2023 interview, Bekzod explained that this well had stopped delivering water that summer, so he had arranged to dig another, this time 12 metres deep with an electric pump. This pressure to dig deeper and deeper wells is a source of anxiety for Bekzod and for many others whose household plots comprise a large share of their livelihoods. As an old homestead farmer and former Soviet-era collective farm brigadier added in a May 2022 interview, "Now there is no money or water in the village – every year we have to dig deeper, and there is less and less water in the canal".

At the discursive level, despite the anxiety-inducing groundwater table recession, the upsurge of environmental precarity does not appear to shock homestead farmers. They say, in a remarkably matter-of-fact tone, "I will dig deeper". This matter-of-factness is likely due to the gradual, manageable temporality of the violence, the *slowness* with which this new precarity has unfolded. While recognising that extensive pumping by surrounding farms has contributed to the depletion of the natural spring in the village, some inhabitants attribute water scarcity to climate change and, rather anachronistically, to water disputes with Tajikistan[7]; they make no reference to diversification, arrival of agrobusinesses, or enforcement of payments for water delivery for *fermers*. Older interviewees vividly remember the water abundance of Soviet-era, cotton-growing Dostlik, when borders and political tensions did not inhibit flows. For them, that memory contrasts so sharply with the present reality that the more recent

[5] Called *asvak*, this a practice that predates the Russian empire and is activated whenever scarcity arises (Abdullaev and Mollinga, 2010).

[6] He does not rent additional land, so 'dehkan', in this case, denotes homestead farmer.

[7] Refers to tensions resulting from the construction of the Rogun Dam by Tajikistan to meet its electricity needs. For more on this, see Filippo Menga's, *Power and Water in Central Asia,* 2018 (https://doi.org/10.4324/9781315559179).

depletions pale in comparison. This was the attitude of Shahnoza; when asked in a May 2023 interview about the changes in water availability in the last several years, she replied emphatically that, "Before independence, there were no issues with water in the village because it was the USSR and there were no borders with Tajikistan. After independence, there were problems because Tajikistan closed the water".

This is not unlike the attitude already observed in Khorezm in 2008 by Oberkircher (2011) when "Soviet times" were used as the point of comparison for subjective measures of water abundance. The feeling persists 15 years later, yet its emotive force is now felt in upstream Samarkand Province, historically considered more water-abundant than downstream Khorezm. It illustrates how water scarcity is slow-violently gaining new ground, encroaching into territories until now little burdened by conditions believed to be reserved for peri-desert localities (Wegerich, 2001).

A part of homestead farmers' ambivalence to changes happening around them stems from an appreciation of the newfound social stability afforded by individualised water access through pumping. Cultivation is rendered more peaceful than it had been in the past, when, as it was put in a May 2023 interview, they "used to kill each other over water". The cessation of conflict following hydrosocial de-territorialisation (Rodríguez-de-Francisco and Boelens, 2016), or the gradual tearing of the material, hydraulic threads that sprawled across the territory of the village, meshing *fermers* and homestead farmers, is indeed, a palpable relief. Yet, it comes at a new cost to the environment, and *re*-territorialised social relations of now groundwater access.

Driven by a turn to pumping technology, for homestead farmers, hydrosocial re-territorialisation micro-localises and fragments the spatiality of water access, contracting water relations to the scale of the individual plot. The transition from withdrawals from inflows to *fermers'* cotton fields to pump-sharing with neighbours, as in the case of Azizbek and his family, is one observable instance of this new spatiality. Another example of change involves collaborating with neighbours and kin in making projections around future groundwater access. During my follow-up visit to Shahnoza's household in 2024, for example, she informed me that her family is now looking to replace their 10-metre pump as it stopped delivering water. From her brother-in-law who lives across from their house, they learned that a 12-metre pump extracted water only in the winter and ran dry in the summer. The plan thus became to install a 15-metre pump because, as she had commented in a May 2023 interview, "everyone in the village uses pumps". Therefore, as inhabitants collectively embark on the age-old collective action problem of the hydraulic race to the bottom, they do so as a result of the 'territorial *effect*' of the political-economic transformation of contemporary agricultural production that redefines how Uzbekistan's hydrosocial relations are territorialised (Painter, 2010; Roberts and Emel, 1992). Like Dostlik's *fermers,* homestead farmers' reliance on groundwater as an agential response to this territory-effect constitutes a newfound, vertical relationship with water, mediated by technology, and narrower, fragmented spatialities of access to it.

CONCLUSION

In September 2025, in his speech for the 80th anniversary session of the United Nations General Assembly, President Shavkat Mirziyoyev sandwiched Uzbekistan's water woes between expressions of concern about the "acute challenges" posed by climate change, adding that,

> As of now, more than two billion people in the world do not have access to clean drinking water. We are planning to hold a World Forum on Water Saving in our country. The outcomes of this conference are expected to recognize the water crisis as a serious threat to sustainable development. We intend to adopt a special Road Map for the wide introduction of innovation technologies globally (Mirziyoyev, 2025).

These utterings ring remarkably hollow in light of the unforeseen, messy scramble for water unfolding in Uzbek villages such as Dostlik. They ring even more hollow considering that "the introduction of

innovation technologies", deployed in a hydro-authoritarian manner, is directly implicated in the production of this messiness.

By drawing on theoretical perspectives on territoriality and temporality, namely hydrosocial territories and slow violence, and combining them with hydro-authoritarianism, this article seeks to streamline the narrative on Uzbekistan's hydro-agrarian transformation. More specifically, it analyses how Uzbekistan's agrarian political-economic transformation is internalised at the local level and how it displaces existing hydrosocial orders, fragmenting them in the process. The main mechanisms driving this change are new rounds of water grabbing that 'effectuate' (produce) new territories. Previously, land in Uzbekistan could be confiscated and reallocated on the grounds that the state's cotton and wheat orders had not been met. Following agricultural modernisation – legitimised by water crisis narratives – the list of potential reasons for land confiscation has expanded. It now includes non-adoption of water-efficient technologies, low yields, or even interest in the land by a more-capitalised agro-entrepreneur, more fitting with the 'Green Economy's' favoured agricultural subject.

The conflict-ridden sociomaterial interdependence that characterised water-access relations between *fermers* and homestead farmers has gradually succumbed to 'modernisation'. This has taken the form of commodification through water payments, and adjustment of centralised water limits to accommodate a diverse and technologically upgraded production landscape. Although Uzbekistan's 'Green Economic' agricultural transformation is being achieved at the cost of groundwater – indeed, at the cost of the environment itself – it constitutes a relief for rural dwellers, however fleeting. The brevity of this respite, is precisely what is meant by slow violence: it is "a contest not only over space, or bodies, or labour, or resources, but also over time" (Nixon, 2013: 8).

Uzbekistan's struggles to contain groundwater over-extraction are common in state-centred governance contexts, nor are they limited to authoritarian countries of the Global South (Molle and Closas, 2020). This is in part due to the mechanics of (capitalist) globalisation exemplified in Uzbekistan by the Green Economic, techno-fetishist promise to achieve 'sustainable growth' superimposed onto a hydro-authoritarian system (Wanner, 2015). Technology, however, is not a fix. As Roberts and Emel poignantly concluded in 1992 on the basis of their observations of Texas's aquifer depletion,

> Technical and agronomic innovations include soil moisture monitoring, irrigation scheduling, skip-row planting, furrow diking, and surge valves. What is common to all these techniques is not that they save water, but that they increase profit margins. Most of them certainly increase water use efficiency (in crop produced per unit of water), but (…) total water use may not decline (Roberts and Emel, 1992: 266).

The historic 'gradual' pace of Uzbekistan's transformation, as reflected in just how recently its cotton production was reformed, allows us to trace these relationships with empirically valuable clarity. The observed shift from horizontal to vertical modalities of water access emerges as an analytically portable framework for operationalising hydrosocial re-territorialisation as a change in the very geometry of resource relations, and as this article proposes, being sensitive to *how* this happens is paramount.

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REFERENCES

Abdullaev, I. and Mollinga, P.P. 2010. The socio-technical aspects of water management: Emerging trends at grassroots level in Uzbekistan. *Water* 2: 85-100.

Agnew, J. 1994. The territorial trap: The geographical assumptions of international relations theory. *Review of International Political Economy* 1(1): 53-80.

Amirova, I.; Petrick, M. and Djanibekov, N. 2019. Long and short-term determinants of water user cooperation: Experimental evidence from Central Asia. *World Development* 113: 10-25.

Asfaw, E. 2021. State-led cotton deregulation in Uzbekistan: Reforms and effects. *Central Asian Journal of Water Research* 7(2): 121-137.

Babadjanov, J. and Petrick, M. 2023. Uzbekistan's cotton clusters in the context of the industrial policy debate. *Eurasian Geography and Economics* 66(3): 1-30.

Boelens, R.; Hoogesteger, J.; Swyngedouw, E.; Vos, J. and Wester, P. 2016. Hydrosocial territories: A political ecology perspective. *Water International* 41(1): 1-14.

CACIP (Central Asia Climate Information Portal). 2025. 2025 has been declared the Year of Environmental Protection and Green Economy in Uzbekistan: What changes are expected? www.centralasiaclimateportal.org/2025-has-been-declared-the-year-of-environmental-protection-and-green-economy-in-uzbekistan-what-changes-are-expected/ (accessed on 7 May 2026)

CAREC (Regional Environmental Centre for Central Asia). 2025. The French have shown interest in the construction of a hydroelectric power station on the Zarafshon River in Tajikistan, www.centralasiaclimateportal.org/the-french-have-shown-interest-in-the-construction-of-a-hydroelectric-power-station-on-the-zarafshon-river-in-tajikistan/ (accessed on 6 September 2025)

Charyyeva, S. and Herzfeld, T. 2024. The transition from cotton to horticulture in Uzbekistan: Effects on women's empowerment. Paper presented at the Allied Social Science Association (ASSA) 2024 Annual Meeting, San Antonio, Texas, USA, 5-7 January 2024.

Conrad, C. 2022. The scientific online tool 'Water Use Efficiency Monitor for Central Asia – WUEMoCA' for monitoring and optimizing national water use efficiency measures. Policy brief. GIZ.

Dadabaev, T. 2019. Developmental state and foreign policy in post-Karimov Uzbekistan. In Inoguchi, T. (Ed), *The SAGE Handbook of Asian Foreign Policy*, pp. 893-917. London: SAGE.

Daloz, A.S. 2023. Climate change: A growing threat for Central Asia. In Sabyrbekov, R.; Overland, I. and Vakulchuk, R. (Eds), *Climate change in Central Asia: Decarbonization, energy transition and climate policy*, SpringerBriefs in Climate Studies. Cham: Springer Nature.

Damonte, G. and Boelens, R. 2019. Hydrosocial territories, agro-export and water scarcity: Capitalist territorial transformations and water governance in Peru's coastal valleys. *Water International* 44(2): 206-223.

Djanibekov, N. and Assche, K.V. 2013. Revealing the role of agricultural contracts in rural livelihoods in Uzbekistan. In Kimhi, A. and Lerman, Z. (Eds), *Agricultural transition in Post-Soviet Europe and Central Asia after 25 years*, Studies on the Agricultural and Food Sector in Transition Economies. Halle (Saale): Leibniz Institute of Agricultural Development in Transition Economies (IAMO).

Djanibekov, N.; Herzfeld, T. and Petrick, M. 2024. Agriculture and rural development reforms. In Mirkasimov, B. and Pomfret, R. (Eds), *New Uzbekistan: The third renaissance*. Abingdon: Routledge.

Djumaboev, K.; Hamidov, A.; Anarbekov, O.; Gafurov, Z. and Tussupova, K. 2017. Impact of institutional change on irrigation management: A case study from Southern Uzbekistan. *Water* 9(6): 419.

Eichholz, M.; van Assche, K.; Oberkircher, L. and Hornidge, A.-K. 2013. Trading capitals? Bourdieu, land and water in rural Uzbekistan. *Journal of Environmental Planning and Management* 56(6): 868-892.

Elden, S. 2005. Missing the point: Globalization, deterritorialization and the space of the world. *Transactions of the Institute of British Geographers* 30(1): 8-19.

Elden, S. 2022. The state of territory under globalization: Empire and the politics of reterritorialization. In Brighenti, A. and Kärrholm, M. (Eds), *Territories, environments, politics*. London: Routledge.

Ferghana News. 2025. Mirziyoyev dismisses Syrdarya Region Governor over neglect in attracting investments, www.en.fergana.news/news/136242/ (accessed on 14 August 2025)

Galdini, F. 2021. The post-soviet space and Uzbekistan in the international division of labour: From transition to capital accumulation. PhD thesis, The University of Manchester, Manchester, United Kingdom.

Galdini, F. 2023. Rise of the surplus population? Land decollectivization, class stratification, and labor precarization in Uzbekistan. *International Labor and Working-Class History* 103: 1-15.

Gazeta.uz. 2023a. 'The idea that water is not free should be instilled' – President of the Republic of Uzbekistan, www.gazeta.uz/ru/2023/11/17/water/ (accessed on 4 March 2024)

Gazeta.uz. 2023b. Nearly $2 billion allocated to the water sector, but loss of water and the state of pumps only worsened, www.gazeta.uz/ru/2023/10/23/water/ (accessed on 4 March 2024)

Gleeson, T. 2016. Protecting springs from groundwater extraction: Is a 'drawdown trigger' a sensible strategy? Water Underground, www.blogs.agu.org/waterunderground/2016/06/15/protecting-springs-from-groundwater-extraction-is-a-drawdown-trigger-a-sensible-strategy-2/ (accessed on 4 March 2024)

Hamidov, A.; Kasymov, U.; Salokhiddinov, A. and Khamidov, M. 2020. How can intentionality and path dependence explain change in water-management institutions in Uzbekistan? *International Journal of the Commons* 14(1): 16-29.

Harvey, D. 2004. The 'new' imperialism: Accumulation by dispossession. *Socialist Register* 40: 63-87.

Hommes, L.; Boelens, R.; Duarte Abadía, B.; Hidalgo-Bastidas, J.P. and Hoogesteger, J. 2018. Reconfiguration of hydrosocial territories and struggles for water justice. In Boelens, R.; Perreault, T. and Vos, J. (Eds), *Water justice*, pp. 151-168. Cambridge: Cambridge University Press.

Hornidge, A.-K., Oberkircher, L. and Kudryavtseva, A. 2013. Boundary management and the discursive sphere: Negotiating 'realities' in Khorezm, Uzbekistan. *Geoforum* 45: 266–274.

Hydrosolutions. 2023. Balancing demand and sustainability: The water crisis in the Zarafshan River Basin. Hydrosolutions Ltd, www.hydrosolutions.ch/projects/balancing-demand-and-sustainability-the-water-crisis-in-the-zarafshan-river-basin (accessed on 9 June 2025)

ILO (International Labour Organisation). 2022. Uzbek cotton is free from systemic child labour and forced labour, www.ilo.org/resource/news/uzbek-cotton-free-systemic-child-labour-and-forced-labour (accessed on 7 May 2026)

Ioris, A.A.R. 2012. Applying the strategic-relational approach to urban political ecology: The water management problems of the Baixada Fluminense, Rio de Janeiro, Brazil. *Antipode* 44(1): 122-150.

Irkakhodjaev, A. 2019. Associations of water consumers are not effective – how to fix this. Norma.uz, www.norma.uz/novoe_v_zakonodatelstve/associacii_vodopolzovateley_neeffektivny_-_kak_eto_ispravit (accessed on 19 June 2023)

Ismatova, N.R. 2022. Natural geographical features of Jomboy district. *Journal of Geography and Natural Resources*: 34-38.

Kandiyoti, D. 2003. The cry for land: Agrarian reform, gender and land rights in Uzbekistan. *Journal of Agrarian Change* 3(1): 225-256.

Kim, E. and Hornidge, A.-K. 2016. IWRM in Uzbekistan: A global concept with local consequences. In Borchardt, D.; Bogardi, J.J. and Ibisch, R.B. (Eds), *Integrated water resources management: Concept, research and implementation*. Cham: Springer International.

Knorr, H.; Theesfeld, I. and Soliev, S. 2022. License to drill: Typology of groundwater use regulations in agriculture of Uzbekistan. *International Journal of Water Resources Development* 38(5): 815-835.

Kumar, T. and Saizen, I. 2023. Hydrosocial territories in transition: Implications of traditional agricultural and irrigation water management practices under the effects of social, institutional, and environmental changes in Ladakh, India. *Environmental Development* 47: 1-16.

Kuvandikov, O.K. 2020. Territorial features of horticultural development in agriculture of Samarkand Region. *Nature and Science* 18(10): 30-34.

Liao, Y.-K. and Schmidt, J.J. 2023. Hydrosocial geographies: Cycles, spaces and spheres of concern. *Progress in Environmental Geography* 2(4): 240-265.

Linton, J. and Budds, J. 2014. The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water. *Geoforum* 57: 170-180.

Lombardozzi, L. 2020. Patterns of accumulation and social differentiation through a slow-paced agrarian market transition in post-Soviet Uzbekistan. *Journal of Agrarian Change* 20(4): 637-658.

Lombardozzi, L. 2023. An historical analysis of state capitalism through structural transformation: The case of Uzbekistan. *Globalizations* 23(3): 470-490.

Mehta, L.; Veldwisch, G.J. and Franco, J. 2012. Introduction to the special issue: Water grabbing? Focus on the (re)appropriation of finite water resources. *Water Alternatives* 5(2): 193-207.

Mirziyoyev, S. 2025. Address by the President of the Republic of Uzbekistan Shavkat Mirziyoyev at the 80th session of the United Nations General Assembly. New York: Press Service of the President of the Republic of Uzbekistan.

Molle, F. and Closas, A. 2020. Why is state-centered groundwater governance largely ineffective? A review. *Wiley Interdisciplinary Reviews: Water* 7(2): 17.

Mollinga, P.P. 2014. Canal irrigation and the hydrosocial cycle: The morphogenesis of contested water control in the Tungabhadra Left Bank Canal, South India. *Geoforum* 57: 192-204.

Moss, T. and Hamidov, A. 2016. Where water meets agriculture: The ambivalent role of water users associations. In Hüttl, R.F.; Bens, O.; Bismuth, C. and Hoechstetter, S. (Eds), *Society-water-technology: A critical appraisal of major water engineering projects*, pp. 149-169. Cham: Springer Open.

Muradov, B. and Ilkhamov, A. 2014. *Uzbekistan's cotton sector: Financial flows and distribution of resources*. Open Society Eurasia Program.

Nixon, R. 2013. *Slow violence and the environmentalism of the poor*. Cambridge, MA: Harvard University Press.

Oberkircher, L. 2011. On pumps and paradigms: Water scarcity and technology adoption in Uzbekistan. *Society & Natural Resources* 24(12): 1270-1285.

Olsson, O.; Wegerich, K. and Kabilov, F. 2012. Water quantity and quality in the Zerafshan River Basin: Only an upstream riparian problem? *International Journal of Water Resources Development* 28(3): 493-505.

Painter, J. 2010. Rethinking territory. *Antipode* 42(5): 1090-1118.

Panez, A. and Olea, J. 2023. Agribusiness moving through the Capitalocene: Slow violence and renewed strategies of capitalist agriculture in Chile. *The Journal of Peasant Studies* 51(5): 1-21.

Panitch, L. 1994. Globalisation and the state. *Socialist Register* 30: 60-93.

Press Service of the President of the Republic of Uzbekistan. 2021. A new system for the development of the horticulture sector will be implemented, www.president.uz/ru/lists/view/4779 (accessed on 31 March 2024)

Rahmonov, O.; Rahmonov, M.; Opała-Owczarek, M.; Owczarek, P.; Niedźwiedź, T. and Myga-Piątek, U. 2017. Ecological and cultural importance of juniper ecosystem in the area of Zeravshan valley (Tajikistan) on the background of environmental condition and anthropogenic hazards. *Geographia Polonica* 90(4): 441-461.

Republic of Uzbekistan. 2021. Law of the Republic of Uzbekistan on the dehkan farm, No. LRU-680. Tashkent: Ministry of Justice, www.lex.uz/en/docs/6906906 (accessed on 7 May 2026)

Republic of Uzbekistan. 2023. On urgent measures to increase the efficiency of water resources use, No. 107. Presidential Decree, www.fao.org/faolex/results/details/en/c/LEX-FAOC218518 (accessed on 31 March 2024)

Republic of Uzbekistan. 2024. On the measures to organize the activities of the 'Water Supply Service' state institutions. Cabinet of Ministers. Tashkent.

Republic of Uzbekistan. 2025. *Water code of the Republic of Uzbekistan*. Tashkent: Ministry of Justice.

Roberts, R.S. and Emel, J. 1992. Uneven development and the tragedy of the commons: Competing images for nature-society analysis. *Economic Geography* 68(3): 249-271.

Rodríguez-de-Francisco, J.C. and Boelens, R. 2016. PES hydrosocial territories: De-territorialization and re-patterning of water control arenas in the Andean highlands. *Water International* 41(1): 140-156.

Samarkand Regional Government, 2019. Jomboy district: Investment opportunities: Djambay district. Main Administration of Economy and Industry and Main Administration of Investment and Foreign Trade, Samarkand Regional Government. www.samarkand.uz/uploads/news_foto/2019/10/4.-Zomboj-t-257-MB.pdf (accessed on 29 March 2026)

Sokolov, V. 2021. *Uzbekistan's national strategy on water management and development of irrigation* 2021-2023. GWP (Global Water Partnership).

Spoor, M. and Thiemann, L. 2025. Hydro-authoritarianism: Mega-engineering the (semi-)arid regions of Central Eurasia and China. *Europe-Asia Studies* 77(2): 278-299.

Swyngedouw, E. 2004. Globalisation or 'glocalisation'? Networks, territories and rescaling. *Cambridge Review of International Affairs* 17(1): 25-48.

Swyngedouw, E. 2015. *Liquid power: Contested hydro-modernities in twentieth-century Spain*. Cambridge, MA: MIT Press.

The Tashkent Times. 2023. Shavkat Mirziyoyev declares 2024 as the year of transition to a water-saving regimen in Uzbekistan, www.tashkenttimes.uz/national/12133-shavkat-mirziyoyev-declare-2024-as-the-year-of-transition-to-water-saving-regimen-in-uzbekistan (accessed on 4 April 2026)

Tsetereli, M. 2018. *The economic modernization of Uzbekistan*. Silk Road Paper. Stockholm-Nacka: Central Asia-Caucasus Institute Silk Road Studies Program.

UNECE (United Nations Economic Commission for Europe). 2025. Uzbekistan advances water, health and industrial safety with UNECE support, www.unece.org/media/press/409881 (accessed on 7 May 2026)

Veldwisch, G.J. 2008. Cotton, rice and water: The transformation of agrarian relations, irrigation technology and water distribution in Khorezm, Uzbekistan. PhD thesis, Rheinische Friedrich-Wilhelms-Universität Bonn, Bonn, Germany.

Veldwisch, G.J. and Spoor, M. 2008. Contesting rural resources: Emerging 'forms' of agrarian production in Uzbekistan. *The Journal of Peasant Studies* 35(3): 424-451.

Veldwisch, G.J.A. and Bock, B.B. 2011. Dehkans, diversification and dependencies: Rural transformation in post-Soviet Uzbekistan. *Journal of Agrarian Change* 11(4): 581-597.

Vos, J. and Hinojosa, L. 2016. Virtual water trade and the contestation of hydrosocial territories. *Water International* 41(1): 37-53.

Wanner, T. 2015. The new 'passive revolution' of the green economy and growth discourse: Maintaining the 'sustainable development' of neoliberal capitalism. *New Political Economy* 20(1): 21-41.

Wegerich, K. 2001. Natural drought or human made water scarcity in Uzbekistan? *Central Asia and the Caucasus* 2(14): 154-162.

Wegerich, K. 2015. Shifting to hydrological/hydrographic boundaries: A comparative assessment of national policy implementation in the Zerafshan and Ferghana Valleys. *International Journal of Water Resources Development* 31(1): 88-105.

World Bank. 2012. *Uzbekistan strengthening the horticulture value chain*. Background Paper Series – Uzbekistan Vision 2030. Washington, DC: The World Bank.

Zinzani, A. 2015. *The logics of water policies in Central Asia: The IWRM implementation in Uzbekistan and Kazakhstan*. LIT Verlag, Zürich.

Zinzani, A. 2018. Development initiatives and transboundary water politics in the Talas waterscape (Kyrgyzstan-Kazakhstan). In Menga, F. and Swyngedouw, E. (Eds), *Water, technology and the nation-state*. London: Routledge.

Zorya, S.; Htenas, A.; Babaev, S.; Illina, D.; Nazarov, P.; Kurbanov, Z. and Tojiyev, A. 2020. Uzbekistan agrifood job diagnostic, Europe and Central Asian Region. World Bank Group, Washington, DC.

Zwarteveen, M. and Boelens, R. 2014. Defining, researching and struggling for water justice: Some conceptual building blocks for research and action. *Water International* 39(2): 143-158.